University of California
San Francisco

UCSF Real Estate

UCSF Box 0286
654 Minnesota Street, 2nd Floor
San Francisco, CA 94143

www.ucsf.edu

July 13, 2020

Project:	UCSF Comprehensive Parnassus Heights Plan
Location:	UCSF Parnassus Heights campus site
Block/Lot:	2634A/011 & 005; 1849/054; 1850/001; 1758/043; 1757/035; 1756/001; and 1275A/030
Sponsor:	University of California, San Francisco (UCSF)
Lead Agency:	The Regents of the University of California
Staff Contact:	Diane Wong, UCSF (415) 502-5952

This is the Draft Environmental Impact Report (Draft EIR – State Clearinghouse Number 2020010175) for the above-named project, prepared pursuant to the requirements of the California Environmental Quality Act (CEQA). The document is available at **https://www.ucsf.edu/cphp/community#eir** for a 60-day public review and comment period beginning **July 13 through September 11, 2020.**

Project Description

The University of California, San Francisco (UCSF) is proposing the Comprehensive Parnassus Heights Plan (CPHP, published October 2019 and revised June 2020), a conceptual, flexible plan to meet projected space needs for critical programs in research, patient care, and education at the UCSF Parnassus Heights campus site while improving upon the aesthetic and functional design of the campus environment; and includes opportunities for development of on-campus housing. The CPHP includes an "Initial Phase" that primarily comprises: 1) Irving Street Arrival improvements, 2) Research and Academic Building (RAB), 3) initial Aldea Housing Densification, and 4) New Hospital; as well as other Initial Phase improvements. This Initial Phase is anticipated to be completed by approximately year 2030. Beyond the Initial Phase, the "Future Phase" encompasses the remaining development described in the CPHP envisioned for completion by the horizon year of 2050. In total, the CPHP provides for development of approximately 2.9 million gross square feet (gsf) of new building space at Parnassus Heights. When accounting for existing campus site development; demolition that was approved under the UCSF 2014 Long Range Development Plan (LRDP) but yet not implemented; and potential additional building demolition that would occur under the CPHP, the total amount of campus space upon full implementation of the CPHP would be approximately 6.0 million gsf, including instruction, research, clinical, and support space; housing; and structured parking. The CPHP is available at **https://www.ucsf.edu/cphp**.

Because the CPHP proposes to modify the Parnassus Heights development plans identified in the 2014 LRDP, an amendment of the 2014 LRDP is proposed.

For purposes of the CEQA, the University of California is lead agency.

Anticipated Environmental Effects

The proposed CPHP is anticipated to result in potentially significant environmental effects relating to Aesthetics; Wind; Air Quality, Biological Resources, Cultural Resources and Tribal Cultural Resources; Geology and Soils; Greenhouse Gas Emissions; Hazards and Hazardous Materials; Noise and Vibration; Transportation; and

Cumulative Impacts. The project site is not located on any of the lists of sites enumerated under Section 65962.5 of the Government Code.

Public Review and Comment

As indicated above, the Draft EIR is available at https://www.ucsf.edu/cphp/community#eir for a 60-day public review and comment period beginning **July 13 through September 11, 2020.**

If you would like a paper copy of the Draft EIR, please call (415) 502-5952 and leave a message clearly stating your full name, mailing address, and contact information (email or phone number).

During the public comment period, the public may submit comments on the content and adequacy of the Draft EIR analysis. Comments may be submitted in writing and/or orally at the Draft EIR public hearing (see information below).

Submission of Written Comments

- Submission of written comments via email is encouraged. Please email comments to EIR@ucsf.edu.
- Should you wish to send written comments via regular mail, please mail your comment letter to Diane Wong, UCSF Real Estate - Campus Planning, 654 Minnesota Street, San Francisco, CA 94143-0286.

Please include your full name and address in written correspondence. All comments must be received no later than 5:00 PM on **September 11, 2020.**

Draft EIR Public Hearing

UCSF will hold a Draft EIR Public Hearing on August 26, 2020 beginning at 5:30 p.m. to receive oral comments on the adequacy of the information presented in the Draft EIR. Due to the COVID-19 pandemic, the Draft EIR Public Hearing will be conducted via Zoom. If you are interested in attending this meeting, please register at: http://tiny.ucsf.edu/CPHPDEIRHearing. After registering, you will receive a confirmation email containing information about joining the meeting.

Please note that all public comments made in writing or in oral testimony at the Draft EIR Public Hearing will be part of the public record. Comments received at the Public Hearing or in writing will be responded to in a Comments and Responses document to be prepared subsequent to the close of the comment period. The Comments and Responses document, together with the Draft EIR, will comprise the Final EIR which will be prepared for the University of California Board of Regents to consider for certification.

Thank you for your interest in this project.

Sincerely,

Diane C. Wong

Diane Wong, Environmental Coordinator
UCSF Real Estate - Campus Planning
654 Minnesota Street
San Francisco, CA 94143-0286
EIR@ucsf.edu
(415) 502-5952

DRAFT

JULY 2020

UCSF COMPREHENSIVE PARNASSUS HEIGHTS PLAN

Environmental Impact Report

State Clearinghouse Number 2020010175

DRAFT

JULY 2020

UCSF COMPREHENSIVE PARNASSUS HEIGHTS PLAN

Environmental Impact Report

State Clearinghouse Number 2020010175

Prepared for
University of California, San Francisco
Real Estate - Campus Planning
654 Minnesota Street
San Francisco, California 94143-0286

TABLE OF CONTENTS

UCSF Comprehensive Parnassus Heights Plan Environmental Impact Report

Page

Appendices

List of Figures

Page

List of Figures (continued)

Page

List of Figures (continued)

List of Tables

List of Tables (continued)

List of Tables (continued)

Page

List of Tables (continued)

LIST OF ABBREVIATIONS AND ACRONYMS

2014 LRDP	2014 Long Range Development Plan
ABAG	Association of Bay Area Governments
AB 32	California Global Warming Solutions Act
AB 52	California Assembly Bill 52
AB 341	California Assembly Bill 341
AB 939	California Integrated Waste Management Act of 1989
AB 1007	California Assembly Bill 1007
AB 1493	California Assembly Bill 1493
AB 1497	California Assembly Bill 1497
AB 1807	California Assembly Bill 1807
AB 1826	California Assembly Bill 1826
AB 1881	California Assembly Bill 1881
AB 2588	California Assembly Bill 2588
ACCDA	Alameda County Community Development Agency
AC Transit	Alameda-Contra Costa Transit District
ACUPCC	American College and University Presidents' Climate Commitment
ADA	federal Americans with Disabilities Act of 1990
AERMOD	American Meteorological Society/Environmental Protection Agency Regulatory Model
AFY	acre-feet per year
APEZ	Air Pollutant Exposure Zone
AQI	Air Quality Index
asl	above sea level
AST	Above Storage Tank
ATCM	Airborne Toxic Control Measure
AWSS	Auxiliary Water Supply System
BAAQMD	Bay Area Air Quality Management District
BACT	best available control technology

BART	San Francisco Bay Area Rapid Transit District
BMPs	best management practices
Btu	British thermal units
°C	degrees Celsius
CAA	federal Clean Air Act
CACS	Chancellor's Advisory Committee on Sustainability
CAFE	Corporate Average Fuel Economy
CalARP	California Accidental Release Prevention Program
CalEPA	California Environmental Protection Agency
CAL FIRE	California Department of Forestry and Fire Protection
CALGreen	California Green Building Standards Code
Cal OES	Governor's Office of Emergency Services
CalTrain	Peninsula Corridor Joint Powers Board
Caltrans	California Department of Transportation
CalRecycle	California Department of Resources Recycling and Recovery
CAP	Clean Air Plan
CAPCOA	California Air Pollution Control Officers Association
CARB	California Air Resources Board
CARE	Community Air Risk Evaluation
CAS	Climate Action Strategy
CBC	California Building Code
CCAR	California Climate Action Registry
CCR	California Code of Regulations
CCSF	City and County of San Francisco
CDE	California Department of Education
CDFW	California Department of Fish and Wildlife
CDHS	California Department of Health Services
CDPH-RHB	California Department of Public Health, Radiological Health Branch
CDMG	California Division of Mines and Geology
CEC	California Energy Commission
CEQA	California Environmental Quality Act
CERCLA	federal Comprehensive Environmental Response, Compensation and Liability Act of 1980
CESA	California Endangered Species Act

CFR	Code of Federal Regulations
CGP	Construction General Permit
CGS	California Geological Survey
CHP	California Highway Patrol
CH_4	methane
CNDDB	California Natural Diversity Database inventory of rare plants and animals
CNEL	Community Noise Equivalent Level
CNI	Carbon Neutrality Initiative
CNPS	California Native Plant Society
CNRA	California Natural Resources Agency
CO	carbon monoxide
CO_2	carbon dioxide
CO_2E	carbon dioxide equivalent
COPPS	Community Orientated Policing and Problem Solving
COVID-19	Coronavirus Disease 2019
CPHP	Comprehensive Parnassus Heights Plan
CPUC	California Public Utilities Commission
CRHR	California Register of Historical Resources
CSB	Clinical Sciences Building
CSC	California Species of Concern
CSS	combined sewer system
CTC	California Transportation Commission
CUP	Central Utility Plant
CUPAs	certified unified program agencies for hazardous materials programs
CWA	Federal Clean Water Act
cy	cubic yards
dB	decibel
dBA	A-weighted decibel
DNL	day-night noise level
DOE	U.S. Department of Energy
DOT	U.S. Department of Transportation
DPM	diesel particulate matter
DTSC	California Department of Toxic Substances Control

DWR	California Department of Water Resources
EC	UCSF Environmental Coordinator
EDD	California Employment Development Department
EDGs	emergency diesel generators
EH&S	UCSF Office of Environment, Health and Safety
EIA	U.S. Energy Information Administration
EIR	Environmental Impact Report
EO	Executive Order issued by California Governor or U.S. President
EV	electric vehicle
°F	degrees Fahrenheit
FAA	Federal Aviation Administration
FCAA	federal Clean Air Act
FEIR	Final Environmental Impact Report
FEMA	Federal Emergency Management Agency
FESA	Federal Endangered Species Act
FHWA	Federal Highway Administration
FIRM	Flood Insurance Rate Maps
FTA	Federal Transit Administration
FY	Fiscal Year
GGE	greenhouse gas equivalents
GGT	Golden Gate Transit
GI	green infrastructure
GHGRS	Greenhouse Gas Reduction Strategy
GHG	Greenhouse gas
gpm	gallons per minute
gsf	gross square feet
GSA	U.S. General Services Administration
GWh	gigawatt hours
GWP	global warming potential
HABS	Historic American Buildings Survey
HAER	Historic American Engineering Record
HAP	hazardous air pollutant
HCD	California Department of Housing and Community Development
HI	hazard index for hazardous or toxic air pollutant exposure

HIA	Health Impact Assessment
HMBP	hazardous materials business plan
HMTA	Hazardous Materials Transportation Act
HP	horsepower
HRA	health risk assessment for hazardous or toxic air pollutants
HRSGs	heat recovery steam generators
HSIR	Health Sciences Instruction and Research
HVAC	heating, ventilation and air conditioning
I-80	Interstate 80
I-280	Interstate 280
ICDC	Integrated Center for Design & Construction
ICU	intensive care unit
IEPR	Integrated Energy Policy Report
JFK	John F Kennedy
kV	kilovolt
kW	kilowatt
kWh	kilowatt-hours
L_{90}	noise level exceeded 90 percent of the time
L_{dn}	day-night noise level
L_{eq}	equivalent continuous sound level
L_{max}	maximum noise level
lb	pounds
LBP	lead-based paint
LCFS	Low Carbon Fuel Standard
LEED®	Leadership in Energy and Environmental Design
LID	Low Impact Development
LORS	Laws, Ordinances, Regulations, and Standards
LOS	level of service
LPPI	Langley Porter Psychiatric Institute
LRA	Local Responsibility Area
LRDP	Long Range Development Plan
LVW	loaded vehicle weight
MBTA	Federal Migratory Bird Treaty Act
MEI	maximally exposed individual

mgd	million gallons per day
MLD	most likely descendant
MMBTUs	million British Thermal Units
MMRP	Mitigation Monitoring and Reporting Program required by CEQA
MOU	Memorandum of Understanding
mph	miles per hour
MPO	Metropolitan Planning Organization
MRI	magnetic resonance imagery
MRZ	Mineral Resource Zone designated by the State Geologist
MS4	Municipal Separate Storm Sewer System
MSB	Medical Science Building
msl	mean sea level
MTC	Metropolitan Transportation Commission
$MTCO_2E$	metric tons of carbon dioxide equivalent
Muni	San Francisco Municipal Railway
MV	megavolt amperes
Mw	Maximum Moment Magnitude Earthquake
MW	megawatt
MWh	megawatt-hours
MWh/year	megawatt-hours per year
NAAQS	national ambient air quality standards
NAHC	California Native American Heritage Commission
NECPA	National Energy Conservation Policy Act
NESHAPs	National Emissions Standards for Hazardous Air Pollutants
NFIP	National Flood Insurance Program
ng/m^3	nanograms per cubic meter
NHPA	National Historic Preservation Act
NHPH	New Hospital at Parnassus Heights
NHTSA	National Highway Traffic Safety Administration
NO	nitric oxide
NO_2	nitrogen dioxide
NOA	CEQA Notice of Availability
NOP	CEQA Notice of Preparation
NOx	nitrogen oxide

N_2O	nitrous oxide
NPDES	National Pollutant Discharge Elimination System
NPC	Nonstructural Performance Category
NPF	North Point Wet Weather Facility
NPS	National Park Service
NRHP	National Register of Historic Places
NSR	New Source Review
NWIC	Northwest Information Center of the California Historical Resources Information System
OPR	Governor's Office of Planning and Research
OSFM	Office of the State Fire Marshal
OSHA	Occupation Safety and Health Administration
OSHPD	Office of Statewide Health Planning and Development
OSP	Oceanside Treatment Plant
PAs	participating agencies
PCBs	polychlorinated biphenyls
PDA	Priority Development Area identified by ABAG
PG&E	Pacific Gas and Electric Company
PHEVs	plug-in hybrid electric vehicles
PIs	Principal Investigators
PM	particulate matter
$PM_{2.5}$	particulate matter of 2.5 microns in diameter or less
PM_{10}	particulate matter of 10 microns in diameter or less
ppb	parts per billion
ppm	parts per million
PPV	peak particle velocity
PRC	California Public Resources Code
PSB	Parnassus Services Building
PV	photovoltaic
RAB	Research and Academic Building
RCRA	Resource Conservation and Recovery Act of 1976
RCNM	Roadway Construction Noise Model
REAP	Rain Event Action Plan
REL	reference exposure level
RHNA	Regional Housing Need Allocation developed by ABAG

ROG	reactive organic gases
RPS	Renewable Portfolio Standard established by the CEC
RSWG	Research Space Working Group
RWQCB	Regional Water Quality Control Board
RWS	SFPUC Regional Water System
RWSAP	Retail Water Storage Allocation Plan
SAAQS	State ambient air quality standards
SamTrans	San Mateo County Transit District
SARA	Superfund Act and Reauthorization Act of 1986
SB X-1-2	California Senate Bill X 1-2
SB 32	California Senate Bill 32
SB 100	California Senate Bill 100
SB 107	California Senate Bill 107
SB 197	California Senate Bill 197
SB 350	California Senate Bill 350
SB 375	California Senate Bill 375
SB 610	California Senate Bill 610
SB 743	California Senate Bill 743
SB 1078	California Senate Bill 1078
SB 1383	California Senate Bill 1383
SB 1953	California Senate Bill 1953
SCS	Sustainable Communities Strategy required by SB 375
SEL	Sound Exposure Level
SEP	Southeast Treatment Plant
SEP	UC Strategic Energy Plan
SF6	sulfur hexafluoride
SFBAAB	San Francisco Bay Area Air Basin
SF-CHAMP	San Francisco Chained Activity Modeling Process
SFCTA	San Francisco Transportation Authority
SF DOE	San Francisco Department of Environment
SFDPH	San Francisco Department of Public Health
SFFD	San Francisco Fire Department
SFIA	San Francisco International Airport
SFPUC	San Francisco Public Utilities Commission

SFPW	San Francisco Public Works
SFRPD	San Francisco Recreation and Park Department
SFUSD	San Francisco Unified School District
SGMA	Sustainable Groundwater Management Act of 2014
SIP	State Implementation Plan for federal Clean Air Act compliance
SLCPs	short-lived climate pollutants
SoMa	South of Market
SO_2	sulfur dioxide
SOV	single-occupant vehicle
SPC	Structural Performance Category
SPP	UC Sustainable Practices Policy
STC	sound transmission class
STG	steam turbine generator
STIP	State Transportation Improvement Program
SVP	Society of Vertebrate Paleontology
SWPPP	Stormwater Pollution Prevention Plan
SWRCB	State Water Resources Control Board
TACs	toxic air contaminants
TAZs	Transportation Analysis Zones
T-BACT	Best Available Control Technology for Toxics
TCR	The Climate Registry
TDM	Transportation Demand Management
TMDL	total maximum daily load for water quality standards
TMP	Transportation Management Plan
TOG	total organic gases
TPAs	Transit Priority Areas
TPY	tons per year
TRU	Transportation Refrigeration Units
TSCA	Toxic Substances Control Act
UC	University of California
UCMP	University of California Museum of Paleontology
UCOP	University of California Office of the President
UCPD	University of California, San Francisco Police Department
UCSF	University of California San Francisco

U.S. 101	U.S. Highway 101
USEPA	United States Environmental Protection Agency
USFWS	United States Fish and Wildlife Service
USGS	U.S. Geological Survey
USPS	US. Postal Service
USTs	Underground storage tanks
UWMP	Urban Water Management Plan
$\mu g/m^3$	micrograms per cubic meter
VdBs	vibration decibels
VMT	vehicle miles traveled
VOCs	volatile organic compounds
W/ft^2	power per square foot
WBERP	Whole Building Retrofit Program
WDRs	Waste Discharge Requirements
WGCEP	Working Group on California Earthquake Probabilities
WHO	World Health Organization
WPA	Works Progress Administration
WRCC	Western Regional Climate Center
WSA	Water Supply Assessment
WSE	Water Supply Evaluation
ZEV	zero emission vehicles

CHAPTER 1
Introduction

This Draft Environmental Impact Report (EIR) assesses the potentially significant environmental effects of implementation of the proposed University of California, San Francisco (UC San Francisco or UCSF) Comprehensive Parnassus Heights Plan (CPHP or Plan).[1]

The CPHP is a conceptual, flexible plan to meet projected space needs for critical programs in research, patient care, and education at the Parnassus Heights campus site while improving the functional and aesthetic design of the campus environment. The Plan also includes planning for development of much-needed on-campus housing. While the Plan guides physical development necessary to achieve the University's mission based on projected growth, it is not a commitment for growth or specific projects. It establishes a long-term development framework for the revitalization of the physical environment at the Parnassus Heights campus site, by identifying the following:

- Opportunity sites for new buildings and major renovations of existing buildings;
- Candidate buildings for demolition;
- Opportunities for development of open spaces; and
- Opportunities for improvements to on-campus mobility and circulation.

The CPHP includes an Initial Phase that primarily comprises: 1) Irving Street Arrival improvements, 2) Research and Academic Building (RAB), 3) New Hospital, and 4) initial Aldea Housing Densification; as well as certain other Initial Phase improvements. This phase is anticipated to be completed by approximately year 2030. Beyond the Initial Phase, the "Future Phase" encompasses the remaining development described in the CPHP envisioned for completion by the horizon year of 2050.

In total, the CPHP provides for development of approximately 2.90 million gross square feet (gsf) of new building space at Parnassus Heights. When accounting for existing campus site development (approximately 3.92 million gsf); demolition that was approved under the 2014 LRDP but not yet implemented (approximately 187,000 gsf); and potential additional building demolition that would occur under the CPHP (approximately 688,000 gsf), the total amount of campus building space upon full implementation of the CPHP would be approximately

1 The CPHP was published in October 2019. An Addendum to the CPHP dated June 2020 is now available that provides an update to the plan document, noting the changes to the plan that have resulted from the ongoing work to refine space needs, project parameters, and forecasts.

5.97 million gsf, including instruction, research, clinical, and support space; housing; and structured parking.

Because the CPHP proposes to modify the Parnassus Heights development plan identified in the 2014 LRDP, an amendment of the 2014 LRDP is proposed. This amendment would incorporate the CPHP into the 2014 LRDP, replacing the Parnassus Heights chapter in the 2014 LRDP and making other necessary conforming changes.

As required by the California Environmental Quality Act (CEQA), this EIR: (1) assesses the potentially significant direct and indirect environmental impacts, as well as the potentially significant cumulative impacts, associated with implementation of the CPHP; (2) identifies feasible means of avoiding or substantially lessening significant adverse impacts; and (3) evaluates a range of reasonable alternatives to the proposed CPHP, including the required No Project Alternative.

The University of California (University or UC) is the “lead agency” for the environmental review of the CPHP and for the LRDP amendment to incorporate concepts and proposals identified in the CPHP. UC is governed by the Board of Regents of UC (UC Regents), which under Article IX, Section 9, of the California Constitution, has “full powers of organization and government” subject only to very specific areas of legislative control. The UC Regents has the responsibility for certifying this EIR, and approving the LRDP amendment.

If the LRDP amendment to incorporate the CPHP is approved, it would be used to guide the development of the campus site through the next 30 years.

1.1 Purpose of the CPHP EIR

The University has prepared this EIR on the CPHP for the following purposes:

- To inform the general public, the local community, and responsible, trustee and federal public agencies of the nature of the CPHP, its potentially significant environmental effects, feasible measures to mitigate those effects, as well as reasonable and feasible alternatives;
- To enable the University to consider the environmental consequences of implementing the CPHP, adopting the LRDP amendment, and approving those specific projects identified in the CPHP and the Initial Phase improvements;
- To provide project-level review of three of the Initial Phase projects: Irving Street Arrival, RAB, and initial Aldea Housing Densification;
- To serve as a reference document and first tier document for subsequent review of individual projects undertaken to implement the CPHP, including the New Hospital;
- To enable responsible agencies to consider the environmental consequences of those CPHP proposals for which they have a role in approving or issuing permits; and
- To satisfy CEQA requirements.

As described in CEQA and the CEQA Guidelines, public agencies cannot approve projects that may cause a significant environmental impact without adopting mitigation measures or alternatives to avoid or substantially lessen those significant environmental effects, where feasible. In discharging this duty, a public agency has an obligation to balance the project's significant effects on the environment with its benefits, including economic, social, technological, legal and other benefits. This EIR is an informational document, the purpose of which is to identify the potentially significant environmental effects of implementing the CPHP, and to indicate the manner in which those significant effects can be avoided or significantly lessened. The EIR also identifies any significant and unavoidable adverse impacts that cannot be mitigated to a less-than-significant level. Reasonable and feasible alternatives to the CPHP are identified that would avoid or substantially lessen any significant adverse environmental effects of the CPHP.

The Regents or its designee pursuant to its delegation authority is required to consider the information in the EIR, along with any other relevant information, in making its decision to approve the LRDP amendment to incorporate the CPHP and each specific proposed project that may be brought forth for approval in the future to implement the CPHP. Although the EIR does not determine the ultimate decision that will be made regarding implementing the CPHP or any individual CPHP project, CEQA requires the Regents to consider the information in the EIR and make findings regarding each significant effect identified in the EIR.

If determined to comply with CEQA, the Regents will certify the Final EIR prior to approving the proposed LRDP amendment to incorporate the CPHP.

1.2 Relationship of CPHP to 2014 LRDP

On November 20, 2014, the Regents adopted the UCSF 2014 LRDP. The 2014 LRDP serves as a comprehensive physical land use plan and policy document to guide the physical development of the San Francisco campus at its various campus sites, accommodating future increases in enrollment and clinical, academic, and research activities, and increased housing demand at UCSF and meeting its projected clinical, educational and research demand. The existing 2014 LRDP accommodates development anticipated to occur through horizon year 2035. The 2014 LRDP contains objectives to guide decisions for future facilities to meet demands, and it projects the quantities and uses of new building space needed during this time frame.

The 2014 LRDP included *Community Planning Principles*, which were produced in collaboration with the UCSF Community Advisory Group. These *Principles* formalize UCSF's commitment to communicate with neighbors regarding its potential future development, in order to identify potential community concerns that may arise from UCSF's physical development prior to the time that individual projects are brought forward for approval. In addition, the 2014 LRDP included a Greenhouse Gas Reduction Strategy and a commitment to continue to enhance its Transportation Demand Management Program.

As noted earlier, the 2014 LRDP included a number of development concepts for each of UCSF's main campus sites, including Parnassus Heights. Since the adoption of the 2014 LRDP and certification of the 2014 LRDP Final EIR, UCSF initiated a planning process to re-envision Parnassus Heights as a whole, seeking ways to update and reorganize campus facilities to better respond to UCSF's clinical, educational, and research missions. This planning process resulted in the development of the CPHP that provides a vision for the future of the campus site, ensuring that a modernized Parnassus Heights enhances UCSF's status as an anchor institution in San Francisco and a leading academic medical center in the region, state and nation.

Because the CPHP proposes to modify the Parnassus Heights development plan identified in the 2014 LRDP, an amendment of the 2014 LRDP is proposed. The proposed LRDP amendment would revise those portions of the 2014 LRDP that pertain to Parnassus Heights to incorporate concepts and proposals identified in the CPHP. Proposed changes would include revisions to functional zones; revisions to the space program; updates to the projected population; revisions to existing planning agreements, including revisions to the Regents' Resolution; modification of the UCSF Mount Sutro Open Space Reserve boundary adjacent to the New Hospital; and an update to the Greenhouse Gas Reduction Strategy.

LRDPs typically cover a 10- to 15-year planning period. As indicated above, the UCSF 2014 LRDP addressed development at the entire UCSF campus over an approximately 20-year period, or an approximate horizon year of 2035. However, determining the length of the planning period may depend on a number of factors, including academic and other physical planning efforts; anticipated development cycles; and alignment with local, regional, or state plans and regulations.

If the Regents approve the proposed 2014 LRDP amendment to incorporate the CPHP, the CPHP would become the primary planning document for Parnassus Heights and would guide the development of the Parnassus Heights campus site through the next 30 years, or an approximate horizon year of 2050. Nevertheless, all other UCSF campus sites addressed by the 2014 LRDP would continue to have an approximate horizon year of 2035.

This EIR analyzes the potential significant environmental impacts that could result if the LRDP amendment is approved and the CPHP is implemented at Parnassus Heights campus site. The CPHP EIR will replace in full the program-level impact analysis for the Parnassus Heights campus site contained in the 2014 LRDP FEIR. As some of the information in the 2014 LRDP FEIR is still relevant and has been used to characterize existing conditions and inform the impact analysis in the CPHP EIR, including applying pertinent 2014 LRDP EIR mitigation measures to the CPHP projects, the 2014 LRDP FEIR is incorporated by reference in this EIR and its Initial Study.

1.3 Environmental Review Process

1.3.1 Notice of Preparation and Public Scoping

On January 14, 2020, a Notice of Preparation (NOP), including an Initial Study, was published for the CPHP EIR. A 38-day public comment period ended on February 21, 2020. A copy of the NOP/Initial Study is included in **Appendix A**. A scoping meeting was held on February 10, 2020, at Millberry Union on the Parnassus Heights campus site, to accept public input on environmental topics to be analyzed in the EIR and approaches to the impact analyses. Written comments received on the NOP, and a transcript of the scoping meeting, are included in **Appendix B**.

Pursuant to Section 15063 of the CEQA Guidelines, an Initial Study is a preliminary environmental analysis that may be used by the lead agency to focus an EIR on the environmental effects resulting from a proposed project that may be significant. The Initial Study prepared for the CPHP identified activities proposed under the CPHP that would clearly result in no impact or result in a less-than-significant impact under the CEQA significance criteria. No further analysis beyond that provided in the Initial Study is necessary for those activities and environmental topics.

The Initial Study also identified potential environmental effects that require detailed study in the EIR. As discussed in the Initial Study, these effects consist of less-than-significant impacts that were included in this EIR in order to provide a more comprehensive analysis; impacts for which further analysis is necessary or desirable before determinations about significance could be made; impacts that were potentially significant but may be reduced to less-than-significant levels with the adoption of mitigation measures; and impacts that may be significant and unavoidable.

1.3.2 Draft EIR

This Draft EIR is being circulated to governmental agencies and to interested organizations and individuals that may wish to review and comment on the document. CEQA Guidelines sections 15086(c) and 15096(d) require Responsible Agencies or other public agencies to provide comment on those project activities within the agency's area of expertise or project activities that are required to be carried out or approved by the agency, and the agency should support those comments with either oral or written documentation. Publication of the Draft EIR initiates a 60-day public review period, during which time UCSF will accept comments on the Draft EIR. The public review period for the Draft EIR for the proposed CPHP is from July 13 through September 11, 2020.

This Draft EIR, including supporting technical appendices and reference materials, can be found at **https://www.ucsf.edu/cphp/community#eir**. The University encourages agencies and interested parties to submit written comments on the Draft EIR electronically via the following link: **EIR@ucsf.edu**. Written comments may also be submitted via regular mail to Diane Wong, UCSF Real Estate - Campus Planning, 654 Minnesota Street, San Francisco, CA 94143-0286.

1.3.3 Comments and Responses and Final EIR

Following the close of the public and agency comment period on this Draft EIR September 11, 2020, the University will prepare responses to all written comments and to oral comments received at the public hearing that raise CEQA-related environmental issues regarding the CPHP and the analysis in this EIR. The responses will be published in the Final EIR. The Final EIR will be considered by the Regents in a public meeting and certified if it is determined to be in compliance with CEQA. Upon certification of the Final EIR, the Regents will consider whether to adopt the proposed LRDP amendment incorporating the CPHP, as well as approve any individual projects that are brought forth at that time.

1.3.4 Mitigation Monitoring and Reporting Program

Throughout this EIR, mitigation measures have been described in language that will facilitate establishment of a Mitigation Monitoring and Reporting Program (MMRP). As required under CEQA (see CEQA Guidelines, Section 15097), an MMRP will be prepared and presented to the Regents at the time of certification of the Final EIR for the proposed CPHP and will identify the specific timing and roles and responsibilities for implementation of adopted mitigation measures.

1.4 CPHP Campus, Public and Agency Outreach

The CPHP planning process was highly participatory and involved a wide variety of viewpoints on the future vision for the Parnassus Heights campus site. Stakeholders internal to UCSF as well as the public were engaged and consulted.

Internal to UCSF, the CPHP process was led by the Parnassus Master Plan Steering Committee (PMP), which was comprised of faculty and senior administrators across the campus, including UCSF Health. PMP members helped define the programmatic strategy and vision for the Parnassus Heights campus site and oversaw the preparation of the Plan. They guided the following:

- Four Faculty Working Groups (Research Space, Education Space, CoLabs, Digital Hub) to develop the vision, concepts, and specific space needs for the various program areas
- Three Visioning Workshops: Blue Sky Ideas, Design Alternatives, and Preferred Alternative
- A Town Hall Meeting attended by more than 300 participants in-person and watched by more than 200 livestream viewers online
- Three surveys with broad internal participation to gather further input
- A Community Relations Subcommittee that oversaw the external community engagement process

UCSF engaged its external community to provide input into the Parnassus Heights campus site re-envisioning effort to identify potential improvements that would further neighborhood goals for the physical environment surrounding the campus site. The Community Working Group comprising 24 members was established, which included community leaders, neighbors, merchants, City representatives, and UCSF staff. Over a thousand community members were engaged through a public survey, community working group meetings, and three open houses.

The external engagement process was organized in three phases:

- *Discovery Phase*: focused on introducing the community to the CPHP concepts and soliciting initial feedback from neighbors on potential campus proposals.
- *Alternatives Phase*: neighbors were presented with three plan options and they gave feedback on the alternatives. The Community Working Group was launched with five meetings through this period.

- *Future Direction Phase*: focused on refining the plan and finalizing the Community Ideas Report, a document memorializing the community feedback received on the plan.

Community Working Group members identified potential improvements that would further the community's goals for the physical environment surrounding the Parnassus Heights campus site. In the Community Ideas Report, the group identified six key areas of focus: Housing, Campus Design, Connectivity with Nature, Multi-modal Mobility, Public Realm, and Programs and Amenities that Benefit the Neighborhood.

Following the conclusion of the Community Working Group effort, UCSF continued its community engagement by convening the Advisory Committee on the Future of Parnassus Heights, comprised of community stakeholders, leaders, neighbors, merchants, and representatives from City agencies and non-profit organizations. The group is advising UCSF on potential neighborhood issues and concerns as UCSF transitions from the concepts explored in the CPHP to the assessment of implementation. Meetings of the Advisory Committee on the Future of Parnassus Heights are open to the public and are ongoing through the summer of 2020.

1.5 Uses of the CPHP EIR

This CPHP EIR will be used by the UC Regents or its designee to evaluate the environmental implications of implementing the proposed CPHP.

A program EIR has been prepared for the CPHP that establishes a framework for tiered or project-program. Accordingly, this EIR provides a program-level analysis of the environmental impacts that could result from the development of the entire space program under the CPHP, and identifies Plan-level mitigation measures to reduce potential significant effects of the CPHP. In addition, this EIR includes project-level analysis for the following CPHP Initial Phase developments: Irving Street Arrival, RAB, and initial Aldea Housing Densification; and certain Initial Phase improvements (e.g., utility improvements, Parnassus Avenue Streetscape Plan, building renovations of existing buildings, and community investments). The analysis of these Initial Phase development projects and improvements at the project-level is intended to provide sufficient detail to permit project approval and implementation following certification of the CPHP Final EIR.

UCSF has begun to plan the New Hospital at Parnassus Heights (NHPH or New Hospital) and is projecting the need for a larger hospital than was planned in the 2014 LRDP. The planning, design and construction of a new, world-class hospital at Parnassus Heights would ensure that UCSF can continue to provide premier care to patients in the San Francisco Bay Area and beyond in the 21st century. Broad parameters for the New Hospital project (location, size, mass, height, and projected population) are accounted for at a program level in the CPHP and analyzed in this EIR. Further details of the New Hospital are being developed, including the specific design. Those elements of the New Hospital will be the subject of a subsequent project-specific environmental review when more details become available. It is anticipated that sufficient detail will be available to publish a project-level Draft EIR for the New Hospital in the summer of 2021.

Similarly, when details on CPHP Future Phase projects are known, each Future Phase project would be reviewed in light of the CPHP Final EIR to determine the appropriate level of additional environmental review, if any, needed before approval and implementation of the particular project. If no new significant effects would occur, all significant effects have been adequately addressed, and no new mitigation measures would be required, the later activities within the scope of the approved CPHP could rely on the environmental analysis provided in the program EIR, and no additional environmental analysis would be required; otherwise, additional environmental analysis must be prepared. The additional analysis may rely on the program EIR, as appropriate, for general discussions, some analysis, and cumulative impacts, but would be tiered to allow the analysis to focus on more project- and site-specific impacts of the later project. Appropriate documentation associated with later activities not examined in the program EIR would be prepared pursuant to CEQA and CEQA Guidelines.

1.6 Approvals Required

Comprehensive Parnassus Heights Plan

Regents Approvals

- Certification of the Final EIR
- Adoption of the LRDP amendment:
  - Update Parnassus Heights functional zones, space program and population projections
  - Modify Regents Resolution regarding the Space Ceiling
  - Modify the Mount Sutro Open Space Reserve boundary adjacent to the New Hospital site, if necessary
  - Update UCSF's Greenhouse Gas Reduction Strategy

Individual Building Projects – Irving Street Arrival, RAB and Initial Aldea Housing Densification

Regents Approvals

- Budget
- Design

Bay Area Air Quality Management District

- Stationary source permit for diesel generators

California Office of Statewide Health Planning and Development (OSHPD) Approvals

- Building permit approval and construction oversight for clinical facilities

City Approvals

- Board of Supervisors
  - Bridge and tunnel within City Right-of-Way

  - Lease of air rights for pedestrian bridge above Parnassus Avenue
  - Lease of property for underground tunnel and utilities beneath Parnassus Avenue
- San Francisco Public Works
  - Curb modifications including street parking controls and curb cuts for driveways
  - Community investments within City Right-of-Way (traffic signals, turning lanes, traffic-calming)
- San Francisco Municipal Transportation Agency
  - Community investments within City Right-of-Way (traffic signals, turning lanes, traffic-calming)

1.7 Potential Implications of COVID-19

The current Coronavirus disease 2019 (COVID-19) pandemic has introduced a substantial amount of uncertainty in human lives. The pandemic has directly affected human behavior, requiring people to shelter in place, implement social distancing, and make other changes to the manner in which they live. Indirectly it has affected the economy resulting in reduced consumer spending, business closures, and widespread unemployment. While some of these trends are considered short-term and are expected to reverse, it is likely that there could be more permanent changes in the ways humans live and behave in the post pandemic world. As with humans, institutions such as UCSF are also expected to make changes to the manner in which they operate. As a result of the pandemic, UCSF will likely consider operational changes such as increases in telework and telehealth services, especially primary and secondary health care services. At the same time, the pandemic has highlighted the importance of biomedical research and advanced tertiary and quaternary health care, along with the need for more doctors and increased and improved inpatient facilities. The net effect of the pandemic on the Parnassus Heights campus site development and operations cannot be predicted at this point in time without speculation.

1.8 Report Organization

Chapter 1, ***Introduction***, provides an introduction and overview of the proposed CPHP; describes the intended uses of the EIR, including the review and certification process; and discusses the organization of the EIR.

Chapter 2, ***Summary of Environmental Impacts and Mitigation Measures***, summarizes the environmental impacts that would result from implementation of the proposed CPHP, lists proposed mitigation measures and indicates the level of significance of impacts after mitigation. A summary of the alternatives to the CPHP, and the environmentally superior alternative, is also provided.

Chapter 3, ***Project Description***, provides a detailed description of the proposed CPHP, including relationship of the CPHP to the 2014 LRDP; a discussion of project need and objectives, a description of proposed physical development and growth at the Parnassus Heights campus site under the CPHP, and a description of how development at the campus site under the CPHP varies from that described in the2014 LRDP.

Chapter 4, ***Environmental Setting, Impacts and Mitigation Measures****,* provides with respect to each environmental impact category an introduction to environmental analysis, describes the CPHP's environmental setting, includes a regulatory framework, discusses the methodology used; provides a programmatic impact analysis of the CPHP, project-level analysis of the proposed Irving Street Arrival, RAB, initial Aldea Housing Densification, and certain Initial Phase improvements, and analysis of cumulative impacts; and identifies mitigation measures that would reduce or avoid those impacts as presented.

Chapter 5, ***Other CEQA Considerations***, summarizes significant and unavoidable impacts, significant irreversible environmental changes, and any growth-inducing impacts.

Chapter 6, ***Alternatives***, describes the alternatives to the proposed CPHP that could avoid or substantially lessen significant effects and evaluates their environmental effects in comparison to the proposed CPHP.

Chapter 7, ***Report Preparation***, identifies the persons who prepared the EIR, and those who were consulted during its preparation.

Appendices. The appendices include the NOP and Initial Study, written and oral comments on the NOP, Greenhouse Gas Reduction Strategy Update, Space Needs Assessment, and various supporting technical information for the Draft EIR.

CHAPTER 2
Summary

2.1 Introduction

This EIR assesses the potentially significant environmental effects of implementation of the proposed University of California, San Francisco (UC San Francisco or UCSF) Comprehensive Parnassus Heights Plan (CPHP or Plan).[1]

This EIR provides a program-level analysis of the environmental impacts that could result from the development of the entire space program under the CPHP, and identifies Plan-level mitigation measures to reduce potential significant effects of the CPHP. In addition, this EIR includes project-level analysis for the following CPHP Initial Phase developments: Irving Street Arrival, Research and Academic Building (RAB), and initial Aldea Housing Densification; and certain Initial Phase improvements. The analysis of these Initial Phase development projects and improvements at the project-level is intended to provide sufficient detail to permit project approval and implementation following certification of the CPHP Final EIR. Although also an Initial Phase development, the New Hospital will be the subject of a subsequent project-specific environmental review separately from the CPHP when more details of this project become available. Because the CPHP proposes to modify the Parnassus Heights development plan identified in the 2014 Long Range Development Plan (LRDP), an amendment of the 2014 LRDP is proposed. This amendment would incorporate the CPHP into the 2014 LRDP, replacing the Parnassus Heights chapter in the 2014 LRDP following certification of the CPHP Final EIR and adoption of the LRDP amendment.

The University of California (University or UC) is the “lead agency” for the environmental review of the CPHP and for the LRDP amendment to incorporate concepts and proposals identified in the CPHP.

This summary highlights the major areas of importance in the environmental analysis for the proposed CPHP, as required by Section 15123 of the CEQA Guidelines. It provides a brief description of the CPHP, the project objectives, the significant and unavoidable environmental effects, alternatives to the CPHP, and areas of controversy known to the University. In addition, this chapter summarizes (1) the potential environmental impacts that would occur as the result of implementation of the CPHP; (2) the recommended mitigation measures that would avoid or

[1] The CPHP was published in October 2019. An Addendum to the CPHP dated June 2020 is now available that provides an update to the plan document, noting the changes to the plan that have resulted from the ongoing work to refine space needs, project parameters, and forecasts.

reduce significant environmental impacts; and (3) the level of impact significance after mitigation measures are implemented.

2.2 Project Description

In November 2014, the Regents of the University of California (Regents) adopted the 2014 LRDP for the San Francisco campus, which outlines projected development levels and patterns for UCSF at all of its main campus sites through the year 2035. The 2014 LRDP Final EIR (FEIR) was certified by the Regents in November 2014 and includes, among other things, analysis of the potential environmental impacts from then-envisioned development at the Parnassus Heights campus site.

The Parnassus Heights campus site is the oldest and largest of the UCSF campus sites. This campus site comprises approximately 107 acres of land located in the Inner Sunset mixed-use neighborhood and adjacent to the Haight Ashbury and Cole Valley neighborhoods in San Francisco. UCSF's facilities are concentrated at the north end of the campus site, where Moffitt and Long Hospitals, five professional programs, clinics, research, housing, parking, and other support uses are located. The 61-acre Mount Sutro Open Space Reserve occupies the central and southern portion of the campus site. The Aldea Housing complex is located in the southeast portion of the campus site adjacent to the Reserve.

The facilities at Parnassus Heights are aging and the site as a whole lacks a cohesive identity. Over the last 20 years, UCSF has invested billions of dollars into acquiring, developing, and supporting its Mission Bay campus site, without commensurate investment in Parnassus Heights. UCSF's investment in Parnassus Heights has not kept pace with its aging facilities or changes in programmatic need, resulting in infrastructure, buildings, and interior spaces that require substantial renewal and investment.

Since the adoption of the 2014 LRDP and certification of the 2014 LRDP FEIR, UCSF undertook a planning process to re-envision and revitalize Parnassus Heights as a whole, to integrate UCSF's clinical, educational, and research missions in ways that promote collaboration and synergies in the UCSF Parnassus Heights campus community. The planning process resulted in the development of CPHP, which provides a long-term development framework for the revitalization of the Parnassus Heights physical environment, and is intended to ensure that a modernized Parnassus Heights enhances UCSF's status as an anchor institution in San Francisco, and a leading academic medical center in the region, state and nation.

Because the CPHP proposes to modify the Parnassus Heights development plans identified in the 2014 LRDP, an amendment of the 2014 LRDP is proposed. In total, the CPHP provides for development of approximately 2.90 million gross square feet (gsf) of new building space at the Parnassus Heights campus site. The net increase in building space at the campus site under the CPHP would be approximately 2.04 million gsf, when accounting for demolition that was approved under the 2014 LRDP but yet not implemented, and potential additional building demolition that would occur under the CPHP. Currently, there is approximately 3.92 million gsf of building space on the campus site. The total amount of campus building space upon full implementation of the CPHP would be approximately 5.97 million gsf (including instruction, research, clinical, and support space; housing; and structured parking), when accounting for existing campus site development, demolition, and proposed new development.

The Plan includes an "Initial Phase" that comprises: 1) Irving Street Arrival improvements, 2) RAB, 3) New Hospital, and 4) initial Aldea Housing Densification, and as well as other Initial Phase improvements. The Initial Phase would account for approximately 1.43 million gsf of new building development, and is anticipated to be completed by approximately year 2030. Beyond the Initial Phase, the "Future Phase" encompasses the remaining approximately 1.47 million gsf of new building development described in the CPHP envisioned for completion by the horizon year of 2050.

2.3 Project Objectives

2.3.1 Parnassus Heights [from the 2014 LRDP and FEIR]

The 2014 LRDP FEIR identified objectives specific to the Parnassus Heights campus site. Those objectives which are listed below remain valid, with the exception of objective E. related to the space ceiling, to be revised as shown as part of the proposed amendment to the LRDP.

A. Continue to promote excellence and leadership in health science education, maintaining the Parnassus Heights campus site as the central location for classroom instruction.

B. Ensure that adequate space is provided to foster collaboration and to facilitate the inter-dependence and connectivity for operational efficiency and effectiveness of instruction, clinical, research and support uses in close physical proximity to each other.

C. Ensure that Long Hospital and the New Hospital Addition have adequate clinical and administrative support and are aligned with education, research and specialized care programs and support that remain at the campus site.

D. Provide additional campus housing and improve campus life amenities including outdoor space.

E. ~~Strive to better achieve the remaining unfulfilled components of the 1976 Regents' Resolution by reducing space, minimizing population growth, and improving transportation-related programs.~~ Conform to the space limits and population estimates established in the Regents' Resolution Regarding the Parnassus Heights Campus Site, as amended.

F. Preserve the Mount Sutro Open Space Reserve as permanent open space, and serve as the steward of the Reserve by maintaining and expanding the trail system and by ensuring the safety of visitors and neighboring structures.

2.3.2 Objectives for the CPHP

The following are objectives pertaining to the CPHP, including its Initial Phase projects.

Space

- Revitalize the aging Parnassus Heights campus to enhance its place as a premier educational, research, and clinical institution -- one that draws in research and clinical faculty, staff, students, and trainees.
- Fulfill the need for contemporary research, educational, clinical, and support spaces that have been lacking at Parnassus Heights for decades.
- Increase the quantity and improve the quality of research space, to enhance synergies between research and clinical activities at Parnassus Heights for UCSF to maintain its stature as a world-class hub of basic, translational, and clinical research.
- Connect buildings and spaces at multiple levels to foster collaboration that facilitates learning and scientific discoveries.
- Facilitate patient/pedestrian safety and functional efficiency by connecting campus buildings across and under Parnassus Avenue.
- Increase the on-campus supply of housing for students, faculty and staff, thereby minimizing the impact of UCSF-demand for housing on adjoining neighborhoods.

Urban Design

- Improve the campus's functional organization and foster intuitive wayfinding.
- Develop a framework of open spaces that enhance the campus environment by connecting people to nature.
- Create welcoming spaces for enhancing the patient/visitor experience throughout the campus site.
- Enhance connectivity between the campus site and the surrounding community.

Mobility

- Promote sustainable transportation behavior.
- Improve campus circulation options to reduce impacts on the surrounding neighborhood.
- Improve the patient and visitor parking and arrival experience.
- Create safe on- and off-street passenger drop-off zones.
- Enhance Parnassus Avenue as a campus "main street."
- Optimize the use of existing parking supply.
- Enhance overall campus functionality and efficiency.
- Improve campus circulation by way of a service corridor that facilitates loading and deliveries to campus and minimizes impacts of those activities on the neighborhood.

Objectives for Irving Street Arrival

- Create a welcoming experience for patients, visitors, students, and employees arriving at the Parnassus Heights campus site.

- Enhance and speed the pedestrian journey between Irving Street and Parnassus Avenue.
- Provide amenities that benefit the UCSF community and draw in residents from the surrounding neighborhood, such as a reception area, wellness offerings, and convenience retail.

Objectives for the Research and Academic Building

- Provide new state-of-the-art, flexible research space on the Parnassus Heights campus site expediently to replace existing obsolete wet lab space and to satisfy existing demand.
- Site and develop a new research and educational building at a location that is currently underutilized or otherwise a candidate for demolition, to minimize the disruption to campus operations that would be caused by relocation of occupants of heavily-occupied buildings.
- Provide an "empty chair" i.e., space in which to move research teams so that vacated deteriorating space can be renovated.
- Provide replacement space for the seismically deficient School of Nursing building.

Objectives for the New Hospital at Parnassus Heights

- Meet seismic requirements of California Senate Bill 1953 by developing a new, seismically-sound, state-of-the-art inpatient facility.
- Site and develop a new inpatient facility in a way that optimizes operational activities with other clinical facilities at Parnassus Heights, such as Long Hospital, a renovated and repurposed Moffitt Hospital building, and Medical Building 1.
- Increase inpatient beds at Parnassus Heights to address severe constraints on capacity and access to care, and to meet the needs of a growing and aging Bay Area population.
- Increase inpatient beds at Parnassus Heights to allow for the capacity to provide inpatient health care in times of severe strain such as the current pandemic, without resorting to reducing or canceling non-essential surgeries to create bed capacity.
- Develop a new inpatient facility that has sufficient space to accommodate modern regulatory requirements and industry standards of contemporary hospitals, such as construction codes, sizes of operating rooms, ratio of operating rooms to pre-and post-recovery areas, and space for privacy and infection control issues.
- Develop a new inpatient facility that has sufficient space to accommodate modern technology, including telemedicine, robotics, and new diagnostic, imaging, testing, treatment, surgery and laboratory equipment, all requiring substantial infrastructure and space.
- Develop a new inpatient facility that has sufficient space to accommodate patient satisfaction requirements of contemporary hospitals, such as private patient rooms of sufficient size.
- Develop a new inpatient facility that is optimized in its spatial layout to enhance functionality and efficiency.
- Develop spaces for clinical and translational research and learning in or adjacent to clinical areas where patients are located.

Objectives for the Aldea Housing Densification

- Increase the supply of housing for UCSF students and potentially faculty and staff.
- Develop housing in a cost-effective manner in order to make rents as affordable as possible for housing residents.

2.4 Significant and Unavoidable Environmental Effects

Throughout this EIR, significant environmental impacts are identified, and mitigation measures are described that would eliminate the impacts or decrease them to a less-than significant level. Similarly, many impacts are identified that would be less-than-significant without the need for additional mitigation measures. There are, however, a number of impacts that are identified that cannot be eliminated or cannot be decreased to a level of insignificance even with the implementation of feasible mitigation measures. The unavoidable significant environmental impacts of the CPHP are listed in **Table 2-1**; and the unavoidable significant environmental impacts of the Irving Street Arrival, RAB and/or initial Aldea Housing Densification projects are listed in **Table 2-2**, below.

TABLE 2-1
SIGNIFICANT AND UNAVOIDABLE IMPACTS OF THE PROPOSED CPHP

Impacts
4.1 Aesthetics, Wind and Shadow
Impact AES-4: Implementation of the CPHP would potentially create wind hazards in publicly accessible areas of substantial pedestrian use.
Impact C-AES-3: Implementation of the CPHP, combined with cumulative projects, would potentially create wind hazards in publicly accessible areas of substantial pedestrian use.
4.2 Air Quality
Impact AIR-2: Operation of campus facilities developed under the CPHP would result in a cumulatively considerable net increase of a criteria pollutant (PM_{10}) for which the project region is non-attainment under an applicable federal or state ambient air quality standard.
Impact C-AIR-1: Implementation of the CPHP would result in a cumulatively considerable net increase of a criteria pollutant (PM_{10}) for which the project region is non-attainment under an applicable federal or state ambient air quality standard.
4.4 Cultural Resources and Tribal Cultural Resources
Impact CUL-1: Implementation of the CPHP would result in a substantial adverse change in the significance of known historical resources.
Impact CUL-2: Implementation of the CPHP would result in a substantial adverse change in the significance of potential future historical resources that may become eligible by the full build-out of the CPHP in 2050.
Impact C-CUL-1: Implementation of the CPHP would result in cumulatively considerable impacts on cultural and/or tribal cultural resources, in combination with past, present and reasonably foreseeable future projects in the vicinity of the Parnassus Heights campus site.
4.11 Noise and Vibration
Impact NOI-1: Construction activities under the CPHP would generate a substantial temporary increase in ambient noise levels in the vicinity of the construction project in excess of standards established in the local general plan or noise ordinance, or applicable standards of other agencies.
Impact C-NOI-1: Implementation of the CPHP, combined with cumulative construction noise in the project area, would generate a substantial temporary increase in ambient noise levels from construction activity in the vicinity of the project in excess of standards established in the local general plan or noise ordinance, or applicable standards of other agencies.

TABLE 2-2
SIGNIFICANT AND UNAVOIDABLE IMPACTS OF THE PROPOSED IRVING STREET ARRIVAL, RAB, AND INITIAL ALDEA DENSIFICATION PROJECTS

Impacts
4.1 Aesthetics, Wind and Shadow
Impact AES-4: Implementation of the Irving Street Arrival, RAB, and initial Aldea Housing Densification projects would potentially create wind hazards in publicly accessible areas of substantial pedestrian use.
4.4 Cultural Resources and Tribal Cultural Resources
Impact CUL-1: Implementation of the RAB, Initial Aldea Densification project, and Initial Phase improvements would result in a substantial adverse change in the significance of known historical resources.
4.11 Noise and Vibration
Impact NOI-1: Construction activities under the RAB and initial Aldea Housing Densification projects would generate a substantial temporary increase in ambient noise levels in the vicinity of the construction project in excess of standards established in the local general plan or noise ordinance, or applicable standards of other agencies.

2.5 Alternatives to the Proposed Project

The following alternatives were analyzed in detail in the EIR and compared to the proposed CPHP. The objective of the alternatives analysis is to determine whether an alternative would feasibly obtain some or most of the project objectives, while avoiding or substantially lessening some of the significant effects of the proposed CPHP.

Alternative 1: No Project Alternative, consisting of:

1A: No Project - No Development; and

1B: No Project - Development under 2014 LRDP;

Alternative 2: Reduced Project;

Alternative 3: CPHP including New Hospital - 19-Story Option; and

Alternative 4: CPHP including New Hospital - Phased Option

The comparative evaluation of these alternatives is presented in Chapter 6 of the EIR.

An EIR is required to identify the environmentally superior alternative from among the range of reasonable alternatives that are evaluated. If the No Project Alternative is considered the environmentally superior alternative, the EIR must identify which among the others is environmentally superior.

From the alternatives evaluated in this EIR, the environmentally superior alternative would be the No Project - No Development Alternative. Of the remaining alternatives that are not the No Project Alternative, the Reduced Project Alternative is considered the environmentally superior alternative.

2.6 Areas of Controversy

Areas of controversy known to the lead agencies, including issues raised by agencies and the public, must be identified in the Summary of an EIR (14 Cal. Code Regs. Section 15123).

On January 14, 2020, a Notice of Preparation (NOP), including an Initial Study, was published for the CPHP EIR. A 38-day public comment period ended on February 21, 2020. A copy of the NOP/Initial Study is included in **Appendix A**. A scoping meeting was held on February 10, 2020, at Millberry Union on the Parnassus Heights campus site, to accept public input on environmental topics to be analyzed in the EIR and approaches to the impact analyses. Written comments received on the NOP, and a transcript of verbal comments received during the scoping meeting, are included in Appendix B.

Based on the comments received during the public scoping period, issues of concern for the proposed CPHP include the following:

Project Description

- Concerns regarding the scale of the proposed development, including the size and location of the New Hospital; justification for the need for the proposed New Hospital
- Concerns regarding the exceedance of the space ceiling
- Concerns regarding the amount and timing of new housing to be built under the CPHP

Aesthetics, Wind, and Shadow

- Concerns regarding the effects of the New Hospital on nightlighting, shade and wind effects at neighboring residences and within campus site
- Concerns regarding the effects of the proposed Aldea Housing under CPHP on lighting, wind and shade

Air Quality

- Potential health effects from construction dust, particulate matter, and TACs, including emissions, including from construction staging/trucks
- Concerns regarding air quality hazards associated with asbestos disturbed during demolition of older buildings as well as from grading of soils that might contain naturally occurring asbestos
- Concerns regarding operational air emissions, including particulate matter and pathogens from laboratory and hospital ventilation systems and air emissions from mobile sources, including idling trucks
- Concerns regarding air quality effects on Edgewood Drive residences from removal of trees in the Reserve

Biological Resources

- Concerns regarding construction and operational effects of CPHP development on wildlife and habitat in the Reserve, including nightlighting effects on birds; concerns about the effects of additional Aldea Housing on plant and wildlife in the Reserve

Cultural Resources

- Concerns regarding CPHP impacts on Toland Hall murals and the effects of CPHP on Ishi Trail

Geology and Soils

- Concerns regarding slope stability and landslide hazards, including under seismic conditions
- Concerns regarding seismic effects on campus site buildings
- Concern regarding the effects of tunneling and cut and fill of new service corridor; concern regarding excavation

Hazards and Hazardous Materials

- Concerns regarding presence of asbestos in older buildings and in soils
- Concern about increased wildfire risk in the Reserve

Hydrology and Water Quality

- Concern about CPHP effects on groundwater recharge and groundwater quality; concern about changes in surface water drainage, including flooding.

Land Use and Planning

- Concerns regarding the extent of encroachment into the Reserve, including loss of open space; environmental effects of Reserve land swaps
- Concern regarding the proposed use of the Surge parking lot
- Concern that large buildings, including the proposed New Hospital, would be incongruous with character of the surrounding neighborhood

Noise and Vibration

- Concern about construction noise and vibration effects on nearby homes and residents, including noise from construction delivery and haul trucks
- Concerns about noise from utilities, rooftop equipment and generators on Edgewood neighbors
- Concerns about noise from increase in operational traffic (cars, trucks, ambulances, emergency vehicles, and shuttles) on Medical Center Way
- Concern about the removal of trees in the Reserve that buffer noise experienced by Edgewood neighbors
- Concern about noise from helicopters

Population and Housing

- Concern about the effects on housing demand in San Francisco from increased population at Parnassus Heights

Recreation

- Concern about the effects of the New Hospital on recreation in Edgewood area, including Farnsworth steps community area

Transportation

- Concerns about the effects of construction activities on emergency vehicle access and delay, bicycle and pedestrian safety, transit, and road wear and tear; need for controls on truck traffic
- Concerns about the effects of increase in TNC (transportation network companies, i.e., Uber, Lyft, etc.) vehicles on adjacent streets; consider whether ride-sharing companies are viable in the long-term, when prices will rise
- Concern about increased traffic congestion, including effects of increases in traffic on neighboring streets (19th Avenue, Judah/Parnassus, 17th Street, Fell Street, etc.)
- Concern about increase in parking demand and loss of parking supply; suggestion to build new parking structure by Kezar and shuttle people to the hospital
- Numerous safety concerns, including pedestrian safety, especially Irving at 2nd Avenue, and Irving/Carl/Arguello and the need for pedestrian safety improvements; safety of drop-off/pickup area for new childcare facility at Proctor; bicycle safety
- Concern about impacts on public transit and cost to the City
- Request that traffic level of service analysis be completed for the EIR
- Request that a Transportation Demand Management Program be developed to reduce vehicle trips

Utilities and Service Systems

- Concern about increase in water demand and effects on water supply, especially during drought; request that UCSF engage with the San Francisco Public Utilities Commission
- Request for an analysis of the capacity of water, sewer, waste disposal, and power infrastructure to serve CPHP

Cumulative Impacts

- Concern regarding cumulative impacts with other construction projects in the vicinity
- Concerns regarding cumulative impacts on population growth; housing availability and affordability; greenhouse gas emissions; infrastructure; traffic congestion and transit

Alternatives

- Recommendations regarding alternate sites for the New Hospital
- Recommendations to reconsider Millbery Tower for housing; convert UC Hall to housing; make housing more dense and affordable; implement more or all of proposed housing in the Initial Phase; analyze alternative Aldea Housing sites at lower elevations so that no development extends higher than existing rooftops
- Design and analyze a smaller plan that does not exceed the Space Ceiling

- Design and analyze an alternative that considers buffer zones and low scale buildings to transitioning to neighboring residential properties
- Design and analyze a Reduced New Hospital that is no greater in size than the Langley Porter Psychiatric Institute building
- Design and analyze an alternative that places no development outside of existing boundaries of development (no encroachment into Reserve)
- Design and analyze a modified project that converts UC Hall and Moffitt Hospital to housing

Please also see Section 4.0.2, Scope of Analysis, for a discussion of the approach for determining issues within the scope of this EIR.

2.7 Summary of Impacts and Mitigation Measures

Table 2-3 summarizes the impacts of the proposed CPHP, identifies the significance determination of each impact, and presents the full text of the identified mitigation measures. Similarly, **Table 2-4** summarizes the corresponding impacts of the proposed Irving Street Arrival, RAB and initial Aldea Densification projects, and Initial Phase improvements, identifies the significance determination of each impact for the respective project, and presents the full text of the applicable mitigation measures and improvement measures for each project.

TABLE 2-3
SUMMARY OF CPHP IMPACTS AND MITIGATION MEASURES

Environmental Impact	Level of Significance Before Mitigation	Mitigation Measures	Level of Significance after Mitigation
EIR Section 4.1 Aesthetics, Wind, and Shadow			
Impact AES-1: Development under the CPHP would not have a substantial adverse effect on a scenic vista.	LTS	None required.	NA
Impact AES-2: Development under the CPHP would occur in an urbanized area and would not conflict with applicable zoning and other regulations governing scenic quality.	LTS	None required.	NA
Impact AES-3: Implementation of the CPHP would not create a new source of substantial light or glare which would adversely affect daytime or nighttime views in the area.	S	**CPHP Mitigation Measure AES-3: Minimize light and glare resulting from new buildings.** Light and glare from buildings shall be minimized through the orientation of the building, use of landscaping materials and choice of primary facade materials. Design standards and guidelines to minimize light and glare shall be adopted for the new buildings, including: • Reflective metal walls and mirrored glass walls shall not be used as primary building materials for facades. • Installation of illuminated building signage shall strive to be consistent with UCSF design guidelines and/or City Planning Code sign standards for illumination. • Exterior light fixtures shall be configured to emphasize close spacing and lower intensity light. Light fixtures shall use luminaries that do not direct the cone of light towards off-campus structures. • Design parking structure lighting to minimize off-site glare.	LTS
Impact AES-4: Implementation of the CPHP would potentially create wind hazards in publicly accessible areas of substantial pedestrian use.	S	**CPHP Mitigation Measure AES-4: Design new buildings to minimize wind impacts at pedestrian level.** Prior to the approval of the design of individual buildings to be developed pursuant to the CPHP and for which one or more building facades would have a height of 80 feet or more, UCSF shall engage a qualified wind consultant to conduct wind tunnel testing of the proposed building(s) to determine whether the building(s) would result in new exceedance(s) of the City of San Francisco's 26-mph pedestrian wind hazard criterion. The wind tunnel testing shall be conducted for the building(s) under consideration in the context of then-existing conditions as well as in the context of conditions representative of then-anticipated CPHP buildout (the buildout scenario in the EIR, as may be modified from time to time by UCSF to reflect actual building designs known at the time) so as to determine whether the individual building(s) and/or the buildout condition would result in exceedances of the wind hazard criterion. If the wind tunnel analysis determines that the building(s)' design or buildout conditions would increase the hours of wind hazard exceedance or the number of test points subject to hazardous winds, compared to then-existing conditions, UCSF shall work with the wind consultant to identify feasible mitigation strategies, including design changes (e.g., setbacks, rounded/chamfered building corners, stepped facades, etc.), to eliminate or reduce wind hazards to the maximum feasible extent. If UCSF finds that these changes or other wind speed	SU

SU = Significant and Unavoidable with Mitigation
LTS = Less than Significant impact
NI = No Impact
NA = Not applicable

TABLE 2-3 (CONTINUED)
SUMMARY OF CPHP IMPACTS AND MITIGATION MEASURES

Environmental Impact	Level of Significance Before Mitigation	Mitigation Measures	Level of Significance after Mitigation
EIR Section 4.1 Aesthetics, Wind, and Shadow (cont.)			
Impact AES-4 (cont.)		reduction strategies are not feasible as they would unduly restrict the proposed building's space program, result in operational inefficiencies, and/or substantially higher costs, the building(s) may nonetheless be approved provided that the project incorporates wind speed reduction strategies to the maximum feasible extent, as determined by UCSF in consultation with the wind consultant. Wind speed reduction strategies could also include features such as landscaping, localized installation of porous/solid screens, installation of canopies along building frontages, and the like.	
Impact AES-5: Implementation of the CPHP would not create new shadow in a manner that would substantially and adversely affects the use and enjoyment of publicly accessible open spaces.	LTS	None required.	NA
Impact C-AES-1: Implementation of the CPHP, combined with cumulative projects, would not have a substantial adverse effect on a scenic vista or conflict with applicable zoning and other regulations governing scenic quality.	LTS	None required.	NA
Impact C-AES-2: Implementation of the CPHP, combined with cumulative projects, would not create a new source of substantial light or glare which would adversely affect daytime or nighttime views in the area.	LTS	None required.	NA
Impact C-AES-3: Implementation of the CPHP, combined with cumulative projects, would potentially create wind hazards in publicly accessible areas of substantial pedestrian use.	S	Implement CPHP Mitigation Measure AES-4.	SU
Impact C-AES-4: Implementation of the CPHP, combined with cumulative projects, would not create new shadow that substantially and adversely affects the use and enjoyment of publicly accessible open spaces.	LTS	None required.	NA
EIR Section 4.2 Air Quality			
Impact AIR-1: Construction of campus development under the CPHP would result in a cumulatively considerable net increase of a criteria pollutant for which the project region is non-attainment under an applicable federal or state ambient air quality standard.	S	**CPHP Mitigation Measure AIR-1a: Clean Construction Equipment for CPHP Projects.** The construction contractor(s) shall develop a plan demonstrating that the off-road equipment used to on-site to construct CPHP projects would achieve a fleet-wide average 80 percent reduction in NO_X exhaust emissions, compared to uncontrolled aggregate statewide emission rates for similar equipment. One feasible plan to achieve this reduction would include the following: • All mobile diesel-powered off-road equipment larger than 25 horsepower and operating on the project site for more than two days continuously shall be equipped with engines meeting USEPA emissions standards for Tier 4 engines or equivalent;	LTS

S = Significant Impact
SU = Significant and Unavoidable with Mitigation
LTS = Less than Significant impact
NI = No Impact
NA = Not applicable

TABLE 2-3 (CONTINUED)
SUMMARY OF CPHP IMPACTS AND MITIGATION MEASURES

Environmental Impact	Level of Significance Before Mitigation	Mitigation Measures	Level of Significance after Mitigation
EIR Section 4.2 Air Quality (cont.)			
Impact AIR-1 (cont.)		• Use of electrically-powered construction equipment to the degree available and feasible; and Alternatively, if UCSF can demonstrate through preparation of an air quality assessment report prepared by an air quality specialist that large or contemporaneous CPHP construction projects would not exceed BAAQMD thresholds, then the above mitigation requirements may be waived. **CPHP Mitigation Measure AIR-1b: Best Management Practices for Controlling Particulate Emissions during Construction.** The following BAAQMD Best Management Practices for particulate control will be required for all construction activities related to CPHP projects (BAAQMD, 2017). These measures will reduce particulate emissions primarily during soil movement, grading and demolition activities but also during vehicle and equipment movement on unpaved project sites. • All exposed surfaces (e.g., parking areas, staging areas, soil piles, graded areas, and unpaved access roads) shall be watered two times per day. • All haul trucks transporting soil, sand, or other loose material off-site shall be covered. • All visible mud or dirt track-out onto adjacent public roads shall be removed using wet power vacuum street sweepers at least once per day. The use of dry power sweeping is prohibited. • All vehicle speeds on unpaved roads shall be limited to 15 mph. • All roadways, driveways, and sidewalks to be paved shall be completed as soon as possible. Building pads shall be laid as soon as possible after grading unless seeding or soil binders are used. • Idling times shall be minimized either by shutting equipment off when not in use or reducing the maximum idling time to 5 minutes (as required by the California airborne toxics control measure Title 13, § 2485 of California Code of Regulations [CCR]). Clear signage shall be provided for construction workers at all access points. • All construction equipment shall be maintained and properly tuned in accordance with manufacturer's specifications. All equipment shall be checked by a certified mechanic and determined to be running in proper condition prior to operation. • Post a publicly visible sign with the telephone number and person to contact at UCSF regarding dust complaints. This person shall respond and take corrective action within 48 hours. BAAQMD's telephone number shall also be visible to ensure compliance with applicable regulations.	

S = Significant Impact
SU = Significant and Unavoidable with Mitigation
LTS = Less than Significant impact
NI = No Impact
NA = Not applicable

TABLE 2-3 (CONTINUED)
SUMMARY OF CPHP IMPACTS AND MITIGATION MEASURES

Environmental Impact	Level of Significance Before Mitigation	Mitigation Measures	Level of Significance after Mitigation
EIR Section 4.2 Air Quality (cont.)			
Impact AIR-2: Operation of campus facilities developed under the CPHP would result in a cumulatively considerable net increase of a criteria pollutant (PM_{10}) for which the project region is non-attainment under an applicable federal or state ambient air quality standard.	S	**CPHP Mitigation Measure AIR-2a: Project-Level Operational Measures** The following measures, most of which are identified in the 2017 BAAQMD *CEQA Guidelines,* shall be reviewed and incorporated into specific development projects if not already included in the development project or otherwise in place at the Parnassus Heights campus site: • Provide and maintain secure bike parking (at least one space per 20 vehicle spaces); • Provide and maintain showers and changing facilities for employees; • Provide information on transportation alternatives to employees; • Provide and maintain preferential carpool and vanpool parking for non-residential uses; • Increase building energy efficiency below Title 24 (reduces NO_X related to natural gas combustion); • Require use of electrically powered landscape equipment, where feasible; • Use low VOC architectural coatings in maintaining buildings; • Meet California Green Building Code standards in new construction (reduces NOx related to natural gas combustion); and • Provide electric vehicle charging stations in existing parking areas to promote the use of zero emission vehicles. • Equip all truck loading and unloading docks with a power outlet for every two-dock doors. Signs shall be posted stating "Diesel trucks are prohibited from idling more than 5 minutes and trucks requiring auxiliary power shall connect to the electrical outlets to run auxiliary equipment. **CPHP Mitigation Measure AIR-2b: TDM Program Enhancements** To reduce on- and off-campus vehicle trips and resulting air quality impacts, UCSF will implement TDM program enhancements such that the number of new average daily vehicle trips to and from the campus site is reduced by at least 15 percent from the estimated new average daily vehicle trips without these program enhancements. TDM program enhancements/strategies shall initially include the following: 1. *New shuttle connections to regional transit (e.g. BART):* Implement new UCSF shuttle service between the campus site and regional transit stations (e.g. BART, Caltrain) to make regional transit a more attractive option for employees, patients, and visitors.	SU

S = Significant Impact
SU = Significant and Unavoidable with Mitigation
LTS = Less than Significant impact
NI = No Impact
NA = Not applicable

TABLE 2-3 (CONTINUED)
SUMMARY OF CPHP IMPACTS AND MITIGATION MEASURES

Environmental Impact	Level of Significance Before Mitigation	Mitigation Measures	Level of Significance after Mitigation
EIR Section 4.2 Air Quality (cont.)			
Impact AIR-2 (cont.)		2. *Expand telecommuting and flexible hours program for employees:* Allow employees in appropriate positions to telecommute from home and/or work a modified schedule such that they are commuting to the campus less frequently per week. 3. *Improved telehealth program for patients:* Implement an expanded telehealth program to reduce the need for patients to travel to the campus site for appointments. 4. *Carpool and vanpool credits and incentives:* Provide cash allowance or discounted parking permit rates for individuals who carpool rather than drive alone; reduce monthly fares for Vanpool riders and drivers. 5. *Discontinue monthly parking permits:* Discontinue issuance of monthly parking permits to make commute travel mode a daily decision by shifting to daily parking permits. 6. *Enhanced patient TDM program*: Enhance information provided to patients regarding travel options to the campus site, including discussion of limited parking environment and public transit options. 7. *TNC to transit subsidy*: Provide cash allowance for individuals to use TNC to travel to transit rather drive alone. UCSF may also make improvements to its existing TDM measures to achieve the targeted reduction in daily vehicle trips. In addition, if other new and/or improved TDM strategies are identified in the future, UCSF may implement such strategies in place of or in addition to the ones listed above. The TDM program enhancements/strategies shall be monitored annually for their combined effectiveness in meeting the performance standard set forth above. The annual monitoring and reporting program shall include: (a) an annual calculation of baseline new average daily vehicle trips without TDM program enhancements for each year starting in 2030[2]; (b) an annual calculation of new average daily vehicle trips with the TDM program enhancements; and (c) a comparison of the results of (a) and (b) against the “existing” average daily vehicle trips to determine whether the performance standard of a 15 percent reduction in new average daily vehicle trips is achieved. As this significant impact would likely occur upon the completion of the New Hospital, the annual monitoring and reporting program shall be commenced upon the completion and occupancy of the Initial Phase projects, i.e., after 2030, and shall be conducted by a qualified transportation engineer, using data from UCSF’s regularly administered travel behavior surveys for employee commute, patient and visitor travel, and resident travel. Using these survey results, the monitoring report will gauge the effectiveness of implemented TDM program	

[2] The baseline new average daily vehicle trips without TDM program enhancements would be based on the average daily vehicle trip estimates for “Existing Conditions” and “CPHP (Future Phase)” scenarios, as presented in Appendix TRANS.

S = Significant Impact
SU = Significant and Unavoidable with Mitigation
LTS = Less than Significant impact
NI = No Impact
NA = Not applicable

TABLE 2-3 (CONTINUED)
SUMMARY OF CPHP IMPACTS AND MITIGATION MEASURES

Environmental Impact	Level of Significance Before Mitigation	Mitigation Measures	Level of Significance after Mitigation
EIR Section 4.2 Air Quality (cont.)			
Impact AIR-2 (cont.)		enhancements at achieving the required 15 percent reduction in new average daily vehicle trips. If the annual performance standard is met, no further action from UCSF is required until the next year. In the event that the performance standard is not met, UCSF will examine the TDM program to identify areas of improvement and institute changes, which shall be evaluated for their effectiveness in the following year's monitoring report.	
Impact AIR-3: Construction activities under the CPHP could expose sensitive receptors to substantial pollutant concentrations and exceed the LRDP EIR standard of significance by exposing receptors to toxic air contaminant emissions that (1) result in a cancer risk greater than 10 cancer cases per 1 million people exposed in a lifetime; or (2) for acute or chronic effects, result in concentrations of toxic air contaminant emissions with a Hazard Index of 1.0 or greater.	S	**CPHP Mitigation Measure AIR-3: *Project-Specific Health Risk Analysis.*** UCSF shall prepare and submit to UCOP for review and approval, a project-specific health risk analysis demonstrating that project construction activities will not result in a significant acute, chronic non-cancer or cancer-related health risk to sensitive receptors. This requirement shall apply to construction projects in excess of 12 months of active construction (i.e., exclusive of interior renovations) and within 1,000 feet of sensitive receptors. As a performance standard, any subsequent project-specific health risk analysis must demonstrate an excess cancer risk level of 10-in-1 million or less, a non-cancer (i.e., chronic or acute) hazard index of 1.0 or less, and an incremental increase an annual average $PM_{2.5}$ concentrations of no more than 0.3 microgram per cubic meter.	LTS
Impact AIR-4: Campus site operations under the CPHP could expose sensitive receptors to substantial pollutant concentrations and exceed the LRDP EIR standard of significance by exposing receptors to toxic air contaminant emissions that (1) result in a cancer risk greater than 10 cancer cases per 1 million people exposed in a lifetime; or (2) for acute or chronic effects, result in concentrations of toxic air contaminant emissions with a Hazard Index of 1.0 or greater.	S	**CPHP Mitigation Measure AIR-4a: *Laboratory Fume Hood Emission Control.*** For any individual project that contains more than 25,000 square feet of emissions-generating laboratory space within a building and 50 fume hoods, UCSF shall conduct a health risk screening analysis and obtain a permit from BAAQMD for the proposed individual projects; this permit may be required either prior to or as a condition of approval of the proposed individual project. In accordance with BAAQMD Rules 2-1 and 2-5, new sources of emissions must implement Best Available Control Technology for Toxics (T-BACT) if individual source risks exceed 1.0 in a million for cancer and/or chronic hazard index is greater than 0.20. Additionally, a permit will be denied if project cancer risk exceeds 10.0 in a million or if the chronic or acute hazard index exceeds 1.0. **CPHP Mitigation Measure AIR-4b:** *Design for Diesel Delivery Truck Emissions Minimization*. UCSF shall incorporate the following health risk reduction measures into the project design and construction contracts (as applicable) in order to reduce the potential health risk due to exposure to toxic air contaminant emissions from diesel trucks. Emissions from CPHP-associated diesel trucks shall be reduced through implementing the following measures, as feasible: • Install electrical hook-ups for diesel trucks at loading docks. • Require trucks to use Transportation Refrigeration Units (TRU) that meet Tier 4 emission standards. • Require truck-intensive projects to use advanced exhaust technology (e.g., hybrid) or alternative fuels. • Prohibit trucks from idling for more than two minutes to the extent feasible.	LTS

S = Significant Impact
SU = Significant and Unavoidable with Mitigation
LTS = Less than Significant impact
NI = No Impact
NA = Not applicable

TABLE 2-3 (CONTINUED)
SUMMARY OF CPHP IMPACTS AND MITIGATION MEASURES

Environmental Impact	Level of Significance Before Mitigation	Mitigation Measures	Level of Significance after Mitigation
EIR Section 4.2 Air Quality (cont.)			
Impact AIR-4 (cont.)		• Establish truck routes to avoid sensitive receptors in the project to the extent feasible. A truck route program, along with truck calming, parking, and delivery restrictions, shall be implemented	
Impact AIR-5: The CPHP could conflict with or obstruct implementation of the *2017 Clean Air Plan*.	S	**CPHP Mitigation Measure AIR-5: Implement "cool roof and pavement" design elements.** UCSF shall implement "cool parking" that promotes the use of cool surface treatments for new parking facilities, as well existing surface lots undergoing resurfacing. Additionally, new building construction shall include low-albedo roofing materials to the extent it can reduce energy demand.	LTS
Impact C-AIR-1: Implementation of the CPHP would result in a cumulatively considerable net increase of a criteria pollutant (PM_{10}) for which the project region is non-attainment under an applicable federal or state ambient air quality standard.	S	Implement CPHP Mitigation Measure AIR-2a and AIR-2b.	SU
Impact C-AIR-2: Implementation of the CPHP could contribute considerably to cumulative emissions of TACs and $PM_{2.5}$ that could expose sensitive receptors to substantial pollutant concentrations or health risks.	S	Implement CPHP Mitigation Measures AIR-1a and AIR-1b.	LTS
EIR Section 4.3 Biological Resources			
Impact BIO-1: Implementation of the CPHP would not have a substantial adverse effect, either directly or through habitat modifications, on species identified as candidate, sensitive, or special-status species in local or regional plans, policies, or regulations, or by the California Department of Fish and Wildlife or U.S. Fish and Wildlife Service.	S	**CPHP Mitigation Measure BIO-1a. Botanical Surveys** • Within suitable habitat for special-status plant species (open gravel areas along roadsides and hillsides for coastal triquetrella), a qualified biologist approved by CDFW shall conduct a focused survey for all species with potential to be present prior to ground disturbance. If no special-status plants are observed, no further action is required. • If special-status plant species, including coastal triquetrella are observed, the plants will be avoided with a suitable buffer, determined in coordination with CDFW The buffer zone shall be clearly demarcated using exclusion fencing. If establishing an avoidance buffer is not feasible, individual plants shall be transplanted to an area with suitable physical and biological conditions outside of the work area and monitored and adaptively managed for five years. **CPHP Mitigation Measure BIO-1b. Protection of Monarch Butterflies** • Prior to demolition activities, a qualified biologist familiar with monarch butterfly behavior and habitat shall conduct a preconstruction survey for the presence of overwintering monarch butterfly aggregations. The survey shall be conducted in December or January during the period when overwintering aggregations appear. Should an overwintering aggregation be identified in trees surrounding proposed work sites within or adjacent to the Reserve, a 200-foot buffer shall be established around the occupied trees until the aggregation has dispersed, and construction within the buffer zone will be avoided for the duration of the overwintering period.	LTS

S = Significant Impact
SU = Significant and Unavoidable with Mitigation
LTS = Less than Significant impact
NI = No Impact
NA = Not applicable

TABLE 2-3 (CONTINUED)
SUMMARY OF CPHP IMPACTS AND MITIGATION MEASURES

Environmental Impact	Level of Significance Before Mitigation	Mitigation Measures	Level of Significance after Mitigation
EIR Section 4.3 Biological Resources (cont.)			
Impact BIO-1 (cont.)		**CPHP Mitigation Measure BIO-1c. Protection of Nesting Birds** • Tree and vegetation removal or pruning associated with project construction and commencement of outdoor project construction activities shall be avoided from February 1 through August 31, the primary local bird nesting season, to the extent feasible. If tree and vegetation removal or pruning associated with project construction is proposed during the nesting period, within seven days prior to the proposed start of construction activities a qualified biologist shall conduct a nesting bird survey of all potential habitat at the construction site and within 250 feet of the perimeter of the construction site. • If any active nests are detected during the pre-construction survey, the qualified biologist shall recommend a work-exclusion buffer zone that shall be designated around the active nest to allow for both the successful fledging of the birds and initiation of work on some portions of the project site. A qualified biologist shall monitor any occupied nest located within a protective buffer zone in order to determine if the designated buffer zone is effective and when the buffer zone is no longer needed. If the buffer zone is determined to be ineffective, its size shall be increased until it is effective, or work within one-quarter mile of the nest shall cease until the young have fledged and are independent of the nest. **CPHP Mitigation Measure BIO-1d. Protection of Roosting Bats** • Prior to project construction, a qualified bat biologist shall conduct a pre-construction survey for roosting bats in trees to be removed or pruned and structures to be demolished within the work area and within a 50-foot radius of the work area. If no roosting bats are found, no further action is required. • If a non-maternal roost of bats is found in a tree or structure to be removed or demolished as part of project construction, the individuals shall be safely evicted, under the direction of a qualified bat biologist, by opening the roosting area to allow airflow through the cavity. Removal or demolition should occur no sooner than at least two nights after the initial minor site modification (to alter airflow). This action allows bats to leave during darkness, thus increasing their chance of finding new roosts with a minimum of disturbance. Departure of the bats from the construction area shall be confirmed with a follow-up survey by a qualified bat biologist prior to start of construction. • If active maternity roosts are found in trees or structures that will be removed or demolished as part of project construction, tree removal or demolition of that tree or structure shall commence and be completed before maternity roosting colonies form (generally before March 1), or shall not commence until after young are flying (generally after July 31). Active maternity roosts shall not be disturbed between March 1 and July 31.	

S = Significant Impact
SU = Significant and Unavoidable with Mitigation
LTS = Less than Significant impact
NI = No Impact
NA = Not applicable

Table 2-3 (continued)
Summary of CPHP Impacts and Mitigation Measures

Environmental Impact	Level of Significance Before Mitigation	Mitigation Measures	Level of Significance after Mitigation
EIR Section 4.3 Biological Resources (cont.)			
Impact BIO-1 (cont.)		**CPHP Mitigation Measure BIO-1e. Worker Education** • A qualified biologist shall provide training to all construction workers prior to starting work on plan components. The training shall cover special-status species with potential to be found onsite, avoidance measures to be undertaken if a species is found, and best management practices for site housekeeping.	
Impact BIO-2: Implementation of the CPHP would not interfere substantially with the movement of any native resident or migratory fish or wildlife species or with established native resident or migratory wildlife corridors, or impede the use of native wildlife nursery sites.	S	**Mitigation Measure BIO-2a: Prevention of Harm to Migrating Birds During Construction.** Construction areas requiring lights shall implement the following measures to the extent feasible: • Construction-related lighting shall be fully shielded and focused down to ensure no significant illumination passes beyond the immediate work area. Lighting shall be positioned around the perimeter of the work area positioned toward activity and not surrounding habitat of the Reserve. • Yellow or orange light shall be used where possible. • Construction personnel shall reduce the amount of lighting to the minimum necessary to safely accomplish the work. • Night construction near suitable habitat for nesting and migratory birds and bats (i.e. the Reserve forest and understory vegetation) shall be avoided during nesting season (February 15 – August 15). If night construction near these areas cannot be avoided, light shall not be allowed to shine directly into suitable habitat. **Mitigation Measure BIO-2b: Bird-Safe Building Treatments.** Building designs shall: • Avoid installation of lighting in areas where not required for public safety. • Examine and adopt alternatives to bright, all-night, floor-wide lighting when interior lights would be visible from the exterior or when exterior lights must be left on at night, including: – Installing motion-sensitive lighting – Installing task lighting – Installing programmable timers • Installing fixtures that use lower-wattage, sodium, and yellow-red spectrum lighting (if compatible with personnel safety requirements). • Where exterior lights are to be left on at night, install fully shielded lights to contain and direct light away from the sky. • Employ glazing options such as use of either fritted glass, Dichroic glass, etched glass, translucent glass, or glass that reflects ultraviolet light in appropriate portions of the building façade.	LTS

S = Significant Impact
SU = Significant and Unavoidable with Mitigation
LTS = Less than Significant impact
NI = No Impact
NA = Not applicable

TABLE 2-3 (CONTINUED)
SUMMARY OF CPHP IMPACTS AND MITIGATION MEASURES

Environmental Impact	Level of Significance Before Mitigation	Mitigation Measures	Level of Significance after Mitigation
EIR Section 4.3 Biological Resources (cont.)			
Impact BIO-2 (cont.)		• Minimize light and glare resulting from new buildings through the orientation of the building, use of landscaping materials and choice of primary façade materials. Design standards and guidelines to minimize light and glare shall be adopted for the new buildings, including: reflective metal walls and mirrored glass walls shall not be used as primary building materials for facades.	
Impact BIO-3: Implementation of the CPHP would not conflict with any applicable local policies or ordinances protecting biological resources, including exceeding the LRDP EIR standard of significance by damaging or removing heritage or landmark trees or native oak trees of a diameter specified in a local ordinance.	LTS	None required.	NA
Impact C-BIO-1: Implementation of the CPHP would not result in cumulatively considerable impacts on biological resources, in combination with past, present and reasonably foreseeable future projects in the vicinity of the Parnassus Heights campus site.	S	Implement CPHP Mitigation Measures BIO-1a through 1e, and BIO-2a and 2b.	LTS
EIR Section 4.4 Cultural Resources and Tribal Cultural Resources			
Impact CUL-1: Implementation of the CPHP would result in a substantial adverse change in the significance of known historical resources.	S	**CPHP Mitigation Measure CUL-1a: Identify Character-Defining Features.** Prior to any demolition work or significant alterations initiated at the known historical resources, UCSF shall ensure that a qualified architectural historian who meets the Secretary of the Interior's Professional Qualification Standards identifies character-defining features of each historical resource. Despite being presumed or having been previously determined eligible for listing in the National Register and/or California Register, character-defining features of the historical resources that would be demolished or may be significantly altered under the CPHP have not been explicitly or adequately identified. According to guidance from the National Park Service, a historical resource "must retain… the essential physical features [i.e., character-defining features] that enable it to convey its historic identity. The essential physical features are those features that define both *why* a property is significant…and *when* it was significant" (National Park Service, 1997). The identification of character-defining features is necessary for complete documentation of each historical resource as well as appropriate public interpretation and salvage plans. **CPHP Mitigation Measure CUL-1b: Document Historical Resources Prior to Demolition or Alteration.** Prior to any demolition work or significant alterations initiated at the known historical resources, UCSF shall ensure that a qualified architectural historian who meets the Secretary of the Interior's Professional Qualification Standards thoroughly documents each building and associated landscaping and setting. Documentation shall include still photography and a written documentary record of the building to the National Park Service's standards of the Historic American Buildings Survey (HABS) or the Historic American Engineering Record (HAER), including accurate scaled mapping and architectural descriptions. If available, scaled	SU

S = Significant Impact
SU = Significant and Unavoidable with Mitigation
LTS = Less than Significant impact
NI = No Impact
NA = Not applicable

TABLE 2-3 (CONTINUED)
SUMMARY OF CPHP IMPACTS AND MITIGATION MEASURES

Environmental Impact	Level of Significance Before Mitigation	Mitigation Measures	Level of Significance after Mitigation
EIR Section 4.4 Cultural Resources and Tribal Cultural Resources (cont.)			
Impact CUL-1 (cont.)		architectural plans will also be included. Photos include large-format (4”x5”) black-and-white negatives and 8”x10” enlargements. Digital photography may be substituted for large-format negative photography if archived locally. The record shall be accompanied by a report containing site-specific history and appropriate contextual information. This information shall be gathered through site-specific and comparative archival research and oral history collection as appropriate. Copies of the records shall be submitted to the Northwest Information Center at Sonoma State University and the UCSF Kalmanovitz Library Archives and Special Collections. **CPHP Mitigation Measure CUL-1c: Public Interpretation and Salvage Plan.** Prior to any demolition or significant alteration activities that would remove character-defining features of, or demolish, an individual historical resource on the project site, UCSF shall determine whether any such features may be salvaged, in whole or in part, during demolition/alteration. If it is determined that features are present that will be salvaged, a Salvage Plan shall be prepared by a qualified architectural historian or historic architect who meets the Secretary of the Interior’s Professional Qualification Standards and presented to UCSF Planning staff. Prior to any demolition or significant alteration activities that would remove character-defining features of, or demolish, an individual historical resource on the project site, UCSF shall prepare a plan for interpretive displays. The specific location, media, and other characteristics of such interpretive display(s) shall be included in this proposal. The historic interpretation plan shall be prepared in coordination with an architectural historian or historian who meets the Secretary of the Interior’s Professional Qualification Standards and an exhibit designer or landscape architect with historical interpretation design experience. Interpretive display(s) shall document the individually eligible resources to be demolished or altered. The interpretative plan should also explore contributing to digital platforms that are publicly accessible. A proposal describing the general parameters of the interpretive program and the substance, media, and other elements of such interpretive display shall be approved by UCSF Planning staff prior to commencement of any demolition activities. Following any demolition or alteration activities within the project site, UCSF shall provide within publicly accessible areas of the project site a permanent display(s) of interpretive materials concerning the history and architectural features of the individual historical resources. **CPHP Mitigation Measure CUL-1d: Digital-Imaging and Virtual Preservation of Zakheim Murals in UC Hall.** Prior to the commencement of demolition activities at UC Hall, UCSF Planning staff shall work with a conservator experienced in digital preservation to develop and implement a digital imaging and virtual preservation proposal for the Zakheim murals in UC Hall. The proposal shall include a plan to digitally preserve the Zakheim murals through high-resolution three-dimensional digital recording that would be made available both online and through a planned interpretive virtual reality interpretive exhibit on campus to be maintained by the UCSF Library’s Archives and Special Collections department. UCSF Planning staff shall ensure that the digital-imaging and virtual preservation activities are completed prior to any demolition activities in Toland Hall.	

S = Significant Impact
SU = Significant and Unavoidable with Mitigation
LTS = Less than Significant impact
NI = No Impact
NA = Not applicable

TABLE 2-3 (CONTINUED)
SUMMARY OF CPHP IMPACTS AND MITIGATION MEASURES

Environmental Impact	Level of Significance Before Mitigation	Mitigation Measures	Level of Significance after Mitigation
EIR Section 4.4 Cultural Resources and Tribal Cultural Resources (cont.)			
Impact CUL-2: Implementation of the CPHP would result in a substantial adverse change in the significance of potential future historical resources that may become eligible by the full build-out of the CPHP in 2050.	S	Implement CPHP Mitigation Measures CUL-1a through -1c.	SU
Impact CUL-3: Implementation of the CPHP could cause a substantial adverse change in the significance of an archaeological resource pursuant to CEQA Guidelines Section 15064.5.	S	**CPHP Mitigation Measure CUL-3: Inadvertent Discovery of Archaeological Resources and Tribal Cultural Resources.** Prior to commencement of construction activities, all on-site personnel shall attend a mandatory pre-project training to outline the general archaeological and tribal cultural sensitivity of the project area. The training will include a description of the types of resources that could be encountered and the procedures to follow in the event of an inadvertent discovery of resources. If prehistoric or historic-era archaeological resources are encountered by construction personnel during ground-disturbing activities, all construction activities within 100 feet shall halt and the contractor shall notify the UCSF Environmental Coordinator (EC). The UCSF EC shall retain a Secretary of the Interior-qualified archaeologist (qualified archaeologist) to inspect the find within 24 hours of discovery. If it is determined that the project could damage a historical resource or a unique archaeological resource, construction shall cease in an area determined by the qualified archaeologist until a mitigation plan has been prepared and implemented [CEQA Guidelines 15064.5(b)(4)]. If the find is a potential tribal cultural resource, the UCSF EC shall contact a Native American representative or representatives (as provided by the Native American Heritage Commission) [PRC 21074(2)(c)]. The qualified archaeologist, in consultation with the UCSF EC and the Native American representative(s), shall determine when construction can resume. If the resource is determined to be a historical resource or a unique archaeological resource, the preferred mitigation shall be preservation in place. In accordance with PRC Section 21083.2(b), preservation in place shall be accomplished through: (1) modifying the construction plan to avoid the resource; (2) incorporating the resource within open space; (3) capping and covering the resource; or (4) deeding the resource site into a permanent conservation easement. If preservation in place is not feasible, the qualified archaeologist, in consultation with the UCSF EC and the Native American representative(s) (if the resource is prehistoric), shall prepare and implement a detailed treatment plan. In all cases treatment will be carried out with dignity and respect (including protecting the cultural character, traditional use, and confidentiality of the resource). For prehistoric resources, the Native American representative(s) will be consulted on the research approach, methods, and whether burial or data recovery or alternative mitigation is appropriate for the find. Treatment for most resources could consist of (but shall not be limited to) sample excavation, site documentation, and historical research, as appropriate to the discovered prehistoric resource. The treatment plan shall include provisions for analysis of data in a regional context as appropriate to the discovered prehistoric resource, reporting of results within a timely manner, and dissemination of reports to local and state repositories, libraries, and interested professionals.	LTS

S = Significant Impact
SU = Significant and Unavoidable with Mitigation
LTS = Less than Significant impact
NI = No Impact
NA = Not applicable

TABLE 2-3 (CONTINUED)
SUMMARY OF CPHP IMPACTS AND MITIGATION MEASURES

Environmental Impact	Level of Significance Before Mitigation	Mitigation Measures	Level of Significance after Mitigation
EIR Section 4.4 Cultural Resources and Tribal Cultural Resources (cont.)			
Impact CUL-4: Implementation of the CPHP could disturb human remains, including those interred outside of dedicated cemeteries.	S	**CPHP Mitigation Measure CUL-4: Inadvertent Discovery of Human Remains.** In the event of discovery or recognition of any human remains during ground-disturbing activities, treatment shall comply with all applicable state and federal laws. All construction activities within 100 feet shall halt and the contractor shall notify the UCSF Environmental Coordinator (EC). In accordance with PRC 5097.98, the UCSF EC shall contact the San Francisco Office of the Medical Examiner (Medical Examiner) to determine that no investigation of the cause of death is required. The Medical Examiner shall contact the Native American Heritage Commission (NAHC) within 24 hours if it is determined that the remains are Native American. The NAHC will then identify the person or persons it believes to be the most likely descendant (MLD) from the deceased Native American. Within 48 hours, the MLD shall make recommendations to the UCSF EC of the appropriate means of treating the human remains and any grave goods. Whenever the NAHC is unable to identify an MLD, the MLD fails to make a recommendation, or the parties are unable to agree on the appropriate treatment measures, the human remains shall be reinterred with appropriate dignity on the property in a location not subject to further and future subsurface disturbance.	LTS
Impact CUL-5: Implementation of the CPHP could cause a substantial adverse change in the significance of a tribal cultural resource, defined in PRC Section 21074 as either a site, feature, place, cultural landscape that is geographically defined in terms of the size and scope of the landscape, sacred place, or object with cultural value to a California Native American tribe.	S	Implement CPHP Mitigation Measure CUL-3.	LTS
Impact C-CUL-1: Implementation of the CPHP would result in cumulatively considerable impacts on cultural and/or tribal cultural resources, in combination with past, present and reasonably foreseeable future projects in the vicinity of the Parnassus Heights campus site.	SUM for Historical Resources; LTSM for Archaeological Resources, Human Remains, and Tribal Cultural Resources	**Historic Resources.** Implement CPHP Mitigation Measures CUL-1a through -1d. **Archaeological Resources, Human Remains, and Tribal Cultural Resources.** Implement CPHP Mitigation Measures CUL-3 and CUL-4.	SU LTS
EIR Section 4.5 Energy			
Impact ENE-1: Implementation of the CPHP would not result in a potentially significant environmental impact due to wasteful, inefficient, or unnecessary consumption of energy resources, during project construction or operation.	LTS	None required.	NA
Impact ENE-2: Implementation of the CPHP would not conflict with or obstruct a state or local plan for renewable energy or energy efficiency.	LTS	None required.	NA

S = Significant Impact
SU = Significant and Unavoidable with Mitigation
LTS = Less than Significant impact
NI = No Impact
NA = Not applicable

TABLE 2-3 (CONTINUED)
SUMMARY OF CPHP IMPACTS AND MITIGATION MEASURES

Environmental Impact	Level of Significance Before Mitigation	Mitigation Measures	Level of Significance after Mitigation
EIR Section 4.5 Energy (cont.)			
Impact C-ENE-1: The CPHP, combined with cumulative development in the Parnassus Heights campus site vicinity and citywide, would not result in significant cumulative energy impacts.	LTS	None required.	NA
EIR Section 4.6 Geology and Soils			
Impact GEO-1: New development under the CPHP would not directly or indirectly cause substantial adverse effects, including the risk of loss, injury, or death involving strong seismic ground shaking.	LTS	None required.	NA
Impact GEO-2: New development under the CPHP would not directly or indirectly cause substantial adverse effects, including the risk of loss, injury, or death involving strong seismic related ground failure including liquefaction.	LTS	None required.	NA
Impact GEO-3: New development under the CPHP would not directly or indirectly cause substantial adverse effects, including the risk of loss, injury, or death involving landslides.	S	**CPHP Mitigation Measure GEO-3:** UCSF shall implement the following geotechnical recommendations contained within the Rutherford & Chekene March 2019 report: • Remove selected trees located on or at the crest of steep rock slopes on which tree root wedging decreases stability. Determination of specific trees to be removed shall be made in association with a certified arborist and state licensed geotechnical engineer or engineering geologist. Removal will involve cutting trees and leaving stumps such that the root system can rot in situ with minimal disturbance to the surface geology. • Conduct qualitative monitoring of identified slopes by a state licensed geotechnical engineer or engineering geologist or as directed by said professional. Monitoring shall occur, at a minimum, after each moderate to major storm or earthquake, as defined by the geotechnical professional. The geotechnical professional shall submit a report of findings to UCSF that includes recommendations for additional slope stability improvements, if deemed necessary, to maintain continued safety in accordance with geotechnical standards and building code requirements.	LTS
Impact GEO-4: Construction and operation of development associated with the CPHP would not have the potential to result in the substantial erosion or the loss of topsoil.	LTS	None required.	NA
Impact GEO-5: Development and redevelopment associated with the CPHP would not be located on a geologic unit or soil that is unstable, or that would become unstable as a result of the project, and potentially result in on- or off-site landslide, lateral spreading, subsidence, liquefaction or collapse.	LTS	None required.	NA

S = Significant Impact
SU = Significant and Unavoidable with Mitigation
LTS = Less than Significant impact
NI = No Impact
NA = Not applicable

TABLE 2-3 (CONTINUED)
SUMMARY OF CPHP IMPACTS AND MITIGATION MEASURES

Environmental Impact	Level of Significance Before Mitigation	Mitigation Measures	Level of Significance after Mitigation
EIR Section 4.6 Geology and Soils (cont.)			
Impact GEO-6: Construction associated with the CPHP could have the potential to directly or indirectly destroy a unique paleontological resource or site or unique geologic feature.	S	**CPHP Mitigation Measure GEO-6:** Prior to commencement of construction activities, all on-site personnel shall attend a mandatory pre-project training to outline the general paleontological sensitivity of the project area. The training will include a description of the types of resources that could be encountered and the procedures to follow in the event of an inadvertent discovery of resources. If paleontological resources, such as fossilized bone, teeth, shell, tracks, trails, casts, molds, or impressions are discovered during ground-disturbing activities, work shall stop in that area and within 100 feet of the find until a qualified paleontologist meeting the Society of Vertebrate Paleontology (SVP) Standards can assess the nature and importance of the find and, if necessary, develop appropriate salvage measures in conformance with SVP standards (2010). If the discovery can be avoided and no further impacts will occur, no further effort shall be required. If the resource cannot be avoided and may be subject to further impact, a qualified paleontologist shall evaluate the resource and determine whether it is "unique" under CEQA. Any discovered paleontological resources that are determined by the qualified paleontologist to be "unique" in accordance with CEQA shall be given appropriate salvage measures in conformance with SVP standards (2010).	LTS
Impact C-GEO-1: Implementation of the CPHP could have the potential to combine with past, present and reasonably foreseeable future projects to result in cumulatively considerable impacts related to geology and soils.	S	Implement CPHP Mitigation Measure GEO-6.	LTS
EIR Section 4.7 Greenhouse Gas Emissions			
Impact GHG-1: Implementation of the CPHP would generate GHG emissions, either directly or indirectly, that may have a significant impact on the environment.	S	**CPHP Mitigation Measure GHG-1a: Emission Reduction Measures to supplement those currently included in GHGRS update that would occur as part of the proposed amendment to the 2014 LRDP under the CPHP.** The GHGRS update shall include the following measure identified in Table 4.7-4 to address long-term GHG emissions reductions: • ***Water Conservation Strategies*:** Campus design principle WC2 of the CPHP identifies storm water capture and treatment to reduce water demand. UCSF shall amend the GHGRS to include a Water Conservation Measure based on storm water capture and the associated reduction in outdoor water demand. A year 2050 target of 3 percent reduction of overall outdoor water use shall be established. **CPHP Mitigation Measure GHG-1b:** Implement CPHP Mitigation Measure AIR-2a: Project-Level Operational Measures, CPHP Mitigation Measure AIR-2b: TDM Program Enhancements, CPHP Mitigation Measure AIR-4b: Design for Diesel Delivery Truck Emissions Minimization, and CPHP Mitigation Measure AIR-5: Implement "cool roof and pavement" design elements to further reduce emissions from individual projects and mobile sources.	LTS

S = Significant Impact
SU = Significant and Unavoidable with Mitigation
LTS = Less than Significant impact
NI = No Impact
NA = Not applicable

TABLE 2-3 (CONTINUED)
SUMMARY OF CPHP IMPACTS AND MITIGATION MEASURES

Environmental Impact	Level of Significance Before Mitigation	Mitigation Measures	Level of Significance after Mitigation
EIR Section 4.7 Greenhouse Gas Emissions (cont.)			
Impact GHG-1 (cont.)		**CPHP Mitigation Measure GHG-1c: Monitor emissions annually and acquire carbon offset credits in conformance with CARB guidance, prioritizing local and in-State offsets to achieve and maintain carbon neutrality for the Parnassus Heights campus site under the CPHP.** As part of this mitigation measure, UCSF is making the following separate, though overlapping, GHG emission reduction commitments: (1) As a CARB-covered entity, UCSF will maintain compliance with CARB's cap and trade program; (2) Per existing UC Policy, UCSF's Scope 1 and Scope 2 GHG emissions shall, commencing in 2025, be entirely carbon neutral; (3) Also per existing UC Policy, commencing in 2020, UCSF's Scope 1, Scope 2, and Scope 3 emissions from commuters and air travel shall be voluntarily offset; and (4) UCSF's total GHG operational emissions from all Scope 1, 2, and 3 sources (as defined in this EIR) shall not exceed the Parnassus Heights campus's baseline emissions from these sources in 2018. Each of these commitments is described in more detail below. **Compliance with CARB's Cap and Trade Program:** Any carbon offset credits purchased for the purpose of compliance with CARB's cap and trade program shall be purchased from an accredited carbon credit market. Such offset credits (or California Carbon Offsets) shall be registered with, and retired[3] by an Offset Project Registry, as defined in 17 California Code of Regulations § 95802(a), approved by the California Air Resources Board such as, but not limited to, Climate Action Reserve, American Carbon Registry or Verra (formerly Verified Carbon Standard). In order to demonstrate that the carbon offset credits provided are real, permanent, additional, quantifiable, verifiable, and enforceable, as those terms are defined in 17 California Code of Regulations § 95802(a), UCSF shall document in its annual report: (i) the protocol used to develop those credits, and (ii) the third-party verification report concerning those credits. As and when the credits are retired, UCSF shall document in its annual report the unique serial numbers of those credits showing that they have been retired. **Compliance with UC Policy:** Compliance with UC's policies for carbon neutrality by 2025 and UC's own policy to reduce Scope 1, 2, and transportation-related Scope 3 emissions below 1990 levels pursuant to AB 32 will be accomplished through reductions in direct emissions, the purchase of renewable electricity and possibly biomethane, and the purchase of carbon offset credits. UCSF will purchase voluntary carbon offset credits as the final action to reach the GHG emission reduction targets. As part of the UC Carbon Neutrality Initiative, internal guidelines have been developed to ensure that any use of offsets for this purpose will result in additional, verified GHG emissions reductions from actions that align, as much as possible, with UC's research, teaching, and public service mission. Specifically, any voluntary carbon offset credits used by UCSF to mitigate GHG emissions will:	

[3] When Climate Reserve Tonnes (CRTs) are transferred to a retirement account in the Reserve System, they are considered retired. Retirement accounts are permanent and locked to prevent a retired CRT from being transferred again. CRTs are retired when they have been used to offset an equivalent ton of emissions or have been removed from further transactions on behalf of the environment.

S = Significant Impact LTS = Less than Significant impact NA = Not applicable
SU = Significant and Unavoidable with Mitigation NI = No Impact

TABLE 2-3 (CONTINUED)
SUMMARY OF CPHP IMPACTS AND MITIGATION MEASURES

Environmental Impact	Level of Significance Before Mitigation	Mitigation Measures	Level of Significance after Mitigation
EIR Section 4.7 Greenhouse Gas Emissions (cont.)			
Impact GHG-1 (cont.)		1. Prioritize local (within the air district) and in-state offset credits over in-nation offset credits. Offset credits shall be third-party verified by a major registry recognized by CARB such as CAR (Climate Action Reserve). If sufficient local and in-state offset credits are not available, UCSF will purchase CARB conforming national offset credits registered with an approved registry. 2. Be reported publicly and tracked through the Climate Registry (TCR) as required by UC policy. TCR is a non-profit organization governed by U.S. states and Canadian provinces and territories. UCSF's TCR reports will be third-party verified and posted publicly. **Commitment to control Parnassus Heights Annual Emissions to not exceed existing baseline:** UCSF shall monitor Parnassus Heights campus-wide GHG operational emissions from all Scope 1, 2 and 3 sources (as defined in this EIR) annually, commencing in 2025 upon the completion and occupancy of the first project under the CPHP. The estimated annual emissions shall be compared to the year 2018 baseline of 125,426 MT CO_2e per year to determine whether the emissions have increased above the baseline level. For the identified amount of exceedance of the performance standard, UCSF shall purchase carbon offset credits sufficient to maintain carbon neutrality. These offset credits shall be purchased for the types of Scope 1 and Scope 3 emissions that are already reported to and verified by a third party verification body annually, as well as for Scope 3 emissions from patient and visitor vehicle trips, indirect emissions from water and wastewater demand, and solid waste emissions, all of which are included in the EIR analysis above as required by CEQA. Carbon offset credits used for this purpose shall originate from a voluntary carbon credit registry that TCR recognizes such as: CAR, ACR, or Verra (other registries are also applicable). Offset credits in this case shall be registered, transferred, and retired at such registries. The protocols of each registry, and UC own internal screens, shall be used to demonstrate that the carbon offset credits provided are real, permanent, additional, and have been independently verified as adhering to its applicable project protocols. For this purpose, local (within the air district) and in-state carbon offset credits shall be prioritized over in-nation offset credits. If sufficient local and in-state offset credits are not available, UCSF will purchase CARB conforming national offset credits registered with an approved registry. As and when the credits are retired, UCSF shall document in its annual report the unique identifier of those credits showing that they have been retired and accepted by TCR.	
Impact GHG-2: Implementation of the CPHP would not conflict with an applicable plan, policy or regulation adopted for the purpose of reducing the emissions of greenhouse gases.	LTS	None required.	NA

S = Significant Impact
SU = Significant and Unavoidable with Mitigation
LTS = Less than Significant impact
NI = No Impact
NA = Not applicable

TABLE 2-3 (CONTINUED)
SUMMARY OF CPHP IMPACTS AND MITIGATION MEASURES

Environmental Impact	Level of Significance Before Mitigation	Mitigation Measures	Level of Significance after Mitigation
EIR Section 4.8 Hazards and Hazardous Materials			
Impact HAZ-1: Construction and operation of campus development under the proposed CPHP could create a significant hazard to the public or the environment through the routine transport, use, or disposal of hazardous materials.	S	**CPHP Mitigation Measure HAZ-1:** An Excavation Management Plan shall be prepared by a qualified consultant to include the California Air Resource Board (CARB) Asbestos Airborne Toxic Control Measure (ATCM) for Construction, Grading, Quarrying and Surface Mining Operations to minimize naturally occurring asbestos through the application of best management practices for fugitive dust from construction, grading and excavation operations. Unless site specific testing by a certified laboratory can demonstrate the absence of naturally occurring asbestos in materials to be excavated, construction specifications shall include implementation of this CARB ATCM.	LTS
Impact HAZ-2: Construction and operation of campus development under the proposed CPHP would not create a significant hazard to the public or the environment through reasonably foreseeable upset and accident conditions involving the release of hazardous materials into the environment.	LTS	None required.	NA
Impact HAZ-3: Construction and operation of the proposed CPHP would not emit hazardous emissions or handle hazardous or acutely hazardous materials, substances, or waste within one-quarter mile of an existing or proposed school.	LTS	None required.	NA
Impact HAZ-4: Campus development under the proposed CPHP would not be located on a site which is included on a list of hazardous materials sites compiled pursuant to Government Code Section 65962.5. However, previously unknown contamination could be encountered during construction and could have the potential to create a significant hazard to the public or the environment.	S	**CPHP Mitigation Measure HAZ-4:** Prior to development on the Parnassus Heights campus site under the CPHP, a Soil Management Plan shall be prepared by a qualified environmental consulting firm to reflect current regulatory requirements and risk management protocols that are in accordance with Regional Water Quality Control Board oversight. The Plan shall include measures to address protocols for identifying, handling, and characterizing suspect contaminated soils. Notification and sampling requirements for adequate characterization shall be in accordance with the overseeing agency (RWQCB or SFDEH) requirements and any required removal or remediation work shall be completed to the overseeing agency's standards prior to occupancy of the new structure.	LTS
Impact C-HAZ-1: Construction and operation of campus development under the proposed CPHP, in conjunction with other cumulative development within the City of San Francisco, would not create a significant hazard to the public or the environment through the routine transport, use, or disposal of hazardous materials or from risk of upset and accident conditions.	LTS	None required.	NA

S = Significant Impact
SU = Significant and Unavoidable with Mitigation
LTS = Less than Significant impact
NI = No Impact
NA = Not applicable

TABLE 2-3 (CONTINUED)
SUMMARY OF CPHP IMPACTS AND MITIGATION MEASURES

Environmental Impact	Level of Significance Before Mitigation	Mitigation Measures	Level of Significance after Mitigation
EIR Section 4.9 Hydrology and Water Quality			
Impact HYD-1: Construction and operation of campus development under the CPHP would not have the potential to violate water quality standards or waste discharge requirements, or otherwise substantially degrade surface or groundwater quality.	LTS	None required.	NA
Impact HYD-2: Construction and operation of the campus development under the CPHP would not substantially alter the existing drainage patterns of the site or area, in a manner that has the potential to result in substantial erosion or siltation on- or off- site; substantially increase the rate or amount of surface runoff in a manner that would result in flooding on or off site; create or contribute runoff water that would exceed the capacity of existing or planned stormwater drainage systems or provide substantial additional sources of polluted runoff; or impede or redirect flow.	LTS	None required.	NA
Impact C-HYD-1: Construction and operation of campus development under the CPHP, in conjunction with other cumulative development within the City of San Francisco, would not cumulatively violate water quality standards or waste discharge requirements, or otherwise substantially degrade water quality.	LTS	None required.	NA
Impact C-HYD-2: Construction and operation of campus development under the CPHP, in conjunction with other cumulative development in the City of San Francisco's CSS, would not have the potential to cumulatively alter the drainage pattern of the site or area, through the addition of impervious surfaces, in a manner which would result in substantial erosion or siltation on or off site; substantially increase the rate or amount of surface runoff in a manner which would result in flooding on or off site; create or contribute runoff water which would exceed the capacity of existing or planned stormwater drainage systems or provide substantial additional sources of polluted runoff; or impede or redirect flow.	LTS	None required.	NA

S = Significant Impact
SU = Significant and Unavoidable with Mitigation
LTS = Less than Significant impact
NI = No Impact
NA = Not applicable

TABLE 2-3 (CONTINUED)
SUMMARY OF CPHP IMPACTS AND MITIGATION MEASURES

Environmental Impact	Level of Significance Before Mitigation	Mitigation Measures	Level of Significance after Mitigation
EIR Section 4.10 Land Use and Planning			
Impact LU-1: Implementation of the CPHP would not cause a significant environmental impact due to a conflict with land use plans, policies and regulations adopted for the purpose of avoiding or mitigating an environmental effect.	LTS	None required.	NA
Impact LU-2: Development under the proposed CPHP would not conflict with local land use regulations such that a significant incompatibility with adjacent land uses is created.	LTS	None required.	NA
Impact C-LU-1: The proposed CPHP, in combination with past, present, and reasonably foreseeable future projects, would not result in a conflict with land use plans, policies, and regulations adopted for the purpose of avoiding or mitigating an environmental effect or a conflict with local land use regulations such that a significant incompatibility with adjacent land uses is created.	LTS	None required.	NA
EIR Section 4.11 Noise and Vibration			
Impact NOI-1: Construction activities under the CPHP would generate a substantial temporary increase in ambient noise levels in the vicinity of the construction project in excess of standards established in the local general plan or noise ordinance, or applicable standards of other agencies.	S	**CPHP Mitigation Measure NOI-1a: Construction Noise Control Measures.** UCSF contractors shall employ site-specific noise attenuation measures during construction of projects under the CPHP to reduce the generation of construction noise. These measures shall be included in a Noise Control Plan that shall be submitted for review and approval by UCSF to ensure that construction noise is consistent with the standards set forth in the City's Noise Ordinance. Measures specified in the Noise Control Plan and implemented during project construction shall include, at a minimum, the following noise control strategies: • Equipment and trucks used for construction shall use the best available noise control techniques (e.g., improved mufflers, equipment redesign, use of intake silencers, ducts, engine enclosures, and acoustically attenuating shields or shrouds. • Impact tools (e.g., jack hammers, pavement breakers, and rock drills) used for construction shall be hydraulically or electrically powered wherever possible to avoid noise associated with compressed air exhaust from pneumatically powered tools. Where use of pneumatic tools is unavoidable, an exhaust muffler on the compressed air exhaust shall be used; this muffler can lower noise levels from the exhaust by up to about 10 dBA. External jackets on the tools themselves shall be used where feasible; this could achieve a reduction of 5 dBA. Quieter procedures, such as use of drills rather than impact tools, shall be used where feasible. • Stationary noise sources shall be located as far from adjacent receptors as possible, and they shall be muffled and enclosed within temporary sheds, incorporate insulation barriers, or include other measures.	SU

S = Significant Impact
SU = Significant and Unavoidable with Mitigation
LTS = Less than Significant impact
NI = No Impact
NA = Not applicable

TABLE 2-3 (CONTINUED)
SUMMARY OF CPHP IMPACTS AND MITIGATION MEASURES

Environmental Impact	Level of Significance Before Mitigation	Mitigation Measures	Level of Significance after Mitigation
EIR Section 4.11 Noise and Vibration (cont.)			
Impact NOI-1 (cont.)		• Shield staging areas where adjacent sensitive receptors have direct line-of-sight with loading and delivery activities. Shielding may consist of plywood fencing with no gaps or acoustical paneling erected in K-rails. **CPHP Mitigation Measure NOI-1b: Construction Hours.** Construction hours shall be restricted to the hours listed in the table below. In rare circumstances, work may need to occur outside of these work hour limits. In such cases, UCSF Community and Government Relations will receive advance notice from the project manager, at least one week in advance as feasible, and will engage the community to identify measures to minimize potential impacts. These measures may include, but not be limited to, restricting work to smaller time windows, condensing the overall duration of nighttime work to the degree feasible, and erecting temporary barriers to shield the short-term nighttime activity.	

Construction Hours

	"Not Noisy" Work[1]		Noisy Work	
	Regular hours	**Extended hours[2]**	**Regular hours**	**Extended hours[1]**
Monday - Friday	7:00 a.m. to 5:00 p.m.	5:00 p.m. to 8:00 p.m.	8:00 a.m. to 5:00 p.m.	
Saturday		8:00 a.m. to 5:00 p.m.		9:00 a.m. to 4:00 p.m.
Sunday		8:00 a.m. to 5:00 p.m.		

1 "Not Noisy" work = 80 decibels or less at 100 feet; "Noisy" work = more than 80 decibels at 100 feet.
2 Extended hours to be considered by UCSF Community and Government Relations with advance notice from the project manager.

CPHP Mitigation Measure NOI-1c: Pile-Installation Noise-Reducing Techniques. Noise-reducing pile-installation techniques shall be employed during project construction. These techniques shall include:

- Installing cast-in-place concrete piles. Noise from auger drilling is 17 dBA less than an impact pile driver.
- Vibrating piles into place, and installing shrouds around the pile-driving hammer where feasible.
- Implement "quiet" pile-installation technology (such as pre-drilling of piles and the use of more than one pile driver to shorten the total pile installation duration).

S = Significant Impact
SU = Significant and Unavoidable with Mitigation
LTS = Less than Significant impact
NI = No Impact
NA = Not applicable

TABLE 2-3 (CONTINUED)
SUMMARY OF CPHP IMPACTS AND MITIGATION MEASURES

Environmental Impact	Level of Significance Before Mitigation	Mitigation Measures	Level of Significance after Mitigation
EIR Section 4.11 Noise and Vibration (cont.)			
Impact NOI-1 (cont.)		Implement CPHP Mitigation Measure TRANS-5: Construction Coordination and Monitoring Measures–Construction Traffic Control Plan.	SU
Impact NOI-2: Implementation of the CPHP would generate substantial permanent increases in ambient noise levels in the vicinity of the project in excess of standards established in the local general plan or noise ordinance, or applicable standards of other agencies.	S	**CPHP Mitigation Measure NOI-2: Operational Noise Control.** For all development projects under the CPHP, mechanical equipment shall be selected and designed to meet the City's Police Code requirements of 8 dBA over existing ambient noise levels without the equipment operating as well as an interior noise standard at any sleeping or living room in any dwelling unit located on residential property of 45 dBA between 10:00 p.m. and 7:00 a.m., and 50 dBA between 7:00 a.m. and 10:00 p.m. A qualified acoustical consultant shall be retained to review mechanical noise as these systems are selected to determine specific noise reduction measures necessary to reduce noise to comply with the City's Police Code. Noise reduction measures could include, but are not limited to, selection of equipment that emits low noise levels; installation of noise barriers such as enclosures and parapet walls to block the line of sight between the noise source and the nearest receptors; and siting the mechanical equipment, including intake and exhaust portals for fixed mechanical equipment, as far as possible from the nearby existing sensitive receptors (i.e., west side of building).	LTS
Impact NOI-3: Construction activities under the CPHP could result in generation of excessive groundborne vibration or groundborne noise levels.	S	**CPHP Mitigation Measure NOI-3a: Limited Use of Vibratory Rollers.** UCSF shall require that contractors use (non- vibratory) excavator mounted compaction wheels mounted on an excavator or back-hoe and/or small, smooth drum rollers for final compaction of any asphalt base and asphalt concrete within 25 feet of a historic or older structure. If needed to meet compaction requirements, smaller, non-seated vibratory rollers shall be used to minimize vibration levels during repaving activities where needed to meet a vibration standard of 0.25 PPV at adjacent historic or older structures. **CPHP Mitigation Measure NOI-3b: Assessment and Relocation/Retrofitting of Vibration-Sensitive Equipment. UCSF** shall evaluate the presence of vibration-sensitive equipment within 150 feet of construction and demolition areas. Any sensitive equipment shall be evaluated for the existing extent of vibration isolation and relocated or further embellish isolation, as warranted.	LTS
Impact NOI-4: Implementation of the CPHP would not exceed an LRDP EIR operational standard of significance by contributing to an increase in average daily noise levels (L_{dn}) of 3 dB(A) or more at property lines, where ambient noise levels already exceed local noise levels set forth in local general plans or ordinances for such areas based on their use.	LTS	None required.	NA

S = Significant Impact
SU = Significant and Unavoidable with Mitigation
LTS = Less than Significant impact
NI = No Impact
NA = Not applicable

TABLE 2-3 (CONTINUED)
SUMMARY OF CPHP IMPACTS AND MITIGATION MEASURES

Environmental Impact	Level of Significance Before Mitigation	Mitigation Measures	Level of Significance after Mitigation
EIR Section 4.11 Noise and Vibration (cont.)			
Impact C-NOI-1: Implementation of the CPHP, combined with cumulative construction noise in the project area, would generate a substantial temporary increase in ambient noise levels from construction activity in the vicinity of the project in excess of standards established in the local general plan or noise ordinance, or applicable standards of other agencies.	S	Implement CPHP Mitigation Measures NOI-1a, NOI-1b, and CPHP Mitigation Measure TRANS-5: Construction Coordination and Monitoring Measures.	SU
Impact C-NOI-2: Implementation of the CPHP, combined with cumulative development in the project area, would generate substantial permanent increases in ambient noise levels in the vicinity of the project in excess of standards established in the local general plan or noise ordinance, or applicable standards of other agencies.	S	Implement CPHP Mitigation Measure NOI-2.	LTS
Impact C-NOI-3: Implementation of the CPHP, combined with cumulative construction in the project area, would result in generation of excessive groundborne vibration or groundborne noise levels.	S	Implement CPHP Mitigation Measure NOI-3a.	LTS
Impact C-NOI-4: Implementation of the CPHP combined with cumulative development in the project area could exceed an LRDP EIR operational standard of significance by contributing to an increase in average daily noise levels (L_{dn}) of 3 dB(A) or more at property lines, if ambient noise levels in areas adjacent to proposed development already exceed local noise levels set forth in local general plans or ordinances for such areas based on their use.	LTS	None required.	NA
EIR Section 4.12 Population and Housing			
Impact POP-1: Implementation of the CPHP would induce population growth in the San Francisco Bay area, which could create demand for housing outside the market area.	LTS	None required.	NA
Impact POP-2: Implementation of the CPHP would not displace substantial numbers of existing people or housing, necessitating the construction of replacement housing elsewhere	LTS	None required.	NA

S = Significant Impact
SU = Significant and Unavoidable with Mitigation
LTS = Less than Significant impact
NI = No Impact
NA = Not applicable

TABLE 2-3 (CONTINUED)
SUMMARY OF CPHP IMPACTS AND MITIGATION MEASURES

Environmental Impact	Level of Significance Before Mitigation	Mitigation Measures	Level of Significance after Mitigation
EIR Section 4.12 Population and Housing (cont.)			
Impact C-POP-1: The CPHP, in combination with past, present, and reasonably foreseeable future projects, would not result in a cumulatively considerable contribution to significant cumulative population and housing impacts.	LTS	None required.	NA
EIR Section 4.13 Public Services			
Impact PUB-1: Implementation of the CPHP would not result in substantial adverse physical impacts associated with the provision of new or physically altered fire protection facilities, need for new or physically altered fire protection facilities, the construction of which could cause significant environmental impacts, in order to maintain acceptable service ratios, response times or other performance objectives.	LTS	None required.	NA
Impact PUB-2: Implementation of the CPHP would not result in substantial adverse physical impacts associated with the provision of new or physically altered public school facilities, need for new or physically altered public school facilities, the construction of which could cause significant environmental impacts, in order to maintain acceptable service ratios, response times or other performance objectives.	LTS	None required.	NA
Impact C-PUB-1: The CPHP, in combination with past, present, and reasonably foreseeable future projects, would not result in substantial adverse physical impacts associated with the provision of new or physically altered public facilities, need for new or physically altered public facilities, the construction of which could cause significant environmental impacts, in order to maintain acceptable service ratios, response times or other performance objectives.	LTS	None required.	NA
EIR Section 4.14 Recreation			
Impact REC-1: Implementation of the CPHP would not increase the use of existing neighborhood and regional parks or other existing on- and off-campus recreational facilities such that substantial physical deterioration of the facility would occur or be accelerated.	LTS	None required.	NA

S = Significant Impact
SU = Significant and Unavoidable with Mitigation
LTS = Less than Significant impact
NI = No Impact
NA = Not applicable

TABLE 2-3 (CONTINUED)
SUMMARY OF CPHP IMPACTS AND MITIGATION MEASURES

Environmental Impact	Level of Significance Before Mitigation	Mitigation Measures	Level of Significance after Mitigation
EIR Section 4.14 Recreation (cont.)			
Impact REC-2: The CPHP includes new recreational facilities, the construction of which would not have an adverse impact on the environment with mitigation.	LTS	None required.	NA
Impact C-REC-1: The CPHP, in combination with past, present, and reasonably foreseeable future projects, would not increase the use of existing neighborhood and regional parks or other recreational facilities such that substantial physical deterioration of the facility would occur or be accelerated.	LTS	None required.	NA
EIR Section 4.15 Transportation			
Impact TRANS-1: Implementation of the CPHP would not conflict with a program, plan, ordinance or policy addressing the circulation system, including transit, roadway, bicycle and pedestrian facilities.	LTS	None required.	NA
Impact TRANS-2: Implementation of the CPHP would not conflict or be inconsistent with CEQA Guidelines Section 15064.3, subdivision (b).	LTS	None required.	NA
Impact TRANS-3: Implementation of the CPHP would not substantially increase hazards due to a geometric design feature (e.g., sharp curves or dangerous intersections) or incompatible uses (e.g., farm equipment).	LTS	None required.	NA
Impact TRANS-4: Implementation of the CPHP would not result in inadequate emergency access.	LTS	None required.	NA
Impact TRANS-5: Construction activities under the CPHP could temporarily impact travel conditions along sidewalks and roadways serving the campus site.	S	**CPHP Mitigation Measure TRANS-5: Construction Coordination and Monitoring Measures** ***Construction Traffic Control Plan*** – In order to reduce potential conflicts between construction activities and pedestrians, transit and autos during construction activities at the Parnassus Heights campus site, UCSF shall require construction contractor(s) to prepare a traffic control plan for major phases of project construction (e.g., demolition, construction, or renovation of individual buildings). UCSF and their construction contractor(s) will meet with relevant City agencies to coordinate feasible measures to reduce traffic congestion, including temporary transit stop relocations (e.g., Parnassus Avenue) and other measures to reduce potential traffic and transit disruption and pedestrian circulation effects during major phases of construction of the CPHP projects. For any work within the public right-of-way, the contractor would also be required to comply with the City of San Francisco's *Regulations for Working in San Francisco Streets*, which establish rules and permit requirements so that construction activities can be done safely and with the least possible interference with pedestrians, bicyclists, transit, and vehicular traffic.	LTS

S = Significant Impact
SU = Significant and Unavoidable with Mitigation
LTS = Less than Significant impact
NI = No Impact
NA = Not applicable

Table 2-3 (continued)
Summary of CPHP Impacts and Mitigation Measures

Environmental Impact	Level of Significance Before Mitigation	Mitigation Measures	Level of Significance after Mitigation
EIR Section 4.15 Transportation (cont.)			
Impact TRANS-5 (cont.)		***Reduce Drive Alone Mode Share for Construction Workers*** – In order to minimize parking demand and vehicle trips associated with construction workers, UCSF shall require the construction contractor to include in the Construction Traffic Control Plan methods to encourage walking, bicycling, carpooling, and transit access to the campus site by construction workers. ***Project Construction Updates for Adjacent Residents and Businesses*** – In order to minimize construction impacts on access for nearby residences, institutions, and businesses, UCSF shall provide nearby residences and businesses with regularly-updated information regarding project construction, including construction activities, peak construction vehicle activities (e.g., concrete pours, excavation),and travel lane closures via a newsletter, website, and/or quarterly construction update meetings with neighbors.	
Impact C-TRANS-1: The CPHP, in combination with past, present, and reasonably foreseeable future projects, would not result in a cumulatively considerable contribution to significant transportation impacts.	LTS	None required.	NA
EIR Section 4.16 Utilities and Service Systems			
Impact UTIL-1: Implementation of the proposed CPHP would require or result in the construction of new or expanded water, wastewater treatment or storm water drainage, electric power, natural gas, or telecommunications facilities, the construction or relocation of which could cause significant environmental effects.	LTS	None required.	NA
Impact UTIL-2: Sufficient water supply would be available from existing entitlements and resources to serve development under the proposed CPHP under normal, dry and multi-dry years if the Bay Delta Plan Amendment is implemented. If the Bay Delta Plan Amendment is implemented, the SFPUC may address the shortfalls through rationing and/or develop new or expanded water supply facilities to address shortfalls in single and multiple dry years. The CPHP would not make a considerable contribution to impacts from increased rationing or from the development of new supply sources.	LTS	None required.	NA

S = Significant Impact
SU = Significant and Unavoidable with Mitigation
LTS = Less than Significant impact
NI = No Impact
NA = Not applicable

TABLE 2-3 (CONTINUED)
SUMMARY OF CPHP IMPACTS AND MITIGATION MEASURES

Environmental Impact	Level of Significance Before Mitigation	Mitigation Measures	Level of Significance after Mitigation
EIR Section 4.16 Utilities and Service Systems (cont.)			
Impact UTIL-3: The wastewater treatment provider would have adequate wastewater treatment capacity to serve campus development under the proposed CPHP.	LTS	None required.	NA
Impact UTIL-4: Construction of campus development under the proposed CPHP would not generate solid waste in excess of State or local standards or the capacity of local infrastructure and would comply with federal, state and local statutes and regulations related to solid waste.	LTS	None required.	NA
Impact UTIL-5: Operation of campus development under the proposed CPHP would not generate solid waste in excess of State or local standards or the capacity of local infrastructure and would comply with federal, State and local statutes and regulations related to solid waste.	LTS	None required.	NA
Impact-C-UTIL-1: Development under the proposed CPHP, in combination with past, present, and reasonably foreseeable future projects in the vicinity of the Parnassus Heights campus site, would not substantially contribute to cumulative impacts related to utilities and services systems.	LTS	None required.	NA

S = Significant Impact
SU = Significant and Unavoidable with Mitigation
LTS = Less than Significant impact
NI = No Impact
NA = Not applicable

TABLE 2-4
SUMMARY OF IRVING STREET ARRIVAL, RAB, AND INITIAL ALDEA DENSIFICATION PROJECTS, AND INITIAL PHASE IMPROVEMENTS IMPACTS AND MITIGATION MEASURES

Significant Environmental Impact	Initial Phase Project[a]/ Improvement	Level of Significance Before Mitigation	Applicable Mitigation Measures	Level of Significance after Mitigation			
				Irving Street Arrival	RAB	Initial Aldea Housing Densification	Initial Phase Improvements
EIR Section 4.1 Aesthetics, Wind, and Shadow							
Impact AES-1: Development of the proposed project would not have a substantial adverse effect on a scenic vista.	All Projects	LTS	None required.	NA	NA	NA	NA
Impact AES-2: Development of the proposed project would occur in an urbanized area and would not conflict with applicable zoning and other regulations governing scenic quality.	All Projects	LTS	None required.	NA	NA	NA	NA
Impact AES-3: Implementation of the proposed project would not create a new source of substantial light or glare which would adversely affect daytime or nighttime views in the area.	All Projects	S	**CPHP Mitigation Measure AES-3:** Minimize light and glare resulting from new buildings.	LTS	LTS	LTS	LTS
Impact AES-4: Implementation of the proposed project would potentially create wind hazards in publicly accessible areas of substantial pedestrian use.	Irving Street Arrival, RAB, Initial Aldea Housing Densification	S	**CPHP Mitigation Measure AES-4:** Design new buildings to minimize wind impacts at pedestrian level.	SU	SU	SU	
	Initial Phase Improvements	LTS	None required.				LTS
Impact AES-5: Implementation of the proposed project would not create new shadow in a manner that would substantially and adversely affects the use and enjoyment of publicly accessible open spaces.	All Projects	LTS	None required.	NA	NA	NA	NA
EIR Section 4.2 Air Quality							
Impact AIR-1: Construction activities would result in a cumulatively considerable net increase of a criteria pollutant for which the project region is non-attainment under an applicable federal or state ambient air quality standard.	All Projects	S	**CPHP Mitigation Measure AIR-1a:** Clean Construction Equipment for CPHP Projects. **CPHP Mitigation Measure AIR-1b:** Best Management Practices for Controlling Particulate Emissions during Construction.	LTS	LTS	LTS	LTS
Impact AIR-2: Operation of campus facilities developed under the proposed project would result in a cumulatively considerable net increase of a criteria pollutant (PM_{10}) for which the project region is non-attainment under an applicable federal or state ambient air quality standard.	All Projects	LTS	None required.	NA	NA	NA	NA

SU = Significant and Unavoidable with Mitigation
LTS = Less than Significant impact
NI = No Impact
NA = Not applicable

TABLE 2-4 (CONTINUED)
SUMMARY OF IRVING STREET ARRIVAL, RAB, AND INITIAL ALDEA DENSIFICATION PROJECTS, AND INITIAL PHASE IMPROVEMENTS IMPACTS AND MITIGATION MEASURES

Significant Environmental Impact	Initial Phase Project[a]/ Improvement	Level of Significance Before Mitigation	Applicable Mitigation Measures	Level of Significance after Mitigation			
				Irving Street Arrival	RAB	Initial Aldea Housing Densification	Initial Phase Improvements
EIR Section 4.2 Air Quality (cont.)							
Impact AIR-3: Construction activities could expose sensitive receptors to substantial pollutant concentrations and exceed the LRDP EIR standard of significance by exposing receptors to toxic air contaminant emissions that (1) result in a cancer risk greater than 10 cancer cases per 1 million people exposed in a lifetime; or (2) for acute or chronic effects, result in concentrations of toxic air contaminant emissions with a Hazard Index of 1.0 or greater.	All Projects	S	Implement CPHP Mitigation Measure AIR-1a.	LTS	LTS	LTS	LTS
Impact AIR-4: Campus site operations under the proposed project could expose sensitive receptors to substantial pollutant concentrations and exceed the LRDP EIR standard of significance by exposing receptors to toxic air contaminant emissions that (1) result in a cancer risk greater than 10 cancer cases per 1 million people exposed in a lifetime; or (2) for acute or chronic effects, result in concentrations of toxic air contaminant emissions with a Hazard Index of 1.0 or greater.	All Projects	LTS	None required.	NA	NA	NA	NA
Impact AIR-5: The proposed project could conflict with or obstruct implementation of the *2017 Clean Air Plan*.	All Projects	S	**CPHP Mitigation Measure AIR-5:** Implement “cool roof and pavement” design elements.	LTS	LTS	LTS	LTS
EIR Section 4.3 Biological Resources							
Impact BIO-1: Implementation of the proposed project would not have a substantial adverse effect, either directly or through habitat modifications, on species identified as candidate, sensitive, or special-status species in local or regional plans, policies, or regulations, or by the California Department of Fish and Wildlife or U.S. Fish and Wildlife Service.	Irving Street Arrival	NI	None Required	NA			
	RAB	S	**CPHP Mitigation Measure BIO-1b.** Protection of Monarch Butterflies. **CPHP Mitigation Measure BIO-1c.** Protection of Nesting Birds. **CPHP Mitigation Measure BIO-1d.** Protection of Roosting Bats. **CPHP Mitigation Measure BIO-1e.** Worker Education.		LTS		

S = Significant Impact
SU = Significant and Unavoidable with Mitigation
LTS = Less than Significant impact
NI = No Impact
NA = Not applicable

TABLE 2-4 (CONTINUED)
SUMMARY OF IRVING STREET ARRIVAL, RAB, AND INITIAL ALDEA DENSIFICATION PROJECTS, AND INITIAL PHASE IMPROVEMENTS IMPACTS AND MITIGATION MEASURES

Significant Environmental Impact	Initial Phase Project[a]/ Improvement	Level of Significance Before Mitigation	Applicable Mitigation Measures	Level of Significance after Mitigation			
				Irving Street Arrival	RAB	Initial Aldea Housing Densification	Initial Phase Improvements
EIR Section 4.3 Biological Resources (cont.)							
Impact BIO-1 (cont.)	Initial Aldea Housing Densification, Initial Phase Improvements	S	**CPHP Mitigation Measure BIO-1a.** Botanical Surveys. **CPHP Mitigation Measure BIO-1b.** Protection of Monarch Butterflies. **CPHP Mitigation Measure BIO-1c.** Protection of Nesting Birds. **CPHP Mitigation Measure BIO-1d.** Protection of Roosting Bats. **CPHP Mitigation Measure BIO-1e.** Worker Education.			LTS	LTS
Impact BIO-2: Implementation of the proposed project would not interfere substantially with the movement of any native resident or migratory fish or wildlife species or with established native resident or migratory wildlife corridors, or impede the use of native wildlife nursery sites.	Irving Street Arrival	NI	None required.	NA			
	RAB, Initial Aldea Housing Densification, Initial Phase Improvements	S	**CPHP Mitigation Measure BIO-2a:** Prevention of Harm to Migrating Birds During Construction. **CPHP Mitigation Measure BIO-2b:** Bird-Safe Building Treatments.		LTS	LTS	LTS
Impact BIO-3: Implementation of proposed project would not conflict with any applicable local policies or ordinances protecting biological resources, including exceeding the LRDP EIR standard of significance by damaging or removing heritage or landmark trees or native oak trees of a diameter specified in a local ordinance.	All Projects	LTS	None required.	NA	NA	NA	NA
EIR Section 4.4 Cultural Resources and Tribal Cultural Resources							
Impact CUL-1: Implementation of the proposed project would result in a substantial adverse change in the significance of known historical resources.	Irving Street Arrival	NI	None required.	NA			

S = Significant Impact
SU = Significant and Unavoidable with Mitigation
LTS = Less than Significant impact
NI = No Impact
NA = Not applicable

TABLE 2-4 (CONTINUED)
SUMMARY OF IRVING STREET ARRIVAL, RAB, AND INITIAL ALDEA DENSIFICATION PROJECTS, AND INITIAL PHASE IMPROVEMENTS IMPACTS AND MITIGATION MEASURES

Significant Environmental Impact	Initial Phase Project[a]/ Improvement	Level of Significance Before Mitigation	Applicable Mitigation Measures	Level of Significance after Mitigation			
				Irving Street Arrival	RAB	Initial Aldea Housing Densification	Initial Phase Improvements
EIR Section 4.4 Cultural Resources and Tribal Cultural Resources (cont.)							
Impact CUL-1 (cont.)	RAB	S	**CPHP Mitigation Measure CUL-1a:** Identify Character-Defining Features. **CPHP Mitigation Measure CUL-1b:** Document Historical Resources Prior to Demolition or Alteration. **CPHP Mitigation Measure CUL-1c:** Public Interpretation and Salvage Plan. **CPHP Mitigation Measure CUL-1d:** Digital-Imaging and Virtual Preservation of Zakheim Murals in UC Hall.		SU		
	Initial Aldea Housing Densification, Initial Phase Improvements	S	**CPHP Mitigation Measure CUL-1a:** Identify Character-Defining Features. **CPHP Mitigation Measure CUL-1b:** Document Historical Resources Prior to Demolition or Alteration. **CPHP Mitigation Measure CUL-1c:** Public Interpretation and Salvage Plan.			SU	SU
Impact CUL-3: Implementation of the proposed project could cause a substantial adverse change in the significance of an archaeological resource pursuant to CEQA Guidelines Section 15064.5.	All Projects	S	**CPHP Mitigation Measure CUL-3:** Inadvertent Discovery of Archaeological Resources and Tribal Cultural Resources.	LTS	LTS	LTS	LTS
Impact CUL-4: Implementation of the proposed project could disturb human remains, including those interred outside of dedicated cemeteries.	All Projects	S	**CPHP Mitigation Measure CUL-4:** Inadvertent Discovery of Human Remains.	LTS	LTS	LTS	LTS
Impact CUL-5: Implementation of the proposed project P could cause a substantial adverse change in the significance of a tribal cultural resource, defined in PRC Section 21074 as either a site, feature, place, cultural landscape that is geographically defined in terms of the size and scope of the landscape, sacred place, or object with cultural value to a California Native American tribe.	All Projects	S	Implement CPHP Mitigation Measure CUL-3.	LTS	LTS	LTS	LTS

S = Significant Impact
SU = Significant and Unavoidable with Mitigation
LTS = Less than Significant impact
NI = No Impact
NA = Not applicable

TABLE 2-4 (CONTINUED)
SUMMARY OF IRVING STREET ARRIVAL, RAB, AND INITIAL ALDEA DENSIFICATION PROJECTS, AND INITIAL PHASE IMPROVEMENTS IMPACTS AND MITIGATION MEASURES

Significant Environmental Impact	Initial Phase Project[a]/ Improvement	Level of Significance Before Mitigation	Applicable Mitigation Measures	Level of Significance after Mitigation			
				Irving Street Arrival	RAB	Initial Aldea Housing Densification	Initial Phase Improvements
EIR Section 4.5 Energy							
Impact ENE-1: Implementation of the proposed project would not result in a potentially significant environmental impact due to wasteful, inefficient, or unnecessary consumption of energy resources, during project construction or operation.	All Projects	LTS	None required.	NA	NA	NA	NA
Impact ENE-2: Implementation of the proposed project would not conflict with or obstruct a state or local plan for renewable energy or energy efficiency.	All Projects	LTS	None required.	NA	NA	NA	NA
EIR Section 4.6 Geology and Soils							
Impact GEO-1: New development under the proposed project would not directly or indirectly cause substantial adverse effects, including the risk of loss, injury, or death involving strong seismic ground shaking.	All Projects	LTS	None required.	NA	NA	NA	NA
Impact GEO-2: New development under the proposed project would not directly or indirectly cause substantial adverse effects, including the risk of loss, injury, or death involving strong seismic related ground failure including liquefaction.	All Projects	LTS	None required.	NA	NA	NA	NA
Impact GEO-3: New development under the proposed project would not directly or indirectly cause substantial adverse effects, including the risk of loss, injury, or death involving landslides.	All Projects	S	**CPHP Mitigation Measure GEO-3:** UCSF shall implement the following geotechnical recommendations contained within the Rutherford & Chekene March 2019 report.	LTS	LTS	LTS	LTS
Impact GEO-4: Construction and operation of development associated with the proposed project would not have the potential to result in the substantial erosion or the loss of topsoil.	All Projects	LTS	None required.	NA	NA	NA	NA
Impact GEO-5: Development and redevelopment associated with the proposed project would not be located on a geologic unit or soil that is unstable, or that would become unstable as a result of the project, and potentially result in on- or off-site landslide, lateral spreading, subsidence, liquefaction or collapse.	All Projects	LTS	None required.	NA	NA	NA	NA

S = Significant Impact
SU = Significant and Unavoidable with Mitigation
LTS = Less than Significant impact
NI = No Impact
NA = Not applicable

TABLE 2-4 (CONTINUED)
SUMMARY OF IRVING STREET ARRIVAL, RAB, AND INITIAL ALDEA DENSIFICATION PROJECTS, AND INITIAL PHASE IMPROVEMENTS IMPACTS AND MITIGATION MEASURES

Significant Environmental Impact	Initial Phase Project[a]/ Improvement	Level of Significance Before Mitigation	Applicable Mitigation Measures	Level of Significance after Mitigation			
				Irving Street Arrival	RAB	Initial Aldea Housing Densification	Initial Phase Improvements
EIR Section 4.6 Geology and Soils (cont.)							
Impact GEO-6: Construction associated with the proposed project could have the potential to directly or indirectly destroy a unique paleontological resource or site or unique geologic feature.	All Projects	S	**CPHP Mitigation Measure GEO-6:** Pre-project training and the procedures to follow in the event of an inadvertent discovery of resources.	LTS	LTS	LTS	LTS
EIR Section 4.7 Greenhouse Gas Emissions							
Impact GHG-1: Implementation of the proposed project would generate GHG emissions, either directly or indirectly, that may have a significant impact on the environment.	Irving Street Arrival, RAB, Initial Aldea Housing Densification	S	**CPHP Mitigation Measure GHG-1a:** Emission Reduction Measures to supplement those currently included in GHGRS update that would occur as part of the proposed amendment to the 2014 LRDP under the CPHP. **CPHP Mitigation Measure GHG-1b:** Implement CPHP Mitigation Measure AIR-2a: Project-Level Operational Measures, CPHP Mitigation Measure AIR-2b: TDM Program Enhancements, CPHP Mitigation Measure AIR-4b: Design for Diesel Delivery Truck Emissions Minimization, and CPHP Mitigation Measure AIR-5: Implement “cool roof and pavement” design elements to further reduce emissions from individual projects and mobile sources. **CPHP Mitigation Measure GHG-1c:** Monitor emissions annually and acquire carbon offset credits in conformance with CARB guidance, prioritizing local and in-State offsets to achieve and maintain carbon neutrality for the Parnassus Heights campus site under the CPHP.	LTS	LTS	LTS	
	Initial Phase Improvements	LTS	None required.				NA

S = Significant Impact
SU = Significant and Unavoidable with Mitigation
LTS = Less than Significant impact
NI = No Impact
NA = Not applicable

TABLE 2-4 (CONTINUED)
SUMMARY OF IRVING STREET ARRIVAL, RAB, AND INITIAL ALDEA DENSIFICATION PROJECTS, AND INITIAL PHASE IMPROVEMENTS IMPACTS AND MITIGATION MEASURES

Significant Environmental Impact	Initial Phase Project[a]/ Improvement	Level of Significance Before Mitigation	Applicable Mitigation Measures	Level of Significance after Mitigation			
				Irving Street Arrival	RAB	Initial Aldea Housing Densification	Initial Phase Improvements
EIR Section 4.7 Greenhouse Gas Emissions (cont.)							
Impact GHG-2: Implementation of the proposed project would not conflict with an applicable plan, policy or regulation adopted for the purpose of reducing the emissions of greenhouse gases.	All Projects	LTS	None required.	NA	NA	NA	NA
EIR Section 4.8 Hazards and Hazardous Materials							
Impact HAZ-1: Construction and operation of campus development under the proposed project could create a significant hazard to the public or the environment through the routine transport, use, or disposal of hazardous materials.	All Projects	S	**CPHP Mitigation Measure HAZ-1:** Excavation Management Plan.	LTS	LTS	LTS	LTS
Impact HAZ-2: Construction and operation of campus development under the proposed project would not create a significant hazard to the public or the environment through reasonably foreseeable upset and accident conditions involving the release of hazardous materials into the environment.	All Projects	LTS	None required.	NA	NA	NA	NA
Impact HAZ-3: Construction and operation of the proposed project would not emit hazardous emissions or handle hazardous or acutely hazardous materials, substances, or waste within one-quarter mile of an existing or proposed school.	All Projects	LTS	None required.	NA	NA	NA	NA
Impact HAZ-4: Campus development under the proposed project would not be located on a site which is included on a list of hazardous materials sites compiled pursuant to Government Code Section 65962.5. However, previously unknown contamination could be encountered during construction and could have the potential to create a significant hazard to the public or the environment.	All Projects	S	**CPHP Mitigation Measure HAZ-4:** Soil Management Plan.	LTS	LTS	LTS	LTS
EIR Section 4.9 Hydrology and Water Quality							
Impact HYD-1: Construction and operation of campus development under the proposed project would not have the potential to violate water quality standards or waste discharge requirements, or otherwise substantially degrade surface or groundwater quality.	All Projects	LTS	None required.	NA	NA	NA	NA

S = Significant Impact
SU = Significant and Unavoidable with Mitigation
LTS = Less than Significant impact
NI = No Impact
NA = Not applicable

TABLE 2-4 (CONTINUED)
SUMMARY OF IRVING STREET ARRIVAL, RAB, AND INITIAL ALDEA DENSIFICATION PROJECTS, AND INITIAL PHASE IMPROVEMENTS IMPACTS AND MITIGATION MEASURES

Significant Environmental Impact	Initial Phase Project[a]/ Improvement	Level of Significance Before Mitigation	Applicable Mitigation Measures	Level of Significance after Mitigation			
				Irving Street Arrival	RAB	Initial Aldea Housing Densification	Initial Phase Improvements
EIR Section 4.9 Hydrology and Water Quality (cont.)							
Impact HYD-2: Construction and operation of the campus development under the proposed project would not substantially alter the existing drainage patterns of the site or area, in a manner that has the potential to result in substantial erosion or siltation on- or off- site; substantially increase the rate or amount of surface runoff in a manner that would result in flooding on or off site; create or contribute runoff water that would exceed the capacity of existing or planned stormwater drainage systems or provide substantial additional sources of polluted runoff; or impede or redirect flow.	All Projects	LTS	None required.	NA	NA	NA	NA
EIR Section 4.10 Land Use and Planning							
Impact LU-1: Implementation of the proposed project would not cause a significant environmental impact due to a conflict with land use plans, policies and regulations adopted for the purpose of avoiding or mitigating an environmental effect.	All Projects	LTS	None required.	NA	NA	NA	NA
Impact LU-2: Development under the proposed project would not conflict with local land use regulations such that a significant incompatibility with adjacent land uses is created.	All Projects	LTS	None required.	NA	NA	NA	NA
EIR Section 4.11 Noise and Vibration							
Impact NOI-1: Construction activities under the proposed project would generate a substantial temporary increase in ambient noise levels in the vicinity of the construction project in excess of standards established in the local general plan or noise ordinance, or applicable standards of other agencies.	Irving Street Arrival, Initial Phase Improvements	S	**CPHP Mitigation Measure NOI-1b:** Construction Hours	LTS			LTS
	RAB, Initial Aldea Housing Densification	S	**CPHP Mitigation Measure NOI-1a:** Construction Noise Control Measures. **CPHP Mitigation Measure NOI-1b:** Construction Hours. **CPHP Mitigation Measure NOI-1c**: Pile-Installation Noise-Reducing Techniques. Implement CPHP Mitigation Measure TRANS-5: Construction Coordination and Monitoring Measures–Construction Traffic Control Plan.		SU	SU	

S = Significant Impact
SU = Significant and Unavoidable with Mitigation
LTS = Less than Significant impact
NI = No Impact
NA = Not applicable

TABLE 2-4 (CONTINUED)
SUMMARY OF IRVING STREET ARRIVAL, RAB, AND INITIAL ALDEA DENSIFICATION PROJECTS, AND INITIAL PHASE IMPROVEMENTS IMPACTS AND MITIGATION MEASURES

Significant Environmental Impact	Initial Phase Project[a]/ Improvement	Level of Significance Before Mitigation	Applicable Mitigation Measures	Level of Significance after Mitigation			
				Irving Street Arrival	RAB	Initial Aldea Housing Densification	Initial Phase Improvements
EIR Section 4.11 Noise and Vibration (cont.)							
Impact NOI-2: Implementation of the proposed project would generate substantial permanent increases in ambient noise levels in the vicinity of the project in excess of standards established in the local general plan or noise ordinance, or applicable standards of other agencies.	Irving Street Arrival	NI	None required.	NA			
	RAB, Initial Aldea Housing Densification	S	**CPHP Mitigation Measure NOI-2:** Operational Noise Control.		LTS	LTS	
	Initial Phase Improvements	LTS	None required.				NA
Impact NOI-3: Construction activities under the proposed project could result in generation of excessive groundborne vibration or groundborne noise levels.	Irving Street Arrival, Initial Aldea Housing Densification, Initial Phase Improvements	LTS	None required.	NA		NA	NA
	RAB	S	**CPHP Mitigation Measure NOI-3a:** Limited Use of Vibratory Rollers. **CPHP Mitigation Measure NOI-3b:** Assessment and Relocation/ Retrofitting of Vibration-Sensitive Equipment.		LTS		
Impact NOI-4: Implementation of the proposed project would not exceed an LRDP EIR operational standard of significance by contributing to an increase in average daily noise levels (L_{dn}) of 3 dB(A) or more at property lines, where ambient noise levels already exceed local noise levels set forth in local general plans or ordinances for such areas based on their use.	All Projects	LTS	None required.	LTS	LTS	LTS	LTS
EIR Section 4.12 Population and Housing							
Impact POP-1: Implementation of the proposed project would induce population growth in the San Francisco Bay area, which could create demand for housing outside the market area.	Irving Street Arrival, Initial Phase Improvements	NI	None required.	NA			NA
	RAB, Initial Aldea Housing Densification	LTS	None required.		NA	NA	

S = Significant Impact
SU = Significant and Unavoidable with Mitigation
LTS = Less than Significant impact
NI = No Impact
NA = Not applicable

TABLE 2-4 (CONTINUED)
SUMMARY OF IRVING STREET ARRIVAL, RAB, AND INITIAL ALDEA DENSIFICATION PROJECTS, AND INITIAL PHASE IMPROVEMENTS IMPACTS AND MITIGATION MEASURES

Significant Environmental Impact	Initial Phase Project[a]/ Improvement	Level of Significance Before Mitigation	Applicable Mitigation Measures	Level of Significance after Mitigation			
				Irving Street Arrival	RAB	Initial Aldea Housing Densification	Initial Phase Improvements
EIR Section 4.12 Population and Housing (cont.)							
Impact POP-2: Implementation of the proposed project would not displace substantial numbers of existing people or housing, necessitating the construction of replacement housing elsewhere	Irving Street Arrival, RAB, and Initial Phase Improvements	NI	None required.	NA	NA		NA
	Initial Aldea Housing Densification	LTS	None required.			NA	
EIR Section 4.13 Public Services							
Impact PUB-1: Implementation of the proposed project would not result in substantial adverse physical impacts associated with the provision of new or physically altered fire protection facilities, need for new or physically altered fire protection facilities, the construction of which could cause significant environmental impacts, in order to maintain acceptable service ratios, response times or other performance objectives.	All Projects	LTS	None required.	NA	NA	NA	NA
Impact PUB-2: Implementation of the proposed project would not result in substantial adverse physical impacts associated with the provision of new or physically altered public school facilities, need for new or physically altered public school facilities, the construction of which could cause significant environmental impacts, in order to maintain acceptable service ratios, response times or other performance objectives.	Irving Street Arrival, RAB, Initial Phase Improvements	NI	None required.	NA	NA		NA
	Initial Aldea Housing Densification	LTS	None required.			NA	
EIR Section 4.14 Recreation							
Impact REC-1: Implementation of the proposed project would not increase the use of existing neighborhood and regional parks or other existing on- and off-campus recreational facilities such that substantial physical deterioration of the facility would occur or be accelerated.	Irving Street Arrival, Initial Phase Improvements	NI	None required.	NA			NA
	RAB, Initial Aldea Housing Densification	LTS	None required.		NA	NA	

S = Significant Impact
SU = Significant and Unavoidable with Mitigation
LTS = Less than Significant impact
NI = No Impact
NA = Not applicable

TABLE 2-4 (CONTINUED)
SUMMARY OF IRVING STREET ARRIVAL, RAB, AND INITIAL ALDEA DENSIFICATION PROJECTS, AND INITIAL PHASE IMPROVEMENTS IMPACTS AND MITIGATION MEASURES

Significant Environmental Impact	Initial Phase Project[a]/ Improvement	Level of Significance Before Mitigation	Applicable Mitigation Measures	Level of Significance after Mitigation			
				Irving Street Arrival	RAB	Initial Aldea Housing Densification	Initial Phase Improvements
EIR Section 4.14 Recreation (cont.)							
Impact REC-2: The proposed project includes new recreational facilities, the construction of which would not have an adverse impact on the environment with mitigation.	Irving Street Arrival, RAB, Initial Aldea Housing Densification	NI	None required.	NA	NA	NA	
	Initial Phase Improvements	LTS	None required.				NA
EIR Section 4.15 Transportation							
Impact TRANS-1: Implementation of the proposed project would not conflict with a program, plan, ordinance or policy addressing the circulation system, including transit, roadway, bicycle and pedestrian facilities.	All Projects	LTS	None required.	NA	NA	NA	NA
Impact TRANS-2: Implementation of the proposed project would not conflict or be inconsistent with CEQA Guidelines Section 15064.3, subdivision (b).	Irving Street Arrival, Initial Phase Improvements	NI	None required.	NA			NA
	RAB, Initial Aldea Housing Densification	LTS	None required.		NA	NA	
Impact TRANS-3: Implementation of the proposed project would not substantially increase hazards due to a geometric design feature (e.g., sharp curves or dangerous intersections) or incompatible uses (e.g., farm equipment).	All Projects	LTS	None required.	NA	NA	NA	NA
Impact TRANS-4: Implementation of the proposed project would not result in inadequate emergency access.	All Projects	LTS	None required.	NA	NA	NA	NA
Impact TRANS-5: Construction activities under the proposed project could temporarily impact travel conditions along sidewalks and roadways serving the campus site.	All Projects	S	**CPHP Mitigation Measure TRANS-5:** Construction Coordination and Monitoring Measures.	LTS	LTS	LTS	LTS
EIR Section 4.16 Utilities and Service Systems							
Impact UTIL-1: Implementation of the proposed project would require or result in the construction of new or expanded water, wastewater treatment or storm water drainage, electric power, natural gas, or telecommunications facilities, the construction or relocation of which could cause significant environmental effects.	All Projects	LTS	None required.	NA	NA	NA	NA

S = Significant Impact
SU = Significant and Unavoidable with Mitigation
LTS = Less than Significant impact
NI = No Impact
NA = Not applicable

TABLE 2-4 (CONTINUED)
SUMMARY OF IRVING STREET ARRIVAL, RAB, AND INITIAL ALDEA DENSIFICATION PROJECTS, AND INITIAL PHASE IMPROVEMENTS IMPACTS AND MITIGATION MEASURES

Significant Environmental Impact	Initial Phase Project[a]/ Improvement	Level of Significance Before Mitigation	Applicable Mitigation Measures	Level of Significance after Mitigation: Irving Street Arrival	RAB	Initial Aldea Housing Densification	Initial Phase Improvements
EIR Section 4.16 Utilities and Service Systems (cont.)							
Impact UTIL-2: Sufficient water supply would be available from existing entitlements and resources to serve development under the proposed project under normal, dry and multi-dry years if the Bay Delta Plan Amendment is implemented. If the Bay Delta Plan Amendment is implemented, the SFPUC may address the shortfalls through rationing and/or develop new or expanded water supply facilities to address shortfalls in single and multiple dry years. The CPHP would not make a considerable contribution to impacts from increased rationing or from the development of new supply sources.	Irving Street Arrival	NI	None required.	NA			
	RAB, Initial Aldea Housing Densification, Initial Phase Improvements	LTS	None required.		NA	NA	NA
Impact UTIL-3: The wastewater treatment provider would have adequate wastewater treatment capacity to serve campus development under the proposed project.	Irving Street Arrival	NI	None required.	NA			
	RAB, Initial Aldea Housing Densification, Initial Phase Improvements	LTS	None required.		NA	NA	NA
Impact UTIL-4: Construction of campus development under the proposed project would not generate solid waste in excess of State or local standards or the capacity of local infrastructure and would comply with federal, state and local statutes and regulations related to solid waste.	All Projects	LTS	None required.	NA	NA	NA	NA
Impact UTIL-5: Operation of campus development under the proposed project would not generate solid waste in excess of State or local standards or the capacity of local infrastructure and would comply with federal, State and local statutes and regulations related to solid waste.	Irving Street Arrival	NI	None required.	NA			
	RAB, Initial Aldea Housing Densification, Initial Phase Improvements	LTS	None required.		NA	NA	NA

[a] Please note the proposed New Hospital is also an Initial Phase project, however, there is currently insufficient information about its design to assess its potential impacts with any specificity. As a result, potential impacts of the New Hospital are included in the programmatic CPHP impacts summarized in Table 2-3, and will be the subject of a subsequent EIR.

S = Significant Impact
SU = Significant and Unavoidable with Mitigation
LTS = Less than Significant impact
NI = No Impact
NA = Not applicable

CHAPTER 3
Project Description

3.1 Introduction

Each campus of the University of California is required to periodically prepare a Long Range Development Plan (LRDP) that sets forth concepts, principles, and plans to guide future growth of that campus. In November 2014, the Regents of the University of California (Regents) adopted the 2014 LRDP for the San Francisco campus, which outlines projected development levels and patterns for UCSF at all of its main campus sites through the year 2035. The 2014 LRDP Final EIR (FEIR) was certified by the Regents in November 2014 and includes, among other things, analysis of the potential environmental impacts from then-envisioned development at the Parnassus Heights campus site.

The Parnassus Heights campus site (Parnassus Heights, or campus site) is the oldest and largest of the UCSF campus sites. This campus site comprises approximately 107 acres of land located in the Inner Sunset mixed-use neighborhood and adjacent to the Haight Ashbury and Cole Valley neighborhoods in San Francisco. UCSF's facilities are concentrated at the north end of the campus site, where Moffitt and Long Hospitals, five professional programs, clinics, research, housing, parking, and other support uses are located. The 61-acre Mount Sutro Open Space Reserve occupies the central and southern portion of the campus site. The Aldea Housing complex is located in the southeast portion of the campus site adjacent to the Reserve.

The facilities at Parnassus Heights are aging and the site as a whole lacks a cohesive identity. Over the last 20 years, UCSF has invested billions of dollars into acquiring, developing, and supporting its Mission Bay campus site, without commensurate investment in Parnassus Heights. UCSF's investment in Parnassus Heights has not kept pace with its aging facilities or changes in programmatic need, resulting in infrastructure, buildings, and interior spaces that require substantial renewal and investment.

Since the adoption of the 2014 LRDP and certification of the 2014 LRDP FEIR, UCSF undertook a planning process to re-envision and revitalize Parnassus Heights as a whole, to integrate UCSF's clinical, educational, and research missions in ways that promote collaboration and synergies in the UCSF Parnassus Heights campus community. The planning process resulted in the development of the Comprehensive Parnassus Heights Plan (CPHP, or Plan), which provides a long-term development framework for the revitalization of the Parnassus Heights physical environment, and is intended to ensure that a modernized Parnassus Heights enhances UCSF's status as an anchor institution in San Francisco, and a leading academic medical center in the region, state and nation.

The proposed CPHP is subject to review under the California Environmental Quality Act (CEQA). The University is serving as the Lead Agency under CEQA for the proposed CPHP. This EIR has been prepared in accordance with CEQA to analyze potential environmental impacts that could result from the approval and implementation of the CPHP. The CPHP EIR is a program-level EIR that programmatically analyzes the environmental impacts of the CPHP which is envisioned to be completed by horizon year 2050. The CPHP EIR also provides project-level analyses of specific near-term projects and activities proposed for the initial phase of CPHP implementation that are planned for completion by approximately 2030. This EIR analyzes the CPHP proposals based on the level of information available for each project at the time of preparation of this EIR.

Because the CPHP proposes to modify the Parnassus Heights development plans identified in the 2014 LRDP, an amendment of the 2014 LRDP is proposed. In total, the CPHP provides for development of approximately 2.90 million gross square feet (gsf) of new building space at the Parnassus Heights campus site. The net increase in building space at the campus site under the CPHP would be approximately 2.04 million gsf, when accounting for demolition that was approved under the 2014 LRDP but yet not implemented, and potential additional building demolition that would occur under the CPHP. Currently, there is approximately 3.92 million gsf of building space on the campus site. The total amount of campus building space upon full implementation of the CPHP would be approximately 5.97 million gsf (including instruction, research, clinical, and support space; housing; and structured parking), when accounting for existing campus site development, demolition, and proposed new development.

UCSF has also begun to plan the New Hospital at Parnassus Heights (NHPH or New Hospital) and is projecting the need for a larger hospital than was planned in the 2014 LRDP. The planning, design and construction of a new, world-class hospital at Parnassus Heights would ensure that UCSF can continue to provide premier care to patients in the San Francisco Bay Area and beyond in the 21st century. Broad parameters for the New Hospital project (location, size, mass, height, and projected population) are accounted for in the CPHP and are analyzed at a program level in this Draft EIR. Further details of the New Hospital are being developed, including the specific design. Those elements of the New Hospital will be the subject of a subsequent project-specific environmental review when more details become available.

3.2 Campus Site Location

Figure 3-1 presents an aerial of the Parnassus Heights campus site location and vicinity. The campus site is located in the Inner Sunset mixed-use neighborhood in San Francisco, bounded by Carl and Irving Streets to the north; Third Avenue and Fifth Avenue to the west; and Clarendon Avenue, Christopher Drive, and Crestmont Drive to the south. The campus site's east boundary abuts the Cole Valley neighborhood and the City's Interior Greenbelt Natural Area. As shown in Figure 3-1, Golden Gate Park, including Kezar Stadium, is located one block (approximately 400 feet) north of the campus site boundary, and Sutro Tower is located approximately 700 feet southeast of the campus site.

SOURCE: Google Earth, 2019; ESA, 2019

UCSF Comprehensive Parnassus Heights Plan EIR

Figure 3-1
Parnassus Heights Campus Site Location and Vicinity

ESA

3.3 Existing Campus Site Characteristics

The irregularly-shaped Parnassus Heights campus site comprises 107 acres (see **Figure 3-2**). The topography on the campus site is varied, with slopes generally rising from north to south through the majority of the site. The lowest elevation of the campus site is at the north campus site boundary on Irving Street [approximately 300 feet above sea level (asl)] and the highest elevation is at over 900 feet asl on Mount Sutro in the south portion of the campus site, declining to approximately 700 feet asl along the campus site south boundary at Clarendon Avenue.

The majority of the campus site's development is concentrated in the northern portion of the campus site (see **Figure 3-3**). The physical core of the campus site is located along Parnassus Avenue, which extends east-west through this densely developed area, bisecting this portion of the campus site. Clinical space, including the Moffitt and Long Hospitals, the Langley Porter Psychiatric Institute (LPPI), and Medical Building 1 (formerly Ambulatory Care Center, or ACC) dominate the east area of the campus core. Most of the research facilities, the five professional programs (dentistry, medicine, nursing, pharmacy, and physical therapy), and additional clinical space are located in the central and western portions of the campus core, south of Parnassus Avenue. Principal buildings in this area of the campus core include the Clinical Sciences and Medical Sciences Buildings, the Health Sciences Instruction and Research (HSIR) Towers East and West, School of Nursing, Dental Clinics, Dolby Regeneration Medicine Building, Koret Vision Center, and UC Hall. Classroom and other instructional space are also scattered throughout the campus core.

Support functions are primarily located near the center of the campus core, north of Parnassus Avenue, including within Kalmanovitz Library and Millberry Union, which provides conference, food service, recreation and fitness, and office space. Campus housing occupies the west edges of the north portion of the campus site along Third and Fifth Avenues, and on Irving Street. This housing is occupied by students and postdoctoral scholars; some faculty housing exists on Fifth Avenue as well. Logistical support, including loading facilities; and various service- and utilities-related uses, including the Central Utility Plant (CUP) and Parnassus Services building, are located south of Moffitt and Long Hospitals.

The 61-acre Mount Sutro Open Space Reserve (Reserve) occupies the central and southern portions of the campus site. The Reserve occupies the ridgeline and hillslopes adjoining the drainage divide that forms the boundary between the San Francisco Bay and Pacific Ocean watersheds in the City. The Reserve is heavily vegetated and supports more than 120 plant species. The Reserve is designated by the Regents as permanent open space, and is available for public use. As shown in Figure 3-3, campus site buildings located adjacent to the Reserve include several small office and support buildings, including Environmental Health and Safety (EHS) and its Annex, and the Surge and Woods buildings. These facilities are accessed via Medical Center Way, a narrow, two-lane campus road that winds south from Parnassus Avenue through the Reserve.

SFO/D190291.00 - UCSF CPHP EIR2: Graphics/Illustrator

SOURCE: Google Earth, 2019; ESA, 2019

UCSF Comprehensive Parnassus Heights Plan EIR

Figure 3-2
Parnassus Heights Campus Site

ESA

SOURCE: Google Earth, 2019; ESA, 2019

UCSF Comprehensive Parnassus Heights Plan EIR

Figure 3-3
North Portion of Parnassus Heights Campus Site

ESA

As shown in **Figure 3-4**, the Aldea Housing complex is located on the south slope of Mount Sutro in the southeast portion of the campus site, adjacent to the Reserve. The complex comprises 12 apartment buildings containing 172 student housing units, and a community center (Aldea Center on Mount Sutro). The Aldea Housing is largely used by UCSF students, but also includes postdoctoral scholars, clinical residents, and faculty. Most of these units are for people with families. The Chancellor's residence (University House) is located adjacent to the complex. An internal network of streets serves the Aldea Housing complex, and Medical Center Way connects this area to the campus core.

The primary parking facilities at the campus site are within structured parking at the Millberry Union and Medical Building 1, in surface parking lots north of Kirkham Street and north of the Surge building, and as campus on-street parking within the Aldea Housing complex.

As of 2019, there are 71 buildings and approximately 3.92 million gsf of development on the campus site, including instruction, research, clinical, and support space, housing, and structured parking.

Existing construction activities underway at Parnassus Heights separate from the 2014 LRDP include: on-going tree removal, tree planting, native plant restoration and management of tree risk and defensible space within the Reserve as part of the Mount Sutro Open Space Reserve Vegetation Management Plan (20-year phased plan); and on-going minor renovation of miscellaneous existing space within the campus site. These improvements and activities are separate from those contemplated under the 2014 LRDP, and would not alter the amount of building space at the campus site.

The current average daily population at Parnassus Heights is estimated at approximately 17,400 persons, including faculty and staff, students, patients, and visitors. Approximately 80 percent of UCSF's 4,900 students (including post-doctoral scholars) receive instruction at the campus site. There are currently nearly 7,400 UCSF faculty and staff employed at the campus site. Over 644,000 outpatient visits per year are currently conducted at clinics at the Parnassus Heights campus site. About 580 residents currently reside in UCSF housing at the Parnassus Heights campus site.

3.4 Relationship of CPHP to 2014 LRDP

On November 20, 2014, the Regents adopted the UCSF 2014 LRDP. The 2014 LRDP serves as a comprehensive physical land use plan and policy document to guide the physical development of the San Francisco campus at its various campus sites, accommodating future increases in enrollment and clinical, academic, and research activities, and increased housing demand at UCSF. The existing 2014 LRDP accommodates development anticipated to occur through horizon year 2035. The 2014 LRDP contains objectives to guide decisions for future facilities to meet demands and projects the quantities and uses of new building space needed during this time frame.

The 2014 LRDP included *Community Planning Principles*, which were produced in collaboration with the UCSF Community Advisory Group. These *Principles* formalize UCSF's commitment to communicate with neighbors regarding its potential future development, in order to identify

SOURCE: Google Earth, 2019; ESA, 2019

UCSF Comprehensive Parnassus Heights Plan EIR

Figure 3-4
Southeast Portion of Parnassus Heights Campus Site
(Aldea Housing Complex)

ESA

potential community concerns that may arise from UCSF's physical development prior to the time that individual projects are brought forward for approval. In addition, the 2014 LRDP includes a Greenhouse Gas Reduction Strategy and a commitment to continue to enhance its Transportation Demand Management Program.

Because the CPHP proposes to modify the Parnassus Heights development plan identified in the 2014 LRDP, an amendment of the 2014 LRDP is proposed. The proposed LRDP amendment would revise those portions of the 2014 LRDP that pertain to Parnassus Heights to incorporate concepts and proposals identified in the CPHP. Proposed changes would include revisions to functional zones; revisions to the space program, update to the projected population; revisions to existing planning agreements, including revisions to the Regents' Resolution and an update to the Greenhouse Gas Reduction Strategy.

It should be noted that LRDPs typically cover a 10 to 15 year planning period. As indicated above, the UCSF 2014 LRDP addressed development at the entire UCSF campus over an approximate 20-year period, or an approximate horizon year of 2035. However, determining the length of the planning period may depend on a number of factors, including academic and other physical planning efforts, anticipated development cycles, and alignment with local, regional, or state plans and regulations.

If the Regents approve the proposed 2014 LRDP amendment to incorporate the CPHP, the CPHP would become the primary planning document for Parnassus Heights and would guide the development of the Parnassus Heights campus site through the next 30 years, or an approximate horizon year of 2050. Nevertheless, development at all other UCSF campus sites addressed by the UCSF 2014 LRDP would continue to have an approximate horizon year of 2035.

3.5 Project Need

As the second largest employer in the City, UCSF is a substantial contributor to the San Francisco and Bay Area economies, as well as a major contributor to the culture of innovation, attracting world-class talent to live, work, and study. At the same time, due in part to surging economic growth, San Francisco is facing a number of challenges, including growing socioeconomic and health disparities, increasing cost of living, reduced housing affordability, and a transportation infrastructure that is strained.

As indicated above, over the last 20 years, UCSF has invested substantial financial resources into acquiring, developing, and supporting its Mission Bay campus site, without commensurate investment in the Parnassus Heights campus site. UCSF's investment in Parnassus Heights has not kept pace with its aging facilities or changes in programmatic need, resulting in infrastructure, buildings, and interior spaces that require significant renewal and investment.

Although the 2014 LRDP planned for a modest growth in clinical and research space at the Parnassus Heights campus site, UCSF has since then determined that in order to ensure continued excellence of the University, stay competitive and remain a leading health science institution both nationally and internationally, and build on the outstanding instructional, research, and clinical programs that are present at Parnassus Heights, improvements must be made at this campus site to address its aging and inadequate facilities and provide a teaching hospital that can adequately support the education and research missions while providing expanded and improved clinical services to the local community. The CPHP development program is needed for the reasons presented below (a more detailed analysis is presented in **Appendix SNA**).

1. **Aging and Outdated Facilities.** There is a clear discrepancy between the practice of cutting-edge health sciences and the physical condition of the campus site. Buildings at the Parnassus Heights campus site have an average age of more than 50 years, and many have limited long-term viability. Future advances in learning, discovery, and healing are dependent on close collaboration and creative partnerships that the current campus design does not facilitate. With advances in technology, spatial requirements for research and clinical uses have grown and changed. The increase in equipment sizes, associated code requirements, and new trends for improved work environments put pressure on existing spaces, which fall short of world-class, modern space standards. Building codes for accessibility, fire and life safety, seismic performance, and other requirements have become more stringent. Some older buildings on the Parnassus Heights campus site have not kept up with these advances and are currently being evaluated to assess the dependencies in bringing them up to these standards. Older buildings have low floor-to-floor heights and do not meet the current standards for contemporary specialized research and clinical care. Support infrastructure is at risk of failure, vulnerable to increased environmental stressors, and very costly to maintain. The current clinical facilities are outdated and require expensive maintenance and repair. In addition, the Moffitt Hospital (built in 1955) can remain an acute care hospital only until January 1, 2030, due to State seismic regulations, unless seismically retrofitted.

2. **Adequate and Appropriately Designed New Space for Research Programs.** Through an assessment of research programs and infrastructure at Parnassus Heights, the Research Space Working Group (RSWG) found that the Parnassus Heights campus site is home to numerous highly regarded biomedical research programs that are outstanding across the spectrum. In contrast, the current research space and infrastructure at Parnassus Heights is, in many cases, sub-standard and inadequate. Close to 80 percent of existing research space is in buildings well over 50 years old and much of this space does not meet standards for modern research space and is not compliant with current building codes. Modern research space requires larger open spaces that provide flexibility for new programs, space to connect to other research functions, larger floor-to-floor height to accommodate modern infrastructure, and the ability to foster programmatic research interactions in common or shared space. Because there is a shortage of core resource space, such as co-located shared core labs that facilitate collaboration, and digital hub space for clinical informatics research, many research programs are fragmented, causing difficulty in collaboration, and there is no room to grow or expand existing research programs. Of the total number of Principal Investigators (PIs) at Parnassus Heights, about 45 percent of PIs conduct Parnassus Heights-based sponsored projects involving patient facing research. Currently, there is a lack of designated clinical research space in patient care areas of the hospitals and clinics and properly designed clinical research space for patient cohorts, clinical trials and mechanism-oriented clinical research. This creates suboptimal interactions and collaborations with the clinical programs. The RSWG also noted that the Parnassus Heights campus site is experiencing difficulty recruiting and retaining young faculty due to insufficient research space both in terms of quality and quantity, fragmented research programs, and a shortage of Core resources. The RSWG recommends expansion and transformation of the Parnassus Heights research space to address existing challenges and deficiencies in the current space infrastructure and to allow future expansion. The new research space included in the CPHP would address the current unmet need for research space and support the growth of research at Parnassus Heights.

3. **Adequate and Appropriately Designed New Space for the Education Programs.** All five professional degree programs are located at the Parnassus Heights campus site and classroom instruction for them will continue to occur primarily at this campus site. The Education Space Working Group (ESWG) composed of a range of faculty and staff from across the academic enterprise was charged with addressing the space needs of these educational programs. The ESWG engaged with education mission stakeholders, including students; conducted an inventory of current shared and departmental instructional spaces; and explored the role of clinical and research space on the Parnassus Heights campus site as it intersects with the education mission. The ESWG assumed that teaching and learning would continue to evolve and change due to the influence of new technologies and that there would not be an overall reduction in instructional space at Parnassus Heights. Rather, different types of space would be needed to meet changing educational needs. The ESWG also envisioned an innovative central education core to support active learning and inter-professional pedagogies, including the reconfiguration of existing education space. This education core would integrate with clinical simulation space, updated modern classrooms, and lab space. The ESWG determined that there would be a need to increase instructional space by about 27 percent from existing conditions, and that would be possible to achieve this through use of existing repurposed space.

4. **Adequate and Appropriately Designed New Space for Clinical Programs.** UCSF Health provides both outpatient and inpatient clinical services at the Parnassus Heights campus site. The Helen Diller Medical Center (Medical Center) at Parnassus Heights, which comprises Moffitt and Long Hospitals, provides highly specialized tertiary and quaternary[1] adult care. According to UCSF Health, the Medical Center's inpatient census is at a record high and continues to experience unprecedented growth. The Medical Center is already at capacity and has to turn away transfer patients who need complex care. In 2017, UCSF received over 5,500 requested medically necessary transfers, of which about 2,200 (or approximately 40 percent) were turned away due to lack of capacity. In 2018, over 2,300 patients were turned away (about 40 percent), and in 2019, over 3,000 patients were turned away (about 46 percent). It is anticipated that there will be a 14 percent increase in medically necessary transfers by 2030. Further, the complex tertiary and quaternary cases treated by UCSF specialists at Parnassus Heights are forecast to increase in number over the coming years and decades, due to the Bay Area's projected population growth, which includes an increase in the Medicare population due to an aging regional population (national trends indicated there will be a 31 percent increase in the Medicare population over the next 10 years). Complex cardiac surgery and neurosurgery cases are projected to increase by 30 percent in the next 10 years. These complex cases will require longer hospital stays and more hospital beds. In addition, there is an increase in medical complexity of patients coming to the hospital as less complex cases are transitioned to outpatient clinics, and higher complexity mean longer length of stay for each admission and greater need for beds. Learning from the current COVID-19 pandemic, it is extremely critical for clinical facilities to be flexible and have the ability to increase inpatient capacity to accommodate additional clinical needs during these times, rather than reducing or canceling non-essential surgeries in order to reduce patient census. Based on observed shortages in the availability of beds, especially ICU and acute care beds; an analysis of demographic trends that indicate that the Medical Center will need to serve not only a larger population but also a population that includes more elderly patients; an analysis of the demand/need for private rooms (vs shared rooms/wards); and an analysis of

---

[1] Tertiary health care is the third tier of health care which involves highly specialized medical care provided by medical specialists in state-of-the-art facilities, such as teaching hospitals. It usually is provided over an extended period of time and involves advanced and complex procedures and treatments. Quaternary health care is considered an extension of tertiary care and is even more specialized. Examples would be experimental medicine and procedures, and very rare, specialized surgeries.

trends in health care which show an increased need for tertiary and quaternary health care, UCSF Health determined that a larger hospital is needed that not only replaces the 150 beds that are currently in Moffitt Hospital and the beds that would be reduced in Long Hospital once that hospital is upgraded to current standards, but also provides an additional 200 beds, along with other necessary facilities that include additional operating rooms, additional ER bays and spaces, additional interventional labs, and ambulance bays.

With regard to outpatient facilities, UCSF Health currently projects a modest one percent growth per year at the Parnassus Heights campus site between 2030 and 2050. The CPHP does not plan for additional net new outpatient space. It is assumed that any outpatient space needs would be met in existing space that is converted or renovated from other existing uses.

5. **Co-location of Instructional, Research, and Clinical Spaces.** UCSF is a graduate-level university that is devoted exclusively to health sciences and is host to world-renowned science, from basic and quantitative biomedical sciences to translational and clinical research. Today, UCSF’s public mission goes beyond San Francisco and delivers a substantial impact on a national and global level by innovating health care approaches for the world’s most vulnerable populations, training the next generation of doctors, nurses, dentists, pharmacists, and scientists; supporting elementary and high school education; and translating scientific discoveries into better health for everyone. These three missions of clinical care, education, and research are inter-dependent and require balanced support to ensure continued excellence. With a health science focus, much of the research at UCSF benefits from adjacency to the clinical environment just as access to the most advanced research is important to support the clinicians. Similarly, the research and clinical environments provide critical training for students and learners at UCSF. The clinical, educational and research programs are inextricably linked.

   UCSF’s research activities benefit from the frequent personal connections that foster collaborations in discovery. The current Medical Center, comprising Moffitt and Long hospitals, has convenient connections on every floor to the research and learning facilities in the Medical Sciences Building and is located near the Health Sciences East and West research towers. Parnassus Heights research teams are made up of clinicians, learners, faculty, and staff who leverage the full assets of the campus and the proximity to one another to create a variety of working partnerships. In addition, research and clinical trials, including National Institutes of Health-funded studies and industry-sponsored studies, benefit from proximity to the hospital, while patients benefit from innovative clinical care that results from these trials.

6. **Affordable On-Campus Housing.** Affordable, accessible housing options are critical to the successful recruitment of faculty and students, as well as long-term employee retention, especially in light of the critical housing shortage in San Francisco. Currently, across all UCSF sites, there are 1,251 units of faculty and student/trainee housing. Based on a Housing Study conducted in 2015, the estimated demand in 2025 for student/trainee housing would be about 2,030 units. Estimated demand for faculty housing would be 345 units, predominantly for incoming junior faculty. The estimated demand far exceeds what is currently available across UCSF campus sites. The CPHP includes the development of new housing, both to address the needs of the Parnassus Heights community and to offset the pressures on San Francisco’s existing housing inventory.

7. **Expanded Support Space.** In addition to Instructional, Clinical, and Research spaces, campus support space also need to grow proportionally to provide the essential services and continued support to the research, education, and clinical programs at the Parnassus Heights campus site.

8. **Improved Community Space.** The current campus design contributes to a sense of isolation from the neighborhood and lacks an iconic "front door" experience and a sense of welcome. Entries are confusing and unattractive. Most of the existing buildings are difficult to navigate. There are insufficient comfortable, landscaped areas and public spaces that could provide quality of life improvements, workplace satisfaction, or therapeutic benefits to all user groups. The CPHP development program aims to address this by demolishing some buildings and reconfiguring other buildings and spaces, and creating clear entries, easier pathfinding, better pedestrian circulation, and enhanced community open spaces.

3.6 Project Objectives

3.6.1 Parnassus Heights [from the 2014 LRDP and FEIR]

The 2014 LRDP FEIR identified objectives specific to the Parnassus Heights campus site. Those objectives which are listed below remain valid, with the exception of objective E. related to the space ceiling, to be revised as shown as part of the proposed amendment to the LRDP.

A. Continue to promote excellence and leadership in health science education, maintaining the Parnassus Heights campus site as the central location for classroom instruction.

B. Ensure that adequate space is provided to foster collaboration and to facilitate the inter-dependence and connectivity for operational efficiency and effectiveness of instruction, clinical, research and support uses in close physical proximity to each other.

C. Ensure that Long Hospital and the New Hospital Addition have adequate clinical and administrative support and are aligned with education, research and specialized care programs and support that remain at the campus site.

D. Provide additional campus housing and improve campus life amenities including outdoor space.

E. ~~Strive to better achieve the remaining unfulfilled components of the 1976 Regents' Resolution by reducing space, minimizing population growth, and improving transportation-related programs.~~ Conform to the space limits and population estimates established in the Regents' Resolution Regarding the Parnassus Heights Campus Site, as amended.

F. Preserve the Mount Sutro Open Space Reserve as permanent open space, and serve as the steward of the Reserve by maintaining and expanding the trail system and by ensuring the safety of visitors and neighboring structures.

3.6.2 Objectives for the CPHP

The following are objectives pertaining to the CPHP, including its Initial Phase projects.

Space

- Revitalize the aging Parnassus Heights campus to enhance its place as a premier educational, research, and clinical institution -- one that draws in research and clinical faculty, staff, students, and trainees.

- Fulfill the need for contemporary research, educational, clinical, and support spaces that have been lacking at Parnassus Heights for decades.
- Increase the quantity and improve the quality of research space, to enhance synergies between research and clinical activities at Parnassus Heights for UCSF to maintain its stature as a world-class hub of basic, translational, and clinical research.
- Connect buildings and spaces at multiple levels to foster collaboration that facilitates learning and scientific discoveries.
- Facilitate patient/pedestrian safety and functional efficiency by connecting campus buildings across and under Parnassus Avenue.
- Increase the on-campus supply of housing for students, faculty and staff, thereby minimizing the impact of UCSF-demand for housing on adjoining neighborhoods.

Urban Design

- Improve the campus's functional organization and foster intuitive wayfinding.
- Develop a framework of open spaces that enhance the campus environment by connecting people to nature.
- Create welcoming spaces for enhancing the patient/visitor experience throughout the campus site.
- Enhance connectivity between the campus site and the surrounding community.

Mobility

- Promote sustainable transportation behavior.
- Improve campus circulation options to reduce impacts on the surrounding neighborhood.
- Improve the patient and visitor parking and arrival experience.
- Create safe on- and off-street passenger drop-off zones.
- Enhance Parnassus Avenue as a campus "main street."
- Optimize the use of existing parking supply.
- Enhance overall campus functionality and efficiency.
- Improve campus circulation by way of a service corridor that facilitates loading and deliveries to campus and minimizes impacts of those activities on the neighborhood.

Objectives for Irving Street Arrival

- Create a welcoming experience for patients, visitors, students, and employees arriving at the Parnassus Heights campus site.
- Enhance and speed the pedestrian journey between Irving Street and Parnassus Avenue.
- Provide amenities that benefit the UCSF community and draw in residents from the surrounding neighborhood, such as a reception area, wellness offerings, and convenience retail.

Objectives for the Research and Academic Building

- Provide new state-of-the-art, flexible research space on the Parnassus Heights campus site expediently to replace existing obsolete wet lab space and to satisfy existing demand.
- Site and develop a new research and educational building at a location that is currently underutilized or otherwise a candidate for demolition, to minimize the disruption to campus operations that would be caused by relocation of occupants of heavily-occupied buildings.
- Provide an “empty chair” i.e., space in which to move research teams so that vacated deteriorating space can be renovated.
- Provide replacement space for the seismically deficient School of Nursing building.

Objectives for the New Hospital at Parnassus Heights

- Meet seismic requirements of California Senate Bill 1953 by developing a new, seismically-sound, state-of-the-art inpatient facility.
- Site and develop a new inpatient facility in a way that optimizes operational activities with other clinical facilities at Parnassus Heights, such as Long Hospital, a renovated and repurposed Moffitt Hospital building, and Medical Building 1.
- Increase inpatient beds at Parnassus Heights to address severe constraints on capacity and access to care, and to meet the needs of a growing and aging Bay Area population.
- Increase inpatient beds at Parnassus Heights to allow for the capacity to provide inpatient health care in times of severe strain such as the current pandemic, without resorting to reducing or canceling non-essential surgeries to create bed capacity.
- Develop a new inpatient facility that has sufficient space to accommodate modern regulatory requirements and industry standards of contemporary hospitals, such as construction codes, sizes of operating rooms, ratio of operating rooms to pre-and post-recovery areas, and space for privacy and infection control issues.
- Develop a new inpatient facility that has sufficient space to accommodate modern technology, including telemedicine, robotics, and new diagnostic, imaging, testing, treatment, surgery and laboratory equipment, all requiring substantial infrastructure and space.
- Develop a new inpatient facility that has sufficient space to accommodate patient satisfaction requirements of contemporary hospitals, such as private patient rooms of sufficient size.
- Develop a new inpatient facility that is optimized in its spatial layout to enhance functionality and efficiency.
- Develop spaces for clinical and translational research and learning in or adjacent to clinical areas where patients are located.

Objectives for the Aldea Housing Densification

- Increase the supply of housing for UCSF students and potentially faculty and staff.
- Develop housing in a cost-effective manner in order to make rents as affordable as possible for housing residents.
- Develop housing at a location that minimizes cumulative construction impacts with other proposed development along Parnassus Avenue.

3.7 CPHP

3.7.1 CPHP Features

The CPHP is a conceptual, flexible plan to meet projected space needs for critical programs in research, patient care, and education at Parnassus Heights while improving upon the functional and aesthetic design of the campus environment. The Plan also includes opportunity sites for development of much-needed on-campus housing. While the Plan guides physical development necessary to achieve the University's mission based on projected growth, it is not a commitment for growth or specific projects. It establishes a long-term development framework for the revitalization of the physical environment at Parnassus Heights, by identifying the following:

- Opportunity sites for new buildings and major renovations of existing buildings;
- Candidate buildings for demolition;
- Opportunities for development of open spaces; and
- Opportunities for improvements to on-campus mobility and circulation.

In total, the CPHP provides for development of approximately 2.90 million gsf of new building space at Parnassus Heights. The net increase in building space at the campus site under the CPHP would be approximately 2.04 million gsf, when accounting for demolition that was approved under the 2014 LRDP but yet not implemented (approximately 187,000 gsf), and potential additional building demolition that would occur under the CPHP (approximately 688,000 gsf). When accounting for existing campus site development (approximately 3.92 million gsf), and demolition, the total amount of campus space upon full implementation of the CPHP would be approximately 5.97 million gsf, including instruction, research, clinical, and support space; housing; and structured parking. (For more details regarding the space program, see Table 3-2.)

The Plan includes an "Initial Phase" that comprises: 1) Irving Street Arrival improvements, 2) Research and Academic Building (RAB), 3) New Hospital, and 4) initial Aldea Housing Densification, and as well as other Initial Phase improvements. The Initial Phase would account for approximately 1.43 million gsf of new building development, and is anticipated to be completed by approximately year 2030. Beyond the Initial Phase, the "Future Phase" encompasses the remaining approximately 1.47 million gsf of new building development described in the CPHP envisioned for completion by the horizon year of 2050.

CPHP Districts

The CPHP identifies six districts in the developed portions of the Parnassus Heights campus site as a way of organizing planned land uses in a rational manner based in part on existing land use patterns (see **Figure 3-5**).

- ***Research and Academic Commons:*** This district covers a portion of the campus site south of Parnassus Avenue and encompasses the majority of research and educational space on the campus (e.g., the Medical Sciences Building, HSIR Towers, the Dolby Regeneration Medicine Building, the Clinical Sciences Building, the School of Nursing, Koret Vision Center, Dental Clinics, and UC Hall). The CPHP envisions future development of research and academic space within this district.

- ***The North Side Gateway:*** This district includes the current location of the main arrival point to Parnassus Heights -- via public transit (the N-Judah Muni line on Irving Street and the 6 Haight-Parnassus Muni line on Parnassus Avenue) as well as via private vehicle and bicycle into the Millberry Union and Medical Building 1 parking structures on campus. This district also includes Kalmanovitz Library. Improvements to the arrival experience (i.e. the Irving Street Arrival) overlap the North Side Gateway and Clinical East End district (see below). The North Side Gateway also includes potential program space intended to welcome visitors and better integrate UCSF with the adjoining neighborhood.
- ***The Clinical East End:*** This district currently includes a cluster of major clinical facilities, such as Moffitt and Long Hospitals and Medical Building 1. The Clinical East End is where the proposed New Hospital would be located, as well as where future development of major clinical spaces could occur.
- ***The West Side:*** This district includes the West Side parking lot, the Kirkham Child Care Center, and the Proctor building. The CPHP envisions development of housing within this district, as well as a new child care center.
- ***Service Corridor:*** This is the current location of back-of-house functions that serve the buildings on the south side of Parnassus Avenue, including loading and deliveries, maintenance vehicle parking, and services to the CUP, among other functions. The CPHP envisions a more centralized and expanded service corridor that would stretch from Medical Center Way on the east side of the campus to Koret Way and to a proposed extension of Fourth Avenue on the west side of the campus.
- ***Aldea:*** The CPHP envisions development of additional housing on this site by demolishing the existing housing structures and constructing student housing in new buildings, either on existing building foundations or within a completely reconfigured and redesigned site. A small daycare center is also planned within the complex.

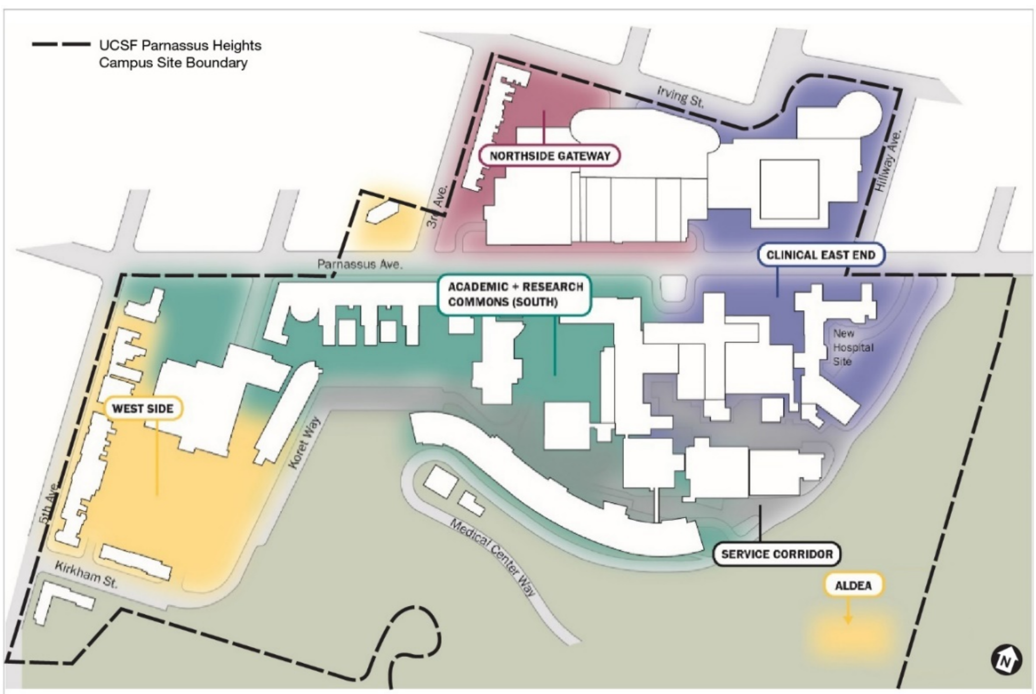


Figure 3-5
CPHP Districts

Opportunity Sites for New Development

Opportunities for new development under the CPHP include:

- New construction of clinical, educational, research, and housing facilities on opportunity sites throughout the campus (see **Figure 3-6**);
- Additional housing development at the Aldea Housing complex site;
- Open space enhancements throughout the campus, most notably the Millberry Terrace, the expansion of Saunders Court, and the Promenade to the south of the current UC Hall;
- Extension of Fourth Avenue as a campus street between Parnassus Avenue and Kirkham Street;
- Development of a service and utility corridor at the back of the campus to connect Medical Center Way to Koret Way and the proposed extension of Fourth Avenue;
- Public realm improvements, including within the campus core (along Parnassus Avenue generally between Fifth Avenue and Medical Center Way); and
- Development of a bridge across, and tunnel beneath, Parnassus Avenue associated with the New Hospital.

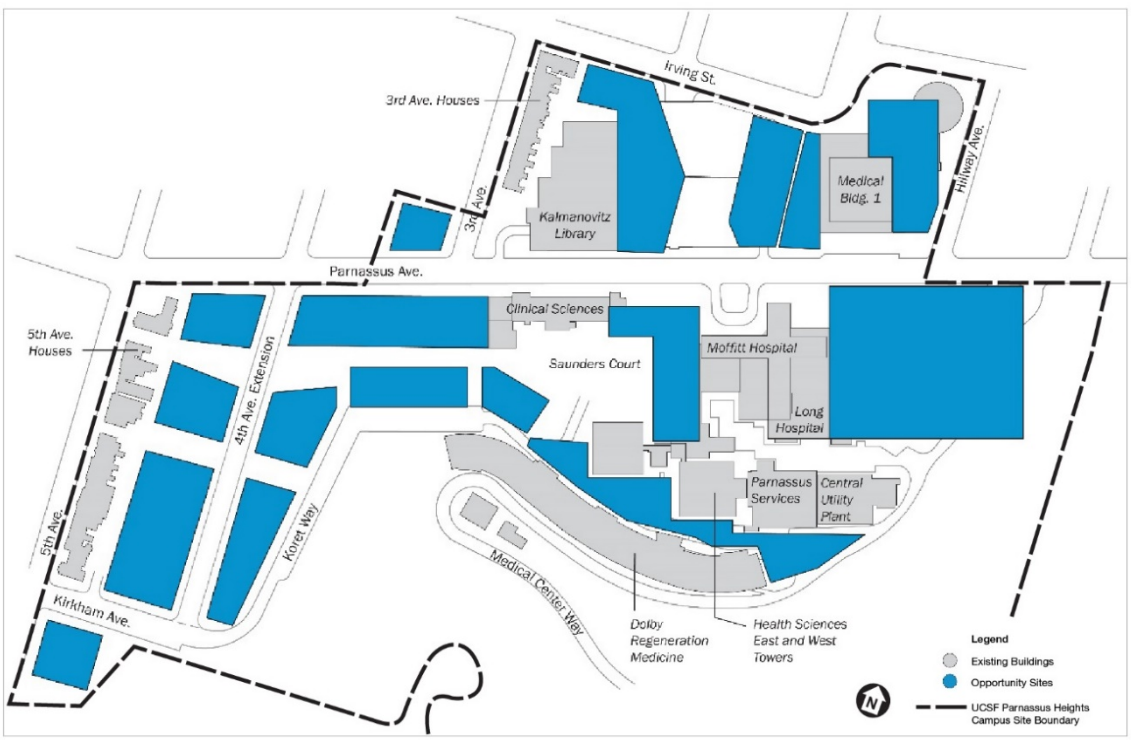


Figure 3-6
CPHP Opportunity Sites in Campus Core

The 2014 LRDP approved demolition of the LPPI, Koret Vision Center, EHS, Surge, Woods, and Proctor buildings. These buildings are also proposed for demolition under the CPHP. The LPPI is now deemed to be eligible for the California Register of Historical Resources (CRHR) based upon information that became available after certification of the 2014 LRDP FEIR. The 2014

LRDP also approved a renovation and repurposing of Moffitt Hospital for outpatient, hospital support and other non-acute care uses.

Additionally, redevelopment of the campus site under the CPHP would entail demolition of structures beyond those identified in the 2014 LRDP, to make way for new buildings. The Plan assumes the eventual demolition and replacement of up to 26 percent of existing program space on opportunity sites (see **Figure 3-7**). Demolitions to occur as part of the CPHP, in addition to those already identified for demolition in the 2014 LRDP, may include:

- UC Hall
- Dental Clinics
- School of Nursing building
- Millberry Union and Garage (either wholly or partially)
- Lucia Child Care Center
- Kirkham Child Care Center
- EHS Annex
- All of the residential structures of the Aldea Housing complex

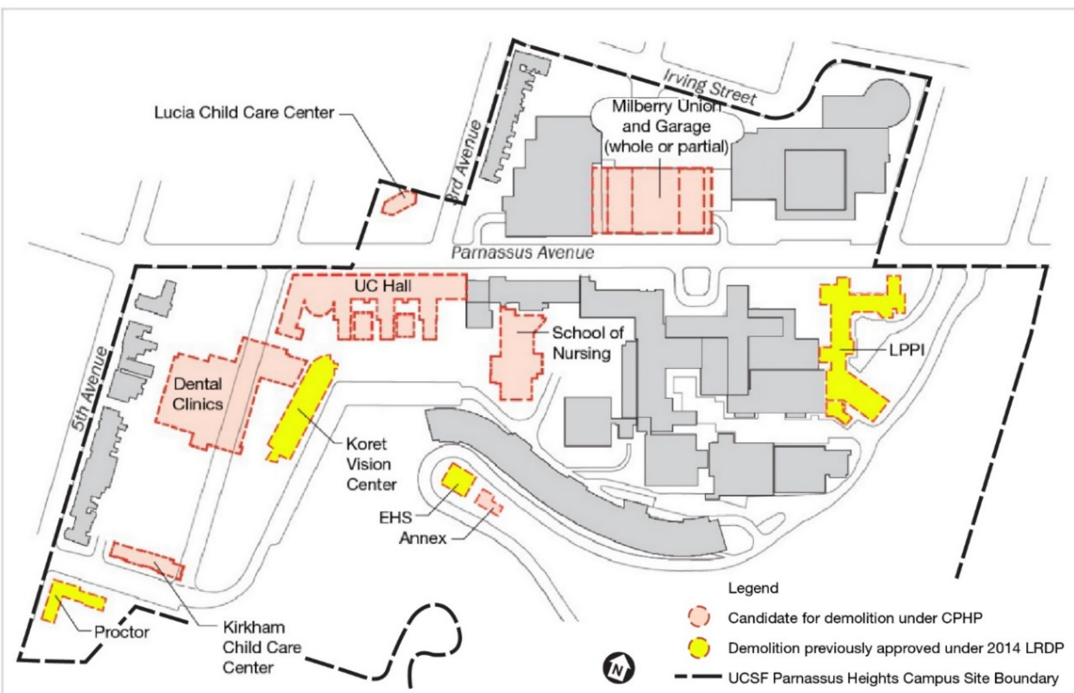


Figure 3-7
Potential Demolitions in Campus Core

As discussed further below, UC Hall, the Dental Clinics, Millberry Union and a portion of the Aldea Housing complex structures are eligible or potentially eligible for the CRHR and/or National Register of Historic Places (NRHP).

There is the potential for the New Hospital and widening of Medical Center Way to result in the need to modify the Reserve boundary. UCSF proposes to replace any area of the Reserve that is lost due to new development under the CPHP by designating new Reserve area elsewhere on the campus site in an amount equal to or greater than the area lost. Please see Section 3.7.2, *Revisions to the 2014 LRDP*, for a discussion and illustration of proposed functional zones at the Parnassus Heights campus site, including estimates of the campus site proposed to be redesignated to and from the Reserve.

Figure 3-8 illustrates potential building massing for new development that would occur in these sites, and assumed for EIR analysis purposes. An illustration of existing Parnassus Heights campus core building heights compared to proposed new building heights under the CPHP are presented in **Figure 3-9**. It is important to note that building sizes, heights, and massing are conceptual and remain approximate as the buildings are not yet designed.

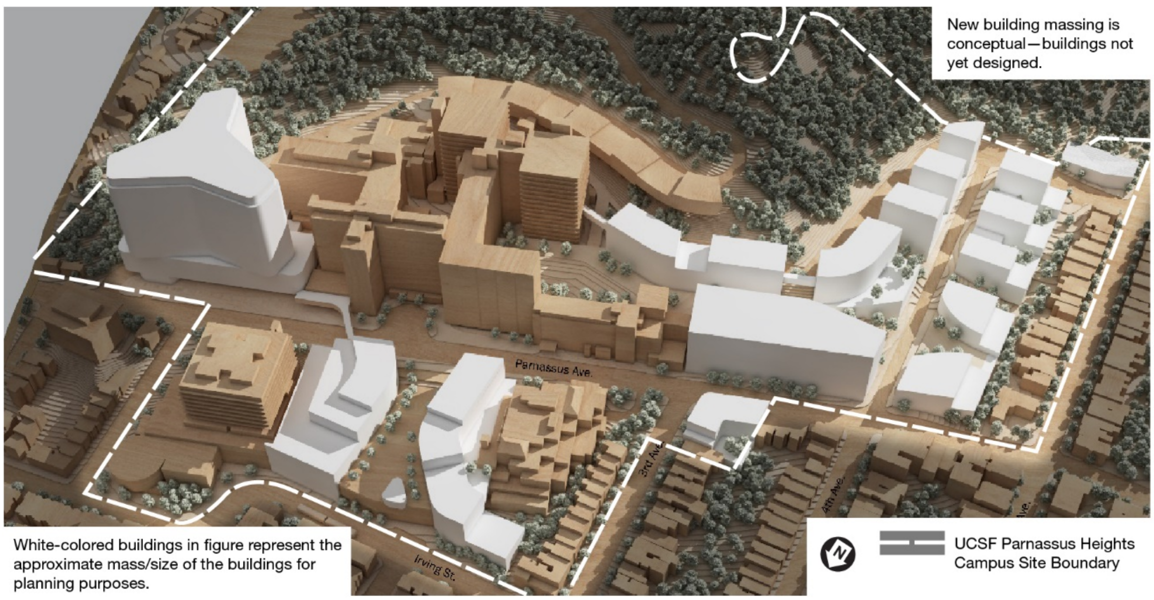
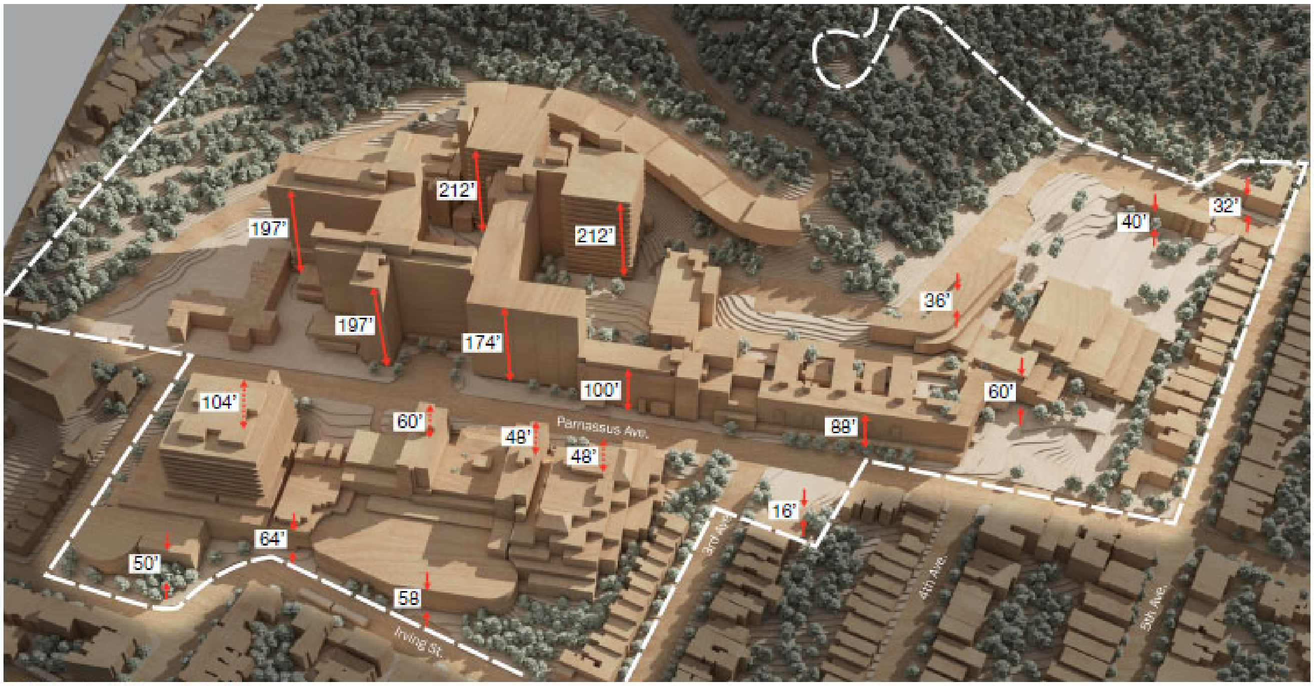


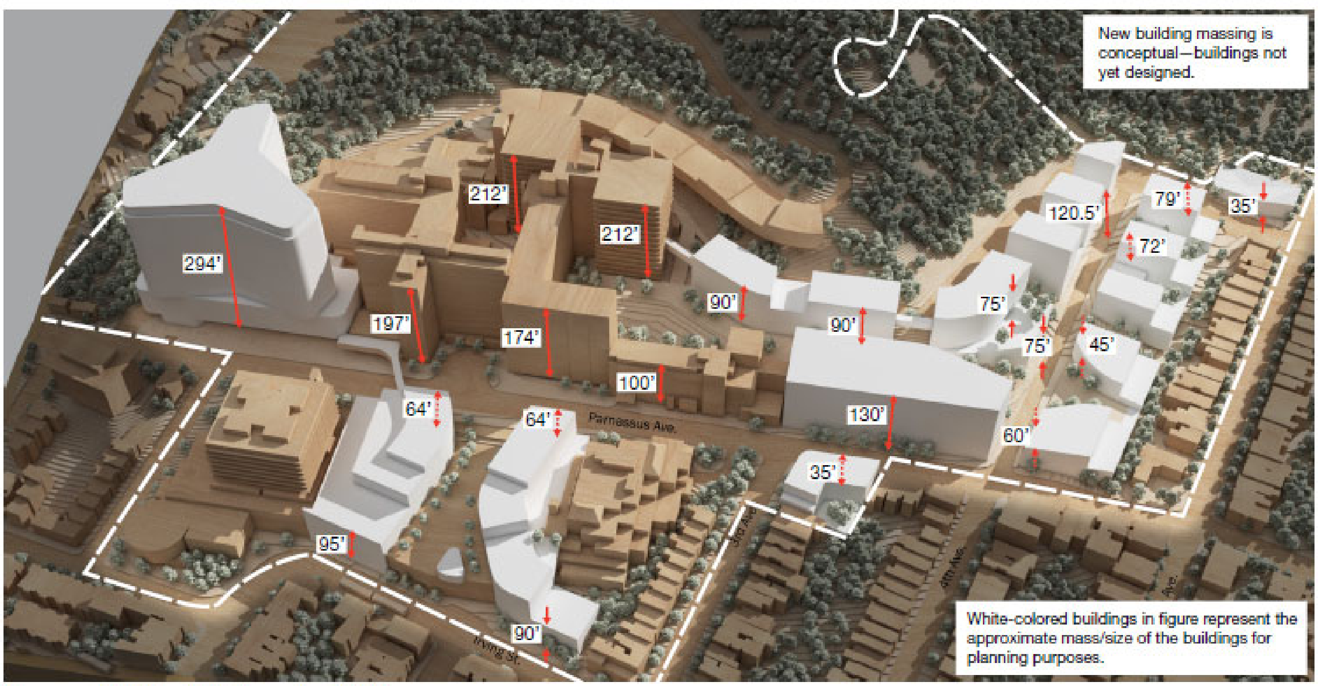
Figure 3-8
Vision for Parnassus Heights Campus Site – Development to year 2050 in Campus Core

CPHP Initial Phase

As discussed above, this EIR includes project-level analysis for certain Initial Phase projects anticipated to be completed by about the year 2030; specifically, the Irving Street Arrival, Research and Academic Building (RAB), and initial Aldea Housing Densification; and Initial Phase improvements, as described below. These near-term projects are intended to support the priorities of research space and the New Hospital, increase on-campus housing supply, and to provide benefits to the community. The New Hospital is also an Initial Phase project anticipated to be completed by about the year 2030, but is analyzed at a program level in this EIR and will be analyzed at a project level in a subsequent EIR when more details are available. **Figure 3-10** identifies the location of each of these Initial Phase developments. Additional detail on each Initial Phase development is described further, below.



Existing Buildings Heights



Proposed Building Heights under CPHP

Building heights are measured at the midpoint on street frontage,
from sidewalk to roof, excluding mechanical penthouses. Based on current topographic data.

UCSF Parnassus Heights Campus Site Boundary

SFO/D190291.00 - UCSF CPHP EIR2. Graphics/Illustrator

SOURCE: ESA, 2020

Figure 3-9
Change in Building Heights in Campus Core under CPHP

ESA

Figure 3-10
CPHP Initial Phase Projects

Irving Street Arrival

The proposed Irving Street Arrival project is proposed to create a welcoming arrival experience at Parnassus Heights and further promote use of the N Judah by UCSF personnel and visitors. The proposal includes modification of the portion of the existing Medical Building 1 that functions as a pedestrian entrance extending from Irving Street to Parnassus Avenue.

This section of Medical Building 1 currently includes circulation space, an elevator core, and program space. As shown in the Irving Street Arrival project concept plan in **Figure 3-11**, this space would be modified or demolished in order to develop a new and/or reconfigured multi-story vertical circulation space to include express elevators or escalators, stairs, and arrival features such as information and orientation areas (the "unified lobby"). The new/modified structure would result in about 25,000 gsf net new space, and include an additional two stories on the Irving Street side (increasing to a total of 8 stories and up to 86 feet in height) and an additional two stories on the Parnassus Avenue side (increasing to a total of three stories and up to 45 feet in height). The Irving

Street Arrival project would also include replacing the facades or reskinning of the Millberry Union and Medical Building 1 garage structures. The maximum development footprint for the Irving Street Arrival project, which would include a total of five floors of new development, is illustrated in **Figure 3-12**.

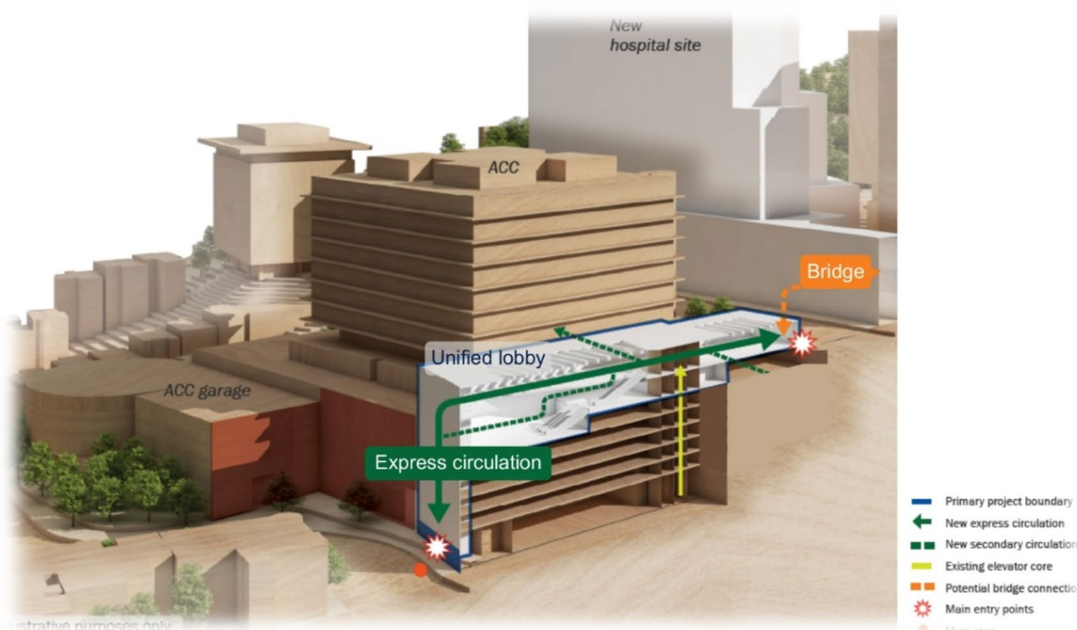


Figure 3-11
Irving Street Arrival Project Context

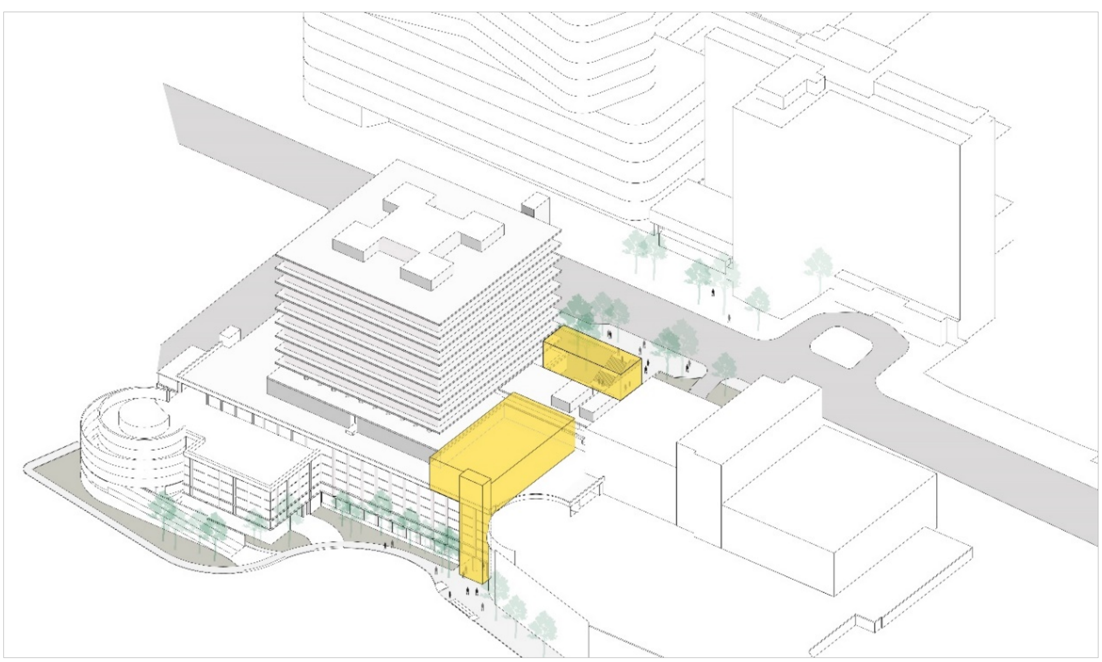


Figure 3-12
Irving Street Arrival Maximum Development Potential

Research and Academic Building

The proposed RAB would be located in the Research and Academic Commons District on the current site of UC Hall, following the proposed demolition of this building. UC Hall, which was completed in 1917, is one of the oldest buildings at Parnassus Heights and is the oldest extant hospital building in the UC system. UC Hall is potentially eligible for the National Register of Historic Places and the California Register of Historic Resources, although is not currently formally nominated for either register. The School of Nursing building would also be demolished as part of this Initial Phase project.

The proposed RAB is conceptually illustrated in **Figure 3-13**. The RAB would be approximately 270,000 gsf and eight stories tall (up to 130 feet in height) and would contain primarily research, academic and education space. (It should be noted that the conceptual RAB design presented in Figure 3-13 depicts building articulation that differs in massing from the maximum RAB building envelope as illustrated in Figure 3-7.[2])

A district plan of the Research and Academic Commons District, which includes the RAB and surrounding area, is currently underway to evaluate more closely and recommend a development sequence for the area. Development of the RAB site could also include components of the CPHP intended to be constructed incrementally that are adjacent to the RAB site, such as a portion of the Promenade (see description and Figure 3-17 below), the service/utility corridor to the south of the RAB site, and the first increment of Fourth Avenue extension to the west of the RAB site.

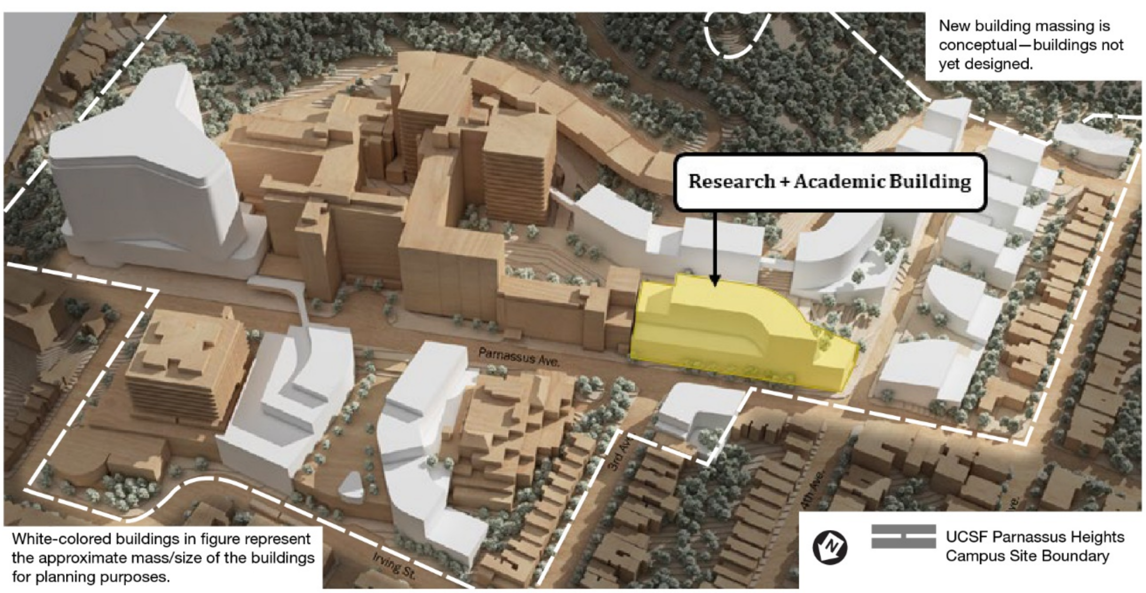


Figure 3-13
Research and Academic Building - Conceptual Building Envelope

2 This EIR conservatively analyzes the maximum envelope RAB design (as indicated in Figure 3-7), since it would have the greatest potential environmental impacts (please see Section 4.1, Aesthetics, Wind and Shadow for additional detail).

New Hospital, and Bridge and Tunnel Across Parnassus Avenue

The New Hospital has not yet been designed and therefore will be analyzed in more detail in a future, separate project-level EIR. Nonetheless, this EIR includes assumptions regarding the New Hospital to facilitate the analysis of program-level and cumulative impacts.

Table 3-1 presents an overview of the existing Parnassus Heights hospital program, and the hospital programs envisioned under the 2014 LRDP and the proposed CPHP. As shown in Table 3-1, there are currently 325 inpatient beds at Long Hospital and 150 inpatient beds at Moffitt Hospital, for a total of 475 inpatient beds within a combined approximate 754,400 gsf. The 2014 LRDP envisioned a New Hospital of about 308,000 gsf and 140 beds to replace the inpatient facilities that were at Moffitt Hospital; renovation and reuse of Moffitt Hospital for outpatient, support and other campus uses; and reduction in the inpatient beds at Long Hospital to 299 beds, for a total of approximately 439 inpatient beds at Parnassus Heights. At that time of preparation of the 2014 LRDP, the New Hospital size was based on meeting basic clinical needs in response to SB 1953, with a minimal program that could be accommodated on the LPPI site while staying as close as possible to the existing Parnassus Heights space ceiling.

TABLE 3-1
PARNASSUS HEIGHTS HOSPITAL PROGRAM

	2014 LRDP		Existing (2020)		CPHP		CPHP as Modified and Studied in EIR	
	Beds	**GSF**	**Beds**	**GSF**	**Beds**	**GSF**	**Beds**	**GSF**
Moffitt Hospital			150	385,800	100	385,800		
Long Hospital	299	368,600	325	368,600	291	368,600	291	368,600
Proposed New Hospital	140	308,000			284	563,000	384	955,000
Total	**439**	**676,600**	**475**	**754,400**	**675**	**1,317,400**	**675**	**1,323,600**

SOURCE: UCSF, 2020

In response to the CPHP project needs discussed in Section 3.5 and consistent with the project objectives presented in Section 3.6, above, the proposed CPHP Final Report (October, 2019) envisioned development of an approximately 563,000 gsf New Hospital on the site of LPPI, with a capacity for 284 inpatient beds. The CPHP Final Report assumed maintaining 100 inpatient beds at Moffitt Hospital and 291 inpatient beds at Long Hospital. Collectively, the CPHP would provide for 675 inpatient beds, an increase of 200 beds over existing conditions.

As master planning for the Parnassus Heights campus site progressed, the University identified certain aspects of the CPHP necessitating modification, including the provision for additional New Hospital building space beyond that assumed in the CPHP Final Report. Under the CPHP as modified, the 100 inpatient beds originally proposed to be maintained in Moffitt Hospital would instead be located in the New Hospital, thereby allowing these 100 inpatient beds to be developed to modern clinical standards in the New Hospital and creating additional space at Moffitt Hospital to accommodate other clinical uses that would support the New Hospital. As shown in Table 3-1, this modification would increase the inpatient beds at the New Hospital from 284 to 384.

Collectively, the CPHP as modified would provide for 675 inpatient beds, the same as that contemplated under the original CPHP.

Other factors informing the size of the New Hospital include complying with applicable codes and regulations for new hospitals that require among other things taller floor heights and additional space to accommodate mechanical equipment and hospital support functions. The New Hospital conceptual design as modified also reflects considerations to further improve operational efficiency, including providing operating rooms and critical supporting functions on the same level.

The proposed New Hospital would be located on the site of LPPI and adjacent land on the south side of Parnassus Avenue and east of Moffitt Hospital (see **Figure 3-14** for the study area in which the New Hospital would be developed). As currently envisioned, the New Hospital would be about 955,000 gsf, and 16 stories tall (up to 294 feet in height).[3] The preliminary concept for the New Hospital consists of a 5-story podium, above which an 11-story tower would rise.

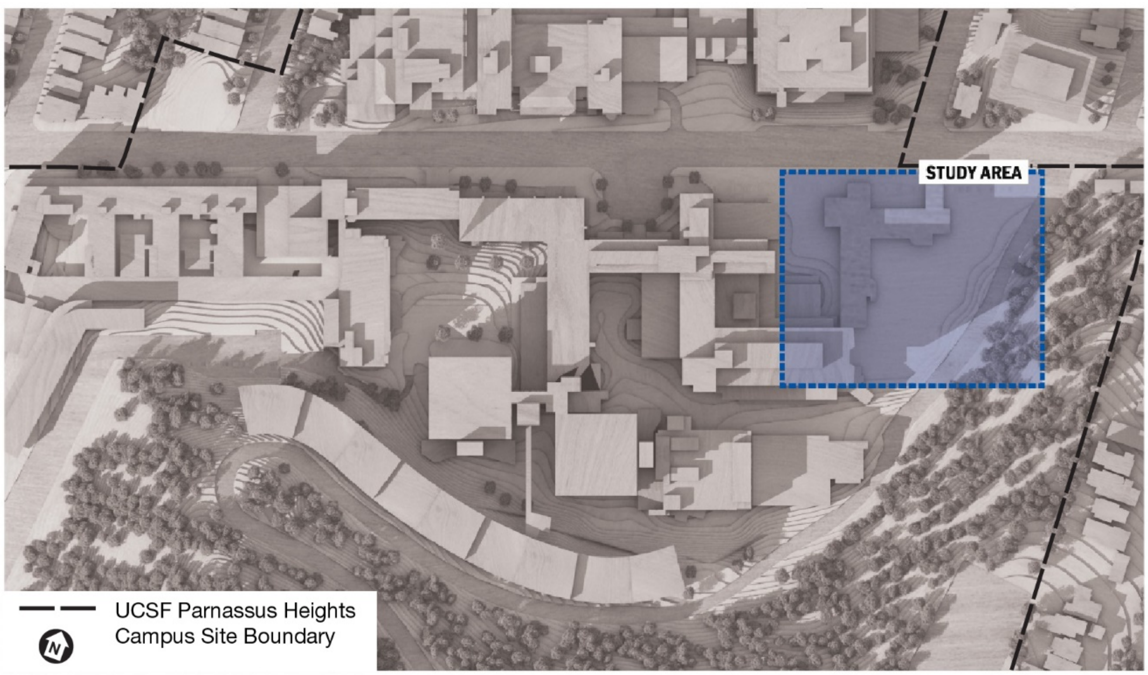


Figure 3-14
New Hospital Study Area

There is the potential for the proposed New Hospital and associated widening of Medical Center Way adjacent to the New Hospital (which must be done for fire safety purposes) to require modification of the Reserve boundary. As indicated above, UCSF proposes to replace any area of

3 Including potential rooftop observation deck and elevator vestibule that would occupy a portion of the roof. As currently conceived, the majority of mechanical equipment would be contained within various levels of the New Hospital to minimize the amount of equipment located on the roof; components of mechanical equipment located on the roof may slightly exceed the 294 feet in height.

the Reserve that is lost due to new development under the CPHP by designating new Reserve area elsewhere on the campus site in an amount equal to or greater than the area lost.

To facilitate pedestrian safety, ease of crossing Parnassus Avenue, and patient transport, a pedestrian bridge over Parnassus Avenue is proposed connecting the New Hospital to the Irving Street Arrival (**Figure 3-15**). A tunnel beneath Parnassus Avenue connecting the south side of the campus to the north side is also proposed. The tunnel is intended for pedestrians, utility lines, and the movement of goods and materials, to reduce the amount of activity and congestion that occurs on Parnassus Avenue and to provide a safer crossing experience for patients, visitors, employees, and students. As currently envisioned, the proposed pedestrian bridge would span approximately 90 feet across Parnassus Avenue. The enclosed bridge structure is assumed to be about 12 feet wide and 16 feet tall and situated up to 30 feet above grade, for a total height of up to 46 feet from grade to the top of the structure. The proposed tunnel would be about 20 feet wide and be located approximately 30 to 40 feet below grade.

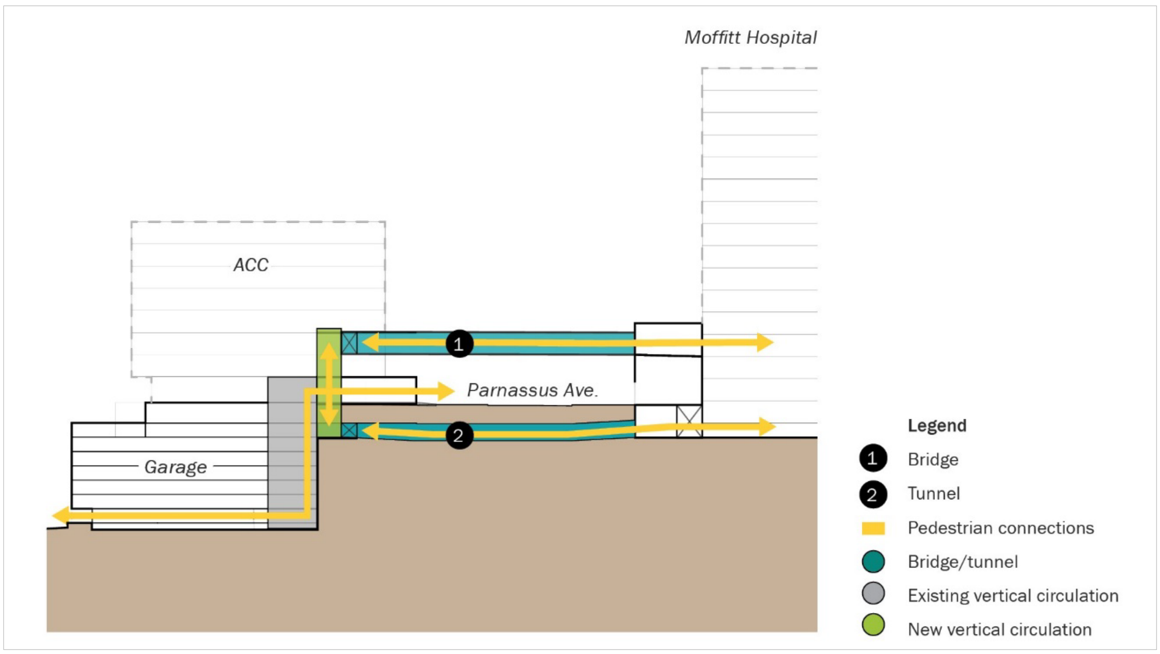


Figure 3-15
Proposed Parnassus Avenue Bridge and Tunnel

In addition, a temporary construction office [i.e., Integrated Center for Design & Construction (ICDC)] would be developed to facilitate construction of the proposed New Hospital, RAB, Irving Street Arrival and Parnassus Avenue Streetscape, and would range in size between approximately 25,000 to 45,000 sf. The ICDC would be located within the campus site boundary, taking up one or two floors of the Kalmanovitz Library Garage (which would temporarily displace about 60 parking spaces per floor).

Initial Aldea Housing Densification

The CPHP envisions densification of the Aldea Housing complex site by demolishing the existing student housing structures (note the University House would remain), and constructing student housing in new buildings, in the approximate location of existing building foundations. This development would be phased over time to avoid displacement of housing residents and to minimize the amount of disruption caused by construction activities. In the initial phase, the three existing 3-story 1960s-era housing structures (individually eligible for the CRHR and NRHP) depicted in Figure 3-10 would be replaced with three 8-story housing structures (up to 96 feet in height) and one 5-story housing structure (up to 60 feet in height) as illustrated in **Figure 3-16** and **Figure 3-17**, increasing the number of dwelling units by 142 units (i.e., from 42 existing units to a proposed 184 units); and a net increase of approximately 153,000 gsf new building space. Parking would be provided at a ratio of one parking space per unit. To address stormwater management, site improvements would incorporate Low-Impact Design (LID) and green infrastructure (GI) features.

Figure 3-16
Initial Aldea Housing Densification Location and Building Type

Figure 3-17
Conceptual Massing – Initial and Future Phases of Aldea Housing Densification

Other CPHP Initial Phase Improvements

Utility Improvements

Service Corridor and Utility Line Extensions

A proposed multi-level service corridor would extend from roughly Medical Center Way to Koret Way and the new extension of Fourth Avenue to facilitate transport of goods and materials for back-of-house functions and to provide easy access to major utility lines serving the campus. The service corridor is envisioned to be located above ground on its east end. Given the existing topography, several options are being considered for its routing on the western end. On the west end, the service corridor would be located underground and could extend north below the proposed Promenade, and/or could extend to the south to Koret Way before terminating at the new Fourth Avenue extension. The service corridor would be a key component of a campus-wide utility loop that would connect into existing utility lines. Utilities anticipated in the service corridor include steam, chilled water, condensate return pipes, domestic and fire water, electrical and communications. A conceptual diagram of proposed main line utility infrastructure pathways is presented in **Figure 3-18**.

In addition, existing utilities in the vicinity of the New Hospital site would be modified or relocated to enhance functionality of utilities serving the campus site and to improve aesthetics along Parnassus Avenue.

Additional detail on notable utility improvements throughout the campus site is provided below.

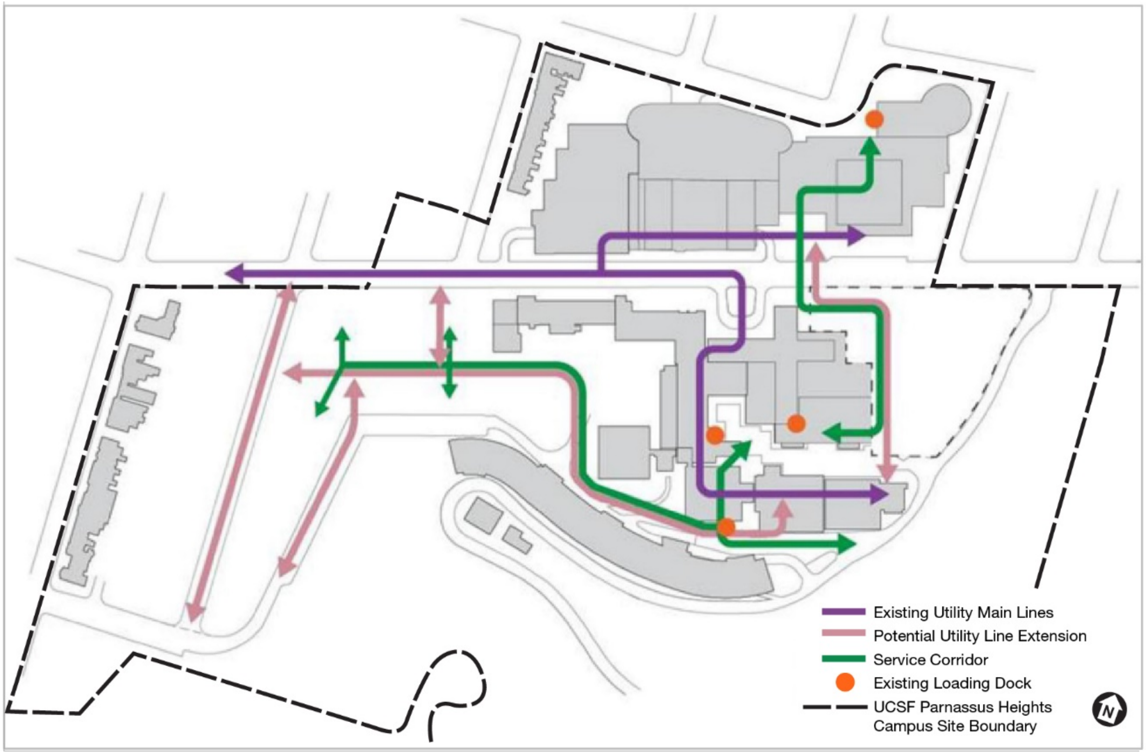


Figure 3-18
Conceptual Diagram of Proposed Main Line Utility Infrastructure Pathways

Fuel Tank Replacement

UCSF currently has five underground single-walled fiberglass diesel storage tanks located beneath Medical Center Way that serve the CUP generators and boilers, providing fuel for backup power in the event of an emergency. Each tank has a capacity of 30,000 gallons, for a total storage capacity of 150,000 gallons. These tanks do not meet current code requirements and must be replaced with new code-compliant tanks by 2025. UCSF proposes to remove the existing tanks and install new code-compliant below-ground diesel tanks with a maximum allowable capacity of approximately 210,000 gallons. The preferred design option includes replacement of the existing tanks with up to 10 new approximately 21,000-gallon tanks beneath Medical Center Way in the vicinity of the Dolby Regeneration Medicine building. No permanent aboveground tanks are planned.

It is anticipated that three temporary fuel storage tanks would first be installed south of, and adjacent to, the Parnassus Services Building. Grading would then occur within Medical Center Way and on the adjacent hillside to the south, requiring removal of vegetation, and installation of a replacement retaining wall. The existing fuel tanks would then be removed, and the new fuel tanks would be installed. Lastly, a widened Medical Center Way would then be rebuilt along this affected segment, and revegetation conducted as needed. Applicable monitoring and safety systems and measures would be installed to ensure safe operation of the new fuel tanks.

Ammonia Tank Replacement

UCSF currently maintains an 8,000-gallon ammonia tank in a small building located near the intersection of Parnassus Avenue and Medical Center Way. Under the CPHP, UCSF would remove and replace this tank with an 10,000-gallon aqueous urea tank, to be located just south of the CUP.

Domestic and Emergency Water

Some of the existing domestic and fire water lines and systems on the Parnassus Heights campus site are in poor condition or close to the end of their useful service life, and would need to be replaced in order to serve the net new development envisioned under the proposed CPHP. In addition, several new water storage tanks are required to serve net new development envisioned under the proposed CPHP. Two existing 20,000-gallon emergency water tanks located on land adjacent to the Reserve west of Medical Center Way (and west of the Woods parking lot) would be replaced with two new 180,000-gallon emergency water tanks at the same location to serve the western portion of the campus core. Each tank may be installed above- or below-ground, and measure approximately 20 feet in height by 40 feet in diameter. Other new water storage tanks, including a new 110,000-gallon tank to provide emergency and domestic water storage for the existing hospitals and proposed New Hospital, and a new 52,000-gallon domestic water storage tank to provide backup domestic water storage for the CUP, would be installed within the basement of the New Hospital.

Wastewater / Stormwater

The combined sewer system (CSS) that serves the campus core varies in age and material, and would need to be replaced in order to serve the net new development envisioned under the proposed CPHP. In addition, the proposed CPHP would require several existing sewer networks on the west side of the campus site to be reconfigured. The CSS system serving the Aldea Housing complex may also need to be upsized pending verification, and modifications to existing stormwater catchments may change how run-off is collected, likely requiring new drainage inlets and pipe improvements. Also, the existing hospitals and proposed New Hospital would require a new tank to provide onsite emergency sewer effluent storage (approximately 110,000 gallons); this tank would be installed within the New Hospital basement.

Electric and Natural Gas

The existing electrical infrastructure at the campus site is not capable of bearing the anticipated power demand increase associated with the net new development envisioned under proposed CPHP. As a result, improvements would be needed to the existing electrical system to distribute electricity across the campus site. Key improvements include adding two new PG&E connections to increase the transmission capacity provide up to 30 MW of electricity to the campus site, the creation of a service corridor pathway on the south side of the campus core to enable the creation of a campus loop 12 kV distribution system, and a connection across Parnassus Avenue (via the bridge and/or tunnel described above) to improve redundancy on the north side of the campus core. Natural gas branch lines would also need to be installed to serve new development envisioned in the proposed CPHP.

Heating and Chilled Water

The existing heating and chilled water network would need to be extended to connect existing and proposed buildings under the proposed CPHP, which would require the construction of a heating hot water and chilled water loop throughout the campus site. The system would utilize the proposed bridge and/or tunnel across Parnassus Avenue described above and include another crossing of Parnassus Avenue near 4th Avenue. The system would also follow the alignment of the proposed service corridor on the south side of the campus core.

Telecommunications

Several improvements to the telecommunications system serving the campus site would be needed to serve development anticipated under the proposed CPHP. Near-term improvements include placing new pathway and fiber optic cable in a new tunnel across Parnassus Avenue and along Medical Center Way to the Aldea Housing complex.

Parnassus Avenue Streetscape Plan

The 2014 LRDP FEIR analyzed the Parnassus Streetscape Plan, a proposal that calls for improvements along Parnassus Avenue generally between Fifth Avenue and Medical Center Way. The purpose of the proposed improvements is to make crossing the street safer and more convenient for pedestrians; increase bicycle safety; reorganize and improve transit and UCSF shuttle operations; create more usable outdoor pedestrian space; strengthen UCSF's identity; and enhance the public realm as called for in the UCSF Physical Design Framework. Specific improvements include new paving, street furniture, lighting, and street trees, as well as sidewalk and crosswalk widening in certain locations and better defined campus gateways. These improvements are proposed to occur in phases starting on the south side of Parnassus Avenue, at the west end of Fifth Avenue, and extending to Medical Center Way. The improvements are proposed to be implemented following the principle of adjacency – that is, implemented incrementally as adjacent new buildings or substantial renovations are completed.

With the proposed CPHP, it is expected that slight modifications to the Parnassus Avenue Streetscape Plan would be made to conform to new development proposals that front Parnassus Avenue. Those modifications would be specified as adjacent new buildings are designed.

Opportunities for Renovation of Existing Buildings

A certain portion of existing space undergoes renovation at Parnassus Heights annually. As individual renovation projects are proposed, they are reviewed for consistency with the 2014 LRDP and assessed for CEQA compliance. The CPHP identifies opportunity sites for building renovations (i.e., separate from those buildings identified in the CPHP as opportunity sites for demolition and new construction). Opportunity sites for notable renovations include the HSIR Towers and the Medical Sciences Building. As discussed above, renovation and reuse of Moffitt Hospital for outpatient, support and other campus uses was previously approved under the 2014 LRDP.

Community Investments

UCSF may voluntarily propose improvements to public streets or other public realm areas that, while not considered mitigation measures under CEQA, may nonetheless improve operations or otherwise enhance conditions at those locations. Such voluntary improvements, or "community investments," may include, but are not limited to, payment to the City of San Francisco for stop signs and/or traffic signals at intersections, turning lanes, curb extensions to improve sightlines and crosswalks to clarify rights-of-way, greening, and other traffic-calming measures or public realm enhancements.

CPHP Future Phase

The CPHP Future Phase comprises all remaining development opportunities identified under the CPHP. Potential development includes the following:

Millberry Union New Towers and Terrace

Millberry Union is individually eligible for the CRHR and NRHP. The CPHP envisions redevelopment of Millberry Union by demolishing the existing Millberry Union towers and constructing a larger facility of about 230,000 gsf. The two new towers that would flank the new terrace would be five stories (up to 64 feet in height) as measured from Parnassus Avenue; and eight stories (up to 90 to 95 feet in height) along Irving Street. The new building could contain clinical, instruction, and research space, as well as campus community space (i.e. potentially retail and meeting space, wellness facilities, and other active uses to better integrate with the community).

It is possible that in order to construct the facility, the existing Millberry Union would need to be demolished in its entirety, depending on the seismic condition of the building, cost, and other factors at the time the proposal is implemented. It is also possible that the Millberry Union garage, upon which Millberry Union sits, would need to be reconstructed in order to support the new structure.

Hotel for Patients and Families

The CPHP envisions the demolition of the existing Lucia Child Care center and the construction of a 48,000 gsf hotel to provide lodging for both patients and families of patients who are receiving treatment at the hospital for an extended period. The Plan envisions a building of about three stories and up to 35 feet in height. A nominal amount of parking could be constructed on this site.

New Program Adjacent to RAB

The CPHP identifies opportunities for future development behind the future RAB on a site that is largely vacant except for a small storage and loading area. The CPHP also identifies opportunities for future development to the southwest of the RAB, which would necessitate demolition of the Koret Vision Center building and Dental Clinics building. The Dental Clinics building is individually eligible for the CRHR and the NRHP. Future uses in these new spaces, which would total about 435,000 gsf, would include primarily research and academic space. The buildings would range from three to nine stories (up to 45 to 130 feet in height). The existing Faculty Alumni House as well as UCSF-owned housing along the east side of Fifth Avenue would remain.

West Side Housing

The CPHP includes the development of new housing for students and staff to address the pressing need for affordable housing in San Francisco. Approximately 280,000 gsf of new housing within the West Side district would be located on both sides of the proposed Fourth Avenue extension. Approximately 430 units of housing are planned. The structures would range from approximately six to ten stories, up to 72 feet to 120 feet in height and would step down (east to west) along the slope.

Development on the site would require demolition of the Kirkham Child Care center and the West Side Parking Lot. Parking spaces lost from demolition of the West Side Parking Lot and from alterations of the Millberry Union garage would be replaced at the West Side Housing site; approximately 190 parking spaces at this site are proposed.

Child Care on Proctor Site

The CPHP envisions that the Proctor building would be demolished and replaced with a new three-story, up to 35-foot tall childcare facility of about 35,000 gsf. An outdoor play area, a nominal amount of on-site parking, and a drop-off area would be included.

Future Phase of Aldea Housing

In the Future Phase, the remaining nine 3-story existing housing structures in the Aldea Housing complex would be replaced with eight 5-story housing structures (up to 60 feet in height), increasing the number of dwelling units in this phase by 190 units); and a net increase of approximately 225,000 gsf new building space. A small daycare center of about 15,000 gsf is also planned within the complex under the CPHP.

When considering the initial phase and future phase collectively, the number of dwelling units in the Aldea Housing complex would increase from 172 units to 504 units (an increase of 332 units); a total net increase of about 378,000 gsf new building space.

Open Space

The Plan envisions an increase in the amount of usable open space on the campus site. The most notable of these spaces include the Millberry Terrace, to be located atop the altered or new Millberry Union garage; an expansion of Saunders Court; and the proposed Promenade (see **Figure 3-19**). The proposed east-west Promenade would be located to the west of Saunders Court and south of the RAB, and provide pedestrian access between the principal campus site research/hospital uses and the West Side district. The Plan also indicates potential additional pathways leading to the Mount Sutro Open Space Reserve.

Utilities and Infrastructure

Additional domestic and emergency water, waste wastewater/stormwater, electric and natural gas, heating and chilled water, and/or telecommunications utility improvements would occur throughout the campus site to accommodate Future Phase development, including but not limited to, utility improvements to serve the proposed Future Phase development on the west side of the campus core, and Future Phase Aldea Housing development.

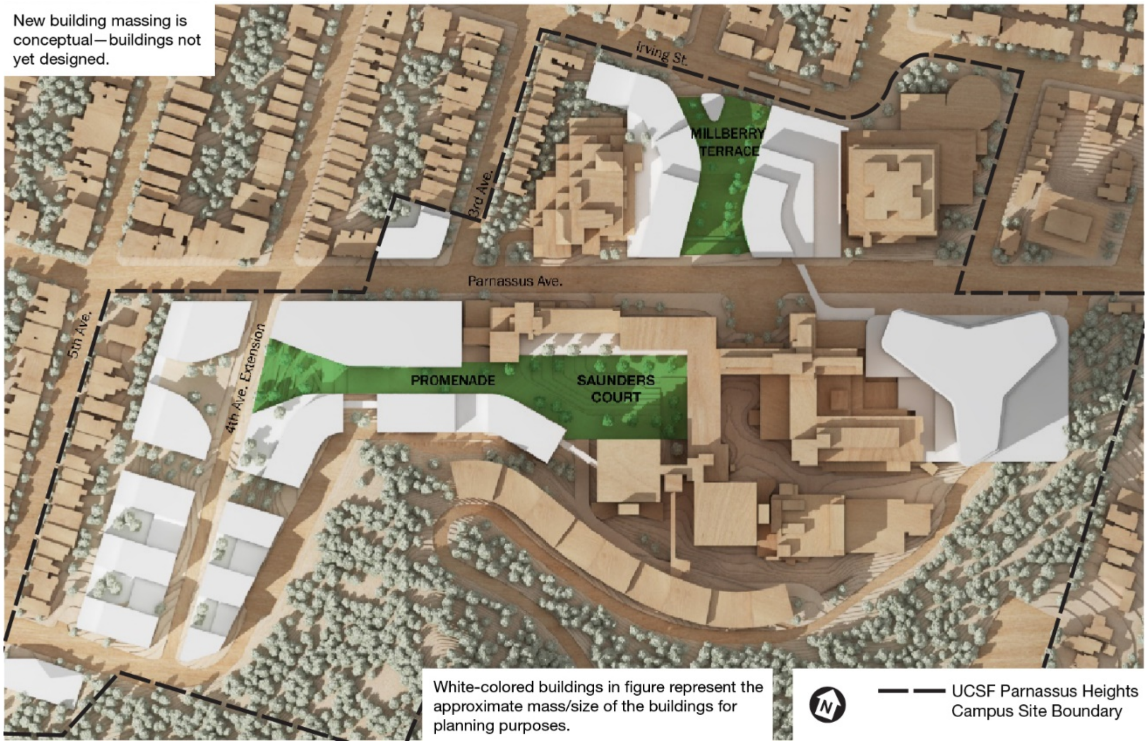


Figure 3-19
Proposed Open Space Areas in Campus Core

Circulation, Transportation and Parking

As mentioned above, the Plan envisions the extension of Fourth Avenue as a campus street between Parnassus Avenue and Kirkham Street. The extension of Fourth Avenue would serve as the main access point for future new buildings to the west of the proposed RAB, including the new housing structures on the West Side.

CPHP Construction

Construction Overview

As described in more detail below, construction would begin in mid-2021, with Initial Phase projects anticipated to be completed by 2030, and Future phase projects implemented over the remainder of the CPHP and completed by horizon year 2050. Depending on the individual CPHP project, construction activities would include, but not be limited to, demolition or renovation of certain existing campus site buildings; site clearing, excavation, and grading activities; new building foundation and vertical construction; new street, sidewalk and service corridor construction; installation of utilities; building interior finishing; and exterior hardscaping and landscaping improvements.

CPHP construction would generate temporary construction workers on-site that would vary, depending on the specific construction activities being performed and overlap between construction of individual projects. A variety of mobile and stationary construction equipment would be used at the campus site and/or immediate vicinity during construction. This is expected to include use of cranes for pier drilling for foundations, steel and/or precast erection, and building façades. Other mobile equipment such as excavators, backhoes, front-end loaders, dump trucks, concrete boom trucks and forklifts would be used at the project site for a range of other construction tasks on the project site, including site clearing, excavation and grading, building construction, and/or hardscape and landscape materials installation. Project construction would generate off-site truck trips for deliveries of concrete and other building materials, transportation of construction equipment to and from the site, hauling soils and debris from the site, and street sweepers. A variety of other smaller mechanical equipment would also be used at the project site during the construction period, such as saw cutters, chopping saws, tile saws, stud impact guns, impact drills, torque wrenches, welding machines, and concrete boom pumps. The proposed tunnel under Parnassus Avenue would be constructed by means of either boring or open cut excavation. Depending on location within the campus site and depth of excavation, limited and temporary dewatering may be required for individual projects during construction; in which case, water would be discharged to the City's sewer system, after treatment, if necessary.

Potential on-site CPHP construction materials/construction worker staging areas would include: the 1) the existing parking lot area located south of UC Hall (i.e., site of the former Laboratory of Radiobiology building); 2) the Surge parking lot, and/or 3) the top level of the Medical Building 1 parking lot. Certain roads within the campus site, most notably Medical Center Way, are likely to be partially or fully closed for limited durations during construction. (See also potential off-site roads temporarily affected during CPHP construction, below).

No pile driving or blasting activities are proposed during construction of projects proposed under the CPHP. Rather, foundations would be installed using drilled piers; and excavation of soft rock would be conducted using hydraulic heavy excavators.

Construction under the CPHP is proposed to occur consistent with Section 2908 of the City Police Code, known as the San Francisco Noise Ordinance. Although UCSF is not subject to the noise ordinance, it strives to be consistent with it to the extent feasible.[4]

Estimated CPHP Construction Timeline

CPHP Initial Phase

It is anticipated that the CPHP Initial Phase would be constructed along the following approximate timeline:

Irving Street Arrival:	Early 2022 to end of 2023
Research and Academic Building:	Early 2022 to end of 2025

[4] Section 2908 prohibits erecting, constructing, demolishing, excavating for, altering, or repairing any building or structures between the hours of 8:00 p.m. of any day and 7:00 a.m. of the following day if the noise level created is in excess of the ambient noise level by 5 dBA at the nearest property line.

New Hospital:	Mid 2023 to beginning of 2030[5]
Initial phase of Aldea Housing Densification:	From 2028 to end of 2030
Renovation of Existing Buildings:	Ongoing
Parnassus Avenue Streetscape:	Concurrent with Projects (principle of adjacency)
Bridge and Tunnel:	Mid 2023 to beginning of 2030 (concurrent with New Hospital)

Actual timelines for individual construction projects may be influenced by factors outside of UCSF's control, including, but not limited to, economic conditions (e.g., as a consequence of the present COVID-19 pandemic), weather, and other considerations.

CPHP Future Phase

After year 2030, the sequencing of the individual CPHP Future Phase projects is speculative. However, for purposes of the EIR, all remaining potential development under the CPHP is assumed to be completed by the horizon year of the Plan, by about year 2050.

CPHP Construction, Demolition and Excavation

In total, the CPHP would result in an estimated 2.89 million gsf of new building construction, 688,000 gsf of existing building demolition, and approximately 393,000 cubic yards (cy) of excavation of materials, within the campus site.[6] The following provides additional detail, by phase.

CPHP Initial Phase

During the CPHP Initial Phase, there would be approximately 1.43 million gsf of new building construction within the campus site. In addition, there would be approximately 287,000 gsf of existing building demolition within the campus site during the Initial Phase. This includes approximately 30,000 gsf of building demolition to accommodate the proposed Irving Street Arrival project, 254,000 gsf for demolition of UC Hall and School of Nursing to make way for the proposed RAB, and an estimated 24,000 gsf of demolition for three of the existing Aldea Housing structures.

It is also estimated that during the CPHP Initial Phase, approximately 233,000 cy of material would be excavated from the campus site to accommodate the Initial Phase projects. This includes excavation of approximately 1,000 cy associated with the proposed Irving Street Arrival; 77,000 cy beneath, and south of, UC Hall to accommodate the RAB; 150,000 cy to accommodate

5 An exception is development of the proposed temporary ICDC office to facilitate the construction of the New Hospital. The ICDC would be constructed either within the Kalmanovitz Library Garage as early mid/late 2021, off-site at the Kezar parking lot as early as 2021, or off-site within the 350 Parnassus Avenue building as early as the end of 2023 following the planned retrofit of that building.

6 As noted above, separate from the CPHP demolition activities addressed here, additional building demolition within the campus site was previously contemplated in the 2014 LRDP and analyzed in the 2014 LRDP Final EIR, including demolition of the LPPI, Koret Vision Center, EHS, Surge, Woods and Proctor buildings. This would account for an additional approximate 187,000 gsf existing building demolition over the course of the CPHP.

the New Hospital, and tunnel beneath Parnassus Avenue; and 5,000 cy associated with the initial Aldea Housing Densification).

Preliminary plans indicate the proposed New Hospital would be programmed with a basement and sub-basement. In addition, preliminary plans indicate the New Hospital podium levels 3, 4 and 5 would extend both above a widened Medical Center Way and into the adjacent hillside in the Reserve. This would require tree removal, excavation and regrading of a portion of this hillside, and shoring of the hillside around the perimeter of the building footprint.

CPHP Future Phase

During the CPHP Future Phase, there would be approximately 1.47 million gsf of new building construction within the campus site. In addition, there would be approximately 401,000 of existing building demolition during the Future Phase, including 135,000 gsf associated demolition of the Dental Clinics building; 153,000 gsf related to demolition of the Millberry Union towers; 102,000 gsf associated with demolition of nine Aldea Housing structures; and approximately 11,000 gsf collectively for demolition of the Lucia and Kirkham Child Care Centers.

It is also estimated that during the CPHP Future Phase, approximately 139,000 cy of material would be excavated to accommodate new development throughout the campus site, including along the proposed Fourth Avenue extension, Saunders Court, and service corridor; at Millberry Union; and at the Aldea Housing complex.

Off-site Construction

While the great majority of construction under the CPHP is proposed within the campus site boundary, certain CPHP elements would require construction off-site. This includes: implementation of streetscape improvements on Parnassus Avenue as part of the Parnassus Avenue Streetscape Plan; connection of the proposed Fourth Avenue extension with Parnassus Avenue; and construction along Parnassus and Irving Avenue frontages (e.g., for Irving Street Arrival, RAB and New Hospital projects), and bridge over and tunnel under Parnassus Avenue. Depending on activity, off-site construction may result in temporary partial public road closures, including on Parnassus and/or Irving Avenue.

In addition, certain off-site utility extensions/connections would occur within adjacent public streets under the CPHP; and related to a potential new off-site potable water line extension between the south terminus of Fifth Avenue and north terminus of Crestmont Drive.

Tree Removal

As indicated above, certain tree removal would be required under the CPHP as a result of clearing, excavation and regrading activities. This includes, but is not limited to, areas within the Reserve (e.g., on the hillside east of the New Hospital, and locations adjacent to Medical Center Way), elsewhere within the campus site (e.g., redwood grove along Parnassus Avenue west of UC Hall, and miscellaneous areas of ornamental landscaping), and off-site (e.g., street trees along Parnassus Avenue and/or Irving Street).

3.7.2 Revisions to the 2014 LRDP

Proposed LRDP Amendment No. 6[7] would revise those portions of the 2014 LRDP pertaining to Parnassus Heights to incorporate concepts and proposals identified in the CPHP. Proposed changes would include the following:

- Revisions to functional zones
- Revisions to the space program
- Update to the projected population
- Revisions to Regents' Resolution
- Update to Greenhouse Gas Reduction Strategy

Revised Functional Zones

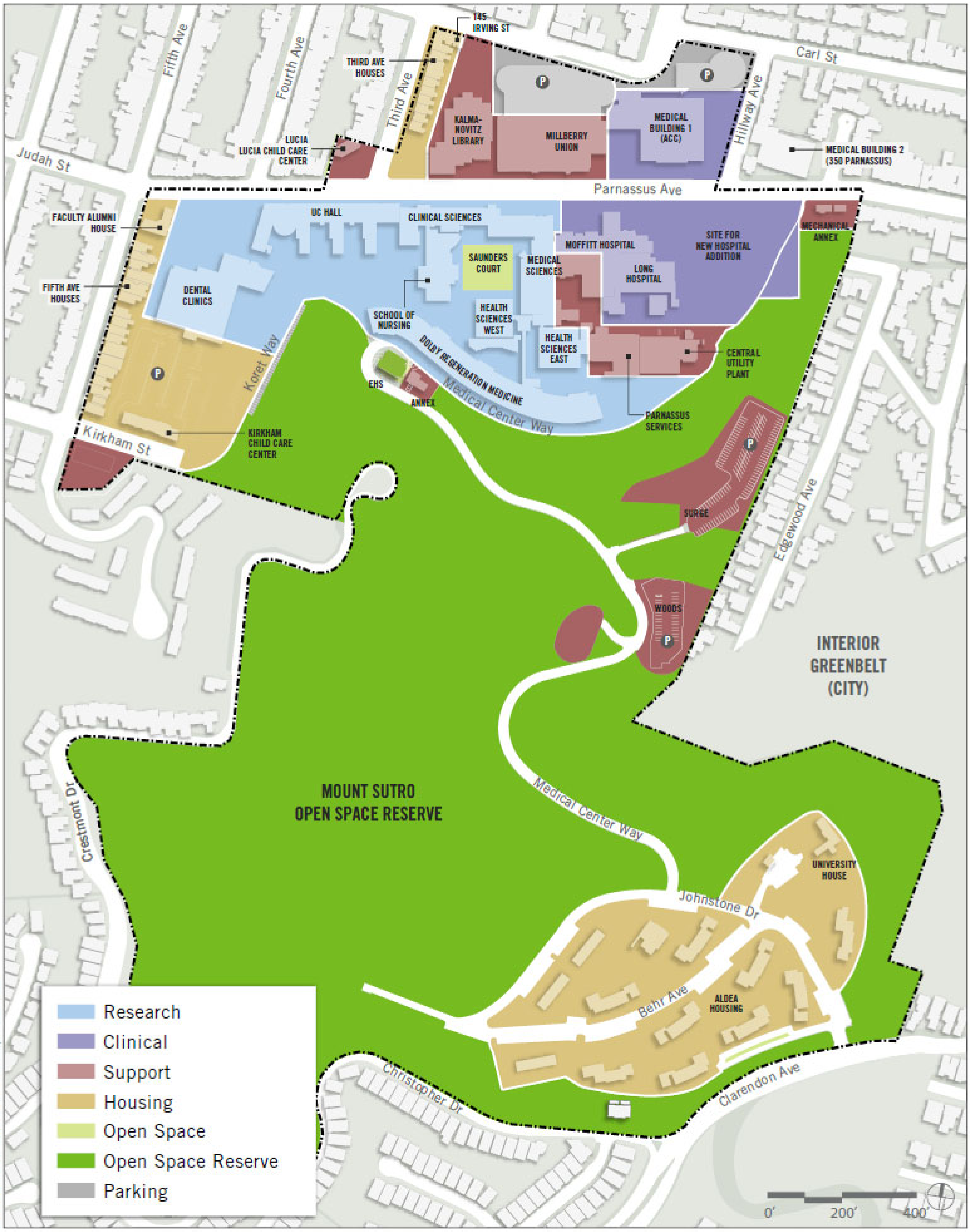
Each primary campus site identified in the 2014 LRDP includes a functional zone map reflecting the plans for predominant land uses. The 2014 LRDP Parnassus Heights functional zone map identifies land use zones for clinical, research, support, housing and parking uses. The functional zone map would be amended to be consistent with the districts proposed in the CPHP. **Figure 3-20** presents the updated proposed functional zones at the Parnassus Heights campus site. **Figure 3-21** illustrates areas of functional zone modifications under CPHP. As shown in Figure 3-21, the proposed location for the West Side housing under the CPHP that is currently designated as Research functional zone would be changed to a Housing functional zone. The proposed location for the RAB (on the site currently occupied by UC Hall) would be changed from Housing functional zone to Research functional zone. The proposed location for the childcare facility under the CPHP (on the site currently occupied by the Proctor building) would be changed from a Housing functional zone to Support functional zone. It is preliminarily estimated that approximately 0.15 acres[8] of the Reserve would be changed from Open Space Reserve to a Clinical functional zone to accommodate the proposed New Hospital. In addition, an approximate 0.40-acre of undeveloped land within the Surge/Woods parking area would be redesignated from Support to Open Space Reserve.

Revised Space Program

The 2014 LRDP space program for Parnassus Heights would be updated to reflect the space program proposed under the CPHP. **Table 3-2**, below, summarizes: 1) the total Parnassus Heights campus site space developed as of 2014 (i.e., at the time of preparation of the 2014 LRDP and associated FEIR), 2) the future space program buildout (in horizon year 2035) approved for the campus site in the 2014 LRDP and analyzed in the associated FEIR, 3) the existing (2019) space developed at the campus site, and 4) the future space program buildout (in horizon year 2050) under the proposed LRDP amendment.

7 The prior five amendments to the 2014 LRDP are as follows: Amendment No. 1 revised the functional zone map for the Mission Bay campus site; Amendment No. 2 was for Mission Bay East Campus Phase 1 Building; Amendment No. 3 was for the Child, Teen, and Family Center and Department of Psychiatry Building at 2130 Third Street; Amendment No. 4 was for the Minnesota Street Graduate Student and Trainee Housing; and Amendment No. 5 was for the 2130 Post Street Faculty Housing Retrofit.

8 Excluding the widening of Medical Center Way adjacent to the proposed New Hospital, which would be necessary for safety purposes. The amount of acreage for the widening of Medical Center Way is to be determined.



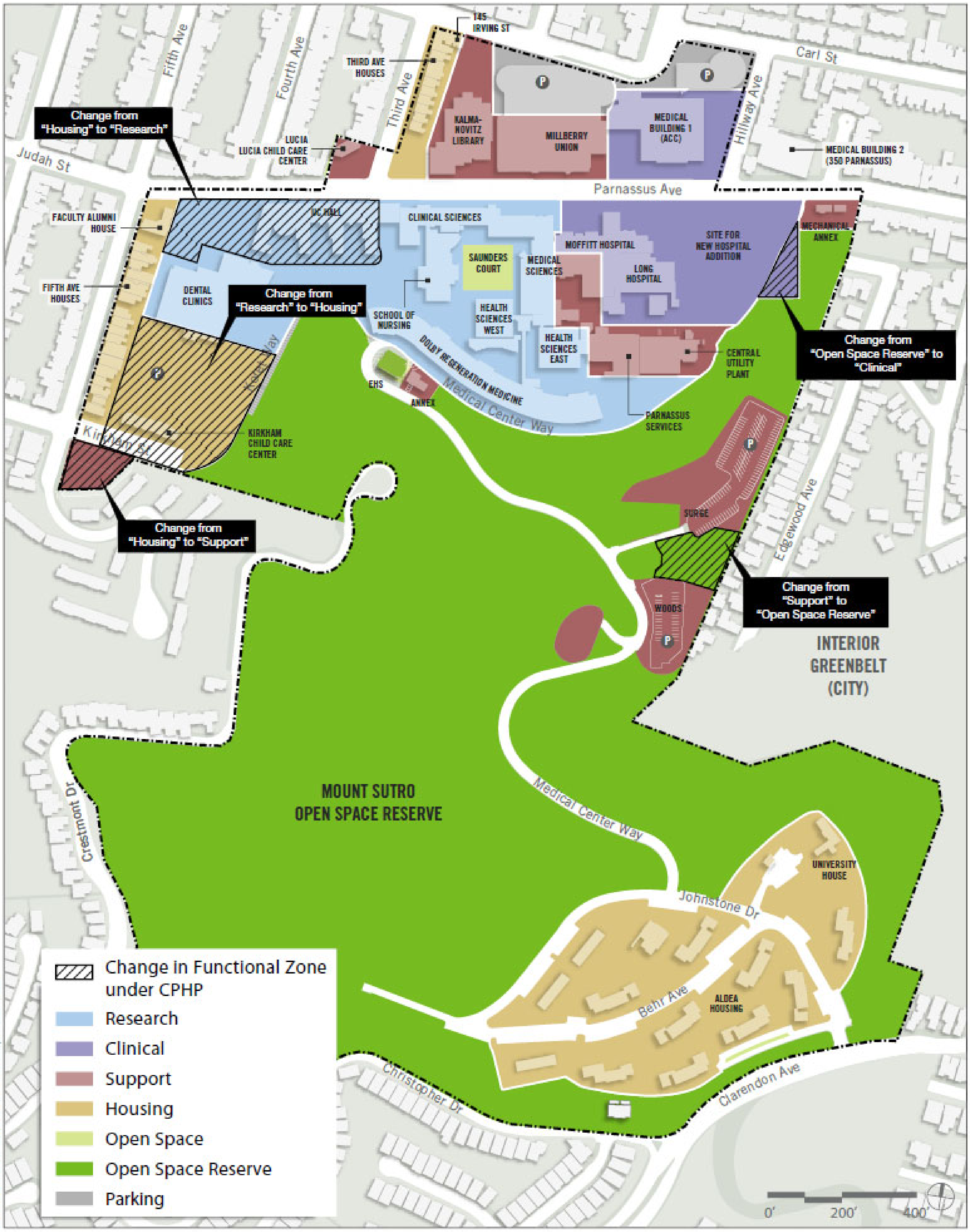
SFO/D190029 1.00 - UCSF CPHP EIR2. Graphics/Illustrator

SOURCE: UCSF, 2020

UCSF Comprehensive Parnassus Heights Plan EIR

Figure 3-20
Proposed Functional Zones at Parnassus Heights Campus Site

ESA



SOURCE: UCSF, 2020

UCSF Comprehensive Parnassus Heights Plan EIR

Figure 3-21
Areas of Functional Zone Modifications under CPHP

ESA

As shown in Table 3-2, the LRDP amendment would increase the future buildout space program at Parnassus Heights from the currently approved 3.61 million gsf (excluding housing) in horizon year 2035 to approximately 5.05 million gsf (excluding housing) in horizon year 2050, a net increase of approximately 1.44 million gsf. When compared to the existing (2019) space developed at the campus site (approximately 3.68 million gsf, excluding housing), the proposed LRDP amendment would result in a net increase in the space program by approximately 1.37 million gsf (excluding housing) by 2050 (approximately 74 percent of which would occur in the Initial Phase).

TABLE 3-2
PARNASSUS HEIGHTS CAMPUS SITE EXISTING AND PROJECTED SPACE PROGRAM (GSF)

Type of Space	2014 Total gsf	2014 LRDP Horizon 2035 Total gsf	Existing (2019) Total gsf	Proposed LRDP Amendment Horizon 2050 Total gsf
Instruction	318,600	280,100	290,300	290,300
Research	802,200	711,200	709,800	1,018,700
Clinical	950,500	1,051,300	1,030,800	1,872,700
Support				
Academic Support	217,500	215,000	193,800	193,800
Academic/Campus Admin	471,200	414,500	438,300	524,400
Campus Community	146,800	140,900	145,500	170,500
Logistics	144,700	138,800	107,400	150,900
Support Subtotal	980,200	909,200	885,000	1,039,600
Structured Parking	653,700	653,700	653,700	719,700
Vacant/Alteration	8,000	6,000	109,000	109,000
Housing	242,000	510,900	241,900	915,300
Total with Housing	**3,955,200**	**4,122,400**	**3,920,500**	**5,965,300**
Total without Housing	**3,713,200**	**3,611,500**	**3,678,600**	**5,050,000**

SOURCE: UCSF, 2019

Updated Population Projections

Detailed population projections are not provided in the 2014 LRDP by campus site, however, they were included in the 2014 LRDP FEIR for purposes of analysis of environmental effects. **Table 3-3**, below, summarizes: 1) the average daily population at the Parnassus Heights campus site as of 2013 (i.e., at the time of preparation of the 2014 LRDP and associated FEIR), 2) the future average daily population at buildout (horizon year 2035) of the 2014 LRDP and analyzed in the associated FEIR, 3) the existing (2018) average daily population at the campus site, and 4) the future average daily population at buildout (horizon year 2050) under the proposed LRDP amendment. It should be noted that estimated population projections are based on no changes to telecommuting, telehealth, and other remotely-conducted operations and services, and therefore are considered conservative.

TABLE 3-3
PARNASSUS HEIGHTS CAMPUS SITE EXISTING AND PROJECTED AVERAGE DAILY POPULATION

	2013 Population	Projected Population at 2014 LRDP Horizon 2035	Existing (2018) Population	Proposed LRDP Amendment Projected Population at Horizon 2050
Students	3,503	4,133	3,683	4,187
Faculty and Staff	8,323	8,268	7,395	12,075
Patients	2,572	2,685	2,984	3,810
Visitors	3,549	3,462	3,375	5,221
Total	**17,947**	**18,547**	**17,438**	**25,293**

SOURCE: UCSF, 2019

As shown in Table 3-3, the LRDP amendment would result in an increase in the estimated average daily population from approximately 18,500 in horizon year 2035 to about 25,300 in horizon year 2050, a net increase of approximately 6,800. When compared to the existing (2018) average daily population at the campus site (approximately 17,400), the proposed LRDP amendment would result in a net increase in the average daily population of nearly 7,900 persons by 2050.

As discussed above, while the UCSF 2014 LRDP addressed development at the entire UCSF campus over an approximate 20-year period, or an approximate horizon year of 2035, the CPHP is anticipated to guide the development of the Parnassus Heights campus site for the next 30 years, or an approximate horizon year of 2050. Nevertheless, all other UCSF campus sites addressed by the UCSF 2014 LRDP would continue to have an approximate horizon year of 2035.

Revisions to Planning Agreements

Regents' Resolution

In the 1976 Regents' Resolution,[9] which was adopted to address potential impacts associated with development of the Parnassus Heights campus site, the Regents designated the Mount Sutro Open Space Reserve as a permanent open space;[10] defined campus boundaries to prohibit further property acquisition (by purchase, condemnation or gift) and leasing of private residential properties outside this area by UCSF; directed that the houses acquired and occupied by UCSF on Third Avenue, Fifth Avenue, Parnassus Avenue, Irving Street, and Kirkham Street be returned to residential use, and that some be sold; and adopted a limit on the amount of built space of 3.55 million gsf, commonly referred to as the "space ceiling," within the newly designated campus site boundaries. At that time, the space ceiling applied to all building space, including

[9] The 1976 Regents' Resolution" refers to the action taken by the Regents entitled "Designation of Open Space Reserve, Alteration of Campus Boundaries, Commitment of Houses to Residential Use, Authorization to Negotiate Sale of Properties, and Commitment to Transportation Studies, San Francisco."

[10] The Reserve on Mount Sutro was designated as open space for a 25-year period by the Regents in 1975. In the 1976 Regents' Resolution, the Regents increased the Mount Sutro Open Space Reserve from 52 acres to 58 acres and made the open space designation permanent. The 1996 LRDP updated the boundaries of the Reserve to reflect the results of a survey which found that the Reserve contained an additional three acres, for a total of 61 acres.

parking structures, but excluding residential uses in UCSF buildings on Third, Fourth, Fifth, and Parnassus Avenues and Kirkham and Irving Streets.

The 2014 LRDP revised the Regents' Resolution to exclude other residential square footage within the campus site from the space ceiling (i.e., Aldea Housing and University House). At the time of adoption of the 2014 LRDP, Parnassus Heights contained approximately 3.84 million gsf of space subject to the space ceiling, approximately 294,800 gsf or 8.3 percent above the space ceiling limit. The 2014 LRDP identified strategies to reduce the space ceiling overage over the life of the 2014 LRDP. Currently, excluding housing, Parnassus Heights contains approximately 3.68 million gsf of space, approximately 128,600 gsf or 3.6 percent above the space ceiling limit.

The 1976 Regents' Resolution also recognized the principle of limiting the average daily population at Parnassus Heights to be substantially in accordance with the level projected in the 1976 LRDP EIR (13,400 persons). The 1982 LRDP limited use of the campus site to purely academic and clinical functions and called for the relocation of most campus-wide administrative functions to other sites that subsequently had to be purchased or leased. The 1996 LRDP established a new goal to limit the average daily population to 16,000 persons. At the time of adoption of the 2014 LRDP, the average daily population at Parnassus Heights was estimated at approximately 17,950 persons. Currently, the average daily population at Parnassus Heights is about 17,440 persons.

UCSF proposes to ask the Regents to update the Regents' Resolution to:

- Reaffirm continuing commitments, including 1) maintaining the designation of the Mount Sutro Open Space Reserve as permanent open space, potentially including an adjustment to the Reserve boundary while maintaining a minimum of 61 acres in the Reserve; 2) continuing to respect the Parnassus Heights campus boundary established in 1976; and 3) continuing to adhere to the expansion restriction area within which UCSF would not acquire property or lease residential property.
- Increase the space ceiling limit from the current 3.55 million gsf to a proposed 5.05 million gsf, excluding housing (an increase of approximately 1.5 million gsf above the current space ceiling limit) in recognition of the tremendous need for program space at the campus site in order for UCSF to retain its leadership position in patient care, research, and education.

Update to Greenhouse Gas Reduction Strategy

The 2014 LRDP included Appendix E: UCSF Greenhouse Gas Reduction Strategy (GHGRS) to ensure that the LRDP is implemented in alignment with UC Sustainable Practices Policy, and to fulfill the GHG reduction requirements of the State of California Assembly Bill 32 (AB 32): the California Global Warming Solutions Act of 2006. Since the adoption of the 2014 LRDP by the Regents, the University of California Office of the President further identified a UC policy goal to reach climate neutrality from Scopes 1 and 2 sources by 2025. Proposed LRDP Amendment No. 6 includes an update to the GHGRS which incorporates emissions generated by CPHP construction and operations.

3.8 References

UCSF, 2014a. *UCSF 2014 Long Range Development Plan*. November.

UCSF, 2014b. *UCSF 2014 Long Range Development Plan Final EIR*. November.

UCSF, 2019. *University of California San Francisco Comprehensive Parnassus Heights Plan, Final Report*. October 2019, as amended in June 2020.

This page intentionally left blank

CHAPTER 4

Environmental Setting, Impacts, and Mitigation Measures

4.0 Introduction to Environmental Analysis

This chapter describes the environmental setting, assesses impacts, and identifies measures that would avoid or lessen the severity of the significant impacts of the proposed CPHP. This section, Section 4.0, Introduction to the Environmental Analysis, outlines the issues analyzed in this chapter, describes the overall approach to the impact analysis, explains the significance determinations and terminology used in the impact analysis, and provides the basis for the cumulative impact analysis.

4.0.1 Definition of Terms Used in the EIR

This EIR uses a number of terms that have specific meaning under CEQA. Among the most important of the terms used in the EIR are those that refer to the significance of environmental impacts. The following terms are used to describe environmental effects of the proposed CPHP:

- **Significance Criteria:** The criteria used by UCSF, as lead agency under CEQA, to determine whether the magnitude of an adverse, physical, environmental impact would be considered significant. In determining the level of significance, the analysis recognizes that the proposed CPHP must comply with relevant and applicable federal, State, regional and/or local regulations and ordinances which are regularly enforced through building codes and standards and/or other means.
- **Significant Impact:** An impact is considered significant if any of the proposed projects implementing the CPHP *could* result in a substantial adverse change in the physical conditions of the environment. Significant impacts are identified by the evaluation of a project-related or cumulative physical change from baseline conditions, compared to a specified significance criterion. A significant impact is defined 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."[1]
- **Less-than-Significant Impact:** An impact is considered less than significant when the impact caused by a proposed project implementing the CPHP would not exceed the applicable significance criterion.
- **Less-than-Significant Impact with Mitigation:** An impact is considered less than significant with mitigation if any of the proposed projects implementing the CPHP could result in a substantial adverse change when evaluated with respect to one or more

1 CEQA Guidelines Section 15382.

significance criteria, but feasible mitigation is available that would effectively reduce the impact to a less-than-significant level.

- **Significant and Unavoidable Impact:** Significant impacts resulting from implementation of the CPHP that cannot be feasibly avoided or mitigated to a less-than-significant level, that is, to a magnitude below the applicable significance criterion.
- **Cumulative Impact:** Under CEQA, a cumulative impact refers to "two or more individual effects which, when considered together, are considerable or which compound or increase other environmental impacts."[2] A significant cumulative impact is one in which the cumulative adverse physical environmental effect would exceed the applicable significance criterion and the contribution of the proposed project would be "cumulatively considerable."[3] If the contribution of the project to a significant cumulative impact is less than considerable, the cumulative impact is considered less than significant.
- **Mitigation Measure:** A mitigation measure is a feasible action that could be taken that would avoid or reduce the magnitude of a significant impact. Section 15370 of the CEQA Guidelines defines mitigation as:
    a) Avoiding the impact altogether by not taking a certain action or parts of an action;
    b) Minimizing impacts by limiting the degree of magnitude of the action and its implementation;
    c) Rectifying the impact by repairing, rehabilitating, or restoring the affected environment;
    d) Reducing or eliminating the impact over time by preservation and maintenance operations during the life of the action; and
    e) Compensating for the impact by replacing or providing substitute resources or environments.
- **Feasible:** Under CEQA, the term feasible means "means capable of being accomplished in a successful manner within a reasonable period of time, taking into account economic, environmental, legal, social, and technological factors."[4]

4.0.2 Scope of Analysis

A program EIR has been prepared for the CPHP that discloses the impacts that could result from the approval and implementation of the CPHP and also establishes a framework for tiered or project-level environmental documents that would be prepared in accordance with the overall program. Accordingly, the EIR provides a program-level analysis of the environmental impacts from the development of the entire space program under the CPHP, and identifies Plan-level mitigation measures to reduce potential significant effects of the CPHP. In addition, this EIR includes project-level analysis for the following CPHP Initial Phase developments: Irving Street Arrival, RAB, and initial Aldea Housing Densification; and certain other Initial Phase improvements (e.g., utility improvements, Parnassus Avenue Streetscape Plan, building renovations of existing buildings, and community investments). The analysis of these Initial Phase development proposals at the project-level is intended to provide sufficient detail to permit project approval and implementation

---

[2] CEQA Guidelines Section 15355.
[3] CEQA Guidelines Section 15130(a).
[4] CEQA Guidelines Section 15364.

following certification of the CPHP Final EIR. The fourth CPHP Initial Phase project – the proposed New Hospital – is analyzed at a program level in this EIR, but because it represents a major project for UCSF, it will undergo additional project-level environmental review separately from the CPHP when more details become available. However, this EIR includes certain project-level analysis of the New Hospital where appropriate (e.g., to disclose overlapping construction-related air quality and noise effects of the New Hospital with the other CPHP Initial Phase projects). Similarly, when details on CPHP Future Phase projects are known, each Future Phase project would be reviewed in light of the CPHP Final EIR to determine the appropriate level of additional environmental review, if any, needed before approval and implementation of the particular project.

It should also be noted that there were a number of projects at the Parnassus Heights campus site that were previously approved under the 2014 LRDP that have not yet been implemented (including demolition of the LPPI, Koret Vision Center, Environmental Health and Safety, Surge, Woods, and Proctor buildings). These projects will be implemented separately from the CPHP based upon the prior analysis and approval, and therefore, they are appropriately considered in the cumulative context in this EIR (see *Cumulative Impact Analysis*, below). An exception to this is the proposed demolition of LPPI, which was recently determined to be eligible for the California Register of Historical Resources. Accordingly, this EIR addresses the potential effect of demolition of the LPPI on historic resources as part of the CPHP (see Section 4.4, *Cultural Resources and Tribal Cultural Resources*).

Analytical Horizon

This EIR evaluates the foreseeable impacts under the proposed CPHP through Year 2050, consistent with UCSF's planning horizon for buildout of development under the proposed CPHP. In the absence of any specific proposal by UCSF at this time for additional development at the Parnassus Heights campus site beyond this planning horizon, 2050 is considered the longest feasible timeframe for analyzing potential environmental impacts in this EIR with any level of reliability. As such, this EIR does not assess potential environmental impacts beyond 2050.

Aesthetics and Parking Analysis

CEQA Statute section 21099(d) states that "Aesthetic and parking impacts of a residential, mixed-use residential, or employment center project on an infill site located within a transit priority area shall not be considered significant impacts on the environment."[1] Accordingly, aesthetics and parking are not considered in determining if a project has the potential to result in significant environmental effects for projects that meet all of the following three criteria:

a. The project is in a transit priority area;[2]

---

1 Refer to CEQA *Statute s*ection 21099(d)(1).

2 CEQA *Statute* 21099(a)(7) defines a "transit priority area" as an area within 0.5 mile of an existing or planned major transit stop. A "major transit stop" is defined in CEQA Statute 21064.3 as a site containing any of the following: an existing rail or bus rapid transit station, a ferry terminal served by either a bus or rail transit service, or the intersection of two or more major bus routes with a frequency of service interval of 15 minutes or less during the morning and afternoon peak commute periods.

b. The project is on an infill site;[3] and

c. The project is residential, mixed-use residential, or an employment center.[4]

The proposed project meets each of the above three criteria because it (1) is within a transit priority area, as it is located within one-half mile of the Irving St and Arguello Blvd stop on the N-Judah MUNI line, which has service intervals of 15 minutes or less (2) is located on an infill site, as the campus site is an urban area that has been previously developed; and (3) would substantially meet the definition of an employment center as the campus site includes a variety of commercial uses. Thus, this EIR does not consider aesthetics and the adequacy of parking in determining the significance of project impacts under CEQA.

Nevertheless, the public and decision-makers may be interested in information pertaining to the aesthetic effects of the proposed CPHP, and may desire that such information be provided as part of the environmental review process. Therefore, this EIR provides an assessment of potential aesthetic impacts, and identifies, as feasible, mitigation measures to mitigate potential significant lighting/glare impacts (see Section 4.1).

Effects of the Environment on the Project

In a change since the certification of the 2014 LRDP FEIR, in 2015 the California Supreme Court held that "CEQA generally does not require an analysis of how existing environmental conditions will impact a project's future users or residents." *California Building Industry Association v. Bay Area Air Quality Management District* (2015) 62 Cal.4th 369, 386. The Supreme Court explained that, where existing hazards exist, an agency is only required to analyze the potential impact of such hazards on future residents if the project would exacerbate those existing environmental hazards or conditions. Thus, with respect to such issues as geologic and seismic hazards, exposure to existing levels of air pollution and noise, and the like, CEQA does not require consideration of the effects of bringing a new population into an area where such hazards exist, as long as the project itself would not increase or otherwise affect the conditions that create those hazards.

Economic and Social Effects

Under CEQA, economic and social effects by themselves are not considered to be significant impacts, and are relevant only insofar as they may serve as a link in a chain of cause and effect that may connect the proposed project with a physical environmental effect, or they may be part of the factors considered in determining the significance of a physical environmental effect.[5] In addition, economic and social factors may be considered in the determination of feasibility of a mitigation measure or an alternative to the proposed project.[6] As such, the potential effect of the CPHP on economic and social issues, in and of themselves, such as tax revenues, crime, the cost

[3] CEQA *Statute* 21099(a)(4) defines an "infill site" as a lot located within an urban area that has been previously developed, or a vacant site where at least 75 percent of the perimeter of the site adjoins, or is *separated* only by an improved public right-of-way from, parcels that are developed with qualified urban uses.

[4] CEQA *Statute* 21099(a)(1) defines an "employment center" as a project located on property zoned for commercial uses with a floor area ratio of no less than 0.75 and located within a transit priority area.

[5] CEQA Guidelines Section 15131.

[6] CEQA Guidelines Section 15364.

of public services, or property values are not part of this EIR. That being said, UCSF may evaluate a wide range of factors, including social or economic effects, in its consideration of the merits of the proposed CPHP.

4.0.3 Organization of the Impact Analysis

Chapter 4 is organized as follows and focuses on the environmental resource topics listed below:

4.1 Aesthetics, Wind, and Shadow
4.2 Air Quality
4.3 Biological Resources
4.4 Cultural Resources
4.5 Energy
4.6 Geology and Soils
4.7 Greenhouse Gas Emissions
4.8 Hazards and Hazardous Materials
4.9 Hydrology and Water Quality
4.10 Land Use and Planning
4.11 Noise and Vibration
4.12 Population and Housing
4.13 Public Services
4.14 Recreation
4.15 Transportation
4.16 Utilities and Service Systems

Each environmental topic discussion includes these main subsections:

- *Environmental Setting*, which includes a description of the existing environmental setting
- *Regulatory Framework*, including relevant University, federal, State, and local laws, regulations, and policies; and
- *Impacts and Mitigation Measures*, which describes the (1) significance criteria; (2) analysis methodology, (3) potential project-specific and cumulative impacts; and (4) proposed feasible measures that would eliminate or reduce the severity of significant project-specific and/or cumulative impacts.

This EIR identifies all environmental impacts with an alpha-numeric designation that corresponds to the environmental resource topic (e.g., Aesthetics impacts are labeled AES, Air Quality impacts are labeled AIR, etc.). The resource identifier is followed by a number that indicates the sequence in which the impact statement occurs within the section. For example, “Impact AES-1” is the first (i.e., “1”) aesthetic impact identified in the EIR. All impact statements are presented in bold text. The significance of the impacts prior to implementation of mitigation measures is stated in parentheses immediately following the impact statement (further discussed below).

Similarly, each mitigation measure is numbered to correspond with the impact that it addresses. Where multiple mitigation measures address a single impact, each mitigation measure is numbered sequentially. For example, “CPHP Mitigation Measure AES-1” would be the first mitigation identified to address the first aesthetic impact (i.e., “Impact AES-1”). All mitigation measure statements are presented in bold text.

Within each environmental resource section, a programmatic analysis of the impacts of the CPHP as a whole is presented first, followed by project-specific impact analysis of the following proposed CPHP Initial Phase projects: Irving Street Arrival, Research and Academic Building, initial Aldea Housing Densification projects, and Initial Phase Improvements[5].

4.0.4 Section Structure

Each environmental resource section follows a set structure, as described below.

Introduction

This subsection summarizes the applicable topic analysis and its relevance to the proposed CPHP.

Existing Environmental Setting

According to Section 15125 of the CEQA Guidelines, an EIR must include a description of the existing physical environmental conditions in the vicinity of the project to provide the "baseline condition" against which project-related impacts are compared. Normally, the baseline condition is the physical condition that exists when the Notice of Preparation ("NOP") is published. The NOP for the proposed CPHP was published in January 2020, and the baseline conditions contained in this CPHP EIR are generally taken from this time period. However, the CEQA Guidelines and applicable case law recognize that the date for establishing an environmental baseline cannot always be rigid. Physical environmental conditions may vary over a range of time periods; thus the use of environmental baselines that differ from the date of the NOP may be reasonable and appropriate when conducting the environmental analyses. Some sections rely on a variety of data to establish an applicable baseline, as described in those sections.

Regulatory Framework

The regulatory setting presents relevant information about University, federal, State, regional, and/or local laws, regulations, ordinances, plans, policies and standards that pertain to the environmental resources addressed in each section.

Applicable University documents presented in the Regulatory Framework sections of this EIR include, but are not limited to, the 2014 LRDP, University of California (UC) Policy on Seismic Safety, UC Sustainable Practices Policy, 1976 Regents' Resolution, UCSF Physical Design Framework, and UC Strategic Energy Plan. With respect to the 2014 LRDP, applicable land use objectives are presented, and for informational purposes, relevant Community Planning Principles are also discussed.

Significance Criteria

According to CEQA Guidelines Section 15382, a significant effect on the environment means "a substantial, or potentially substantial, adverse change in any of the physical conditions within the area affected by the project." Significance criteria are identified for each environmental issue area in each resource section. The environmental criteria and considerations applied to determine the

5 Please note that certain project-level analysis of the New Hospital is also included in this EIR where appropriate (e.g., to disclose overlapping construction effects of the New Hospital with the other CPHP Initial Phase projects).

significance of CPHP-related changes in the environment are based on the CEQA Guidelines Appendix G and additional criteria used in the 2014 LRDP FEIR, as applicable. The significance criteria serve as benchmarks for determining if proposed activities or conditions would result in a significant adverse environmental impact when evaluated against the baseline conditions.

Approach to Analysis

Each section describes the analytical methods and key assumptions used to evaluate effects of the proposed CPHP.

Impacts and Mitigation Measures

The EIR evaluates the environmental consequences and potentially significant impacts that would result from implementation of the proposed CPHP. The impacts identified are compared with predetermined significance criteria (discussed above), and classified according to significance categories discussed above.

To the extent the residual impact may still be significant even after implementation of the conditions, laws and regulations, potentially feasible mitigation measures are described which would eliminate or substantially reduce the severity of the impact. The effectiveness of a mitigation measure is determined by evaluating the residual impact remaining after its application. Those impacts meeting or exceeding the impact significance criteria after potentially feasible mitigation measures are incorporated are identified as residual impacts that remain significant and unavoidable. Implementation of more than one mitigation measure may be needed to reduce an impact below a level of significance.

Cumulative Impact Analysis

An analysis of cumulative impacts follows the project-specific impacts and mitigation measures evaluation in each section. A cumulative impact consists of an impact that is created as a result of the combination of the impact of the project evaluated in the EIR together with the impacts from other past, present and reasonably foreseeable projects causing related impacts.[7]

As noted above, where a cumulative impact is significant when compared to baseline conditions, the analysis must address whether the project's contribution to the significant cumulative impact is "considerable." If the contribution of the project is considerable, then the EIR must identify potentially feasible measures that could avoid or reduce the magnitude of the project's contribution to a less-than-considerable level. If the project's contribution is not considerable, it is considered less than significant and no mitigation for the project's contribution is required.[8]

The geographic scope of the cumulative impact analysis varies depending upon the specific environmental issue area being analyzed. The geographic scope defines the geographic area within which projects may contribute to a specific cumulative impact. Therefore, past, present,

---

7 CEQA Guidelines Section 15355.
8 CEQA Guidelines Section 15130(a)(3).

and future reasonably foreseeable projects within the defined geographic area for a given cumulative issue must be considered. The cumulative impact analysis in each technical section includes a description of the cumulative analysis methodology and the geographic or temporal context in which the cumulative impact is analyzed (e.g., the Bay Area Air Basin, other activity concurrent with CPHP construction, etc.).

Consistent with CEQA Guidelines Section 15130(b), the cumulative impact analysis considers the CPHP's effects in combination with the projections contain within previously approved planning documents and forecasting models, including but not limited to the San Francisco General Plan, the San Francisco Transportation Authority (SFCTA) Forecast Model, 2015 Urban Water Management Plan for the City and County of San Francisco, and regional planning documents from the Association of Bay Area Governments (ABAG), Bay Area Air Quality Management District, as well as applicable associated environmental review documents.

In addition, consistent with CEQA Guidelines Section 15130(b), the cumulative impact analysis also considers other known or reasonably foreseeable projects that could combine with potential impacts from implementation of the CPHP within the local geographic area. These include:

- *Cumulative Projects within the Parnassus Heights Campus Site Boundary:* This includes the following:
  - On-going activities associated with implementation of the *UCSF Mount Sutro Open Space Reserve Vegetation Management Plan.*
  - Implementation of projects at the Parnassus Heights campus site that were previously approved under the 2014 LRDP, but not yet implemented. These include, but are not limited to, demolition of the Langley Porter Psychiatric Institute (LPPI)[6], Surge and Proctor buildings; and miscellaneous utility improvements.
- *Off-site Cumulative Projects within the Parnassus Heights Campus Site Vicinity*:
  - 350 Parnassus Avenue, located just outside the campus site boundary, is an office building for which UCSF currently leases approximately 80 percent of space. This building is planned to be seismically retrofitted in 2022.
  - Based on a review of the City of San Francisco's *SF Development Pipeline 2019 Q2,* there were six proposed development projects (larger than two units of construction) located within 0.5-mile of the campus site boundary, including at: 478 Warren Drive (9 accessory dwelling units), 271 Upper Terrace (demolition of two homes, and addition of four new two-units buildings), 1801 Haight Street (new building with 7 dwelling units and ground-floor commercial), 1275-1281 8th Avenue (four new accessory dwelling units), 1950 Page Street (7 units of group housing), 1010 Stanyan Street (four dwelling units).

---

6 With the exception of effects of demolition of LPPI on historic resources, which as previously noted, is addressed in this EIR as part of the CPHP.

4.1 Aesthetics, Wind, and Shadow

This section assesses the potential for campus development under the Comprehensive Parnassus Heights Plan (CPHP or Plan), including the three Initial Phase projects and Initial Phase improvements, to result in significant aesthetic, wind, and shadow impacts. This section includes a description of the existing environmental setting as it relates to aesthetics, shadow, and wind; and provides a regulatory framework that discusses applicable University, federal, State, and local regulations. The section presents the significance criteria used to evaluate impacts on aesthetics, shadow and wind, and the results of the impact assessment, including any significant impacts and associated mitigation measures.

The analysis included in this section was developed based on the CPHP project description, reconnaissance visits to the campus site and vicinity on June 21, 2019 and April 14, 2020, computer-generated visual simulations, a shade and shadow study prepared by Prevision Design, and a wind study prepared by Cermak Peterka Peterson (CPP). Photographs are also included in this section to supplement the description of publicly-accessible views and analysis of visual character.

4.1.1 Environmental Setting

The 107-acre campus occupies the central portion of the City in the Inner Sunset neighborhood (see Chapter 3, *Project Description*, Figures 3-1 to 3-4). The campus site is bounded by Carl and Irving Streets to the north; Third Avenue and Fifth Avenue to the west; and Clarendon Avenue, Christopher Drive, and Crestmont Drive to the south. The campus site's east boundary abuts the Cole Valley neighborhood and the City's Interior Greenbelt Natural Area.

Scenic Views

Scenic views may be generally described as panoramic vistas of a large geographic area for which the field of view can be wide and extend into the distance. Under CEQA, scenic vistas are those that are experienced from publicly accessible locations and include urban skylines, valleys, mountain ranges, or large bodies of water.

One scenic view from Grandview Park (located approximately 2/3-mile west of the campus site boundary) affords long-range views of the campus site looking east, beyond which the downtown San Francisco skyline, San Francisco Bay, and East Bay hills are visible in the background (see **Figure 4.1-1**). Other scenic views in the vicinity of the campus site include views from the top of Tank Hill (approximately 1/4-mile east of the campus site boundary), and Buena Vista Park and Corona Heights Park (both approximately 2/3-mile northeast of the campus site boundary).

Views from within the Campus Site

Due to the campus site's elevated location (between 300 and 900 feet above sea level), long-range scenic views of the Golden Gate Bridge, Marin Headlands, Golden Gate Park, and the Pacific Ocean are available from certain locations on and adjacent to the campus site. In particular, views of Golden Gate Park and the Golden Gate Bridge are available from the intersection of Third and Parnassus Avenues. Scenic views from within the 61-acre Mount Sutro Open Space Reserve

SOURCE: Prevision Design, 2019

UCSF Comprehensive Parnassus Heights Plan

Figure 4.1-1
View from Grandview Park, Looking East

(Reserve) are generally filtered by vegetation and/or can be obstructed by topography within the Reserve, however, depending on location, the surrounding neighborhoods are still partially visible, including Twin Peaks, Mount Davidson, Ocean Beach, Golden Gate Park, the Presidio, as are the Golden Gate Bridge, Marin Headlands, Mount Tamalpais, and the East Bay hills.

Scenic Resources

The heavily vegetated Reserve occupies the central and south portions of the campus site and supports more than 120 plant species. The Reserve is notable because of its steep topography, rounded peak, and dense forest coverage composed predominantly of eucalyptus trees. These features combine to form a natural refuge from the urban setting that surrounds it. As one of the tallest hills in San Francisco, the Reserve is considered a scenic resource.

Visual Character

The visual character of a city or a part of a city, such as the Parnassus Heights campus site, is comprised of a number of physical elements that in combination form a city's image. The aesthetic setting of the campus site area is varied. It reflects the visual characteristics of its natural and built elements, including topography, street grid, buildings (individually and collectively), parks and public open spaces, and transportation infrastructure.

Topography

The topography on the campus site is varied, with slopes generally rising from north to south through the majority of the site. The lowest elevation of the campus site is at the north campus site boundary on Irving Street (approximately 300 feet), and the highest elevation is greater than 900 feet on Mount Sutro in the south portion of the campus site, declining to approximately 700 feet along the campus site south boundary at Clarendon Avenue. Due to steep slopes, the developed portion of the campus site is mostly limited to the lower slope and shelf of Mount Sutro. Other smaller-scale campus site structures are located in the Reserve, although largely hidden from view in the heavily wooded areas on the slopes of Mount Sutro.

Street Grid and Block Pattern

Streets within the vicinity of the north portion of the campus site, where the majority of the campus site's development is located, break the conventional perpendicular street grid pattern characteristic of the Inner Sunset neighborhood. Parnassus Avenue runs east-west through the campus core, bisecting this portion of the campus site. Parnassus Avenue also serves as the southern terminus of Hill Point Avenue, Hillway Avenue, 2nd Avenue, 3rd Avenue, and 4th Avenue. Streets in the Aldea Housing complex located in the southeast portion of the campus site are irregular and follow the sloped topography of this portion of the site.

The character of the public rights-of-way that bisect, or are located adjacent to, the campus site is defined primarily by transit and automobile-related uses. Along Parnassus Avenue, there is one travel lane in each direction, in addition to dedicated turning lanes. Curb-side parking is located on both sides of Parnassus Avenue, except at building entrances.

From the pedestrian perspective, visually, the roadbeds (visual relief) are the open areas between large blocks. The streets' "edges" are the areas dedicated to pedestrian use. These "edges" are narrow; generally 12 feet, and in some cases are non-existent. Along Parnassus Avenue, the street width (excluding sidewalks) is approximately 50 feet, and internal streets within the campus site, such as Medical Center Way and Koret Way, range from approximately 25 to 30 feet wide. The narrower internal campus site streets do not contain sidewalks, which serves to create a tighter urban fabric with less visual relief available from the pedestrian perspective.

Open Spaces

Public open spaces contribute to a neighborhood's identity, serve as visual focal points, and provide visual relief to developed built environments. Within the campus site, public open space is easily accessible. The Reserve is designated by the Regents as permanent open space, and is available for public use. Another important open space feature on the campus site is Saunders Court, located within the interior of the core campus and surrounded by the Medical Sciences Building, Clinical Sciences Building, School of Nursing, and HSIR Tower West.

Outside of the campus site boundary, the City's Interior Greenbelt natural area is located adjacent to the east side of the Reserve. Golden Gate Park, including Kezar Stadium, is located one block (approximately 400 feet) north of the campus site boundary. The aforementioned Grandview

Park, Buena Vista Park, Corona Heights Park and Tank Hill natural area afford panoramic views of the City.

Building Uses and Built Form

The type and distribution of land uses and building types within the campus site contribute to its existing visual character. The campus site is characterized by a collection of hospitals, medical office buildings, laboratories, service buildings, and housing which were constructed between the late 1910s and early 2000s. The CPHP identifies six districts in the developed portions of the campus site as a way of organizing planned land uses in a rational manner based in part on existing land use patterns (see Figure 3-5 in Chapter 3, *Project Description*). The descriptions below summarize the existing aesthetic attributes of the areas within the six districts. It is noted that, as depicted in Figure 3-5, the districts are not separated by hard borders, but rather, there is a gradual transition between districts.

Research and Academic Commons District

The Research and Academic Commons district identified in the CPHP includes the majority of research and educational space on campus. Buildings in this district include the Medical Sciences Building, Health Sciences Instruction and Research (HSIR) Towers, the Regeneration Medicine Building, the Clinical Sciences Building (currently under renovation), the School of Nursing, Koret Vision Center, Dental Clinics, and UC Hall. The slab-like principal (north) façade of the 13-story Medical Sciences Building, built in the mid-1950s, is visually cohesive with the 15-story north façade of Moffitt Hospital (described under *Clinical East End District*, below), although Moffitt's cruciform plan results in the principal façade being set back from Parnassus Avenue. The seven-story Clinical Sciences Building (built in 1933) is adjacent to and west of the Medical Sciences Building, and is currently undergoing a seismic retrofit and renovation to be completed in 2020 (see **Figure 4.1-2**). UC Hall, which was constructed in 1917 and is the second oldest building on the campus site, ranges from six to seven stories.

The older campus site buildings along Parnassus Avenue contrast with the more contemporary Dental Clinics building and Koret Vision Research Building, which are located partially within the West Side district (see description below) in the western portion of the campus site. The Dental Clinics building contains five levels stepping back from Fifth Avenue toward Koret Way to the southeast and also set back from Parnassus Avenue to the north. The Koret Vision Research building, east of the Dental Clinics, contains setbacks above the second and fourth levels.

Also included in the Research and Academic Commons district is the Dolby Regeneration Medicine building. This 660-foot long building was constructed in 2010. Located behind the buildings that face Parnassus Avenue, this building is the southernmost of the major structures in the campus core. The building comprises a series of split-level floors with terraced grass green roofs, generally follows the curving topography of the hillside it is constructed on, and is supported on steel trusses.

SOURCE: ESA, 2019

UCSF Comprehensive Parnassus Heights Plan

Figure 4.1-2
View of the Clinical Sciences Building (shown under renovation) and Medical Sciences Building within the Research and Academic Commons District, Looking East

North Side Gateway District

The North Side Gateway district identified in the CPHP (see **Figure 4.1-3**) is a prominent node because it is the main arrival point to Parnassus Heights via public transit, as well as via private vehicle and bicycle. Drop-offs to clinics and hospitals occur on Parnassus Avenue. The North Side Gateway district includes the Millberry Union and its parking garage constructed in 1958; the Kalmanovitz Library, a five-story building built in 1990; and low rise housing (along Third Avenue). The North Side Gateway district is considerably less densely developed than the south side of Parnassus Avenue, and the buildings in this district gradually become shorter toward the western edge of the campus site. The Millberry Union parking structure located along Irving Street (but with vehicular access from both Irving and Parnassus Avenues) creates a podium upon which the Millberry Union sits.

SOURCE: Prevision Design, 2019

UCSF Comprehensive Parnassus Heights Plan

Figure 4.1-3
View of the North Side Gateway District,
Looking South

Clinical East End District

The Clinical East End district identified in the CPHP comprises major clinical facilities, such as Moffitt and Long Hospitals, the Langley Porter Psychiatric Institute (LPPI), and Medical Building 1 and its parking structure (**Figure 4.1-4** shows a view of LPPI and the adjacent hospitals). Moffitt Hospital and Long Hospitals are the largest and most visually prominent buildings on the campus site, rising to a height of 15 stories. The presence of Moffitt Hospital (along with the aforementioned Medical Sciences Building, Clinical Sciences Building and UC Hall) creates a solid street wall along Parnassus Avenue that screen views of other campus site development located behind (e.g., Long Hospital, the HSIR Towers, and the School of Nursing building).

Medical Building 1, built in 1972, is a concrete building at 400 Parnassus Avenue, on the north side of Parnassus Avenue, and features a square tower and sits on a six-story parking structure. In total, the building is nine stories tall.

SOURCE: ESA, 2019 UCSF Comprehensive Parnassus Heights Plan

Figure 4.1-4
View of the Clinical East End District, Looking South

West Side District

The West Side district identified in the CPHP includes the Kirkham Child Care Center, the Proctor building, housing (along Fifth Avenue), and the West Side surface parking lot (see **Figure 4.1-5**). The Kirkham Child Care Center is a three-story contemporary building set back behind residential uses along Fifth Avenue, and the Proctor Building is a two-story wood frame, "L"-shaped building constructed in 1956. Due to the separation caused by the West Side parking lot from the rest of the campus site, this district is not visually cohesive.

SOURCE: ESA, 2019

UCSF Comprehensive Parnassus Heights Plan

Figure 4.1-5
View of the West Side Parking Lot and Kirkham Child Care Center,
Looking Southwest

Service Corridor District

The Service Corridor district identified in the CPHP generally contains the back-of-house functions that serve the buildings on the south side of Parnassus Avenue, including loading and deliveries, maintenance vehicle parking, and services to the Central Utility Plant, among other functions. The Service Corridor district is generally hidden from public view from Parnassus Avenue, and does not have a distinct or cohesive feel because it traverses a variety of buildings constructed during different eras of the campus site's development (see **Figure 4.1-6**).

SOURCE: ESA, 2019

UCSF Comprehensive Parnassus Heights Plan

Figure 4.1-6
View of the Service Corridor District, Looking West

Aldea District

The Aldea district identified in the CPHP consists of a student housing complex constructed between 1960 and the late 1990s. The housing complex contains 12 three-story apartment buildings and a community center. The Chancellor's residence (University House) is located adjacent to the housing complex These buildings blend in with the steep, wooded slopes of Mount Sutro (see **Figure 4.1-7**). Off-site views of the Aldea Housing complex are generally only visible from close-range because of its densely vegetated forest setting. As such, views of the Aldea Housing complex are limited to streets within—and immediately adjacent to—the housing complex.

SOURCE: ESA, 2019

UCSF Comprehensive Parnassus Heights Plan

Figure 4.1-7
Views of Student Housing in the Aldea District, Looking Southeast

Light and Glare

Sources of light and glare around the campus site include light emitted from building windows, and exterior illuminated signage, street lights and safety lighting. In addition, street lights and motor vehicles can be a source of nighttime light and glare along Parnassus Avenue. These sources of light are typical of those in a developed urban area.

Wind

Data collected at the old San Francisco Federal Building at Civic Center show that average winds speeds in San Francisco are the highest in the summer and lowest in winter. However, the strongest peak wind speeds occur in winter. The highest average wind speeds occur in mid-afternoon and the lowest in the early morning. Westerly to northwesterly winds are the most frequent and strongest winds during all seasons; southwest and west-southwest winds are also relatively prevalent.[1] The wind speed data collected at the old Federal Building that is the basis of San Francisco wind-tunnel testing was collected between 1945 and 1950.[2] This data source is relied upon for all wind analyses conducted in San Francisco as it represents the most complete record of wind speed data within the city limits. These wind data are taken from more than 40 years of record keeping at the Old Federal Building; the longer data set conform with the six years of data used in San Francisco wind tests. As reported in the 2014 LRDP Final EIR, historical wind data collected at Fort Funston, which is upwind of the project site with respect to southwest winds, show that there is reasonable consistency between the Civic Center and the Fort Funston meteorological stations, regardless of their substantially different locations. Similar to Civic Center, the majority of strong winds at Fort Funston were recorded as blowing from the south-southwest through the north-northwest. As also reported in the 2014 LRDP Final EIR, winds approaching the Parnassus Heights campus from the coast lose speed and become more turbulent as they encounter buildings, vegetation, and the ground. Winds that approach the campus from the southwest through the northwest tend to be accelerated as they flow between Mount Sutro and the taller campus buildings along the south side of Parnassus Avenue, as well as along Parnassus Avenue between taller campus buildings to either side of the street.

CEQA review in San Francisco is concerned with wind conditions at pedestrian level in publicly accessible areas, and UCSF similarly evaluates at-grade winds in its environmental documents. The 26-miles-per-hour (mph) wind hazard criterion of San Francisco Planning Code section 148—wind speeds that exceed 26 mph for one full hour of the year—is relied upon for the analysis of significant impacts. Therefore, if a project would cause pedestrian-level wind speeds to exceed 26 mph for a full hour, a project would have a significant wind impact. In general, buildings with a height of less than 80 feet above surrounding structures tend not to result in substantial effects on pedestrian-level winds or to create new exceedances of the hazard criterion. For compliance with section 148 (applicable to downtown San Francisco), projects are also evaluated against a pedestrian comfort criterion, which is a wind speed of 11 mph for pedestrian areas and 7 mph for seating areas, not to be exceeded more than 10 percent of the time.

The wind environment for pedestrians can be adversely affected by buildings that are considerably taller than surrounding structures, particularly where such taller buildings present large planar surfaces towards the prevailing winds. A building that stands alone or is much taller than the surrounding buildings can intercept and redirect winds that might otherwise flow overhead and bring them down the vertical face of the building to ground level, where they create ground-level wind and turbulence (variability in wind speed and pressure). These redirected

1 Wind direction is given as the point of origin (i.e., a westerly wind blows from west to east).

2 Arens, E., et al., "Developing the San Francisco Wind Ordinance and its Guidelines for Compliance," *Building and Environment*, Vol. 24, No. 4, p. 297–303, 1989.

winds, or down-drafts, can be relatively strong and turbulent, and may in some instances be incompatible with the intended uses of nearby ground-level spaces. Conversely, a building with a height that is similar to the heights of surrounding buildings typically would cause little or no additional ground-level wind acceleration and turbulence. Thus, wind impacts are generally caused by large building masses extending substantially above their surroundings, and by buildings oriented so that a large wall catches a prevailing wind, particularly if such a wall includes little or no articulation. Buildings spaced closely together can also result in increased wind speeds at pedestrian level as the winds are channeled between closely spaced structures. However, groups of buildings can interact with and slow approaching winds due to the friction and drag created by the many individual structures, resulting in calmer pedestrian winds at locations sheltered by the groups of buildings.

Westerly winds blowing from the Pacific Ocean encounter surface roughness in the form of buildings, ground, and vegetation, resulting in some slowing of winds at ground level. Winds may also be altered by intervening topography; for example, the project site is offered substantial protection from southwest winds by the mass of Mount Sutro. However, because there are virtually no tall buildings between the ocean and the campus, westerly and northwesterly winds generally flow unimpeded from the ocean to the project site. The existing campus buildings along either side Parnassus Avenue between Fourth Avenue and Hill Point Avenue range in height from about 50 feet to nearly 200 feet, with several structures 100 feet or more in height and with large, relatively unbroken facades. In addition, where large building masses are proximate to Parnassus Avenue on both sides of the street—for example, where the Moffitt-Long Hospital complex is directly across the street from Medical Building 1—these buildings result in channeling of winds that increases wind speeds along both sides of Parnassus Avenue. This location is the publicly accessible area generally subject to the greatest wind speeds on or adjacent to campus, and winds along this portion of Parnassus Avenue can be uncomfortable, particularly on summer afternoons.

Shadow

CEQA review in San Francisco is concerned with the shadow impacts of the proposed project on publicly accessible open spaces and recreation facilities near the project site, and UCSF similarly evaluates shadow impacts in its environmental documents. Therefore, existing publicly accessible open spaces and recreation facilities near the project site that could potentially be affected by the proposed project are described below. The potential extent of shadow impacts of the proposed CPHP is based on a digital shadow analysis prepared by an independent consultant that shows the location of project shadow on existing and planned public open spaces on and near the proposed project at representative times of the year—generally, the solstices and equinoxes to bracket the impacts, along with the day of maximum impact—throughout the day between one hour after sunrise to one hour before sunset (see "Approach to Analysis," below).

There are a variety of publicly-accessible open spaces on the campus site and in the campus site vicinity that may be affected by shadow from campus development under the CPHP.

On-Site Open Space

On the campus site, the largest publically-accessible open space includes the Reserve (described below), in addition to various smaller open space areas within the campus core that are owned and maintained by UCSF, including Saunders Court.

Mount Sutro Open Space Reserve

The Reserve is a 61-acre open space reserve owned and operated by UCSF that features approximately five-miles of publicly-accessible trails. The Reserve contains winding hiking trails in a densely vegetated forest with shadow cast on the open space primarily by eucalyptus trees up to 100 feet tall.

Off-Site Open Space

In the campus site vicinity, there are a number of parks and publicly-accessible open spaces under the jurisdiction of the San Francisco Recreation and Parks Department (SFRPD). These facilities are protected from shadowing by new structures greater than 40 feet tall under Section 295 of the San Francisco Planning Code (Planning Code).[3] A brief description of these SFRPD facilities, related City facilities under its Shared Schoolyard Project, and shadows currently experienced at these facilities, is provided below.

Golden Gate Park

Golden Gate Park is an approximately 1,000-acre large urban park that contains a variety of amenities including landscaped gardens, aquatic features, playgrounds, museums, stadiums, sports fields, skate parks, and other tourism points of interest. Due to the size of the park and amount of trees, shadow from existing nearby buildings never covers a majority of the park. Shadows from existing buildings cover the most park area on the winter solstice before 9:00 a.m.

Richard Gamble Memorial Park

Richard Gamble Memorial Park is a 0.6-acre park that includes two grass fields connected by a walking trail, trees, and benches. The majority of the park is covered by shadow before 7:00 a.m. and after 7:36 p.m. on the summer solstice, before 8:00 a.m. and after 6:00 p.m. on the fall/spring equinox, and before 9:00 a.m. and after 3:00 p.m. on the winter solstice. This park is popular for informal off-leash dog play activities; however, this park is not among those authorized for off-leash activity by the San Francisco Recreation and Park Department.[4]

---

3 The Planning Department commonly relies upon the hours governed by Planning Code Section 295—from one hour after sunrise to one hour before sunset—in environmental review, separate from Section 295 review, of potential shadow impacts of a project. This is because, during the first hour after sunrise and the last hour before sunset, shadows are very long due to the sun's low position near the horizon, meaning that most of the City is shaded at these times: for example, shadow from a single-story, 20-foot-tall building reaches a length of 250 feet 30 minutes after sunrise on June 21. Moreover, in the first and last hours of sunlight, these very lengthy shadows move more quickly across the ground than do shadows at other times of day. When evaluating the potential for a development to shade a particular open space during the hours subject to Planning Code Section 295, one may initially rule out any location that is more distant than 6.5 times the building height, which is the maximum length of any shadow during the Section 295 period, based on the lowest sun angle (at the winter solstice) at one hour after sunrise and one hour before sunset.

4 Francisco Recreation and Parks, Dog Play Areas website. Available at http://sfrecpark.org/457/Dog-Play-Areas. Reviewed February 14, 2020.

Grattan Playground

Grattan Playground is a 1.5-acre park that includes two soccer fields, two tennis courts, a basketball court, picnic areas, and a playground. Existing shadows at the Grattan Playground are minimal for most of the year, however, after 6:00 p.m. on the fall/spring equinox, and on the winter solstice before 8:19 a.m. and after 3:53 p.m., the majority of the park is shaded.

Interior Greenbelt

The Interior Greenbelt is a natural area located adjacent to the east side of the Reserve, and includes a two-mile multi-use trail that leads to the Mount Sutro trail network. The trail traverses a densely vegetated forest composed of mainly Eucalyptus trees, which shade the trail throughout the year. As shown in the shade and shadow study prepared by Prevision Design, no portion of the Interior Greenbelt would be affected by shadowing associated with the CPHP, and therefore, this open space is not addressed further in this section as it relates to shadow.

In addition, the following San Francisco Unified School District (SFUSD) public schools participate in the City's Shared Schoolyard Project,[5] which allows for public access to schoolyards on the weekend. Because school open spaces participating in this program function as publicly-accessible open spaces on the weekend, the City requires that shade and shadow impacts on these spaces be analyzed.

Independence High School

Independence High School is a SFUSD public high school and includes an approximately 0.4-acre paved playground featuring a basketball court. There are existing shadows on the paved playground throughout the year early in the morning and in the late afternoon. On the summer solstice, shadows cover a majority of the open space before 7:00 a.m. and again after 6:00 p.m. On the fall/spring equinox, existing shadows cover a majority of the open space before 8.00 a.m., and return to cover a majority of the open space between 5:00 p.m. and sunset. On the winter solstice, existing shadows cover a majority of the open space from sunrise until 9:00 a.m., and return to cover a majority of the open space between 3:00 p.m. to sunset.

Grattan Elementary School

Grattan Elementary School is a SFUSD public elementary school and includes an approximately 0.4-acre paved open area, basketball court, and play structure. Existing buildings in the vicinity cast shadows on the school's open space throughout the year in the early morning between approximately 7:00 to 9:00 a.m. A portion of the open space at this school is not shaded at all daytime hours during the year except on the winter solstice at 3:54 p.m., at which point the open space is fully subsumed by shade from existing buildings.

5 The Shared Schoolyard Project is a partnership between the City, the SFUSD, several other City departments, and San Francisco's neighborhoods and communities that opens up schoolyards to the public for recreation and open space on the weekends. Currently, there are over 50 schools citywide are enrolled in the Shared Schoolyard Project.

4.1.2 Regulatory Framework

Federal

There are no federal regulations, applicable to aesthetics, wind, or shadow relevant to the CPHP.

State

State Scenic Highway Program

California's Scenic Highway Program was created by the Legislature in 1963 to preserve and protect scenic highway corridors from change that would diminish the aesthetic value of lands adjacent to designated scenic highways. The State laws governing the Scenic Highway Program are found in the California Streets and Highways Code, Division 1, Chapter 2, Article 2.5, section 260 et seq. The State Scenic Highway System includes a list of federal and State highways that are either eligible for designation as scenic highways or have been so designated. These highways are identified in Streets and Highways Code sections 263 through 263.8. A highway may be designated scenic based upon the amount of natural landscape that can be seen by travelers, the scenic quality of the landscape, and the extent to which existing development intrudes upon the traveler's enjoyment of the view (Caltrans, 2020).

UCSF

UCSF 2014 LRDP

The UCSF 2014 LRDP identifies campus-wide objectives and objectives specific to the Parnassus Heights campus site. The following UCSF 2014 LRDP objectives relate to aesthetics, shadow and/or wind:

Campus-Wide Objectives

1. **Respond to City and Community Context**

   B. Acknowledge and respond to local zoning and height and bulk limitations to the extent possible.

   C. Design new buildings to be sensitive to the surrounding neighborhood and landscape, taking into account use, scale, potential noise generation, and density.

   D. Incorporate pedestrian-friendly urban design principles to relate campus buildings to surrounding streetscape and neighborhoods.

While not objectives or regulations, the UCSF 2014 LRDP also included *Community Planning Principles*, which were produced in collaboration with the UCSF Community Advisory Group:

Community Planning Principles

Community Planning Goals for Building and Public Realm Design

BD1. Consider viewsheds of surrounding neighborhoods when designing new buildings.

BD4. Incorporate pedestrian-friendly urban design principles so as to better relate campus buildings to the adjoining streetscape, landscape, public space, and pedestrian realm.

BD5. Present proposed building designs, using 3-D modeling and other visualization techniques, to the public for review and comment at critical milestones.

BD6. Consult with the community in the design of buildings and open space, to ensure that they are complementary to the surrounding neighborhoods while being inspiring, creative, and innovative.

BD9. Conform to the planning and design principles set forth in UCSF's 2007 Physical Design Framework when planning for physical development at UCSF's campus sites. These principles are: respond to context while reinforcing identity; welcome the community; ensure connectivity to and within the campus; improve campus cohesiveness; create spaces to promote collegiality; and lead through conservation and sustainability.

Community Planning Goals for Land Use

LU1. Plan for growth and renovations that are substantially consistent with use limitations and height and bulk limitations in City planning and zoning codes that exist at the time UCSF initiates the site selection process for such growth and renovation projects. The University should consider City planning proposals that are underway. UCSF will endeavor to be consistent with applicable land use plans and mitigation approaches where consistent with UC policy, while respecting specific neighborhood plans and concerns.

With respect to other provisions of the planning and zoning codes, such as off-street parking, UCSF will comply with such provisions or, if unable to comply strictly, will attempt to address impacts of its development with alternative measures, whether physical or operational.

LU3. Ensure that future UCSF development is compatible with physical surroundings in use, scale, and density, and that surrounding land uses do not negatively affect UCSF's activities. Similarly, ensure that UCSF's activities do not negatively affect surrounding land uses.

UCSF's Physical Design Framework

UCSF's Physical Design Framework provides guidance for design consultants retained by UCSF to ensure that future projects enhance the physical environment and will enable UCSF to determine if those designs are consistent with these principles, guidelines and strategies. The six universal planning and design principles that guide physical development at all UCSF-owned campus sites include the following:

- Respond to context while reinforcing identity;
- Welcome the community
- Ensure connectivity to and within the campus;
- Improve campus cohesiveness;
- Create spaces to promote collegiality; and
- Lead through conservation and sustainability.

City of San Francisco

Although the University is constitutionally exempt from local land use regulation when using properties under its control in furtherance of its educational mission, the University strives to be substantially consistent with local policies where feasible.

UCSF consults with the City when planning new development, and obtains approvals, such as encroachment permits, if improvements are proposed within City rights-of-way adjacent to campus sites. In addition, it is UCSF's intent to adhere substantially, to the extent possible, to City zoning codes related to building use, height, and bulk limitations; floor area ratios; and parking requirements or restrictions for the purpose of ensuring compatibility with the surrounding areas.

San Francisco General Plan

The *San Francisco General Plan* provides general policies and objectives to guide land use decisions and includes policies that relate to environmental issues.

Urban Design Element

The Urban Design Element is concerned "both with development and with preservation. It is a concerted effort to recognize the positive attributes of the city, to enhance and conserve those attributes, and to improve the living environment where it is less than satisfactory." The Urban Design Element also seeks to protect public views of open space and water bodies, and to protect and enhance the aesthetic character of San Francisco. The following policies of the Urban Design Element are particularly relevant to the CPHP:

> **Policy 1.1:** Recognize and protect major views in the city, with particular attention to those of open space and water.
>
> **Policy 1.3:** Recognize that buildings, when seen together, produce a total effect that characterizes the city and its districts.
>
> **Policy 1.6:** Make centers of activity more prominent through design of street features and by other means.
>
> **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.

The Urban Design Element of the City's General Plan emphasizes the importance of lowrise buildings surrounding large parks at tops of hills to maintain visibility of the park from other areas of the city. The Urban Design Element also states that views from roadways that reveal major destinations or that provide overlooks of important routes and areas of the city assist the traveler in orientation.

The Urban Design Element also includes three maps relevant to the proposed project: "Street Areas Important to Urban Design and Views," "Quality of Street Views," and "Plan to Strengthen City Pattern through Visually Prominent Landscaping." Fourth Avenue (between Irving Street and Parnassus Avenue), Fifth Avenue (between Irving and Kirkham Streets), Sixth Avenue (between Judah and Kirkham Streets), and Stanyan Street, Edgewood Avenue, Woodland Avenue, and Willard Street are described in the City's General Plan as streets providing excellent quality street views. In addition, in the Aldea Housing complex vicinity, Clarendon Avenue is classified as having good to excellent views. In addition, nearby Seventh Avenue and Judah Street are listed as streets that provide views of important buildings. The "Plan to Strengthen City Pattern Through Visually Prominent Landscaping" map identifies four parks in the vicinity of the CPHP (Grandview Park, Tank Hill, Corona Heights Park, and Buena Vista Park) as important vistas to be protected. This map also identifies the Reserve as "Existing Landscaping to be Preserved."

Recreation and Open Space Element

Policy 1.9 from the Recreation and Open Space Element of the San Francisco General Plan states that solar access to public open space should be protected.

San Francisco Planning Code

The Planning Code incorporates by reference the City's zoning maps. The Planning Code also governs permitted uses, densities, and the configuration of buildings in San Francisco.

Use Districts

The campus site is primarily located in the City's P (Public) Zoning District. Housing located along Third and Fifth Avenues is designated as Residential House District, Two-Family (RH-2).

The developed areas of the campus site are located within the following Height and Bulk Districts: 25-X, 40-X, 65-D, 80-D, 130-D, and 220-F. The locations with an "X" designation permit all floors of structures to cover the entire building footprint. The "D" designation limits floor plans above 40 feet to a maximum plan length of 110 feet and a maximum diagonal plan dimension of 140 feet. The "F" designation limits floor plans above 80 feet to a maximum plan length of 110 feet and a maximum diagonal plan dimension of 140 feet. See additional discussion of the Planning Code use designations on the campus site in Section 4.10, *Land Use and Planning*.

Shadow

Planning Code Section 101.1/Proposition M

In November 1986, the voters of San Francisco approved Proposition M (the Accountable Planning Initiative), which added section 101.1 to the Planning Code and established eight Priority Policies. These Priority Policies are the basis upon which inconsistencies with the General Plan are resolved. Priority Policy No. 8 calls for the protection of parks and open space and their access to sunlight and vistas.

Planning Code Section 295/Proposition K

In 1984, San Francisco voters approved an initiative known as "Proposition K, The Sunlight Ordinance," which was codified in 1985 as Planning Code section 295. Section 295 of the Planning Code generally prohibits new structures above 40 feet in height that would cast additional shadows on open space that is under the jurisdiction of the San Francisco Recreation and Park between one hour after sunrise and one hour before sunset, at any time of the year, unless that shadow would not result in a significant adverse impact on the use of the open space. A project that adds new shadow to sidewalks or a public open space, or exceeds the absolute cumulative limit on a section 295 park does not necessarily result in a significant impact under CEQA; the City's significance criteria used in CEQA review asks whether a project would "create new shadow in a manner that substantially and adversely affects the use and enjoyment of publicly accessible open spaces."

4.1.3 Impacts and Mitigation Measures

Significance Criteria

Would implementation of the CPHP, including the three Initial Phase projects and Initial Phase improvements:

a) Have a substantial adverse effect on a scenic vista?

b) Substantially damage scenic resources, including, but not limited to, trees, rock outcroppings, and historic buildings within a state scenic highway?

c) In non-urbanized areas, substantially degrade the existing visual character or quality of public views of the site and its surroundings? (Public views are those that are experienced from publicly accessible vantage points.) If the project is in an urbanized area,[6] would the project conflict with applicable zoning and other regulations governing scenic quality?

d) Create a new source of substantial light or glare which would adversely affect daytime or nighttime views in the area?

e) Create new shadow in a manner that substantially and adversely affects the use and enjoyment of publicly accessible open spaces?

f) Create wind hazards in publicly accessible areas of substantial pedestrian use?

As discussed in more detail under the *Approach to Analysis* for aesthetics, below, and further in Section 4.0, *Introduction to Environmental Analysis,* pursuant to CEQA Section 21099(d)), this EIR does not consider aesthetics in determining the significance of project impacts under CEQA. As a result, an assessment of the CPHP effects against criteria a) through d), above, is presented for informational purposes.

6 The campus site qualifies as an "urban area" as defined in CEQA Guidelines section 21094.5 because it is located in an incorporated city.

Criteria Not Analyzed

As stated in the Initial Study, there would no impact related to the following topic for the reasons described:

- ***Substantially damage scenic resources, including, but not limited to, trees, rock outcroppings, and historic buildings within a state scenic highway.*** A portion of 19th Avenue, between Highway 101 in the Presidio and St. Francis Boulevard, is an eligible state scenic highway. The campus site is 0.85 miles from 19th Avenue and would not affect scenic resources within a state scenic highway. Therefore, this criterion related to scenic resources does not apply and is not addressed further in this section.

Approach to Analysis

Aesthetics

As discussed in further detail in Section 4.0, *Introduction to Environmental Analysis*, the proposed CPHP substantially meets the criteria set forth in CEQA Section 21099(d)). Thus, this EIR does not consider aesthetics and the adequacy of parking in determining the significance of project impacts under CEQA. Nevertheless, the public and decision-makers may be interested in information pertaining to the aesthetic effects of the proposed CPHP, and may desire that such information be provided as part of the environmental review process. Therefore, this EIR provides an assessment of potential aesthetic impacts, and identifies, as feasible, mitigation measures to mitigate potential significant lighting/glare impacts.

The analysis in Impacts AES-1 and AES-2, below, is aided by the visual simulations prepared by Prevision Design in support of the EIR. The visual simulations document views of and through the campus site. A total of 11 visual simulations were prepared from representative locations. These identified viewpoints are publicly accessible observation points from locations that can see or be seen from the campus site. Viewpoints were selected by UCSF and represent (1) typical views from common types of viewing areas, such as public sidewalks near residential areas with exposure to the proposed CPHP development; or (2) specific high sensitivity areas such as public parks, scenic viewpoints whose scenic views could be affected by development of the proposed CPHP development. The 11 viewpoints were selected to capture a representative sample of existing views of and from the campus site in terms of both sensitive viewing locations, such as public recreational uses, and publicly accessible views near the campus site.

Digitized photographs and computer modeling techniques were utilized to prepare the visual simulations. The visual simulations are based on a simple massing plan of the proposed CPHP, and not on actual building designs, because detailed building plans of CPHP programmatic development are not yet available. The building massing included in the simulations illustrates rough approximations of the building form, but actual building designs are likely to include features such as setbacks, modulation, and potential variation in the depths of façade planes, and fenestration (windows). Therefore, the visual simulations can be considered a conservative depiction of potential visual changes that would result from the CPHP.

Wind

Potential wind effects of the proposed CPHP were evaluated based on a screening-level analysis prepared in support of this EIR by CPP. The analysis was based on the same simple massing model of the proposed CPHP described above, and not on actual building designs, which have not yet been prepared. In general, the massing model can be considered to generate conservative results, in that the model incorporates little in the way of setbacks on some of the major building components, thereby increasing the ground-level wind speeds that would result, compared to results that would arise from a more likely building scenario that does include setbacks and other building sculpting features, such as podiums.

The screening-level analysis involved computer simulation of wind effects using a tool known as computational wind engineering, a specialized sub-set of computational fluid dynamics. This tool, which entails developing a computer-simulated 3D model of existing and proposed development, is appropriate for planning studies of wind effects because it allows for evaluation of overall wind flows, aiding in identification of potentially problematic wind conditions. The computational analysis provides information regarding wind flows over the entire site, unlike the individual point-based analysis undertaken in a wind tunnel, and thus is able to reliably predict wind comfort conditions across a relatively wide area, such as the Parnassus Heights campus site. Computational wind engineering does not, however, account for turbulence (variation in wind speed and direction) in the same manner as does wind-tunnel testing, which is more appropriate for evaluation of actual specific designs of tall buildings. Moreover, computational analysis cannot identify exceedances of the wind hazard criterion due to its inability to reliably simulate turbulence using currently accepted methods. Therefore, the analysis evaluates compliance with the pedestrian comfort criterion, which generally characterizes wind conditions, although inferences can be drawn concerning potential locations of hazardous wind conditions. However, at the planning level of the CPHP, computational wind engineering is a valid tool for generalized evaluation of potential wind effects.

As noted above, the University is constitutionally exempt from local land use regulation when using properties under its control in furtherance of its educational mission, and therefore UCSF is not subject to the San Francisco Planning Code. However, in the interest of consistency with other wind analyses conducted in San Francisco, UCSF relies upon the San Francisco Planning Code wind hazard threshold of 26 miles per hour (mph) as a significance criterion in its EIRs. Accordingly, the wind hazard criterion of San Francisco Planning Code section 148 (applicable to downtown San Francisco)—wind speeds that exceed 26 mph for one full hour of the year—is relied upon in this EIR for the analysis of significant impacts. UCSF also relies upon the San Francisco Planning Code wind comfort thresholds for informational purposes. Therefore, if a project would cause pedestrian-level wind speeds to exceed 26 mph for a full hour, a project would have a significant wind impact. In general, buildings with a height of less than 80 feet above surrounding structures tend not to result in substantial effects on pedestrian-level winds or to create new exceedances of the hazard criterion. For information as to more general pedestrian comfort, projects are also evaluated against the San Francisco Planning Code pedestrian comfort criteria, which are wind speeds of 11 mph for pedestrian areas and 7 mph for seating areas, not to be exceeded more than 10 percent of the time.

Shadow

The evaluation of potential impacts of the proposed CPHP related to shade and shadow are based on the shade and shadow study prepared in support of this EIR by Prevision Design (refer to **Appendix SHDW**). To evaluate the shadow impacts of the CPHP development, a 3D virtual model of the CPHP program was prepared. The model includes the campus site, potentially affected open spaces, and the surrounding urban environment.

The purpose of this analysis is to inform decision-makers of the potential effects of the proposed CPHP's shadow on existing SFPRD parks and publicly accessible open spaces, and to determine whether or not the CPHP would create new shadow in a manner that would substantially affect the use and enjoyment of these facilities, a significant impact under CEQA.

The shadow model considers the CPHP program at full buildout. Specific architectural designs for the buildings within the campus site are not available at this time. The shadow analysis considers shadow from existing buildings and structures, shadow from the proposed CPHP projects, and discloses the net new shadow that would occur as a result of the CPHP program. The shadow model does not consider shadow from existing trees, because the extent of shadow cast by trees can vary based on the season and because trees can be removed for various reasons.

Shadow Diagrams

In order to provide a visual understanding of the location, size, and extent of the new shading, graphics were prepared to accompany the qualitative analysis. The shadow diagrams graphically depict the movement of project shadows across the project site and surrounding area on four representative days of the year from one hour after sunrise to one hour before sunset:[7] the summer solstice (June 21, the longest day of the year, when the sun is highest in the sky and shadows are the shortest at any given time of day); the spring/autumn equinoxes (March 20/September 22, when the sun's position is nearly identical to the opposite equinox and represent the midway point between the winter and summer solstices); and the winter solstice (December 20, the shortest day of the year, when the sun is lowest in the sky and shadows are the longest at any given time of day).

For each of these days (summer solstice, spring/autumn equinoxes, and winter solstice), this section presents representative shadow diagrams at five times of day: one hour after sunrise; the beginning, middle, and end of the midday period of peak use (10 a.m., 12 p.m., and 3 p.m.); and one hour before sunset. Presenting a series of shadow diagrams from the same day demonstrates how shadow moves across the space and expands and contracts over a specific period of time. They represent a representative range of dates and times, including the time of peak midday use of open space on the longest day of the year, on the equinoxes (when day and night are of approximately equal length), and on the shortest day of the year. From these shadow diagrams, shadow impacts on particular open spaces are described and evaluated.

[7] The period analyzed is from the first hour after sunrise until the last hour before sunset, because before and after these hours, shadows are extremely long and move very quickly across the ground. Because of this, much of the city other than areas with no buildings or other structures is in shadow during the first and last hours of sunlight. Additionally, use of most open spaces tends to be less intensive early in the morning and later in the day.

Consistent with San Francisco shadow analysis procedures, shadow is shown at the ground plane only, and shadow on existing and proposed rooftops (including the proposed Millberry Terrace) is not depicted. This is because the analytical model was developed to evaluate shadow on public and publicly accessible open spaces, the vast majority of which are at grade. In instances where existing buildings would be demolished and replaced with open space (for example, portions of the proposed Promenade and extension of Fourth Avenue, which would replace part of the Dental Clinics Building) shadow cast on this area would not constitute net new shadow as the ground plane is currently subsumed by a building and does not receive sunlight.

Approach to Analysis of Initial Phase Projects, including New Hospital, and Initial Phase Improvements

This EIR includes project-level analysis for certain Initial Phase projects anticipated to be completed by about the year 2030; specifically, the Irving Street Arrival, Research and Academic Building (RAB), and initial Aldea Housing Densification; and Initial Phase improvements, as described below. The New Hospital is also an Initial Phase project anticipated to be completed by about the year 2030, but is analyzed at a program level in this EIR within the context of the overall CPHP and will be analyzed at a project level in a subsequent EIR when more details are available.

Impact Analysis

Impact AES-1: Development under the CPHP would not have a substantial adverse effect on a scenic vista. (Less than Significant)

CPHP

The CPHP would have a significant effect on scenic vistas if it would substantially block or degrade scenic views from public vantage points. Please note that impacts on views from private property are not considered significant effects on the environment. Scenic vistas considered in this analysis include long-range panoramic views of scenic resources.

The CPHP would include changes visible from scenic vistas. The most visible CPHP components, depending on viewpoint, would include certain existing building removal (e.g., UC Hall and School of Nursing), and new building development, including the proposed New Hospital (up to 294 feet[8]), proposed Research and Academic Building (RAB, up to 130 feet in height), proposed improvements at the Millberry Union (up to 90 to 95 feet as measured from Irving Street), proposed West Side development (up to 130 feet), and the proposed hotel for patients and families (up to 35 feet). The CPHP would also result in certain topographic and vegetation changes on the campus site. Development of the New Hospital and associated widening of Medical Center Way may result in a modification of the Reserve boundary, and require excavation, re-grading, and some tree removal in this portion of the Reserve. As discussed in Chapter 3, *Project Description*, UCSF proposes to replace any area of the Reserve acreage that is lost due to new development under the CPHP by designating new Reserve area elsewhere on the campus site in an amount equal to or

8 Including potential rooftop observation deck and elevator vestibule that would occupy a portion of the roof. As currently conceived, the majority of mechanical equipment would be contained within various levels of the New Hospital to minimize the amount of equipment located on the roof; components of mechanical equipment located on the roof may slightly exceed the 294 feet in height.

greater than that area lost. The CPHP would also notably lower existing ground elevations south of the proposed RAB, and proposed development along the future Fourth Avenue extension would necessitate the removal of an existing grove of redwood trees. Certain other tree removal would be required under the CPHP as a result of construction activities proposed under the CPHP, including other locations adjacent to Medical Center Way, miscellaneous areas of ornamental landscaping within the campus site, and off-site street trees along Parnassus Avenue and/or Irving Street.

As noted above, to analyze the effect on scenic vistas, visual simulations were prepared from a number of publicly accessible vantage points from where the campus site can be seen or from vantage points on the campus site that provide scenic views. The locations and direction of the visual simulations are indicated on **Figure 4.1-8**.

View from Grandview Park

Locations on Grandview Park provide long-range panoramic views of the Pacific Ocean, Golden Gate Park, Marin Headlands, the Presidio, downtown San Francisco, the Mount Sutro Open Space Reserve, and Sutro Tower. As shown in **Figure 4.1-9**, from this viewpoint, new buildings proposed under the CPHP would be noticeable and partially obstruct views of the lower portion of the north slope of Mount Sutro. However, the Reserve would continue to be a prominent scenic resource from this view due to its elevation and visibility from long distance. The introduction of taller buildings within the campus core under the CPHP would only slightly obstruct the existing view of downtown San Francisco from this perspective. Others views from Grandview Park, including of the Pacific Ocean, Golden Gate Park, Marin Headlands and the Presidio would remain unchanged. With implementation of the CPHP, this scenic vista would continue to retain nearly all of the qualities that make it scenic: panoramic long-range views of scenic resources. Therefore, implementation of the CPHP would not result in a substantial adverse impact on scenic vistas as viewed from Grandview Park.

Views from other Prominent Vantage Points

In addition to the view from Grandview Park discussed above, as discussed above under *Regulatory Framework*, the views from Tank Hill natural area, Buena Vista Park, and Corona Heights Park are listed in the Urban Design Element of the San Francisco General Plan as "Important Vista Points to be Protected."

Certain CPHP development, particularly the proposed New Hospital, would be visible from surrounding parks, including the Tank Hill natural area, Buena Vista Park, and Corona Heights Park. Views from these parks are considered scenic as they include panoramic views of San Francisco and the Bay Area. While certain proposed CPHP development may be visible, and particularly the proposed New Hospital given that it would be taller than surrounding development, it would not block existing views of Golden Gate Park or the Golden Gate Bridge from these parks. Views from Tank Hill of the proposed housing in the Aldea Housing complex area in the southeast area of the campus site would be largely screened by intervening vegetation. Moreover, other long-range views from these parks, including those of the Marin Headlands, downtown San Francisco, and the East Bay Hills would not be affected by the CPHP. Therefore, implementation of the CPHP would not result in a substantial adverse impact to these scenic vistas.

SFO/D190291.00 - UCSF CPHP EIR/2. Graphics/Illustrator

SOURCE: Prevision Design, 2019; Google Earth, 2019; ESA, 2019

UCSF Comprehensive Parnassus Heights Plan EIR

Figure 4.1-8
Visual Simulation Viewpoint Map

ESA

Existing

Proposed

SOURCE: Prevision Design, 2019

UCSF Comprehensive Parnassus Heights Plan

Figure 4.1-9
Viewpoint: 1: Visual Simulation of the Parnassus Heights Campus Site with CPHP Development from Grandview Park, Looking East

As discussed in the *Regulatory Framework*, views from certain streets in the vicinity of the campus site are listed in the City's General Plan as having excellent quality street views. These streets include Fourth Avenue (between Irving Street and Parnassus Avenue), Fifth Avenue (between Irving Street and Kirkham Avenue), Sixth Avenue (between Judah and Kirkham Streets), Edgewood Avenue, Willard Street, Woodland Avenue, and Clarendon Avenue.

Along portions of Fourth Avenue, Fifth Avenue, and Sixth Avenue, views toward the north and west afford mid- to long-range scenic views of the Golden Gate Bridge, Golden Gate Park, Marin Headlands, and the Pacific Ocean. The CPHP development would not obstruct views of these scenic resources toward the north and west from these streets.

Vantage points on Edgewood Avenue and Willard Street provide scenic views of the Marin Headlands, Golden Gate Park, the Presidio and the Golden Gate Bridge. Vantage points along Clarendon Avenue provide glimpses of the Bay and downtown San Francisco between residences. New campus site development under the CPHP may obstruct northerly and westerly views of the Marin Headlands or Golden Gate Park from the corner of Edgewood Avenue and Belmont Avenue, but would not obstruct views of downtown San Francisco from any vantage point on Clarendon Avenue or Willard Street.

The proposed demolition of the School of Nursing building and proposed Promenade and expansion of Saunders Court, a publicly-accessible open space, would make available new scenic views from the campus site westward toward the Pacific Ocean. In addition, the proposed Millberry Union terrace would create new views northward through the campus site toward Golden Gate Park, Golden Gate Bridge, and the Marin Headlands.

Therefore, based on the foregoing, the CPHP development would not have a substantial adverse effect on scenic vistas from these vantage points.

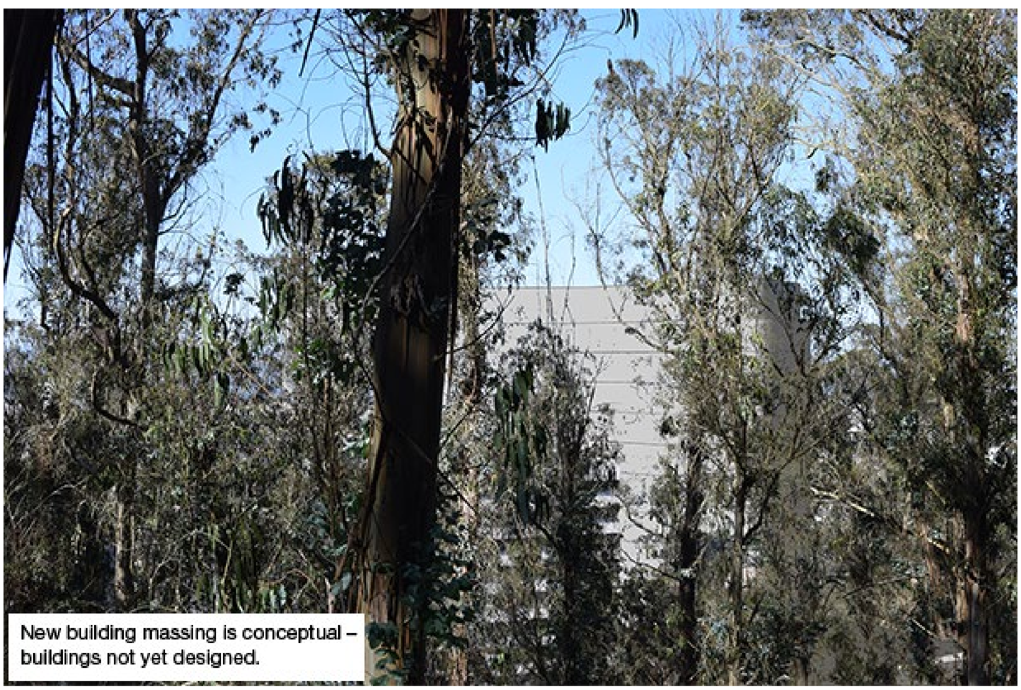
View from the Mount Sutro Open Space Reserve

Figure 4.1-10 shows a visual simulation from the Historic Trail in the Mount Sutro Open Space Reserve, looking north across the campus core toward Golden Gate Park, the San Francisco Bay, and Angel Island. From this vantage point, the proposed New Hospital would be noticeable and would obstruct northward scenic views across the campus core. However, this and other views from within the Reserve are largely obstructed under existing conditions by dense vegetation and/or topography, and, as discussed in the Setting, in general, the Reserve does not provide long range scenic views. As such, implementation of the CPHP would not adversely affect scenic vistas from within the Reserve.

Overall CPHP Impact on Scenic Vistas

The CPHP would introduce new development that would be visible as part of the scenic vistas identified in this analysis, but these scenic vistas would not be substantially or adversely impacted. In addition, the CPHP development would create new scenic views westward toward the Pacific Ocean through removal of the School of Nursing building and creation of new publicly-accessible open space, including proposed Promenade and expansion of Saunders Court. In addition, the proposed Millberry Union terrace would create new views northward through the

Existing



Proposed

SOURCE: Prevision Design, 2019

UCSF Comprehensive Parnassus Heights Plan

Figure 4.1-10
Viewpoint 2: Visual Simulation of the CPHP Development From the Historic Trail in the Mount Sutro Open Space Reserve, Looking North

campus site toward Golden Gate Park, Golden Gate Bridge, and the Marin Headlands. While a portion of the Reserve could be lost to accommodate the New Hospital, which would alter views of the Reserve at this location, UCSF would designate new Reserve area elsewhere on the campus site in an amount equal to or greater than that area lost. Therefore, the CPHP impact on scenic vistas would be less than significant.

Mitigation: None required.

Irving Street Arrival, Research and Academic Building, and Initial Aldea Housing Densification Projects, and Initial Phase Improvements

As discussed in Chapter 3, *Project Description*, the proposed Irving Street Arrival project would modify the pedestrian entrance portion of the existing Medical Building 1, and add two stories on the Irving Street side (increasing to a total of 8 stories and up to 86 feet in height) and an additional two stories on the Parnassus Avenue side (increasing to a total of three stories and up to 45 feet in height). The proposed RAB project would involve removal of UC Hall and the School of Nursing building, and construct an eight story tall building (up to 130 feet in height) on the site of UC Hall. These improvements would alter views to the south and east, and the RAB would become a prominent feature of the visual landscape.

Scenic views from Fourth Avenue, Fifth Avenue, and Sixth Avenue, between Irving and Kirkham Streets of the Pacific Ocean, Golden Gate Park, downtown San Francisco, and Golden Gate Bridge would not be obstructed by these two Initial Phase projects. Removal of the School of Nursing building and the proposed Promenade and expansion of Saunders Court would create new publicly-accessible open space that would provide scenic westward views through the campus site toward the Pacific Ocean.

The initial Aldea Housing Densification project would substantially increase the height of buildings in the Aldea Housing complex, with development of one five-story building (up to 60 feet in height) and three eight-story buildings (up to 96 feet in height). As discussed above, while it is possible that these buildings may be visible from Tank Hill, it is likely that intervening vegetation would largely obstruct views of this Initial Phase project (surrounding dense vegetation and eucalyptus trees can grow to over 100 feet tall in the Aldea Housing complex). Therefore, the initial Aldea Housing Densification project would not be expected to substantially or adversely affect scenic vistas.

As described in Chapter 3, *Project Description*, the Initial Phase improvements would include various Initial Phase utility improvements, implementation of the Parnassus Avenue Streetscape Plan, renovation of certain existing buildings, and installation of miscellaneous community investments in the public realm. As indicated in Chapter 3, the site of the proposed fuel tank replacement project south of the Central Utility Plant would require limited grading and removal of up 50 to 100 eucalyptus trees on the adjacent hillside. However, this location is largely hidden from view from surrounding public vantage points due to intervening development, and consequently, this utility improvement would not affect scenic vistas. Similarly, the site of the proposed emergency water tank replacement west of the Surge parking lot is heavily screened by existing topography and vegetation within the surrounding Reserve, and consequently, this utility improvement would also not affect scenic vistas from public vantage points. The proposed renovation to HSIR Towers and Medical Sciences Building would not increase the building envelope or heights of these existing buildings, and as such would not adversely affect scenic vistas. Lastly, the proposed Parnassus Avenue Streetscape Plan improvements and community investments would not be of a nature or scale that would have the potential to adversely affect scenic vistas.

Mitigation: None required.

Impact AES-2: Development under the CPHP would occur in an urbanized area and would not conflict with applicable zoning and other regulations governing scenic quality. (Less than Significant)

CPHP

The campus site qualifies as an "urban area" as defined in CEQA Guidelines section 21094.5 because it is located in an incorporated city. Therefore, as discussed above under *Significance Criteria*, the CPHP would have an adverse effect related to scenic quality if it were to conflict with applicable regulations governing scenic quality.

The University is the only agency with land use jurisdiction over programs and projects proposed on the Parnassus Heights campus site. As such, the UCSF 2014 LRDP governs scenic quality at the campus site, and, accordingly, potential conflicts of the CPHP with the 2014 LRDP are used as the basis to determine if the CPHP would have a significant impact related to scenic quality. (Nevertheless, following this assessment, this EIR also presents – for informational purposes – a discussion of the general consistency of the CPHP with other planning documents, including the City of San Francisco General Plan and Planning Code. Please see *Informational Discussion of Consistency with Other Planning Documents*, below.)

To help inform the discussion of CPHP effects on scenic quality, **Figures 4.1-11** through **4.1-19** presented in this impact discussion depict visual simulations of the CPHP development from a number of key vantage points.

UCSF 2014 LRDP

The 2014 LRDP objectives are the policies that guide UCSF's physical development. Of the five overarching 2014 LRDP objectives, "Objective 1. "Respond to the City and Community Context" contains three sub-objectives that relate to scenic quality. These include the following:

1B. Acknowledge and respond to local zoning and height and bulk limitations to the extent possible;

1C. Design new buildings to be sensitive to the surrounding neighborhood and landscape, taking into account use, scale, potential noise generation, and density; and

1D. Incorporate pedestrian-friendly urban design principles to relate to campus buildings to surrounding streetscape and neighborhoods.

UCSF's proposed LRDP Amendment would clarify that sub-objectives 1B and 1C would not apply to the New Hospital project, in recognition of the substantial amount of space required for the New Hospital, although UCSF would make efforts during the design process to come as close as possible to meeting these objectives, if feasible.

2014 LRDP Sub-objective 1B

As shown in **Figures 4.1-11** and **4.1-12**, implementation of the CPHP program would result in generally taller buildings and an increase in building mass across the developed areas of the campus site. With regard to 2014 LRDP sub-objective 1B, local zoning and height and bulk limitations would be those contained in the San Francisco Zoning Map. Certain uses under the proposed CPHP would be inconsistent with the San Francisco Zoning Map designations related to height and bulk. The proposed New Hospital (up to 294 feet) would exceed the height limits of the City's 65-D, 220-F Height and Bulk Districts, and, along with the proposed widening of Medical Center Way, could encroach within the City's OS Height and Bulk District. In addition, certain portions of the proposed West Side development (up to 130 feet in height) would exceed the height limits of the City's 40-X Height and Bulk District and encroach within the City's OS Height and Bulk District); and the proposed Aldea Housing Densification project (up to 96 feet in height) would exceed the height of the City's 40-X Height and Bulk District limit. Therefore, in these respects, the CPHP would not fully align with sub-objective 1B. Other height exceedances of the City's Zoning Code by development proposed under the CPHP, including the proposed Millberry Union Towers (up to 90 to 95 feet as measured from Irving Street) and Irving Street Arrival (up to 86 feet as measured from Irving Street), which would nominally exceed the height limit of the City's 80-D Height and Bulk District (by between about 8 and 19 percent).

2014 LRDP Sub-objective 1C

Regarding 2014 LRDP sub-objective 1C, and specifically with respect to the issue of use, the CPHP proposes a range of clinical, research, educational, and residential uses that are consistent with those land use types that currently exist at the campus site. The proposed CPHP districts would also further organize these land uses in a rational manner based in part on existing land use patterns. As such, from a use perspective, the proposed CPHP would be generally consistent with the surrounding neighborhood.

Specifically, with respect to scale and density, implementation of the CPHP program would result in a substantial increase in development, and associated increase in the scale and density, on the campus site. The multi-family housing proposed in the West Side district under the CPHP would be broken into several individual buildings located along the proposed 4th Avenue extension, and these buildings would step down in height from east to west along the lower slope of the Mount Sutro as they approach existing adjacent residential housing to the west. This would serve to reduce the effect of height and mass differences of the proposed housing with neighboring land uses (see **Figure 4.1-13**). Other notable proposed taller and larger-scale CPHP development, such as the proposed RAB and Millberry Union Towers, would be comparatively more centrally-located within the campus core and alongside other taller and prominent existing development on Parnassus Avenue, which would minimize the effects of height and scale of these uses with the surrounding neighborhood.

Existing

Proposed

SOURCE: Prevision Design, 2019

UCSF Comprehensive Parnassus Heights Plan

Figure 4.1-11
Viewpoint: 3: Visual Simulation of the Parnassus Heights Campus Site with CPHP Development from Seventh Avenue and Judah Street, Looking East

Existing

Proposed

SOURCE: Prevision Design, 2019

UCSF Comprehensive Parnassus Heights Plan

Figure 4.1-12
Viewpoint 4: Visual Simulation of the Parnassus Heights Campus Site with CPHP Development from Kezar Triangle, Looking South

Existing

Proposed

SOURCE: Prevision Design, 2019

UCSF Comprehensive Parnassus Heights Plan

Figure 4.1-13
Viewpoint 5: Visual Simulation of the Parnassus Heights Campus Site with CPHP Development from Kirkham Street Between 5th and 6th Avenues, Looking East

The proposed Aldea Housing Densification on the southeast side of the campus site would also be noticeably taller and larger in scale than the existing Aldea Housing buildings it would replace, and the existing housing in the adjacent neighborhood to the south. However, the new Aldea Housing structures would be developed in generally the same building footprints as the existing Aldea Housing buildings, and thus, would continue to maintain existing setbacks from off-site residential uses, and benefit from visual screening provided by the tree cover in the Aldea Housing complex.

As shown in Figure 4.1-12, and **Figures 4.1-14** to **4.1-18**, the New Hospital proposed in the Clinical East End would be the most noticeable visual change under the CPHP program. The New Hospital would contrast sharply both in height and scale with the existing residential development to the east, which is limited to 40 feet in height. The proposed New Hospital would also be nearly 100 feet taller than other existing buildings on the campus site (adjacent Moffitt Hospital is currently the tallest building at 197 feet). In addition, the proposed New Hospital would be a prominent newly visible feature in the viewsheds from nearby neighborhoods, such as those along Parnassus Avenue (see Figure 4.1-16), 17th Street (see Figure 4.1-17), and Willard Street at Belmont Avenue (see Figure 4.1-18).

As such, while CPHP development proposed in the central and west areas of the campus core, and in the Aldea Housing complex, would, on balance, be generally consistent with 2014 LRDP sub-objective 1C, the height and scale of the proposed New Hospital would be inconsistent with 2014 LRDP sub-objective 1C.

With respect to sensitivity to the surrounding landscape as set forth in 2014 LRDP sub-objective 1C, the proposed New Hospital and widening of the Medical Center Way could encroach into the hillside in the Reserve to the east and require tree removal and regrading in this area. As discussed in Chapter 3, Project Description, UCSF proposes to replace any area of the Reserve lost due to new development under the CPHP by designating a new area elsewhere on the campus site as Reserve in an amount equal to or greater than that area lost. Other notable landscape alteration on the campus site under the CPHP would include the removal of an existing grove of redwood trees adjacent to UC Hall. Certain other tree removal would be required under the CPHP as a result of construction activities proposed under the CPHP, including other locations adjacent to Medical Center Way, miscellaneous areas of ornamental landscaping within the campus core, and street trees along Parnassus Avenue and/or Irving Street. However, as discussed in the Project Description, UCSF would also provide a net increase of 3.9 acres of publically accessible open space within the campus core over existing conditions, including an expanded Promenade and Saunders Court, which would serve to minimize effects of loss of existing landscaping elsewhere under the CPHP.

Specifically with respect to the extent this sub-objective concerns noise generation, as addressed in Section 4.11, *Noise and Vibration*, with mitigation, new buildings developed under the CPHP would result in a less-than-significant effect on ambient noise levels pursuant to applicable noise standards.

Existing

Proposed

SOURCE: Prevision Design, 2019

UCSF Comprehensive Parnassus Heights Plan

Figure 4.1-14
Viewpoint 6: Visual Simulation of the Parnassus Heights Campus Site with CPHP Development from Lincoln Way and Arguello Boulevard, Looking South

Existing

Proposed

SOURCE: Prevision Design, 2019

UCSF Comprehensive Parnassus Heights Plan

Figure 4.1-15
Viewpoint 7: Visual Simulation of the Parnassus Heights Campus Site with CPHP Development from 3rd Avenue and Parnassus Avenue, Looking East

Existing

Proposed

SOURCE: Prevision Design, 2019

UCSF Comprehensive Parnassus Heights Plan

Figure 4.1-16
Viewpoint 8: Visual Simulation of the Proposed CPHP New Hospital from Parnassus Avenue and Willard Street, Looking West

Existing

Proposed

SOURCE: Prevision Design, 2019

UCSF Comprehensive Parnassus Heights Plan

Figure 4.1-17
Viewpoint 9: Visual Simulation of the Proposed CPHP New Hospital from 17th Street and Clayton Street, Looking West

Existing

Proposed

SOURCE: Prevision Design, 2019

UCSF Comprehensive Parnassus Heights Plan

Figure 4.1-18
Viewpoint 10: Visual Simulation of the Proposed New Hospital From Willard Street and Belmont Avenue, looking West

2014 LRDP Sub-objective 1D

Regarding 2014 LRDP sub-objective 1D, proposed new buildings along Parnassus Avenue would be constructed concurrent with the proposed Parnassus Avenue Streetscape Plan, which includes pedestrian improvements intended to make street crossings safer and more convenient, the creation of more usable outdoor space as well as visual design elements to strengthen the identity of UCSF at the campus site, and enhance the public realm. Improvements would include new paving, street furniture, lighting and street trees, sidewalk and crosswalk widening and more defined campus gateways at either end of the street. These improvements would serve to enhance the public realm as called for in UCSF's Physical Design Framework, and would be consistent with 2014 LRDP sub-objective 1D.

Overall CPHP Impact on Scenic Quality

To the extent the CPHP would be inconsistent with applicable 2014 LRDP objectives as described above, UCSF would seek amendments to the 2014 LRDP to bring the CPHP and 2014 LRDP into conformity. In particular, the 2014 LRDP would be amended clarify that sub-objectives 1B and 1C would not apply to the New Hospital project, in recognition of the substantial amount of space required for the New Hospital, although UCSF would make efforts during the design process to come as close as possible to meeting these objectives, if feasible. Therefore, because the CPHP includes provisions regarding scenic quality that would apply broadly to the CPHP based on UCSF's Physical Design Framework, with amendments to the 2014 LRDP, the CPHP would not conflict with the 2014 LRDP objectives related to scenic quality. This impact would be less than significant.

Mitigation: None required.

Irving Street Arrival

The Irving Street Arrival project would add two stories on the Irving Street side (increasing to a total of 8 stories and up to 86 feet in height) and an additional two stories on the Parnassus Avenue side (increasing to a total of three stories and up to 45 feet in height). Only minor loss of ornamental vegetation could occur during demolition and construction, but new landscaping would be installed. As discussed above, this project would exceed the City's 80-foot height designation at this site and consequently, not align with 2014 LRDP sub-objective 1B in this respect, although it would be only a nominal exceedance. The Irving Street Arrival project would be generally consistent with sub-objective 1C given the modest scale of this project. The Irving Street Arrival project would also be consistent with sub-objective 1D related to pedestrian-friendly urban design principles because it would include improvements to the pedestrian entrance on Irving Street, and improve pedestrian access between Irving Street and Parnassus Avenue. Therefore, the Irving Street Arrival project would not conflict with applicable regulations governing scenic quality.

Mitigation: None required.

Research and Academic Building

The RAB project would be approximately 130 feet in height in an area of the city zoned for 130 feet. Therefore, the RAB project would not exceed height allowed under the Planning Code, and hence would be consistent with 2014 LRDP sub-objective 1B. The RAB project would be taller than the existing UC Hall (which ranges between approximately 75 and 100 feet in height), which it would replace, but would generally be consistent with sub-objective 1C because it would replace the UC Hall with a similar use, and would be within the City's height and bulk designation for the site. Miscellaneous ornamental tree loss in the RAB vicinity would occur during demolition and construction, however, new replacement landscaping would be installed. Therefore, the RAB project would not conflict with applicable regulations governing scenic quality. The RAB would also be generally consistent with sub-objective 1C as it would accommodate the development of the adjacent Promenade that would promote east-west pedestrian mobility within this vicinity.

Mitigation: None required.

Initial Aldea Housing Densification

As shown in **Figure 4.1-19**, buildings proposed as part of the initial Aldea Housing Densification project would be up to 96 feet in height in an area of the city currently zoned for 40 feet. As such, this project would not align with 2014 LRDP sub-objective 1B because it would not be consistent with local zoning and height and bulk limitations for the site. However, consistent with the CPHP design guidelines, the initial Aldea Housing Densification project would be developed in a way that would reinforce its connection with Mount Sutro, respect the existing wooded setting and open space areas, refrain from impacting the extent of the Reserve, and establish discrete façade treatments to embrace the surrounding context. Some trees and other vegetation presently growing within the housing complex may be removed, however, new replacement landscaping would be installed. This project would also continue the existing use of the Aldea Housing complex site for residential uses. For these reasons, this project would be consistent with 2014 LRDP sub-objective 1C. As a result, the initial Aldea Housing Densification project would not conflict with applicable regulations governing scenic quality.

Mitigation: None required.

Initial Phase Improvements

On balance, the Initial Phase improvements would be generally consistent with 2014 LRDP sub-objectives 1B through 1D. Consistent with sub-objective 1B, these improvements are of a scale that would comply with local zoning and height and bulk limitations. As discussed in Chapter 3, Project Description, certain utility improvements within the campus site, such as the fuel tank replacement, would require some localized grading and tree removal, however, all areas impacted during construction would be revegetated as needed. Implementation of the Parnassus Avenue Streetscape Plan improvements would be consistent with sub-objective 1D for incorporation of pedestrian friendly urban design principles. As a result, the Initial Phase Improvements would not conflict with applicable regulations governing scenic quality.

Mitigation: None required.

Informational Discussion of Consistency with City General Plan

the following discussion considers for informational purposes whether the CPHP would be consistent with San Francisco General Plan policies governing scenic quality. Because of the University's constitutional exemption from local land use regulation, conflicts with City regulations would not constitute significant environmental effects.

Existing

Proposed

SOURCE: Prevision Design, 2019

UCSF Comprehensive Parnassus Heights Plan

Figure 4.1-19
Viewpoint 11: Visual Simulation of Proposed CPHP New Housing in Aldea Housing Complex from Clarendon Avenue, Looking West

The Urban Design Element of the City's General Plan defines the City's desired aesthetic character and quality, and includes policies and principles that guide new development within the City. To the extent the CPHP would conflict with Urban Design Element policies that seek to recognize and protect major views in the city, that analysis is provided in Impact AES-1, above.

With respect to scenic quality, relevant objectives and principles in the Urban Design Element are listed above, under *Regulatory Framework*. In general, the Urban Design Element generally seeks to develop buildings consistent with the prevailing scale of development to avoid an overwhelming or dominating appearance in new construction, to promote building forms that respect and improve the integrity of open space, and to promote the importance of low-rise buildings surrounding large parks at tops of hills to maintain visibility of the park from other areas of the city.

The existing campus site is notable because of the collection of tall buildings that stand out among surrounding off-site development, which is limited to 40 feet in height. Development under the CPHP would further this pattern, by increasing building massing and heights within the campus site. The proposed CPHP buildings would reinforce the campus site character by adding tall buildings in an area of the campus that is already distinguishable for its cluster of tall buildings. As such, the CPHP would be generally consistent with Urban Design Element Policy 1.3, which states that buildings, when seen together, produce a total effect that characterizes the city and its districts, and with Policy 1.6, which strives to make centers of activity more prominent through design of street features and by other means. However, the CPHP would not be consistent with Policy 3.6, which states that the height of buildings should be related to the prevailing scale and character of existing development, when considering the proposed New Hospital would be nearly 100 feet taller than the tallest existing building at the campus site (Moffitt Hospital). With respect to Policy 3.4, which states that building forms should respect and improve the integrity of open spaces and other public areas, the proposed New Hospital could encroach on the adjacent hillside within the Reserve and require modifications to the Reserve boundary, however as noted above the University would designate new Reserve area elsewhere on the campus site in an equal or greater amount than that lost; and proposes new open space within the campus core by way of the proposed Promenade, expanded Saunders Court and Millberry Terrace.

Impact AES-3: Implementation of the CPHP would not create a new source of substantial light or glare which would adversely affect daytime or nighttime views in the area. (Less than Significant with Mitigation)

CPHP

Development of the CPHP could increase ambient light levels due to light dispersion from new buildings. Increases in night lighting could affect nighttime views on the campus site or in the surrounding neighborhood. New light sources could include street lights, illuminated signage, exterior safety lighting and light emitted from building windows. In addition, glare could be generated from reflective building materials.

Lighting would be developed in accordance with campus design principle W4 from the CPHP, which states that lighting should be designed to modulate energy consumption and lighting levels, and respond to program needs and neighborhood concerns. Although specific architectural features and building materials have yet to be determined, the proposed improvements have the potential to include reflective surfaces, such as metal and glass. The resultant glare could affect nearby residents, pedestrians and passing motorists. **Mitigation Measure CPHP AES-3** would be implemented to reduce the impact to a less than significant level. By employing appropriate design standards and minimizing the quantity of reflective material used in new construction, light and glare impacts and impacts to views related to lighting could be reduced to less-than-significant levels.

CPHP Mitigation Measure AES-3: Minimize light and glare resulting from new buildings.

Light and glare from buildings shall be minimized through the orientation of the building, use of landscaping materials and choice of primary facade materials. Design standards and guidelines to minimize light and glare shall be adopted for the new buildings, including:

- Reflective metal walls and mirrored glass walls shall not be used as primary building materials for facades.
- Installation of illuminated building signage shall strive to be consistent with UCSF design guidelines and/or City Planning Code sign standards for illumination.
- Exterior light fixtures shall be configured to emphasize close spacing and lower intensity light. Light fixtures shall use luminaries that do not direct the cone of light towards off-campus structures.
- Design parking structure lighting to minimize off-site glare.

Significance after Mitigation: Less than Significant.

Irving Street Arrival, Research and Academic Building and Initial Aldea Housing Densification Projects, and Initial Phase Improvements

The Irving Street Arrival, Research and Academic Building and initial Aldea Housing Densification projects, and Initial Phase improvements would have the same impacts with respect to light and glare as the impacts described above for the CPHP. **CPHP Mitigation Measure AES-3**, described above, would also apply to these initial phase projects, the implementation of which would reduce impacts to a less-than-significant level.

Mitigation: Implement CPHP Mitigation Measure AES-3.

Significance after Mitigation: Less than Significant.

Impact AES-4: Implementation of the CPHP would potentially create wind hazards in publicly accessible areas of substantial pedestrian use. (Significant and Unavoidable with Mitigation)

CPHP

The CPHP would alter pedestrian-level wind conditions through the demolition of some existing structures and the construction of several new structures. The greatest change in overall site massing, compared to existing conditions, would result from development of the New Hospital, which would be constructed along Parnassus Avenue. In combination with the redevelopment and expansion of Millberry Union, the New Hospital could increase wind speeds along some lengths of Parnassus Avenue through a combination of "downwash" (winds intercepted by a building, diverted down to the ground and accelerated) and channeled flow (winds accelerated by being forced through a relatively narrow passage between buildings). If the New Hospital presents a relatively massive façade towards Parnassus Avenue, the potential increases for substantial downwash and acceleration of winds at ground level that would strike the façade and flow downwards and around the northeast corner of the New Hospital.

Based on the computer modeling (computational wind engineering) simulations conducted for the CPHP, wind speeds with the CPHP would increase along Parnassus Avenue, between approximately the western edge of Medical Building 1 (the Ambulatory Care Center at 400 Parnassus Avenue) and Hill Point Avenue, such that they would fail to meet the 11-mph pedestrian comfort criterion, both west and east of the northeast corner of the New Hospital. (A relatively small area between Medical Building 1 and the west end of the New Hospital exceeds the pedestrian comfort criterion under existing conditions.) Wind speeds are expected to increase most substantially at the northeast corner of the New Hospital and may, depending on the design, also exceed the comfort criterion along the eastern base of the New Hospital.

Additionally, winds flowing past the New Hospital may be accelerated between the building and the local terrain, and the accelerated wind could continue upslope towards Farnsworth Lane and the northern end of Edgewood Avenue, both of which are above and east of the New Hospital site. As a result, wind speeds could exceed the pedestrian comfort criterion in these adjacent residential locations, as well. Computer modeling indicates wind speeds exceed the pedestrian comfort criterion along a small area along Farnsworth Lane under existing conditions, but the CPHP could substantially expand the size of this area to include all of Farnsworth Lane and Edgewood Avenue north of Belmont Avenue.

Computer modeling also shows that wind speeds would be in excess of the 11-mph pedestrian comfort criterion on Parnassus Avenue at, and west of, 3rd Avenue, adjacent to part of the new Research and Academic Building (RAB), which would replace UC Hall. Wind speeds would also exceed the pedestrian comfort criterion in a small area behind the RAB. These increased wind speeds would affect a pedestrian promenade to be developed between the RAB and proposed new construction north of the Regeneration Medicine Building and would result from channeling of westerly winds between the buildings. This interior campus location would be less public than Parnassus Avenue and therefore increased wind speeds would affect fewer pedestrians.

Other locations along Parnassus Avenue are expected to meet the 11-mph pedestrian comfort criterion. Wind speeds at most other locations on, and adjacent to, the campus site are also expected to meet the pedestrian comfort criterion.

Although compliance with the wind hazard criterion was not evaluated as a design of the New Hospital is not yet available, it can be reasonably predicted that, depending on the ultimate design, the hazard criterion could be exceeded around the northeast corner of the New Hospital, where the greatest increases in pedestrian-level wind speeds would be anticipated. This would be a significant impact. **CPHP Mitigation Measure AES-4** would require that wind-tunnel testing of specific building designs for structures 80 feet tall or greater be implemented to reduce wind impacts as feasible. However, in the absence of wind tunnel testing of specific building designs, it cannot be concluded that effects would be reduced to a less than significant level. Therefore, this impact would be significant and unavoidable with mitigation.

It is noted that, as stated above in the Approach to Analysis, this analysis is likely conservative in that it was based on a simple massing model of the proposed CPHP, and not on actual building designs, which have not yet been prepared. In general, a more likely building scenario includes building setbacks and other building sculpting features, such as podiums, would be expected to result in less substantial wind effects.

CPHP Mitigation Measure AES-4: Design new buildings to minimize wind impacts at pedestrian level.

Prior to the approval of the design of individual buildings to be developed pursuant to the CPHP and for which one or more building facades would have a height of 80 feet or more, UCSF shall engage a qualified wind consultant to conduct wind tunnel testing of the proposed building(s) to determine whether the building(s) would result in new exceedance(s) of the City of San Francisco's 26-mph pedestrian wind hazard criterion. The wind tunnel testing shall be conducted for the building(s) under consideration in the context of then-existing conditions as well as in the context of conditions representative of then-anticipated CPHP buildout (the buildout scenario in the EIR, as may be modified from time to time by UCSF to reflect actual building designs known at the time) so as to determine whether the individual building(s) and/or the buildout condition would result in exceedances of the wind hazard criterion.

If the wind tunnel analysis determines that the building(s)' design or buildout conditions would increase the hours of wind hazard exceedance or the number of test points subject to hazardous winds, compared to then-existing conditions, UCSF shall work with the wind consultant to identify feasible mitigation strategies, including design changes (e.g., setbacks, rounded/chamfered building corners, stepped facades, etc.), to eliminate or reduce wind hazards to the maximum feasible extent. If UCSF finds that these changes or other wind speed reduction strategies are not feasible as they would unduly restrict the proposed building's space program, result in operational inefficiencies, and/or substantially higher costs, the building(s) may nonetheless be approved provided that the project incorporates wind speed reduction strategies to the maximum feasible extent, as determined by UCSF in consultation with the wind consultant. Wind speed reduction strategies could also include features such as landscaping, localized installation of porous/solid screens, installation of canopies along building frontages, and the like.

Significance after Mitigation: Significant and Unavoidable. As noted above, it cannot be stated with certainty that no wind hazard exceedances would result from the CPHP, and therefore this impact could be significant even with mitigation. Accordingly, this impact would be considered significant and unavoidable with mitigation.

Irving Street Arrival, RAB and Initial Aldea Housing Densification

The computational wind assessment did not individually evaluate the Irving Street Arrival, RAB and initial Aldea Housing Densification projects; that is, no separate analysis was undertaken for each project on its own. However, the analysis did evaluate the Irving Street Arrival and the RAB projects, along with the New Hospital, absent other longer-term campus development, to identify the impacts of these projects separately from other longer-term development. This intermediate scenario indicates that the Irving Street Arrival project could incrementally increase wind speeds on Carl Street just west of Hillway Avenue, adjacent to the northeast corner of the campus. This would result in wind speeds exceeding the pedestrian comfort criterion in an area adjacent to the Medical Building 1 garage, enlarging an existing very small area of exceedance. Although it is not known if the wind hazard criterion would be exceeded at this location, this is judged to be, at least potentially, a significant impact. As described above, the proposed RAB project would, in combination with other CPHP development to the south, increase wind speeds on Parnassus Avenue and on the pedestrian promenade south of the RAB such that they would exceed the pedestrian comfort criterion. In the intermediate scenario, without the additional development to the south and west, the RAB project would likewise result in wind speeds on Parnassus Avenue and on the pedestrian promenade that would exceed the pedestrian comfort criterion, and to a greater degree than with full buildout of the PHMP because there would be less sheltering by buildout development to the south and west. This would also be a significant impact. Both the Irving Street Arrival and the RAB projects would exceed 80 feet in height along at least one façade and therefore **CPHP Mitigation Measure AES-4** would require that wind-tunnel testing of the specific designs of these buildings be conducted to analyze wind impacts and put forth specific measures to reduce wind speed if an exceedance is identified. However, in the absence of wind tunnel testing of specific building designs, it cannot be concluded that effects would be reduced to a less than significant level. Therefore, this impact would be significant and unavoidable with mitigation.

The computational wind assessment indicates that the proposed Aldea Housing Densification project would have relatively modest effects on pedestrian-level winds. Pedestrian wind conditions at the Aldea Housing complex site are substantially moderated by the surrounding forest canopy. Nevertheless, the CPHP would develop three new residential buildings up to 96 feet in height that could result in localized wind conditions that could result in a significant impact. These buildings would be subject to **CPHP Mitigation Measure AES-4**, which would require that wind-tunnel testing of the specific designs of these buildings be implemented to reduce wind impacts as feasible. However, in the absence of wind tunnel testing of specific building designs, it cannot be concluded that effects would be reduced to a less than significant level. Therefore, this impact would be significant and unavoidable with mitigation.

Irving Street Arrival

Mitigation: Implement CPHP Mitigation Measure AES-4.

Significance after Mitigation: Significant and Unavoidable. As noted above, it cannot be stated with certainty that no wind hazard exceedances would result from the Irving Street Arrival, and therefore this impact could be significant even with mitigation. Accordingly, this impact would be considered significant and unavoidable with mitigation.

Research and Academic Building

Mitigation: Implement CPHP Mitigation Measure AES-4.

Significance after Mitigation: Significant and Unavoidable. As noted above, it cannot be stated with certainty that no wind hazard exceedances would result from the RAB, and therefore this impact could be significant even with mitigation. Accordingly, this impact would be considered significant and unavoidable with mitigation.

Initial Aldea Housing Densification

Mitigation: Implement CPHP Mitigation Measure AES-4.

Significance after Mitigation: Significant and Unavoidable. As noted above, it cannot be stated with certainty that no wind hazard exceedances would result from the Aldea Housing Densification, and therefore this impact could be significant even with mitigation. Accordingly, this impact would be considered significant and unavoidable with mitigation.

Initial Phase Improvements

The computational wind assessment did not include any of the Initial Phase improvements. However, the proposed Initial Phase building renovations that would occur as part of these improvements would not change any of the building footprint or heights, and thus, would not result in a substantive change in those wind effects that were modeled. Other Initial Phase improvements, such as those under the Parnassus Avenue Streetscape, utility improvements, and neighborhood investments would not be of a scale and nature that would have the potential to result in substantial wind effects. The impact would be less than significant.

Mitigation: None required.

Impact AES-5: Implementation of the CPHP would not create new shadow in a manner that would substantially and adversely affects the use and enjoyment of publicly accessible open spaces. (Less than Significant)

CPHP

Development proposed under the CPHP would increase shadow in the vicinity of the campus site. New shadow from the CPHP would reach as far north as the Golden Gate Park baseball fields (at Martin Luther King Jr. Drive and 7th Avenue) early in the morning on the winter solstice. On the fall/spring equinox, CPHP shadow would extend west covering parts of Irving Street between 4th Avenue and 8th Avenue and Judah Street at 7th Avenue early in the morning. In the late afternoon on the fall/spring equinox, CPHP shadow would extend east covering parts of Edgewood Avenue, and Grattan Street between Stanyan Street and Cole Street. The CEQA threshold of significance for shadow impacts used in this EIR is whether a project would create new shadow in a manner that would substantially and adversely affect the use and enjoyment of publicly accessible open spaces. Therefore, the significance of shadow cast on streets, sidewalks, and private properties is not used as the basis for determining shadow impacts. The analysis in this section focuses on whether the CPHP would cast new shadow on publicly accessible open spaces in the vicinity of the campus site and whether this new shadow would adversely affect the use and enjoyment of these open spaces.

The discussion below analyzes impacts of the CPHP on three City parks (Golden Gate Park, Richard Gamble Memorial Park, and Grattan Playground), and on two schoolyards that participate in the Shared Schoolyard Project and provide public access on weekends (Independence High School and Grattan Elementary School). The Interior Greenbelt located adjacent to and east of the Reserve, and the Reserve itself located within the campus site, were also studied for this analysis.

It was determined the CPHP development would not cast new shadow on the Interior Greenbelt. New shadow cast on the Reserve under the CPHP would generally be minimal because most of the campus core development is located north of the Reserve. In particular, the New Hospital would cast shadow on only the steep narrow portion of the Reserve that is immediately east of the hospital site and would not affect any primary trails or public use areas. CPHP development along the east side of the proposed Fourth Avenue extension south of Parnassus Avenue would newly shade a relatively narrow and also steep portion of the Reserve in the afternoon. This shadow would begin as early as approximately 2:00 p.m., around the winter solstice, and as late as approximately 4:00 p.m., around the summer solstice. Shadow from the CPHP would not reach any of the trails on Mount Sutro. Given the lack of impact on the Interior Greenbelt and the relatively minimal shadow on the Reserve, effects on these two recreational areas would be less than significant and they are not discussed further.

Shadow from the proposed Aldea Housing Densification project would be limited, primarily because it would fall largely on a densely wooded area where the existing trees cast substantial shadow under existing conditions. This relatively limited new shadow would fall in proximity to the new buildings, including on parking lots and streets serving the Aldea Housing buildings. New shadow would also be cast on landscaped areas within the Aldea Housing complex, but effects on midday sunshine would be limited. Therefore, new shadow from the Aldea Housing Densification project would not be expected to adversely affect the use of nearby outdoor spaces and is not discussed further.

Table 4.1-1 presents a summary of CPHP shadow effects on public open spaces analyzed. In the table, the time frame presented under the season header (spring/fall equinoxes and summer and winter solstices) are consistent with the period during which section 295 of the *Planning Code* regulates solar access.[9] The times shown for the parks and open spaces denote when new shadow, caused by buildings that could be developed under the CPHP, would occur.

TABLE 4.1-1
SUMMARY OF CPHP PROGRAM SHADOW ON PUBLIC OPEN SPACES NEAR THE CAMPUS SITE

Park/Open Space	Season and Section 295 Hours[a]			
	Spring/Fall Equinoxes 7:57 a.m. – 6:09 p.m.	**Summer Solstice 6:46 a.m. – 7:36 p.m.**	**Winter Solstice 8:19 a.m. – 3:54 p.m.**	**Date of Maximum Shading**
Open Spaces Under the Jurisdiction of the Recreation and Parks Department				
Golden Gate Park	None	None	8:19 a.m. – 9:30 a.m. (minor new shadow)	December 20th between 8:19 a.m. – 9:30 a.m.
Richard Gamble Memorial Park	None	None	None[c]	November 1st between 4:10 p.m. – sunset
Grattan Playground	None	None[b]	None	August 2nd between 7:00 p.m. – sunset
School Playgrounds Open to the Public on Weekends				
Independence High School	None	None	None	October 11th between 8:16 a.m. – 8:30 a.m.
Grattan Elementary School	None	None	None	September 6th between 6:31 p.m. – sunset

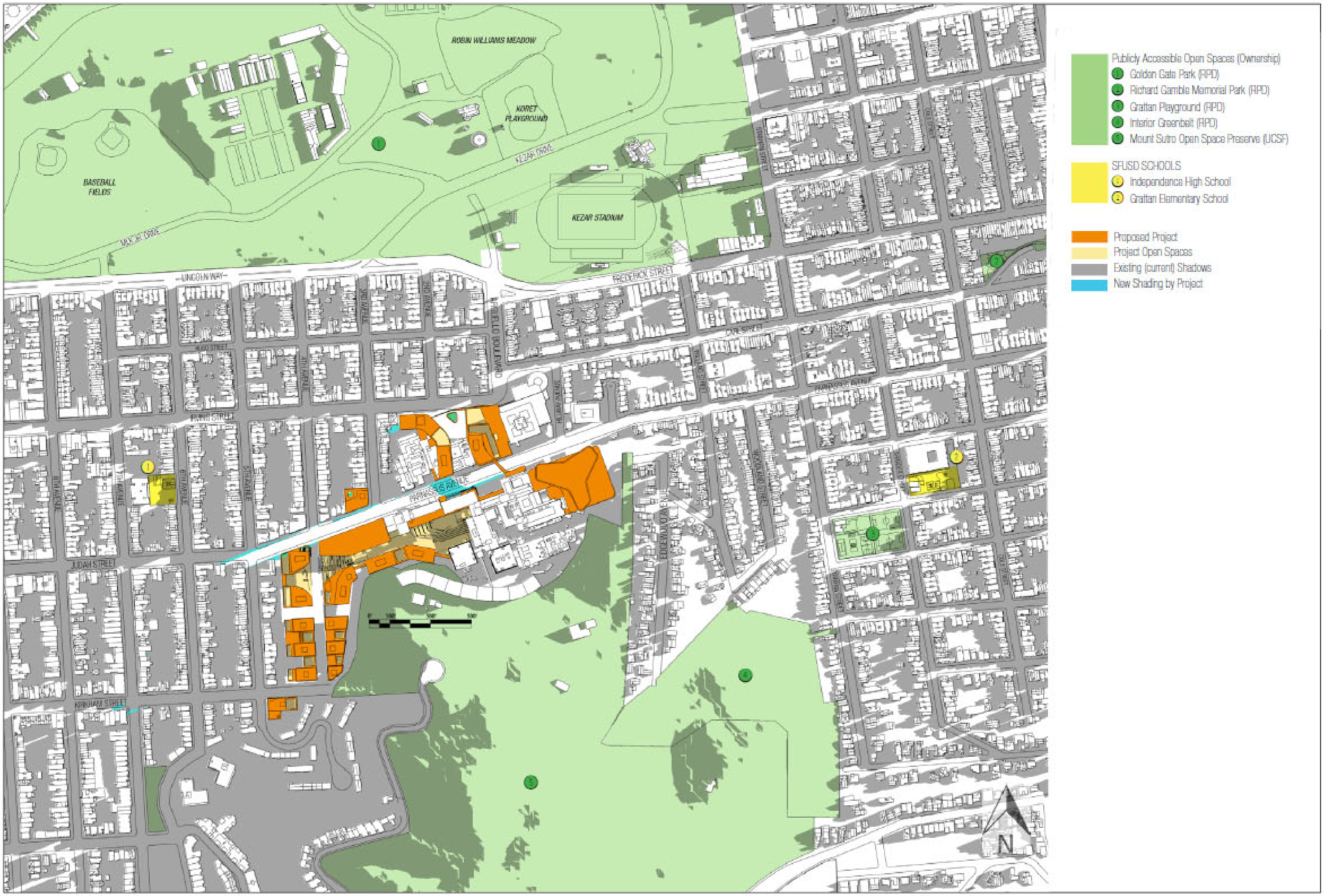
NOTES:
[a] The Planning Department commonly relies upon the hours governed by Planning Code Section 295—from one hour after sunrise to one hour before sunset—in environmental review.
[b] Shadow would be cast on the Grattan Playground between April and early September, but would not be cast on the Summer or Winter Solstice, or the Spring/Fall Equinox.
[c] Shadow would be cast on the Richard Gamble Memorial Park between January and February, and again between October and November, but would not be cast on the Summer or Winter Solstice, or the Spring/Fall Equinox.

SOURCE: Prevision Design, 2019

In order to provide a visual understanding of the location, size, and extent of the new shading, graphics were prepared to accompany the qualitative analysis. **Figures 4.1-20** through **4.1-34** depict existing-plus-project shadow for five representative times on the summer solstice (June 21 the longest day of the year, when the sun is highest in the sky and shadows are the shortest at any given time of day), the spring/fall equinoxes (March 19/September 20, when the sun's position is nearly identical to the opposite equinox and represent the midway point between the winter and summer solstices), and the winter solstice (December 20, the shortest day of the year, when the sun is lowest in the sky and shadows are the longest at any given time of day).[10] In these figures, gray areas represent shading occurring under existing conditions, and blue represents net new shading that would occur as a result of the CPHP.

[9] Although the University is constitutionally exempt from local land use regulation such as section 295 of the *Planning Code* when using properties under its control in furtherance of its educational mission, the University strives to be substantially consistent with local policies where feasible.

[10] These dates can vary slightly from year to year.



SOURCE: Prevision Design, 2020

UCSF Comprehensive Parnassus Heights Plan EIR

Figure 4.1-20
Summer Solstice
June 21, 6:46 am

ESA

SFO.D190291.00 - UCSF CPHP EIR/2 Graphics/Illustrator

SOURCE: Prevision Design, 2020

UCSF Comprehensive Parnassus Heights Plan EIR

Figure 4.1-21
Summer Solstice
June 21, 10:00 am

ESA

SFO.D190291.00 - UCSF CPHP EIR/2. Graphics/Illustrator

SOURCE: Prevision Design, 2020

UCSF Comprehensive Parnassus Heights Plan EIR

Figure 4.1-22
Summer Solstice
June 21, 12:00 pm

ESA

SOURCE: Prevision Design, 2020

UCSF Comprehensive Parnassus Heights Plan EIR

Figure 4.1-23
Summer Solstice
June 21, 3:00 pm

ESA

SFO.D190291.00 - UCSF CPHP EIR/2. Graphics/Illustrator

SFO.D190291.00 - UCSF CPHP EIR/2. Graphics/Illustrator

SOURCE: Prevision Design, 2020

UCSF Comprehensive Parnassus Heights Plan EIR

Figure 4.1-24
Summer Solstice
June 21, 7:36 pm

ESA

SOURCE: Prevision Design, 2020

UCSF Comprehensive Parnassus Heights Plan EIR

Figure 4.1-25
Approx. Fall Equinox (Spring Similar)
September 20, 7:57 am

ESA

SFO.D190291.00 - UCSF CPHP EIR/2. Graphics/Illustrator

SFO D190291.00 - UCSF CPHP EIR/2. Graphics/Illustrator

SOURCE: Prevision Design, 2020

UCSF Comprehensive Parnassus Heights Plan EIR

Figure 4.1-26
Approx. Fall Equinox (Spring Similar)
September 20, 10:00 am

ESA

SOURCE: Prevision Design, 2020

UCSF Comprehensive Parnassus Heights Plan EIR

Figure 4.1-27
Approx. Fall Equinox (Spring Similar)
September 20, 12:00 pm

ESA

SFO.D190291.00 - UCSF CPHP EIR/2. Graphics/Illustrator

SOURCE: Prevision Design, 2020

UCSF Comprehensive Parnassus Heights Plan EIR

Figure 4.1-28
Approx. Fall Equinox (Spring Similar)
September 20, 3:00 pm

SFO.D190291.00 - UCSF CPHP EIR/2. Graphics/Illustrator

ESA

SFO.D190291.00 - UCSF CPHP EIR/2. Graphics/Illustrator

SOURCE: Prevision Design, 2020

UCSF Comprehensive Parnassus Heights Plan EIR

ESA

Figure 4.1-29
Approx. Fall Equinox (Spring Similar)
September 20, 6:09 pm

SFO D190291.00 - UCSF CPHP EIR/2. Graphics/Illustrator

SOURCE: Prevision Design, 2020

UCSF Comprehensive Parnassus Heights Plan EIR

ESA

Figure 4.1-30
Winter Solstice
December 20, 8:19 am

SOURCE: Prevision Design, 2020

UCSF Comprehensive Parnassus Heights Plan EIR

Figure 4.1-31
Winter Solstice
December 20, 10:00 am

ESA

SFO.D190291.00 - UCSF CPHP EIR/2. Graphics/Illustrator

SOURCE: Prevision Design, 2020

UCSF Comprehensive Parnassus Heights Plan EIR

Figure 4.1-32
Winter Solstice
December 20, 12:00 pm

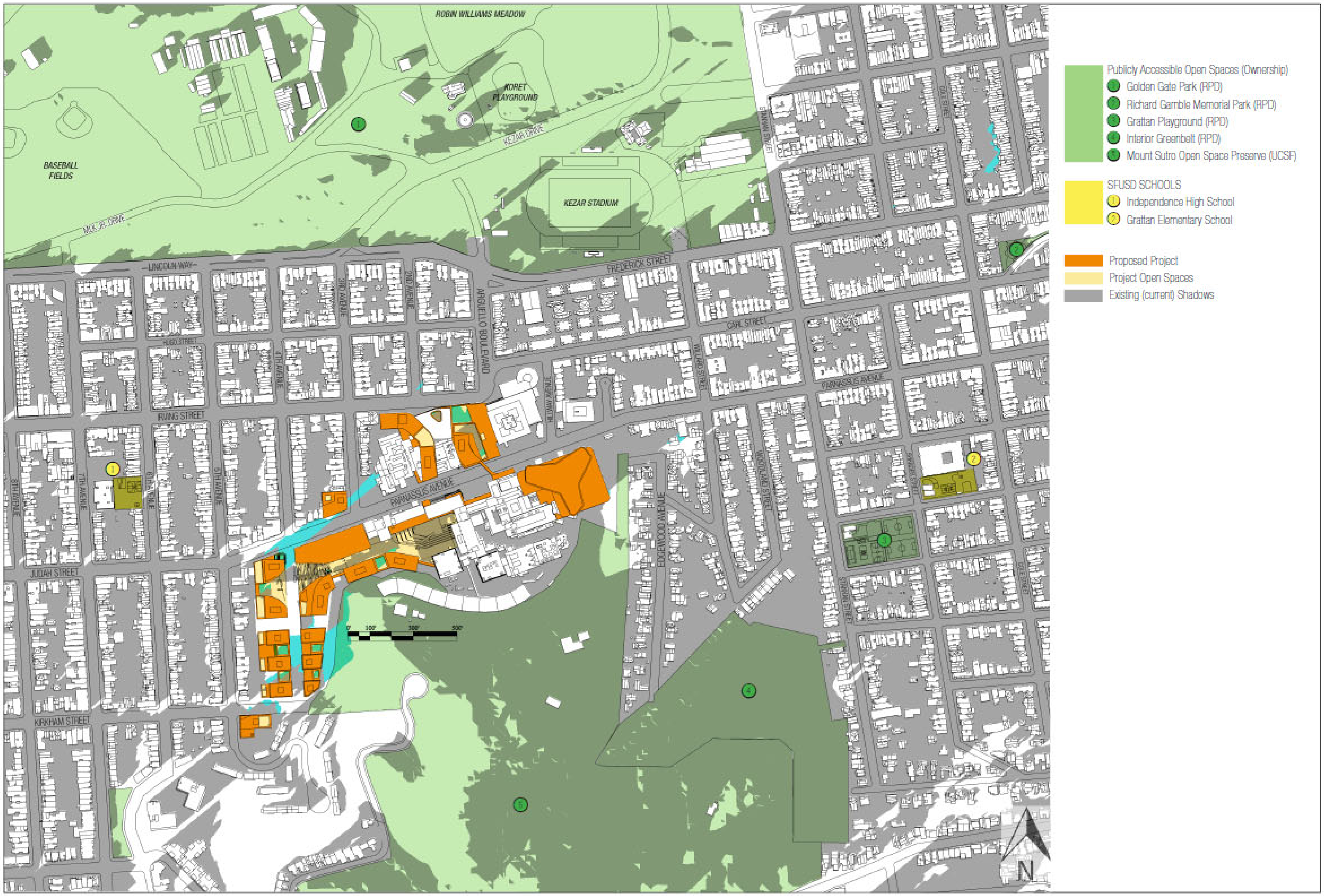
SFO D190291.00 - UCSF CPHP EIR/2. Graphics/Illustrator

SOURCE: Prevision Design, 2020

UCSF Comprehensive Parnassus Heights Plan EIR

ESA

Figure 4.1-33
Winter Solstice
December 20, 3:00 pm



SOURCE: Prevision Design, 2020

UCSF Comprehensive Parnassus Heights Plan EIR

Figure 4.1-34
Winter Solstice
December 20, 3:54 pm

ESA

SFO D190291.00 - UCSF CPHP EIR/2 Graphics/Illustrator

For each of these days (summer solstice, spring/autumn equinoxes, and winter solstice), shadow diagrams at five times of day included: one hour after sunrise; the beginning, middle, and end of the midday period of peak use (10:00 a.m., 12:00 p.m., and 3:00 p.m.); and one hour before sunset. Presenting a series of shadow diagrams from the same day demonstrates how shadow moves across the space and expands and contracts over a specific period of time. They represent a representative range of dates and times, including the time of peak midday use of open space on the longest day of the year, on the equinoxes (when day and night are of approximately equal length), and on the shortest day of the year. From these shadow diagrams, shadow impacts on particular open spaces are described and evaluated. It should be noted that the 3D virtual model of the project used to model shadow impacts includes structures and topography, but does not model shading effects from existing or proposed vegetation.

Golden Gate Park

Proposed CPHP development, and in particular, the New Hospital which would be up to 294 feet tall[11], would increase shadow on portions of Golden Gate Park during early morning hours in the winter between mid-October and late February. New shadow would not be cast during any other season. On the winter solstice, which is the day of maximum shading on Golden Gate Park, new shadow from CPHP development would be added to shadow from existing buildings and topography between 8:19 a.m. and 9:30 a.m. As shown in Figure 4.1-30, this new shadow would be of limited extent compared to the overall unshaded area of Golden Gate Park. All new CPHP shadow on Golden Gate Park would be cast by the New Hospital.

Figure 4.1-35 depicts shadow on the date and time of maximum shading on Golden Gate Park; this figure depicts the same time as Figure 4.1-30 but at a larger scale and in more detail, as it focuses on effects on Golden Gate Park. As can be seen in Figure 4.1-35, new shadow on the winter solstice in the early morning would cover portions of one of the baseball fields, including the third-base line, portions of left field, and the stands behind home plate. In addition, shadows would cover minor portions of the wooded areas and walking paths near Lincoln Way. Throughout the morning, shadows would retreat toward the southwest, covering portions of left field and the Golden Gate Park Nursery, eventually receding entirely from the park by 9:30 a.m.

Baseball fields are typically utilized for games or practice during the midday or in the afternoon. While some may use baseball fields early in the morning, the periods of heaviest use would be around midday or in the afternoon when baseball games would be expected to occur. During these times, CPHP shadow would not reach Golden Gate Park. In addition, these fields are likely to be used substantially less during the winter rainy season. Because of the limited extent of potential new shadow that would be cast by CPHP development, both in terms of area covered and length of time, and because the new shadow would not affect the park during times of heaviest use, new shadow would not be expected to affect people’s enjoyment of the park substantially. Because of this, the shadow impact from CPHP development on Golden Gate Park would be less than significant.

---

[11] Excluding potential rooftop observation deck and vestibule that would occupy a small portion of the roof. No rooftop mechanical equipment/enclosures are proposed for the New Hospital.

SFO D190291.00 - UCSF CPHP EIR/2. Graphics/Illustrator

SOURCE: Prevision Design, 2020

UCSF Comprehensive Parnassus Heights Plan EIR

ESA

Figure 4.1-35
Winter Solstice
December 20, 8:19 am
Date of Maximum Shading on Golden Gate Park

Richard Gamble Memorial Park

No shadow from campus development under the CPHP would be cast on Richard Gamble Memorial Park on the summer/winter solstice or spring/fall equinox. However, campus development under the CPHP would cast new shadow on this park during the early morning and evenings between late January and late February, and again between mid-October and mid-November. All new CPHP shadow on Richard Gamble Memorial Park would be cast by the New Hospital. As shown in **Figure 4.1-36**, February 8th and November 1st would represent the dates of maximum shading. On these two days, new shadow would cover a minor portion of the landscaped area of this park after 4:10 p.m. However, the landscaped portion of the park currently contains mature trees that already cast substantial shade on this portion of the park, particularly in the early morning. As stated above, the shadow model does not consider shadow from trees. This is because the shading effects from trees can change based on the season, and because the City has the authority to issue tree removal permits for various reasons, including new construction or damage caused by trees.

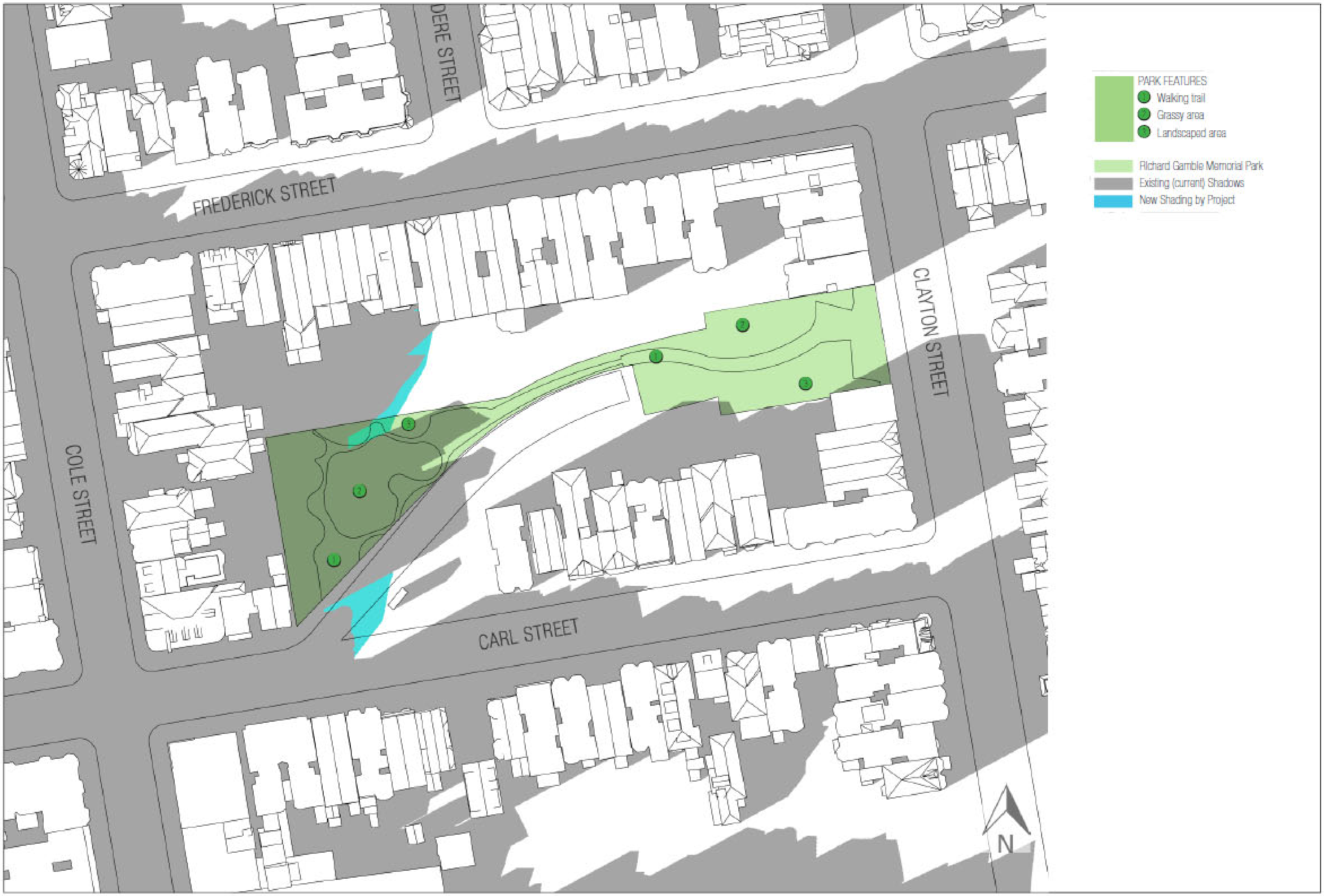
Given the limited extent of CPHP shadow in the fall and winter, and that shadow from the CPHP would only occur after 4:10 p.m. on the landscaped portion of the park that would likely already be shaded by existing trees on the date of maximum shading, the shadow impact of CPHP development on the Richard Gamble Memorial Park would be less than significant.

Grattan Playground

No shadow from campus development under the CPHP would be cast on Grattan Playground on the summer/winter solstice or spring/fall equinox. However, campus development under the CPHP would cast new shadow on the Grattan Playground between early April and early September in the late afternoon. All new CPHP shadow on Grattan Playground would be cast by the New Hospital. As shown in **Figure 4.1-37**, on the dates of maximum shading (May 10 and August 2), shadow cast from CPHP development would cover the tennis court, four square courts, play structure, and blacktop area of this playground at around 7:00 p.m. For the last few minutes prior to one hour before sunset that marks the end of the time period governed by section 295 of the *Planning Code* (7:18 p.m.), new shadow from the CPHP would extend to the east portion of the park, covering the features previously mentioned as well as the majority of two soccer fields.

In the first and last hours of sunlight, very lengthy shadows move more quickly across the ground than do shadows at other times of day. While shadow would cover a majority of the park late in the afternoon on the day of maximum shading, new shadow from the CPHP would last on average 24 minutes. On the dates of maximum shading, CPHP shadow would last approximately 37 minutes before being completely subsumed by shadow from other nearby buildings.

A review of publicly available information regarding events occurring at this park during the late spring and summer was undertaken to determine whether CPHP shadow would create new shadow that would substantially and adversely affect the use and enjoyment of this park. Events that are frequently scheduled during the late spring and summer on work days, in which members of the public are invited to help plant new plants, remove weeds, and mulch the planters in the playground. Because weeding and gardening are relatively active uses and not particularly sensitive to the availability of sunlight, such as sitting or reading, which are passive uses, CPHP shadow cast during the late spring and summer would not substantially and adversely affect this activity.



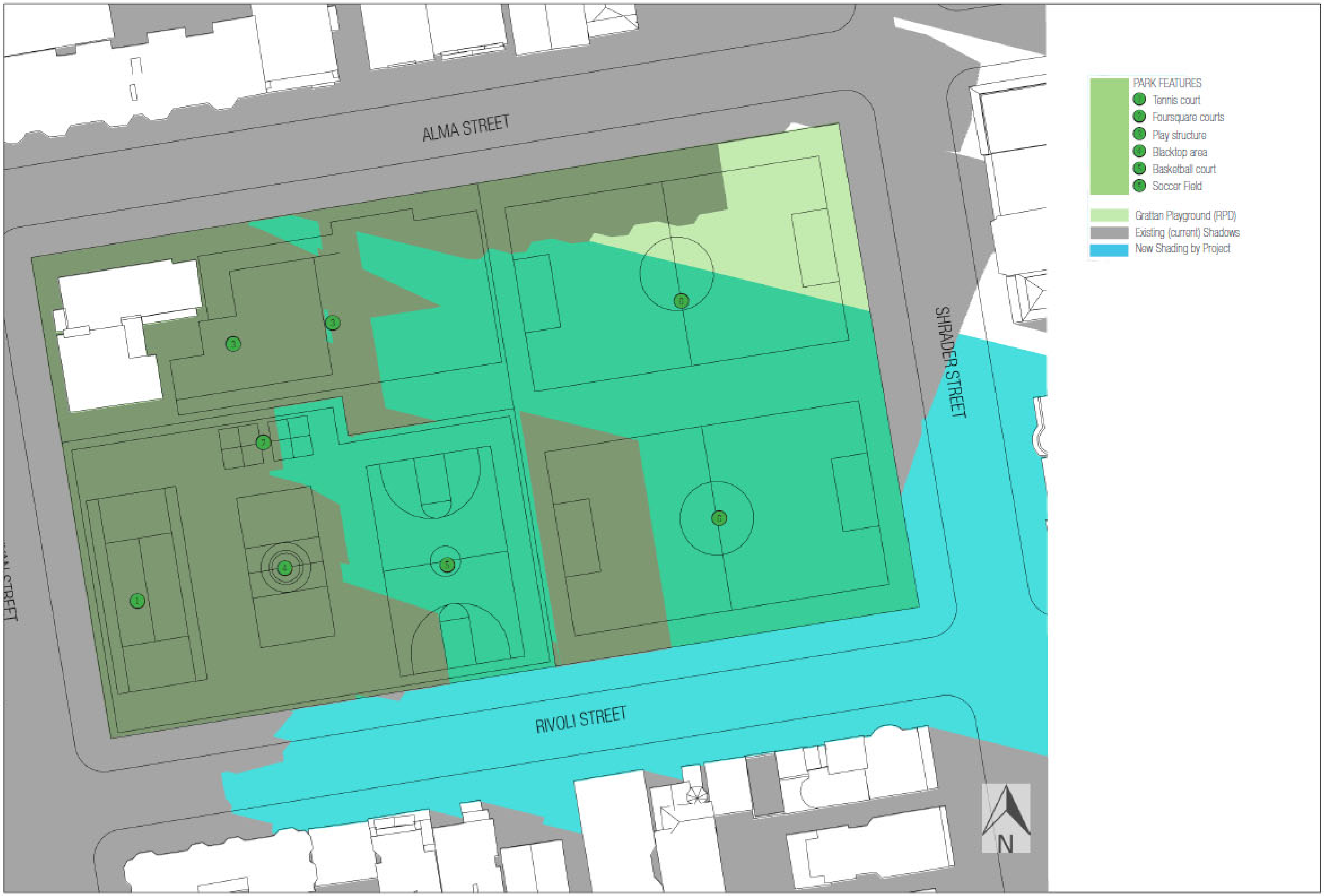
SFO/D190291.00 - UCSF CPHP EIR/2. Graphics/Illustrator

SOURCE: Prevision Design, 2020

UCSF Comprehensive Parnassus Heights Plan EIR

ESA

Figure 4.1-36
February 8 and November 1, 4:10 pm
Date of Maximum Shading on Richard Gramble Memorial Park



SOURCE: Prevision Design, 2020

UCSF Comprehensive Parnassus Heights Plan EIR

SFO D190291.00 - UCSF CPHP EIR/2. Graphics/Illustrator

ESA

Figure 4.1-37
May 10 and August 2, 7:15 pm
Date of Maximum Shading on Grattan Playground

Other unscheduled activities assumed to occur at this park throughout the late spring include typical use of the play structure, tennis court, four square courts, black top area, and soccer fields. Like weeding and gardening, these activities are active uses that can occur in both sun and shade. While the availability of sunlight can be seen as a benefit to some, it is conceivable that other park users could prefer shade especially during the late spring and summer, and in particular, on warm days. Because CPHP shadow would be cast in the late afternoon and would only last for 37 minutes during the hours governed by section 295, this shadow would not substantially and adversely affect the use and enjoyment of this park considering it would occur at the end of the day at a time when park users would expect waning sunlight. Therefore, the shadow impact from CPHP development on the Grattan Playground would be less than significant.

Grattan Elementary School

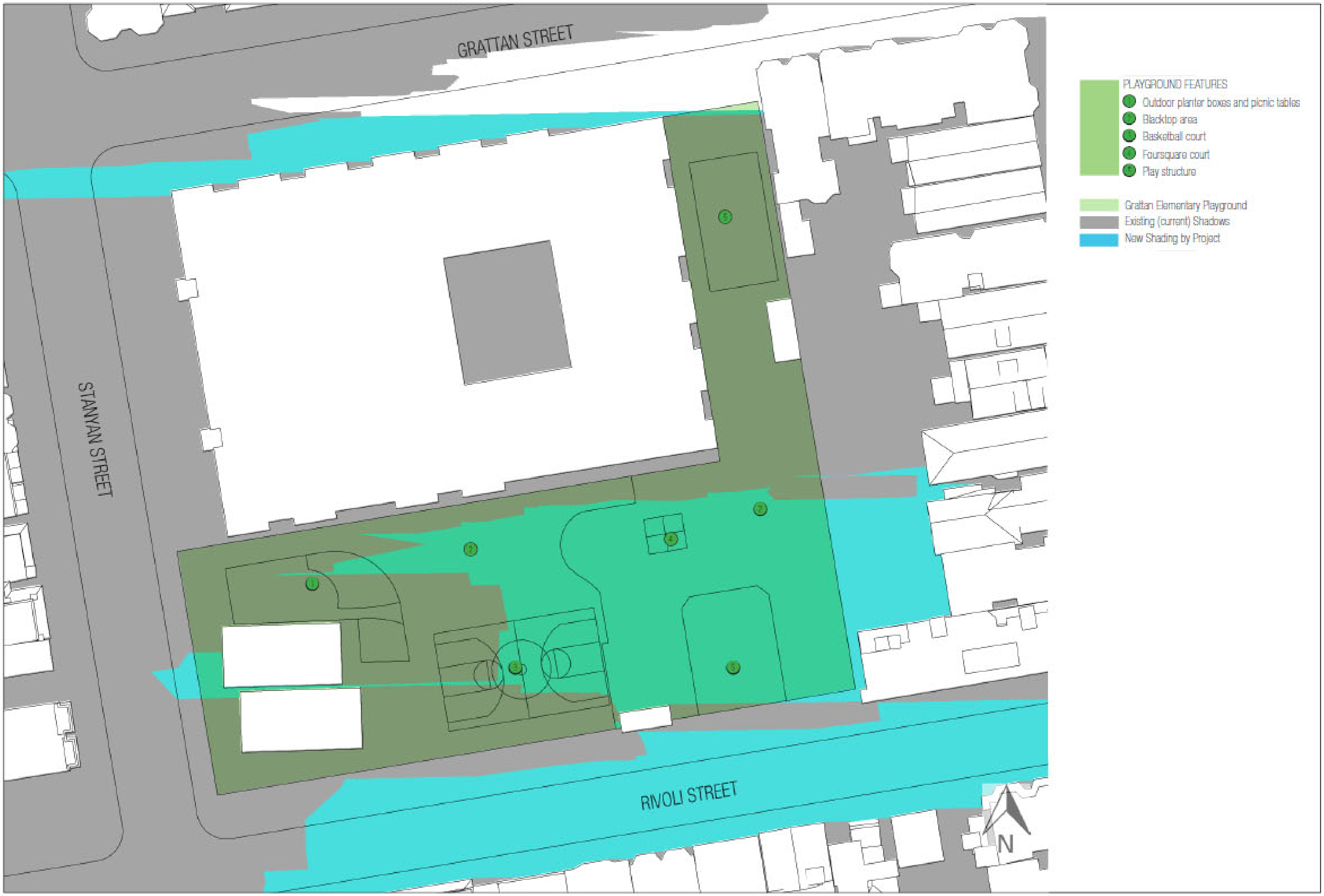
Campus development under the CPHP would cast new shadow on Grattan Elementary School between late March and late April, and between mid-August and mid-September. During this time, new shadow would be cast on the school playground in the late afternoon, and would last on average 15 minutes. As shown in **Figure 4.1-38**, on the dates of maximum shading (September 6 and April 5), existing shadows would cover approximately half the playground between 6:31 p.m. and sunset, and shadow from CPHP development would cover the remaining half for approximately 20 minutes before being completely subsumed by shadow from other buildings. The entire playground would be in shadow for the final hour of sunlight during the hours governed by section 295, with new shadow resulting from the CPHP covering the blacktop area, basketball court, four square court, and play structure. All new CPHP shadow on Grattan Elementary School would be cast by the New Hospital.

At Grattan Elementary school, the regularly-scheduled school day ends at 1:50 p.m. After school programs serve as an extension of the school day, but these would likely have substantially fewer students in attendance than would be on campus during the day. In addition, students are likely to be picked up by their parents by 6:31 p.m. when new shadow from the CPHP would affect the school yard. Therefore, new shadow would only reach the school playground when there are expected to be few, if any, students present. Therefore, CPHP shadow would not be expected to substantially or adversely affect the use and enjoyment of this open space during the week.

As stated earlier, this schoolyard participates in the Shared Schoolyard Project, which provides public access on the weekend. Because CPHP shadow would be cast in the late afternoon and would last up to 20 minutes during the hours governed by section 295, this shadow would not substantially and adversely affect the use and enjoyment of this park considering it would occur at the end of the day at a time when open space users would expect there to be less sunlight available. Therefore, the shadow from CPHP development would not substantially and adversely affect the use and enjoyment of this open space, and according, the impact on the Grattan Elementary School would be less than significant.

Independence High School

Campus development under the CPHP would cast new shadow on Independence High School in early February to late April, from mid-August to mid-September, and from late September to late October. During these times, new shadow from the CPHP development would reach the open space



SFO/D190291.00 - UCSF CPHP EIR/2. Graphics/Illustrator

SOURCE: Prevision Design, 2020

UCSF Comprehensive Parnassus Heights Plan EIR

Figure 4.1-38
September 6 and April 5, 6:31 pm
Date of Maximum Shading on Grattan Elementary School

ESA

in the early morning from 7:57 a.m., the first hour governed by section 295, to around 8:30 a.m. The average duration of shadow from CPHP development during these times would be approximately 15 minutes. The majority of new CPHP shadow on Independence High School would be cast by the RAB project, with a smaller amount of new CPHP shadow cast by the New Hospital.

As shown in **Figure 4.1-39**, on the date of maximum shading (October 11 and March 1), at 8:30 a.m., existing shadows would cover the majority of the playground including the basketball court, blacktop area, and four square court. CPHP shadow would cover the remaining area of the playground, including the landscaped area and walking path. Between 8:30 a.m. and 8:45 a.m., shadow from CPHP development would recede from Independence High School entirely.

During the 2019—2020 school year, class begins at 8:00 a.m. Between 8:16 a.m. and 8:45 a.m., during the time of day when shadows would cover the most area of the open space, it is likely that students would be in class indoors, but is reasonable to assume a small amount of students would utilize the open space during this time for physical education. However, these areas would likely have heavier usage during the lunch period, throughout the day, and after school when more students would be on campus, compared to first thing in the morning. Because shadow from CPHP development would not affect the school's open space when its usage is anticipated to be highest, new shadow cast by the CPHP would not be expected to adversely affect the use and enjoyment of this open space on weekdays.

Like the Grattan Elementary School, Independence High School participates in the Shared Schoolyard Project, which provides public access on the weekend. On the weekend, especially early in the morning, usage of the open space is expected to be less than it would be on weekdays because school would not be in session. In addition, new shadow would not affect the open space after 8:30 a.m., thus, there would be ample time throughout the day to enjoy sunlight. Therefore, the shadow impact from CPHP development on the Grattan Elementary School playground would be less than significant.

Overall Impact on Shadow

Campus development under the CPHP would cast shadow on parks and open spaces in the vicinity of the campus site at different times of the day and year. In particular, CPHP development shadow would reach Golden Gate Park in the morning in late fall and winter, on Richard Gamble Memorial Park in the afternoon in late fall and winter, on Grattan Playground in the late afternoon between late spring and early fall, on Grattan Elementary School late in the afternoon in early spring and late fall, and on Independence High School early in the morning in early February to late April, from mid-August to mid-September, and from late September to late October. However, shadow from CPHP development would reach these spaces during the time of day when usage is expected to be lowest, thus, implementation of the CPHP would not be expected to adversely or substantially affect the use and enjoyment of these open spaces. This impact would be less than significant.

Mitigation: None required.

SOURCE: Prevision Design, 2020

UCSF Comprehensive Parnassus Heights Plan EIR

Figure 4.1-39
October 11 and March 1, 8:30 am
Date of Maximum Shading on Independence High School

SFO D190291.00 - UCSF CPHP EIR/2. Graphics/Illustrator

ESA

Irving Street Arrival, RAB and Initial Aldea Housing Densification

None of the Initial Phase projects, with the exception of the RAB project, would cast any new shadow on any of the above publicly accessible open spaces. As discussed above, the Aldea Housing Densification project would cast a relatively small amount of new shadow on the Reserve, but would not be expected to adversely affect the use of the Reserve. The RAB project would cast new shadow in the fall and spring on the landscaped area at the Independence High School open space in the morning until 8:30 a.m. However, shadow would recede from this area after 8:30 a.m. Shadow from the RAB project would not affect the Independence High School basketball court, blacktop area, or foursquare court on the dates of maximum shading. While shadows in the fall and spring would occur during the first part of the school day, new shadow from the RAB project would recede from this area entirely by the midday lunch hour and after school hours, when usage of the area would be expected to be greatest. Thus, implementation of the RAB project would not be expected to adversely or substantially affect the use and enjoyment of this open space. Therefore, effects of the Irving Street Arrival, RAB and initial Aldea Housing Densification projects would be less than significant.

Mitigation: None required.

Initial Phase Improvements

The proposed Initial Phase building renovations that would occur as part of these Initial Phase improvements would not change any of the building footprint or heights, and thus, would not result in new shadow that would affect any of the publicly accessible open spaces near the campus site. Other Initial Phase improvements, such as those under the Parnassus Avenue Streetscape, utility improvements, and improvements in the public realm would not be of a scale and nature that would have the potential to result in substantial shadow effects.

Mitigation: None required.

Cumulative Impacts

Impact C-AES-1: Implementation of the CPHP, combined with cumulative projects, would not have a substantial adverse effect on a scenic vista or conflict with applicable zoning and other regulations governing scenic quality. (Less than Significant)

Section 4.0 *Introduction to Environmental Analysis*, presents the list of reasonably foreseeable future projects in the vicinity that could contribute to cumulative aesthetic impacts. On-site cumulative development projects include a several demolition projects on the campus site (e.g., Surge, LPPI, Proctor buildings, etc.) that were previously approved under the 2014 LRDP but have not yet been implemented, and on-going implementation of forest management activities in the Reserve under the Mount Sutro Open Space Vegetation Management Plan.

As indicated in Section 4.0, there are no notable off-site cumulative development projects within the vicinity of the Parnassus Heights campus site. The area surrounding the campus site is built-out and opportunity for new development is limited, requiring reuse or redevelopment of existing buildings rather than new construction on undeveloped tracts of adjacent land. As such, cumulative projects are limited to the intensification or rebuilding of existing primarily residential uses, and the potential seismic retrofitting of 350 Parnassus Avenue building. Cumulative projects occurring outside the campus site would be required to comply with City's Zoning regulations, Planning Code, and would be required to be consistent with the City's General Plan as it pertains to protecting scenic vistas and scenic quality. Moreover, cumulative projects would be limited to 40 feet in height, and therefore would not be visually incompatible or result in adverse effects to the future aesthetic character of these neighborhoods. Therefore, the impact of cumulative development projects, in combination with the CPHP, would be less than significant.

Mitigation: None required.

Impact C-AES-2: Implementation of the CPHP, combined with cumulative projects, would not create a new source of substantial light or glare which would adversely affect daytime or nighttime views in the area. (Less than Significant)

As indicated above, there are no notable on- or off-site cumulative development projects in the campus site vicinity. Cumulative development projects would introduce new sources of light and glare, but would be subject to mirrored and reflective glass controls in Planning Commission Resolution 9212, as well as design guidelines and Planning Code compliance, which would be expected to reduce night-lighting impacts of new development. Therefore, cumulative light and glare impacts would not be substantial or adverse. This impact would be less than significant.

Mitigation: None required.

Impact C-AES-3: Implementation of the CPHP, combined with cumulative projects, would potentially create wind hazards in publicly accessible areas of substantial pedestrian use. (Significant and Unavoidable with Mitigation)

As indicated above, there are no notable off-site cumulative development projects in the campus site vicinity. As for on-site projects, the computational wind assessment accounted for anticipated demolition, as previously approved under the 2014 LRDP but not yet implemented (LPPI, Koret Vision Center, EHS, Surge, Woods and Proctor buildings). Therefore, cumulative effects on pedestrian-level winds would be essentially the same as those of the CPHP, as described above under Impact AES-3. Because the proposed CPHP would be responsible for nearly all of this cumulative impact, and because Impact AES-3 was determined to be significant and unavoidable, the cumulative wind impact would likewise be significant and unavoidable.

Mitigation: Implement CPHP Mitigation Measure AES-4.

Significance after Mitigation: Significant and Unavoidable. As noted above, it cannot be stated with certainty that no wind hazard exceedances would result from cumulative development including the proposed CPHP, and therefore this impact could be significant even with mitigation. Accordingly, this impact would be considered significant and unavoidable with mitigation.

Impact C-AES-4: Implementation of the CPHP, combined with cumulative projects, would not create new shadow that substantially and adversely affects the use and enjoyment of publicly accessible open spaces. (Less than Significant)

Cumulative projects are limited to the intensification or rebuilding of existing primarily residential uses and would be required to comply with the City's Zoning regulations and Planning Code, which limits cumulative projects in the vicinity of the campus site to 40 feet in height. Moreover, cumulative projects would be required to comply with Section 295 of the *Planning Code.* Section 295 generally prohibits new structures above 40 feet in height that would cast additional shadows on open space that is under the jurisdiction of the San Francisco Recreation and Park Commission between one hour after sunrise and one hour before sunset, at any time of the year, unless that shadow would not result in a significant adverse impact on the use of the open space. Therefore, cumulative development projects would not be expected to adversely or substantially affect the use and enjoyment of open spaces in the vicinity of the campus site. This impact would be less than significant.

Mitigation: None required.

4.1.4 References

Caltrans, 2020. *Scenic Highways,* https://dot.ca.gov/programs/design/lap-landscape-architecture-and-community-livability/lap-liv-i-scenic-highways/lap-liv-i-scenic-highways-faq2, Accessed June 9, 2020.

Cermak Peterka Petersen (CPP), 2020. *Wind Comfort Study for: UCSF Comprehensive Parnassus Height Plan, San Francisco, CA*. May 29, 2020.

4.2 Air Quality

This section describes and evaluates the potential for the construction and operation of the Comprehensive Parnassus Heights Plan (CPHP or Plan), including the three Initial Phase projects and other Initial Phase improvements, to result in significant air quality impacts. This section discusses the existing air quality conditions in the project area, presents the regulatory framework for air quality management, and analyzes the potential for the proposed project to affect existing air quality conditions, both regionally and locally, due to activities that emit criteria and non-criteria air pollutants. It also analyzes the types and quantities of emissions that would be generated on a temporary basis due to proposed construction activities as well as those generated over the long term from the operation of CPHP elements. The analysis determines whether those emissions are significant in relation to applicable air quality standards and identifies feasible mitigation measures for significant adverse impacts. The section also includes an analysis of cumulative air quality impacts. The impact of greenhouse gases (GHG) emissions resulting from potential CPHP development are presented and discussed in Section 4.7, *Greenhouse Gas Emissions*.

The analysis in this section is based on a review of existing air quality conditions in the region and air quality regulations administered by the United States Environmental Protection Agency (USEPA), the California Air Resources Board (CARB), and the Bay Area Air Quality Management District (BAAQMD). The analysis utilizes methodologies set forth in the updated BAAQMD *CEQA Air Quality Guidelines* (May 2017). The analysis in this section also summarizes the findings of a Health Risk Assessment and Health Impact Assessment prepared in support of the EIR.

4.2.1 Environmental Setting

Climate and Meteorology

The campus site is in the San Francisco Bay Area Air Basin (SFBAAB). Air quality in the basin is influenced by such natural factors as topography, meteorology, and climate, in addition to the presence of existing air pollution sources and ambient conditions. The air basin's moderate climate steers storm tracks away from the region for much of the year, although storms often affect the region from November through April. San Francisco's proximity to the Pacific Ocean and exposure to onshore breezes provides generally very good air quality in the city and at the campus site.

Annual temperatures in the campus site area average in the mid-50s (degrees Fahrenheit), ranging from the low 40s on winter mornings to the mid-70s during summer afternoons. Daily and seasonal oscillations of temperature are small because of the moderating effects of the nearby San Francisco Bay and the ocean. In contrast to the steady temperature regime, rainfall is highly variable and confined almost exclusively to the "rainy" period from November through April. Precipitation varies widely from year to year as shifts in the annual storm track of a few hundred miles can mean the difference between a very wet year and drought conditions.

Atmospheric conditions such as wind speed and direction, and variable air temperatures interact with the physical features of the landscape to influence the movement and dispersal of air pollutants, regionally. The campus site is within the Peninsula climatological subregion. Marine air traveling through the Golden Gate is a dominant weather factor affecting dispersal of air pollutants within the region. The prevailing wind direction on the San Francisco mainland is from the west at an average annual wind speed of 10.3 miles per hour (WRCC, 2020). At higher temperatures ozone formation can increase.

Ambient Air Quality – Criteria Air Pollutants

As required by the 1970 federal Clean Air Act, the USEPA initially identified six air pollutants that are pervasive in urban environments and for which State and federal health-based ambient air quality standards have been established. USEPA calls these pollutants "criteria air pollutants" because the agency has regulated them by developing specific public-health-based and welfare-based criteria as the basis for setting permissible levels. Ozone, carbon monoxide (CO), particulate matter (PM), nitrogen dioxide (NO_2), sulfur dioxide (SO_2), and lead are the six criteria air pollutants originally identified by USEPA. Since that time, subsets of particulate matter have been also identified for which permissible levels have been established. These include particulate matter of 10 microns in diameter or less (PM_{10}) and particulate matter of 2.5 microns in diameter or less ($PM_{2.5}$).

BAAQMD is the regional agency with jurisdiction for regulating air quality within the nine - county SFBAAB. The region's air quality monitoring network provides information on ambient concentrations of criteria air pollutants at various locations in the San Francisco Bay Area. **Table 4.2-1** presents a five-year summary for the period 2014 to 2018 of the highest annual criteria air pollutant concentrations, collected at the air quality monitoring station operated and maintained by BAAQMD at 16th and Arkansas Streets (Potrero Hill), approximately 3 miles east of the campus site. Table 4.2-1 also compares measured pollutant concentrations with the most stringent applicable ambient air quality standards (State or federal). Concentrations shown in bold indicate an exceedance of the standard.

Ozone

Ozone is a secondary air pollutant produced in the atmosphere through a complex series of photochemical reactions involving reactive organic gases (ROG, also sometimes referred to as volatile organic compounds or VOC by some regulating agencies) and nitrogen oxides (NO_X). The main sources of ROG and NO_X, often referred to as ozone precursors, are combustion processes (including motor vehicle engines) and the evaporation of solvents, paints, and fuels. In the Bay Area, automobiles are the single largest source of ozone precursors. Ozone is referred to as a regional air pollutant because its precursors are transported and diffused by wind concurrently with ozone production through the photochemical reaction process. Ozone causes eye irritation, airway constriction, and shortness of breath and can aggravate existing respiratory diseases, such as asthma, bronchitis, and emphysema.

TABLE 4.2-1
SUMMARY OF SAN FRANCISCO AIR QUALITY MONITORING DATA (2014–2018)

Pollutant	Most Stringent Applicable Standard	Number of Days Standards Were Exceeded and Maximum Concentrations Measured[a]				
		2014	2015	2016	2017	2018
Ozone						
- Days 1-Hour Standard Exceeded		0	0	0	0	0
- Maximum 1-Hour Concentration (ppm)	>0.09 ppm[b]	8	9	7	9	7
- Days 8-Hour Standard Exceeded		0	0	0	0	0
- Maximum 8-Hour Concentration (ppm)	>0.07 ppm[c]	7	7	6	5	5
Carbon Monoxide (CO)						
- Days 1-Hour Standard Exceeded		0	0	0	0	0
- Maximum 1-Hour Concentration (ppm)	>20 ppm[b]	1.6	1.8	1.7	2.5	1.9
- Days 8-Hour Standard Exceeded		0	0	0	0	0
- Maximum 8-Hour Concentration (ppm)	>9 ppm[b]	1.2	1.3	1.1	1.4	1.6
Suspended Particulates (PM_{10})						
- Days 24-Hour Standard Exceeded[d]		0	0	0	**2**	0
- Maximum 24-Hour Concentration (μg/m^3)	>50 μg/m^3 [b]	36	47	17	**77**	43
- Annual Average (μg/m^3)	>20 μg/m^3 [b]	17	19	17	**22**	20
Suspended Particulates ($PM_{2.5}$)						
- Days 24-Hour Standard Exceeded		0	0	0	**7**	**14**
- Maximum 24-Hour Concentration (μg/m^3)	>35 μg/m^3	33	35	20	**50**	**177**
- Annual Average (μg/m^3)	>12 μg/m^3 [b, c]	7.7	7.6	7.5	9.7	12
Nitrogen Dioxide (NO_2)						
- Days 1-Hour Standard Exceeded		0	0	0	0	0
- Maximum 1-Hour Concentration (ppm)	>0.1 ppm[c]	8	7	6	7	7

NOTES:

Bold values are in excess of applicable standard.
ppm = parts per million.
μg/m^3 = micrograms per cubic meter.
ND = No data or insufficient data.

a Number of days exceeded is for all days in a given year, except for PM_{10}. PM_{10} has been monitored every 12 days effective January 2013.
b State standard, not to be exceeded.
c Federal standard, not to be exceeded.
d Particulate matter is based on a sampling schedule of one out of every six days, for a total of approximately 60 samples per year.

SOURCE: BAAQMD, 2020a. Bay Area Air Pollution Summary, 2014 – 2018. Available online at: http://www.baaqmd.gov/about-air-quality/air-quality-summaries. Accessed June 10, 2020.

Table 4.2-1 shows that, according to published data, the most stringent applicable standards for ozone (State 1-hour standard of 0.09 parts per million [ppm] and the federal 8-hour standard of 0.07 ppm) were not exceeded in San Francisco from 2014 through 2018.

Carbon Monoxide (CO)

CO is an odorless, colorless gas usually formed as the result of the incomplete combustion of fuels. The single largest source of CO is motor vehicles; the highest emissions occur during low travel speeds, stop-and-go driving, cold starts, and hard acceleration. Exposure to high concentrations of CO reduces the oxygen-carrying capacity of the blood and can cause headaches, nausea, dizziness, and fatigue; impair central nervous system function; and induce angina (chest pain) in persons with serious heart disease. Very high levels of CO can be fatal. As shown in Table 4.2-1, the more stringent State CO standards were not exceeded from 2014 through 2018. Measurements of CO indicate hourly maximums ranging between 8 percent to 13 percent of the more stringent State standard, and maximum 8-hour CO levels that are approximately 12 percent to 18 percent of the allowable 8-hour standard.

Particulate Matter (PM_{10} and $PM_{2.5}$)

Particulate matter is a class of air pollutants that consists of heterogeneous solid and liquid airborne particles from human-made and natural sources. Particulate matter is measured in two size ranges: PM_{10} and $PM_{2.5}$. In the Bay Area, motor vehicles generate about one-half of the SFBAAB's particulate emissions, through tailpipe emissions as well as brake pad and tire wear. Wood burning in fireplaces and stoves, industrial facilities, and ground-disturbing activities such as construction are other sources of such fine particulates. These fine particulates are small enough to be inhaled into the deepest parts of the human lung and can cause adverse health effects. According to the CARB, studies in the United States and elsewhere "have demonstrated a strong link between elevated particulate levels and premature deaths, hospital admissions, emergency room visits, and asthma attacks." Studies of children's health in California have demonstrated that particle pollution "may significantly reduce lung function growth in children."(CARB, 2007) CARB also reports that statewide attainment of PM standards could prevent thousands of premature deaths, lower hospital admissions for cardiovascular and respiratory disease and asthma-related emergency room visits, and avoid hundreds of thousands of episodes of respiratory illness in California.(CARB, 2007) Among the criteria air pollutants that are regulated, particulates appear to represent a serious ongoing health hazard. As long ago as 1999, BAAQMD was reporting in its *CEQA Air Quality Guidelines* that studies had shown that elevated particulate levels contribute to the death of approximately 200 to 500 people per year in the Bay Area. $PM_{2.5}$ is of particular concern because epidemiologic studies have demonstrated that people who live near freeways, especially people who live within 500 feet of freeways or high-traffic roadways, have poorer health outcomes, including increased asthma symptoms and respiratory infections and decreased pulmonary function and lung development in children. (SFDPH, 2008)

As presented above in Table 4.2-1, the State 24-hour PM_{10} standard was exceeded on two monitored occasions from 2014 through 2018 in San Francisco, both in 2017. As PM_{10} data are monitored every 12 days by BAAQMD, it may conservatively be estimated that the State 24-hour PM_{10} standard was exceeded on up to 24 days per year from 2014 through 2018.

The State 24-hour $PM_{2.5}$ standard was exceeded on 21 days from 2014 through 2018 in San Francisco: 7 days in 2017 and 14 days in 2018. Many of these exceedances of the 24-hour $PM_{2.5}$ standard can be attributed to the October 2017 and November and December 2018 fires in Northern California. The State annual average standard for PM_{10} was exceeded in 2017 while the federal and State annual average standard for $PM_{2.5}$ was not exceeded from 2014 through 2018.

Nitrogen Dioxide (NO_2)

NO_2 is a reddish brown gas that is a byproduct of combustion processes. Automobiles and industrial operations are its main sources. Aside from its contribution to ozone formation, NO_2

can increase the risk of acute and chronic respiratory disease and reduce visibility. NO_2 may be visible as a coloring component of the air on high pollution days, especially in conjunction with high ozone levels. The current State one-hour standard for NO_2 (0.18 ppm) is being met in San Francisco. In 2010, the USEPA implemented the current one-hour NO_2 standard (0.10 ppm) (see *Regulatory Framework* below). Currently, the SFBAAB is designated as an attainment area for the NO_2 standard. (U.S. EPA, 2017) As shown in Table 4.2-1, this new federal standard was not exceeded at the San Francisco station from 2014 through 2018.

The USEPA has also established requirements for a new monitoring network to measure NO_2 concentrations near major roadways in urban areas with a population of 500,000 or more. Sixteen new near-roadway monitoring sites are required in California, three of which are in the Bay Area. These monitors are located in Berkeley, Oakland, and San Jose. The Oakland station commenced operation in February 2014, the San Jose station commenced operation in March 2015, and the Berkeley station commenced operation in July 2016. The new monitoring data may result in a need to change area designations in the future. CARB will revise the area designation recommendations, as appropriate, once sufficient monitoring data become available.

Sulfur Dioxide (SO_2)

SO_2 is a colorless, acidic gas with a strong odor. It is produced by the combustion of sulfur-containing fuels such as oil, coal, and diesel. SO_2 has the potential to damage materials and can cause health effects at high concentrations. It can irritate lung tissue and increase the risk of acute and chronic respiratory disease. (BAAQMD, 2017a) Pollutant trends suggest that the SFBAAB currently meets and will continue to meet the State standard for SO_2 for the foreseeable future.

In 2010, the USEPA set a new one-hour SO_2 standard (see *Regulatory Framework*, below). The USEPA initially designated the SFBAAB as an attainment area for SO_2. Similar to the new federal standard for NO_2, the USEPA established requirements for a new monitoring network to measure SO_2 concentrations beginning in January 2013. (USEPA, 2010) No additional SO_2 monitors are required for the Bay Area because BAAQMD jurisdiction has never been designated as non-attainment for SO_2 and no state implementation plans or maintenance plans have been prepared for SO_2. (BAAQMD, 2013)

Lead

Leaded gasoline (phased out in the United States beginning in 1973), paint (on older houses, cars), smelters (metal refineries), and manufacture of lead storage batteries have been the primary sources of lead released into the atmosphere. Lead has a range of adverse neurotoxic health effects, which put children at special risk. Some lead-containing chemicals cause cancer in animals. Lead levels in the air have decreased substantially since leaded gasoline was eliminated.

Ambient lead concentrations are only monitored on an as-warranted, site-specific basis in California. On October 15, 2008, the USEPA strengthened the national ambient air quality standard for lead by lowering it from 1.50 $\mu g/m^3$ to 0.15 $\mu g/m^3$ on a rolling three-month average. The USEPA revised the monitoring requirements for lead in December 2010. (USEPA, 2010) These requirements focus on airports and large urban areas resulting in an increase in 76 monitors nationally. Lead monitoring stations in the Bay Area are located at Palo Alto Airport, Reid-Hillview Airport (San Jose), and San Carlos Airport. Non-airport locations for lead monitoring are in Redwood City and San Jose.

Air Quality Index

The USEPA developed the Air Quality Index (AQI) scale to make the public health impacts of air pollution concentrations easily understandable. The AQI, much like an air quality "thermometer," translates daily air pollution concentrations into a number on a scale between 0 and 500. The numbers in the scale are divided into six color-coded ranges, with numbers 0 through 500 as outlined below.

- Green (0-50) indicates "good" air quality. No health impacts are expected when air quality is in the green range.
- Yellow (51-100) indicates air quality is "moderate." Unusually sensitive people should consider limiting prolonged outdoor exertion.
- Orange (101-150) indicates air quality is "unhealthy for sensitive groups." Active children and adults, and people with respiratory disease, such as asthma, should limit outdoor exertion.
- Red (151-200) indicates air quality is "unhealthy." Active children and adults, and people with respiratory disease, such as asthma, should avoid prolonged outdoor exertion; everyone else, especially children, should limit prolonged outdoor exertion.
- Purple (201-300) indicates air quality is "very unhealthy." Active children and adults, and people with respiratory disease, such as asthma, should avoid prolonged outdoor exertion; everyone else, especially children, should limit outdoor exertion.
- Maroon (301-500) indicates air quality is "hazardous." This would trigger health warnings of emergency conditions, and the entire population is more likely to be affected.

The AQI numbers refer to specific amounts of pollution in the air. They are based on the federal air quality standards for ozone, CO, NO_2, SO_2, PM_{10}, and $PM_{2.5}$. In most cases, the federal standard for these air pollutants corresponds to the number 100 on the index chart. Thus, if the concentration of any of these pollutants rises above its respective standard, the air quality can be unhealthy for the public. In determining the air quality forecast, local air districts, including BAAQMD, use the anticipated concentration measurements for each of the major pollutants, convert them into index numbers, and determine the highest index for each zone in a district.

Readings below 100 on the AQI scale would not typically affect the health of the general public. Levels above 300 rarely occur in the United States. Index statistics over recent years indicate that air quality in the Bay Area is predominantly in the "Good" or Moderate" categories and is healthy on most days for most people.

Historical air district data indicate that the SFBAAB experienced air quality in the red level (unhealthy) on 13 days between the years 2013 and 2017. The October 2017 fires in Northern California resulted in the federal 24-hour $PM_{2.5}$ standard being exceeded on up to seven days just in the first part of the month of October 2017 in certain counties. (BAAQMD, 2020) Even though the air district's data have not been validated yet, these levels of $PM_{2.5}$ in many counties have been the highest levels recorded in recent times. As a result, the index in several neighboring counties reached the "very unhealthy" designation, ranging from values of 201 to 300. During that period, the air district issued "Spare the Air" alerts and recommended that individuals stay inside with windows closed and refrain from significant outdoor activity. However, this was an extraordinary event and is a rare occurrence in the Bay Area.

As shown in **Table 4.2-2**, the basin had a total of 17 orange-level (unhealthy for sensitive groups) days in 2015, 13 days in 2016, 9 days in 2017, 8 days in 2018, and 10 days in 2019. The air basin experienced a total of 19 red-level (unhealthy) days, occurring in 2016 to 2018. In 2017 and 2018, the air basin experienced a total of 8 purple-level (very unhealthy) days. California wildfires contributed to the relatively high number of unhealthy days in 2017 and 2018.

TABLE 4.2-2
AIR QUALITY INDEX STATISTICS FOR THE SAN FRANCISCO BAY AREA AIR BASIN

Air Quality Index Statistics for San Francisco Bay Area Air Basin	Number of Days by Year				
	2015	2016	2017	2018	2019
Unhealthy for Sensitive Groups (Orange)	17	13	9	8	10
Unhealthy (Red)	0	2	9	8	0
Very Unhealthy (Purple)	0	0	3	5	0

SOURCE: Bay Area Air Quality Management District, 2020

Toxic Air Contaminants and Local Health Risks and Hazards

In addition to criteria air pollutants, individual projects may emit *toxic air contaminants* (TACs). TACs collectively refer to a diverse group of air pollutants that may cause chronic (i.e., of long duration) and acute (i.e., severe but short-term) adverse effects on human health, including carcinogenic effects. Human health effects of TACs include birth defects, neurological damage, cancer, and death. There are hundreds of different types of TACs with varying degrees of toxicity. Thus, individual TACs vary greatly in the health risk they present; at a given level of exposure, one TAC may pose a hazard that is many times greater than another.

Unlike criteria air pollutants, TACs are not subject to ambient air quality standards but are regulated by BAAQMD using a risk-based approach to determine which sources and which pollutants to control as well as the degree of control. A *health risk assessment* (HRA) is an analysis that estimates human health exposure to toxic substances, and when considered together with information regarding the toxic potency of the substances, a HRA provides quantitative estimates of health risks.[1]

[1] In general, a health risk assessment is required if BAAQMD concludes that projected emissions of a specific air toxic compound from a proposed new or modified source suggest a potential public health risk. The applicant is then subject to a health risk assessment for the source in question. Such an assessment generally evaluates chronic, long-term effects, estimating the increased risk of cancer as a result of exposure to one or more TACs.

Exposures to fine PM ($PM_{2.5}$) are strongly associated with mortality, respiratory diseases, and poor lung development in children, and other health effects, such as hospitalization for cardiopulmonary disease. (SFDPH, 2008) Diesel particulate matter (DPM), a byproduct of diesel fuel combustion, is also of concern. CARB identified DPM as a TAC in 1998, primarily based on evidence demonstrating cancer effects in humans. (CARB, 1998) The estimated cancer risk from exposure to diesel exhaust is much higher than the risk associated with any other TAC routinely measured in the region.

San Francisco Modeling of Toxic Air Pollutant Exposure Zones

In an effort to identify areas of San Francisco most adversely affected by sources of TACs and elevated concentrations of particulate matter, the City and County of San Francisco partnered with BAAQMD to inventory and assess air pollution exposure from vehicles, stationary sources, and area sources within San Francisco. Citywide dispersion modeling was conducted using AERMOD[2] to assess the emissions from the following primary sources: vehicles on local roadways, permitted stationary sources, port and maritime sources, and diesel emissions from Caltrain. Emissions of PM_{10} (DPM is assumed equivalent to PM_{10}), $PM_{2.5}$, and total organic gases[3] (TOGs) were modeled on a 20 by 20–meter receptor grid covering the entire city. The citywide modeling results represent a comprehensive assessment of existing cumulative exposures to air pollution throughout the city. The methodology and technical documentation for modeling citywide air pollution are available in a recently updated draft document entitled *San Francisco Citywide Health Risk Assessment: Technical Support Documentation*. (SFDPH, 2020)

Modeling results were used to identify areas in the city with poor air quality, which are designated as the *Air Pollutant Exposure Zone* (APEZ), based on the following health-protective criteria: (1) cumulative $PM_{2.5}$ concentrations greater than 10 $\mu g/m^3$ and/or (2) excess cancer risk from the contribution of emissions from all modeled sources greater than 100 per one million persons exposed.

An additional health vulnerability layer was incorporated in the APEZ for those San Francisco ZIP codes in the worst quintile of Bay Area Health Vulnerability scores (ZIP Codes 94102, 94103, 94105, 94124, and 94130). In these areas, the standard for identifying areas as being within the zone were lowered to: (1) excess cancer risk from the contribution of emissions from all modeled sources greater than 90 per one million persons exposed and/or (2) cumulative $PM_{2.5}$ concentrations greater than 9 $\mu g/m^3$.

Lastly, all parcels within 500 feet of a major freeway were also included in the APEZ, consistent with findings in CARB's Air Quality and Land Use Handbook: A Community Health Perspective, which suggests air pollutant levels decrease substantially at approximately 500 feet from a freeway. (CAR, 2005)

---

2 AERMOD is the USEPA's preferred or recommended steady state air dispersion plume model. For more information on AERMOD and to download the AERMOD Implementation Guide, *https://www.epa.gov/scram/air-quality-dispersion-modeling-preferred-and-recommended-models,* accessed February 12, 2019.

3 Total organic gases (TOGs) is a broad descriptor that is inclusive of organic TACs beyond those identified as reactive organic gases (ROG).

The most recent citywide modeling results indicate that the Parnassus Heights campus site and its surrounding area are not located within an APEZ, or a health vulnerable zip code. The nearest APEZ to the Project area is along Lincoln Way, west of 5th Avenue.

Fine Particulate Matter

In April 2011, USEPA published Policy Assessment for the Particulate Matter Review of the National Ambient Air Quality Standards (Particulate Matter Policy Assessment). In this document, USEPA staff concluded that the then-current federal annual $PM_{2.5}$ standard of 15 $\mu g/m^3$ should be revised to a level within the range of 13 to 11 $\mu g/m^3$, with evidence strongly supporting a standard within the range of 12 to 11 $\mu g/m^3$. The APEZs for San Francisco are based on the health protective $PM_{2.5}$ standard of 11 $\mu g/m^3$, as supported by the USEPA's Particulate Matter Policy Assessment, although lowered to 10 $\mu g/m^3$ to account for uncertainty in accurately predicting air pollutant concentrations using emissions modeling programs.

Excess Cancer Risk

The 100 per one million persons exposed (100 excess cancer risk) criterion discussed above in the "San Francisco Modeling of Air Pollution Exposure Zones" section is based on USEPA guidance for conducting air toxic analyses and making risk management decisions at the facility and community-scale level. (BAAQMD, 2009) As described by BAAQMD, USEPA considers a cancer risk of 100 per one million or less to be within the "acceptable" range of cancer risk. Furthermore, in the 1989 preamble to the benzene National Emissions Standards for Hazardous Air Pollutants (NESHAP) rulemaking,[4] USEPA states that it "… strives to provide maximum feasible protection against risks to health from hazardous air pollutants by (1) protecting the greatest number of persons possible to an individual lifetime risk level no higher than approximately one in one million and (2) limiting to no higher than approximately one in ten thousand [100 in 1 million] the estimated risk that a person living near a plant would have if he or she were exposed to the maximum pollutant concentrations for 70 years." The 100 per million excess cancer cases is also consistent with the ambient cancer risk in the most pristine portions of the Bay Area based on air district regional modeling. (BAAQMD, 2009)

In addition to monitoring criteria pollutants, both BAAQMD and CARB operate TAC monitoring networks in the SFBAAB. These stations measure 10 to 15 TACs, depending on the specific station. The TACs selected for monitoring are those that traditionally have been found in the highest concentrations in ambient air and therefore tend to produce the most significant risk. The nearest air district ambient TAC monitoring station to the project area is the station at 10 Arkansas Street in San Francisco. The ambient concentrations of carcinogenic TACs measured at the Arkansas Street station, approximately 3 miles northeast of the campus site, are presented in **Table 4.2-3**. The estimated cancer risk from a lifetime exposure (70 years) to these substances is also reported in the table. When TAC measurements at this station are compared to ambient concentrations of various TACs for the Bay Area as a whole, the cancer risks associated with mean TAC concentrations in San Francisco are similar to those for the Bay Area as a whole. Therefore, the estimated average

4 54 *Federal Register* 38044, September 14, 1989.

lifetime cancer risk resulting from exposure to TAC concentrations monitored at the San Francisco station do not appear to be any greater than for the Bay Area as a region.

TABLE 4.2-3
2017 ANNUAL AVERAGE AMBIENT CONCENTRATIONS OF CARCINOGENIC TOXIC AIR CONTAMINANTS MEASURED AT BAAQMD MONITORING STATION, 10 ARKANSAS STREET, SAN FRANCISCO

Substance	Concentration	Cancer Risk per Million[a]
Gaseous TACs (ppb)		
Acetaldehyde	0.69	10
Benzene	0.216	56
1,3-Butadiene	0.036	39
Carbon Tetrachloride[b]	0.093	71
Formaldehyde	1.64	35
Perchloroethylene	0.009	1
Methylene Chloride	0.114	1
Chloroform	0.028	2
Trichloroethylene	0.010	0.3
Particulate TACs (ng/m^3)		
Chromium (Hexavalent)b	0.078	32
Total Risk for All TACs		**248.3**

NOTES:
TACs = toxic air contaminants; ppb = part per billion; ng/m^3 = nanograms per cubic meter.
a Cancer risks were estimated by applying published unit risk values to the measured concentrations.
b 2016 data provided for this substance as 2017 data was insufficient per CARB.
SOURCE: CARB, Ambient Air Toxics Summary – 2017, http://www.arb.ca.gov/adam/toxics/sitesubstance.html, accessed February 12, 2019.

Roadway-Related Pollutants

Motor vehicles are responsible for a large share of air pollution, especially in California. Vehicle tailpipe emissions contain diverse forms of particles and gases, and vehicles also contribute to particulates by generating road dust and tire wear. Epidemiologic studies have demonstrated that people living close to freeways or busy roadways have poorer health outcomes, including increased asthma symptoms and respiratory infections, and decreased pulmonary function and poor lung development in children. Air pollution monitoring conducted in conjunction with epidemiologic studies has confirmed that roadway-related health effects vary with modeled exposure to PM and NO_2. In traffic-related studies, the additional noncancer health risk attributable to roadway proximity was seen within 1,000 feet of the roadway and was strongest within 300 feet. (CARB, 2005) As a result, CARB recommends that new sensitive land uses not be located within 500 feet of a freeway or urban roads carrying 100,000 vehicles per day. The campus site is not located within 500 feet of a freeway or a busy roadway.

Diesel Particulate Matter (DPM)

CARB identified DPM as a TAC in 1998, primarily based on evidence demonstrating cancer effects in humans. The exhaust from diesel engines includes hundreds of different gaseous and particulate components, many of which are toxic. Mobile sources such as trucks and buses are among the primary sources of diesel emissions, and concentrations of DPM are higher near heavily traveled highways. The board estimated that as of 2000, the average Bay Area cancer risk from exposure to DPM, based on a population-weighted average ambient DPM concentration, is approximately 480 in one million, which is much higher than the risk associated with any other toxic air pollutant routinely measured in the region. The statewide risk from DPM as determined by the board declined from 750 in one million in 1990 to 570 in one million in 1995; by 2012, the board estimated the average statewide cancer risk from DPM at 520 in one million. (CARB, 2009), (CARB, 2019)

In 2000, CARB approved a comprehensive Diesel Risk Reduction Plan to reduce diesel emissions from both new and existing diesel-fueled vehicles and engines. Subsequent board regulations apply to new trucks and diesel fuel. With new controls and fuel requirements, 60 trucks built in 2007 would have the same particulate exhaust emissions as one truck built in 1988. The regulation is anticipated to result in an 80 percent decrease in statewide diesel health risk in 2020 as compared with the diesel risk in 2000. Despite notable emission reductions, the board recommends that proximity to sources of DPM emissions be considered in the siting of new sensitive land uses. The board notes that these recommendations are advisory and should not be interpreted as defined "buffer zones," and that local agencies must balance other considerations, including transportation needs, the benefits of urban infill, community economic development priorities, and other quality of life issues. With careful evaluation of exposure, health risks, and affirmative steps to reduce risk where necessary, CARB's position is that infill development, mixed use, higher density, transit-oriented development, and other concepts that benefit regional air quality can be compatible with protecting the health of individuals at the neighborhood level. (CARB, 2005)

Studies have demonstrated that DPM from diesel-fueled engines is a human carcinogen and that chronic (long-term) inhalation exposure to DPM poses a chronic health risk. Health effects from carcinogenic air toxics are usually described in terms of individual cancer risk. Individual cancer risk is the likelihood that a person exposed to air toxic concentrations over a 30-year period will contract cancer, based on the use of standard risk-assessment methodology. The maximally exposed individual (MEI) represents the worst–case risk estimate, based on a theoretical person continuously exposed for a lifetime at the point of highest compound concentration in the air. This is a highly conservative assumption, since most people do not remain at home all day and on average residents change residences every 11 to 12 years. In addition, this methodology assumes that residents are experiencing outdoor concentrations for the entire exposure period.

Soil Contamination and Naturally Occurring Asbestos

San Francisco is among the identified counties where ultramafic bedrock materials are present. These bedrock materials contain naturally occurring asbestos particles or fibers, which could be disturbed during excavation activities. As discussed in Section 4.8, *Hazards and Hazardous Materials*, the campus site appears to be located east of any mapped ultramafic bedrock units for the City of San Francisco or where reported asbestos occurrences have been mapped. Please also see Impact HAZ-1 in Section 4.8, which includes mitigation to ensure that earthwork activities associated with construction of new development on the campus site under the CPHP would not expose workers or the public to naturally occurring asbestos, if present.

Sensitive Receptors

Air quality does not affect every individual in the population in the same way, and some groups are more sensitive to adverse health effects than others. Population subgroups sensitive to the health effects of air pollutants include: the elderly and the young; population subgroups with higher rates of respiratory disease, such as asthma and chronic obstructive pulmonary disease; and populations with other environmental or occupational health exposures (e.g., indoor air quality) that affect cardiovascular or respiratory diseases. BAAQMD defines sensitive receptors as children, adults, and seniors occupying or residing in residential dwellings, schools, day care centers, hospitals, and senior-care facilities. Workers are not considered sensitive receptors because all employers must follow regulations set forth by the Occupation Safety and Health Administration (OSHA) to ensure the health and well-being of their employees (BAAQMD, 2011b).

The proximity of sensitive receptors to motor vehicles is an air pollution concern, especially in San Francisco where building setbacks are limited and roadway volumes are higher than most other parts of the Bay Area. Vehicles also contribute to particulates by generating road dust and through tire wear.

On the Parnassus Heights campus site, existing sensitive receptors include UCSF campus housing on Third and Fifth Avenues, on Irving Street, and the Aldea Housing complex located in the southeast portion of the campus site. Two child care centers are located within the campus site (Kirkham Child Development Center at 10 Kirkham Street, and the UCSF Marilyn Reed Lucia Child Development Center at 610 Parnassus Avenue). Moffitt and Long Hospitals are also sensitive receptors.

Off-campus receptors (residences) abut the western, northern and southern campus site boundaries while residences to the east are buffered by varying depths of open space. There are also three public schools (Independence High School, Grattan Elementary, and Clarendon Alternative Elementary), and a number of child care centers (Stepping Stones Preschool, Haight Ashbury Community Nursery School, and ABC Bay Area Child Care) located within a quarter mile of the campus site.

Existing Stationary Sources of Air Pollution

The BAAQMD inventory of permitted stationary sources of emissions identifies one permitted operator of stationary emissions (UCSF) present within or near the 1,000-foot zone of influence of the Parnassus Heights campus site. UCSF operates 21 permitted air pollution sources on the campus site. These sources, listed in **Table 4.2-4**, are primarily stationary diesel engines for back-up power generators, combustion turbines, boilers and duct burners.

TABLE 4.2-4
STATIONARY SOURCES AT THE PARNASSUS HEIGHTS CAMPUS SITE

Source #	Facility Type	Source #	Facility Type
2478	UCSF source #9: Gas turbine generator	2478	UCSF source #21: Diesel generator
2478	UCSF source #10: Duct burner for heat recovery	2478	UCSF source #26: Diesel generator
2478	UCSF source #11: Gas turbine generator	2478	UCSF source #27: Diesel generator
2478	UCSF source #12:Duct burner for heat recovery	2478	UCSF source #30: Diesel generator
2478	UCSF source #13: Auxiliary boiler	2478	UCSF source #32: Diesel generator
2478	UCSF source #14: Auxiliary boiler	2478	UCSF source #33: Diesel generator
2478	UCSF source #16: Diesel generator	2478	UCSF source #34: Diesel generator
2478	UCSF source #17: Diesel generator	2478	UCSF source #35: Diesel generator
2478	UCSF source #18: Diesel generator	2478	UCSF source #36: Diesel generator
2478	UCSF source #19: Diesel generator	2478	UCSF source #37: ETO Sterilizer
2478	UCSF source #20: Diesel generator		

SOURCE: BAAQMD, 2019a.

Major Roadways Contributing to Air Pollution

In the City of San Francisco, Parnassus Avenue and Seventh Avenue are arterial streets in the existing local roadway system within the 1,000-foot zone of influence that have at least 10,000 vehicles in annual average daily traffic based on the City's SF CHAMP roadway model (SFCTA, 2015). This traffic contributes to elevated concentrations of $PM_{2.5}$, DPM, and other contaminants emitted from motor vehicles near the street level. There are no freeways within 1,000 feet. The APEZ, which includes both stationary and roadway sources, indicates that roadways around the campus site are not substantial contributors to localized cancer risks or $PM_{2.5}$ concentrations (SFDPH, 2020).

4.2.2 Regulatory Considerations

Federal Regulations

The 1970 Clean Air Act (last amended in 1990) requires that regional planning and air pollution control agencies prepare a regional air quality plan to outline the measures by which both stationary and mobile sources of pollutants will be controlled in order to achieve all standards by the deadlines specified in the act. These ambient air quality standards are intended to protect the public health and welfare, and they specify the concentration of pollutants (with an adequate margin of safety) to which the public can be exposed without adverse health effects. They are designed to protect those segments of the public most susceptible to respiratory distress, including asthmatics, the very young, the elderly, people weak from other illness or disease, or persons engaged in strenuous work or exercise. Healthy adults can tolerate occasional exposure to air pollution levels that are somewhat above ambient air quality standards before adverse health effects are observed.

Table 4.2-5 summarizes current State and federal ambient air quality standards and attainment status for the SFBAAB. In general, the SFBAAB experiences low concentrations of most pollutants when compared to federal standards, except for ozone and particulate matter (PM_{10} and $PM_{2.5}$), for which standards are exceeded periodically (see Table 4.2-1).

TABLE 4.2-5
STATE AND FEDERAL AMBIENT AIR QUALITY STANDARDS AND ATTAINMENT STATUS FOR THE SAN FRANCISCO BAY AREA AIR BASIN

Pollutant	Averaging Time	State (SAAQS[a]) Standard	State (SAAQS[a]) Attainment Status	Federal (NAAQS[b]) Standard	Federal (NAAQS[b]) Attainment Status
Ozone	1-hour	0.09 ppm	**N**	NA	See Note c
	8-hour	0.070 ppm	**N**	0.070 ppm[d]	**N**/Marginal
Carbon Monoxide (CO)	1-hour	20 ppm	A	35 ppm	A
	8-hour	9 ppm	A	9 ppm	A
Nitrogen Dioxide (NO_2)	1-hour	0.18 ppm	A	0.100 ppm	U
	Annual	0.030 ppm	NA	0.053 ppm	A
Sulfur Dioxide (SO_2)	1-hour	0.25 ppm	A	0.075 ppm	A
	24-hour	0.04 ppm	A	0.14 ppm	A
	Annual	NA	NA	0.03 ppm	A
Particulate Matter (PM_{10})	24-hour	50 µg/m^3	**N**	150 µg/m^3	U
	Annual[e]	20 µg/m^3 [f]	**N**	NA	NA
Fine Particulate Matter ($PM_{2.5}$)	24-hour	NA	NA	35 µg/m^3	**N**
	Annual	12 µg/m^3	**N**	12 µg/m^3	U/A
Sulfates	24-hour	25 µg/m^3	A	NA	NA
Lead	30-day	1.5 µg/m^3	A	NA	NA
	Cal. Quarter	NA	NA	1.5 µg/m^3	A
	Rolling 3-month average	NA	NA	0.15	U
Hydrogen Sulfide	1-hour	0.03 ppm	U	NA	NA
Visibility-Reducing Particles	8-hour	See Note g	U	NA	NA

NOTES:

A = Attainment; **N** = Non-attainment; U = Unclassified; NA = Not Applicable, no applicable standard; ppm = parts per million; µg/m^3 = micrograms per cubic meter.

[a] SAAQS = State ambient air quality standards (California). SAAQS for ozone, CO (except Lake Tahoe), SO_2 (1-hour and 24-hour), NO_2, PM, and visibility-reducing particles are values that are not to be exceeded. All other State standards shown are values not to be equaled or exceeded.

[b] NAAQS = national ambient air quality standards. NAAQS, other than ozone and particulates, and those based on annual averages or annual arithmetic means, are not to be exceeded more than once a year. The 8-hour ozone standard is attained when the 3-year average of the fourth highest daily concentration is 0.08 ppm or less. The 24-hour PM_{10} standard is attained when the 3-year average of the 99th percentile of monitored concentrations is less than the standard. The 24-hour $PM_{2.5}$ standard is attained when the 3-year average of the 98th percentile is less than the standard.

[c] The U.S. Environmental Protection Agency (EPA) revoked the national 1-hour ozone standard on June 15, 2005.

[d] This Federal 8-hour ozone standard was approved by USEPA in October 2015 and became effective on December 28, 2015.

[e] State standard = annual geometric mean; national standard = annual arithmetic mean.

[f] In June 2002, CARB established new annual standards for $PM_{2.5}$ and PM_{10}.

[g] Statewide visibility-reducing particle standard (except Lake Tahoe Air Basin): Particles in sufficient amount to produce an extinction coefficient of 0.23 per kilometer when the relative humidity is less than 70 percent. This standard is intended to limit the frequency and severity of visibility impairment due to regional haze and is equivalent to a 10-mile nominal visual range.

SOURCES: Bay Area Air Quality Management District, Standards and Attainment Status, 2017, *http://www.baaqmd.gov/research-and-data/air-quality-standards-and-attainment-status*, accessed August 8, 2019.; USEPA National Ambient Air Quality Standards, 2016. Available online at https://www.epa.gov/criteria-air-pollutants/naaqs-table. Accessed August 8, 2019.

In June 2004, the Bay Area was designated as a marginal nonattainment area of the national 8-hour ozone standard.[5] The USEPA lowered the national 8-hour ozone standard from 0.80 to 0.75 parts ppm effective May 27, 2008. In October 2015, the USEPA designated the Bay Area as a marginal nonattainment region for the 0.70 ppm ozone standard established in 2015. The SFBAAB is in attainment for other criteria pollutants, with the exception of the 24-hour standards for $PM_{2.5}$, for which the Bay Area is designated as "Unclassified." "Unclassified" is defined by the Clean Air Act as any area that cannot be classified, on the basis of available information, as meeting or not meeting the national primary or secondary ambient air quality standard for the pollutant.

On January 9, 2013, USEPA issued a final rule to determine that the Bay Area attains the 24-hour $PM_{2.5}$ national standard. This USEPA rule suspends key State Implementation Plan (discussed below) requirements as long as monitoring data continues to show that the Bay Area attains the standard. Despite this USEPA action, the Bay Area will continue to be designated as "non-attainment" for the national 24-hour $PM_{2.5}$ standard until such time as the Air District submits a "re-designation request" and a "maintenance plan" to USEPA, and USEPA approves the proposed re-designation.

State Regulations

Although the federal Clean Air Act established national ambient air quality standards, individual states retained the option to adopt more stringent standards and to include other pollution sources. California had already established its own air quality standards when federal standards were established, and because of the unique meteorological problems in California, there is considerable diversity between the State and national ambient air quality standards, as shown in Table 4.2-5. California ambient standards tend to be at least as protective as national ambient standards and are often more stringent.

In 1988, California passed the California Clean Air Act (California Health and Safety Code Sections 39600 et seq.), which, like its federal counterpart, called for the designation of areas as attainment or nonattainment, but based on State ambient air quality standards rather than the federal standards. As indicated in Table 4.2-5, the SFBAAB is designated as "nonattainment" for State ozone (both 1-hour and 8-hour standards), PM_{10}, and $PM_{2.5}$ standards. The SFBAAB is designated as "attainment" for other pollutants.

Off-Road Emissions Regulation for Compression-Ignition Engines and Equipment

Engines designated as nonroad engines by USEPA are known as off-road engines in California State regulations implemented by CARB. Similar to the USEPA Nonroad Diesel Rule, the Off-Road Emissions Regulation for New Compression-Ignition Engines and Equipment applies to diesel engines such as those found in construction, general industrial, and terminal equipment. Initially adopted in 2000 and amended in 2004, the regulation establishes Tier emission standards, test procedures, and warranty and certification requirements. For some model years and engine size, the CARB Tier emission standards are more stringent than the USEPA standards.

5 "Marginal nonattainment area" means an area designated marginal nonattainment for the 1-hour national ambient air quality standard for ozone.

CARB In-Use Off-Road Diesel Vehicle Regulation

In July 2007, CARB adopted the In-Use Off-Road Diesel Vehicle Regulation and amended it in December 2011. The regulation requires owners of off-road mobile equipment powered by diesel engines 25 horsepower (HP) or larger to meet the fleet average or best available control technology (BACT) requirements for NO_X and PM emissions by January 1 of each year. The regulation also establishes idling restrictions, limitations on buying and selling older off-road diesel vehicles (Tier 0), reporting requirements, and retrofit and replacement requirements. The requirements and compliance dates vary by fleet size, with performance requirements for large fleets beginning in 2014, medium fleets in 2017, and small fleets in 2019. Requirements regarding idling, disclosure, reporting, and labeling took effect in 2008 and 2009. The Diesel Off-road On-line Reporting System is an online tool designed to help fleet owners report their off-road diesel vehicle inventories and actions taken to reduce vehicle emissions to CARB, as required by the In-Use Off-Road Diesel Vehicle Regulation.

Regional and Local Regulations

Bay Area Air Quality Management District

BAAQMD is the regional agency with jurisdiction over the nine-county region located in the SFBAAB. The Association of Bay Area Governments (ABAG), Metropolitan Transportation Commission (MTC), county transportation agencies, cities and counties, and various non-governmental organizations also participate in the efforts to improve air quality through a variety of programs. These programs include the adoption of regulations and policies, as well as implementation of extensive education and public outreach programs. BAAQMD is responsible for attaining and/or maintaining air quality in the region within federal and State air quality standards. Specifically, BAAQMD has the responsibility to monitor ambient air pollutant levels throughout the region and to develop and implement strategies to attain the applicable federal and State standards.

BAAQMD does not have authority to regulate emissions from motor vehicles. Specific rules and regulations adopted by BAAQMD limit the emissions that can be generated by various stationary sources, and identify specific pollution reduction measures that must be implemented in association with various activities. These rules regulate not only emissions of the six criteria air pollutants, but also TAC emissions sources. Stationary sources are regulated through BAAQMD's permitting process and standards of operation. Through this permitting process, including an annual permit review, BAAQMD monitors the generation of stationary emissions and uses this information in developing its air quality plans. Any sources of stationary emissions constructed as part of the project would be subject to the BAAQMD Rules and Regulations. Both federal and State ozone plans rely heavily upon stationary source control measures set forth in BAAQMD's Rules and Regulations.

Per its Policy and Procedure Manual, BAAQMD requires implementation of Best Available Control Technology for Toxics and would deny an *Authority to Construct* or a *Permit to Operate* for any new or modified source of TACs that exceeds a cancer risk of 10 in one million or a chronic or acute hazard index of 1.0. The permitting process under BAAQMD Regulation 2

Rule 5 requires a Health Risk Screening Analysis, the results of which are posted on the District's website. These permitting requirements would ensure that the health risks of the project on the environment would be less than significant.

BAAQMD has also identified a series of Best Management Practices for the control of fugitive dust generated during construction activities. These measures, which focus on reducing dust generated by excavation, material movement and movement of off-road equipment on unpaved surfaces are considered sufficient to reduce dust-related impacts to a less than significant level (BAAQMD, 2017a).

Bay Area Air Quality Planning Relative to State and Federal Standards

For State air quality planning purposes, the SFBAAB is classified as a serious non-attainment area for the 1-hour ozone standard. The "serious" classification triggers various plan submittal requirements and transportation performance standards. One such requirement is that the BAAQMD update the Clean Air Plan every three years to reflect progress in meeting the air quality standards and to incorporate new information regarding the feasibility of control measures and new emission inventory data (Sections 40924 and 40925 of the California Health and Safety Code). The Bay Area's record of progress in implementing previous measures must also be reviewed. The plans for the air basin are prepared with the cooperation of the MTC and ABAG.

In April 2017, the air district adopted the *2017 Clean Air Plan* whose primary goals are to protect public health and to protect the climate (BAAQMD, 2017b). The plan includes a wide range of proposed control measures to reduce combustion-related activities, decrease fossil fuel combustion, improve energy efficiency, and decrease emissions of potent GHGs. The *2017 Clean Air Plan* updates the *Bay Area 2010 Clean Air Plan* and complies with State air quality planning requirements as codified in the California Health and Safety Code (although the 2017 plan was delayed beyond the 3-year update requirement of the code). The SFBAAB is designated non-attainment for both the 1- and 8-hour State ozone standards. In addition, emissions of ozone precursors in the air basin contribute to air quality problems in neighboring air basins. Under these circumstances, State law requires the Clean Air Plan to include all feasible measures to reduce emissions of ozone precursors and to reduce the transport of ozone precursors to neighboring air basins.

The 2017 Clean Air Plan contains 85 measures to address reduction of several pollutants: ozone precursors, particulate matter, air toxics, and GHGs. Other measures focus on a single type of pollutant, potent GHGs such as methane and black carbon that consists of harmful fine particles that affect public health. These control strategies are grouped into the following categories:

- Stationary Source Measures;
- Transportation Control Measures;
- Energy Control Measures;
- Building Control Measures;
- Agricultural Control Measures;
- Natural and Working Lands Control Measures;

- Waste Management Control Measures;
- Water Control Measures; and
- Super GHG Control Measures.

Under the California Clean Air Act, BAAQMD is required to develop an air quality attainment plan for criteria pollutants that are designated as non-attainment within the air basin. Several project components may be subject to BAAQMD rules and regulations governing criteria pollutants, TACs, and odorous compounds, even though permits may not be required. Stationary sources, such as generators, are required to have permits from BAAQMD before constructing, changing, or operating the source. If the project is subject to BAAQMD permit requirements, the sources would need to comply with BAAQMD Regulation 2 and proceed through the two-stage Authority to Construct and Permit to Operate process.

UCSF

The UCSF 2014 LRDP identified campus-wide objectives and objectives specific to the Parnassus Heights campus site. The following UCSF 2014 LRDP campus-wide objective relates to air quality:

Campus-Wide Objectives

1. **Respond to City and Community Context**

    F. Consider neighborhood and city-wide impacts related to UCSF's physical growth.

The UCSF 2014 LRDP also included *Community Planning Principles*, which were produced in collaboration with the UCSF Community Advisory Group:

Community Planning Principles

Environmental Planning and Safety

EP3. Meet or exceed city, state, and federal standards with respect to health and safety, noise and construction-related environmental impacts.

City of San Francisco

Pursuant to the University of California's constitutional autonomy, development and uses on property owned or leased by the University that are in furtherance of the University's educational purposes are not subject to local land use regulation, including the City and County's General Plan. However, UCSF reviews local general plan policies as planning guidelines and has included the objectives of the Air Quality Element in this Draft EIR.

San Francisco General Plan Air Quality Element

The *San Francisco General Plan* (General Plan) includes the 1997 Air Quality Element. The objectives specified by the City include the following:

***Objective 1*:** Adhere to state and federal air quality standards and regional programs.

Objective 2**:** Reduce mobile sources of air pollution through implementation of the Transportation Element of the General Plan.

Objective 3**:** Decrease the air quality impacts of development by coordination of land use and transportation decisions.

Objective 4**:** Minimize particulate matter emissions from road and construction sites.

Objective 5**:** Link the positive effects of energy conservation and waste management to emission reductions.

4.2.3 Impacts and Mitigation Measures

Significance Criteria

Would implementation of the CPHP, including the Irving Street Arrival, Research and Academic Building (RAB), and initial Aldea Housing Densification projects and other Initial Phase improvements:

a) Conflict with or obstruct implementation of the applicable air quality plan.

b) Result in a cumulatively considerable net increase of any criteria pollutant for which the project region is non-attainment under an applicable federal or state ambient air quality standard.

c) Expose sensitive receptors to substantial pollutant concentrations.

d) Result in other emissions (such as those leading to odors) adversely affecting a substantial number of people.

e) Exceed the LRDP EIR standard of significance by exposing receptors to toxic air contaminant emissions that (1) result in a cancer risk greater than 10 cancer cases per 1 million people exposed in a lifetime; or (2) for acute or chronic effects, result in concentrations of toxic air contaminant emissions with a Hazard Index of 1.0 or greater.

With respect to criterion (a), the analysis below in Impact AIR-4 applies qualitative BAAQMD guidance thresholds that lead agencies should consider three questions in assessing consistency with the 2017 CAP: (1) Would the project support the primary goals of the Clean Air Plan? (2) Does the project include applicable control measures from the Clean Air Plan? and (3) Does the project disrupt or hinder implementation of control measures identified in the Clean Air Plan?

With respect to criterion (b), the analysis below applies BAAQMD significance criteria identified in Table 4.2-6 for assessment of construction-related impacts of criteria air pollutants emissions in Impact AIR-1 and operational criteria air pollutant emissions in Impact AIR-2.

With respect to criteria (c) and (e) above, the analysis in Impact AIR-3 and Impact AIR-4 apply BAAQMD significance criteria for health risks and hazards.

Criteria Not Analyzed

As stated in the Initial Study, there would no impact related to the following topic for the reasons described below:

- ***Odors.*** The proposed CPHP would not include development of land uses identified by BAAQMD as typically associated with odors, such as wastewater treatment plants, landfills, composting facilities, refineries, or chemical plants. As the proposed CPHP would not result in development that would be a potential source of odors.

Analysis Methodology

Air quality analysis conducted for this impact assessment employs the emission factors, models and tools distributed by a variety of agencies including CARB, the California Air Pollution Officers Association (CAPCOA), the California Office of Environmental Health Hazard Assessment (OEHHA) and USEPA. Additionally, the analysis follows methodologies identified in the BAAQMD *CEQA Air Quality Guidelines* (May 2017).

BAAQMD has developed separate guidelines for assessing the air quality impacts for projects and plans under CEQA. The air quality impacts of the proposed overall CPHP are analyzed at the plan-level, while those from the construction and operation of the proposed Irving Street Arrival, RAB and initial Aldea Housing Densification projects and other Initial Phase improvements are analyzed at a project level. The methodology below describes the approach employed for the proposed CPHP and the three Initial Phase projects and other Initial Phase improvements.

In general, implementation of the proposed CPHP would result in two types of air quality impacts. First, the CPHP would result in air pollution through construction activity. Second, the new development under the CPHP would generate operational air pollutants, due to increased vehicle travel and new stationary sources (e.g., laboratory fume hoods, boilers, and emergency generators). This section describes the methodology used to evaluate project impacts related to consistency with the Clean Air Plan, emissions of criteria pollutants, and local health risks and hazards. Each of these types of direct impacts are in turn separated into impacts from criteria air pollutant emissions, which are generally regional in nature, and impacts associated with exposure to TACs and $PM_{2.5}$, which is a localized health risk.

Thresholds for Evaluating Criteria Air Pollutant Impacts

As described above under Regulatory Framework, the SFBAAB experiences low concentrations of most pollutants when compared to federal or State standards and is designated as either in attainment or unclassified for most criteria pollutants, with the exception of ozone, $PM_{2.5}$, and PM_{10}, for which these pollutants are designated as non-attainment for either the State or federal standards.

By definition, regional air pollution is largely a cumulative impact in that no single project is sufficient in size to, by itself, result in non-attainment of air quality standards. Instead, a project's individual emissions are considered to contribute to the existing, cumulative air quality conditions. If a project's contribution to cumulative air quality conditions is considerable, then the project's impact on air quality would be considered significant (BAAQMD, 2017a).

Table 4.2-6 identifies criteria air pollutant significance thresholds for project-level analysis followed by a discussion of each threshold. Projects that would result in criteria pollutant emissions below these significance thresholds would not result in a cumulatively considerable net increase in criteria air pollutants within the SFBAAB.

TABLE 4.2-6
CRITERIA AIR POLLUTANT THRESHOLDS

Pollutant	Construction Thresholds Average Daily Emissions (pounds per day)	Operational Thresholds	
		Average Daily Emissions (pounds per day)	Maximum Annual Emissions (tons per year)
ROG	54	54	10
NOx	54	54	10
PM_{10}	82 (exhaust)	82	15
$PM_{2.5}$	54 (exhaust)	54	10
Fugitive Dust[a]	Construction Dust Ordinance or other Best Management Practices	Not applicable	

NOTE:
[a] Fugitive dust is a specific subset of non-exhaust generated particulate emissions that are generated by material process activity such as rock crushing or result from open transport, storage, and transfer of raw, intermediate, and waste aggregate materials, and nonindustrial sources such as unpaved roads and parking lots, paved streets and highways, heavy construction activities, and agricultural tilling.

SOURCE: BAAQMD, CEQA Air Quality Guidelines. June 2017.

The potential for a project to result in cumulatively considerable net increase of any criteria pollutant for which the project region is non-attainment under an applicable federal or State ambient air quality standard is based on the State and federal Clean Air Acts emissions limits for stationary sources. To ensure that new stationary sources do not cause or contribute to a violation of an air quality standard, BAAQMD Regulation 2, Rule 2 requires that any new source that emits criteria air pollutants above a specified emissions limit must offset those emissions. For ozone precursors ROG and NO_X, the offset emissions level is an annual average of 10 tons per year [or 54 pounds (lbs.) per day] (BAAQMD, 2017a). These levels represent emissions below which new sources are not anticipated to contribute to an air quality violation or result in a considerable net increase in criteria air pollutants that could result in increased health effects.

The federal New Source Review (NSR) program was created under the federal Clean Air Act to ensure that stationary sources of air pollution are constructed in a manner that is consistent with attainment of federal health-based ambient air quality standards. For PM_{10} and $PM_{2.5}$, the emissions limit under NSR is 15 tons per year (82 lbs. per day) and 10 tons per year (54 lbs. per day), respectively. These emissions limits represent levels at which a source is not expected to have a significant impact on air quality (BAAQMD, 2017a).

Although the regulations specified above apply to new or modified stationary sources, land use development projects generate ROG, NO_X, PM_{10}, and $PM_{2.5}$ emissions as a result of increases in vehicle trips, energy use, architectural coating, and construction activities. Therefore, the identified thresholds can be applied to the construction and operational phases of land use projects. Those projects that would result in emissions below these thresholds would not be considered to contribute to an existing or projected air quality violation or result in a considerable net increase in ozone precursors or particulate matter. Due to the temporary nature of construction activities, only the average daily thresholds are applicable to construction phase emissions.

Fugitive dust emissions are typically generated during construction phases. Studies have shown that the application of best management practices (BMPs) at construction sites substantially control fugitive dust (WRAP, 2006) and individual measures have been shown to reduce fugitive dust by anywhere from 30 percent to 90 percent (BAAQMD, 2009). BAAQMD has identified a number of BMPs to control fugitive dust emissions from construction activities (BAAQMD, 2017a). This analysis assumes that UCSF would implement all BAAQMD BMPs for individual construction projects, which is the basis for determining the significance of air quality impacts due to fugitive dust emissions.

Approach to Estimating Construction-Phase Criteria Pollutant Emissions

CPHP

The CPHP includes both Initial Phase and Future Phase projects. However, specific details regarding year of construction or phasing of construction for Future Phase projects are not currently available to perform a full quantitative assessment of all elements of the CPHP. BAAQMD guidelines do not provide a specific methodology for assessing construction-related impacts at the Plan level. Without specific information with respect to year of construction or the phasing sequence, a quantitative analysis of construction emissions of Future Phase projects under the CPHP is not feasible. Therefore, a qualitative analysis is provided for the assessment of construction-related impacts of the CPHP that considers the result of the quantitative assessment of impacts associated with the Initial Phase projects as a proxy for impact assessment of Future Phase projects, acknowledging that in the future years, the fleet of construction-related equipment will be cleaner due to existing regulations and the turn-over of equipment with higher emission rates. If warranted by this qualitative assessment, mitigation measures are identified and were developed from a menu of measures published by BAAQMD.

While the proposed New Hospital is a CPHP Initial Phase project, it is generally considered programmatically in this EIR because adequate details of that project are not available at this time for a project-level analysis. However, given that construction of proposed New Hospital would be concurrent with the other Initial Phase projects, construction emissions associated with the New Hospital were estimated based on the amount of demolition anticipated and the amount of building space that would be constructed. Accordingly, the combined construction emissions of four Initial Phase projects are considered in this assessment for construction-related impacts.

Initial Phase Projects

Construction emissions from the demolition and construction activities associated with the proposed Irving Street Arrival, RAB and initial Aldea Housing Densification projects, and New Hospital, were estimated using the CalEEMod (version 2016.3.2). For each year of construction

(2021 through 2030), the highest average daily emissions were calculated and compared to the BAAQMD thresholds.

Approach to Estimating Operational Criteria Pollutant Emissions

CPHP

For assessment of operational impacts from criteria pollutants there are two important data points that can be used to estimate the increase in emissions from the full build out under the CPHP in 2050. First, the developed square footage under existing and full build out conditions may be used to estimate increases in area source and energy source emissions. Existing emissions from the Central Utility Plant (CUP) as estimated by BAAQMD are scaled based on the increase in developed square feet. Secondly the transportation analysis provides an estimate of vehicle miles travelled (VMT) under existing conditions and under year 2050 conditions (existing plus CPHP). The VMT data is used to estimate emissions under both existing (2019) and existing plus CPHP (2050) conditions. The project increment of increased emissions is then determined by subtracting existing emissions from the resultant emissions under full buildout and compared to BAAQMD thresholds to determine significance.

It should be noted that the New Hospital proposed during the CPHP Initial Phase and all CPHP Future Phase projects would undergo separate CEQA analysis, at the time of project-specific proposal, as appropriate. Specifically with regard to the New Hospital, operational characteristics are not currently available. Therefore, while a quantitative analysis for the New Hospital is provided with respect to construction-related emissions, this is not possible for operational emissions and operational emissions from the New Hospital are addressed programmatically as part of the CPHP as a whole.

Initial Phase Projects

Operational emissions for the Irving Street Arrival, RAB and initial Aldea Housing Densification projects were estimated using the CalEEMod (version 2016.3.2) adjusted with recently EPA-approved Emfac2017 emissions factors. The model inputs include project-specific net new vehicle trips as estimated in Section 4.15, *Transportation*. The analysis also backs out non-transportation emissions from existing buildings to be removed such as UC Hall, School of Nursing building, and the existing Aldea Housing complex structures to be demolished in the Initial Phase.

Approach to Analyzing Other Criteria Pollutant Impacts

Regional concentrations of CO in the Bay Area have not exceeded the State standards in the past 11 years and SO_2 concentrations have never exceeded the standards. The primary source of CO emissions from development projects is vehicle traffic. Construction-related SO_2 emissions represent a negligible portion of the total basin-wide emissions and construction-related CO emissions represent less than 5percent of the Bay Area total basin-wide CO emissions. As discussed previously, the Bay Area is in attainment for both CO and SO_2. Furthermore, BAAQMD has demonstrated, based on modeling, that in order to exceed the California ambient air quality standard of 9.0 ppm (8-hour average) or 20.0 ppm (1-hour average) for CO, project traffic in addition to existing traffic would need to exceed 44,000 vehicles per hour at affected intersections (or 24,000 vehicles per hour where vertical and/or horizontal mixing is limited). The transportation analysis indicates that the intersection in the project area with the greatest volumes would be Stanyan Street and John F Kennedy (JFK) Drive with hourly volumes of 5,722 in year 2050 with the project, which is less than 24,000. Therefore, given the Bay Area's attainment status and the limited CO and SO_2 emissions that could result from the project, the project would not result in a cumulatively considerable net increase in CO or SO_2, and quantitative analysis of these pollutants is not required.

Thresholds for Evaluating TAC Impacts

In addition to criteria air pollutants, individual projects may emit TACs during construction and operation. As part of assessment of Initial Phase projects, a HRA was conducted to provide quantitative estimates of health risks from exposures to TACs.

CEQA provides the lead agency with discretion in selecting significance thresholds for the purposes of assessing impacts. For the analysis of health risk and localized impacts, UCSF uses quantitative significance thresholds adopted by BAAQMD. These thresholds are based on substantial evidence identified in Appendix D of the 2017 BAAQMD CEQA Guidelines and its 2009 Justification Report. These thresholds were applied for the analysis of health risk and localized impacts in the Final EIR for the *2014 UCSF Long Range Development Plan* and are also applied in this document. Specifically, if a proposed project would result in increased cancer risks exceeding 10 in one million or, a hazard index exceeding 1.0 or a localized $PM_{2.5}$ concentration exceeding 0.3 µg/m^3 then it would be considered to result in a significant impact with regard to exposure of sensitive receptors to substantial pollutant concentrations. The 0.3 µg/m^3 $PM_{2.5}$ concentration and the excess cancer risk of 10.0 per million persons exposed are the levels below which BAAQMD considers new sources not to make a considerable contribution to cumulative health risks (BAAQMD, 2017a).

As described by BAAQMD, USEPA considers a cancer risk of 100 per one million or less to be within the "acceptable" range of cancer risk. A cumulative cancer risk of 100 in one million is also used by the City of San Francisco for projects within its jurisdiction to determine the location of APEZ's. Therefore, a cumulative increase in cancer risk from all sources would occur if the total of all risks exceeds in one million.

Approach to Estimating TAC Health Risk Impacts

CPHP

The CPHP includes both Initial Phase and Future Phase projects. While details about the construction phasing of the Initial Phase projects are available, specific details regarding year of construction or phasing of construction for Future Phase projects are not currently available. BAAQMD guidelines do not provide a specific methodology for assessing construction-related health risk impacts at the Plan level. Without specific information with respect to year of construction or the phasing sequence of Future Phase projects, a quantitative analysis of the construction-phase human health risk for all elements of the CPHP is not feasible. Therefore, a quantitative analysis is provided only for the construction of the Initial Phase projects (inclusive of the New Hospital), while a qualitative analysis is provided for the assessment of post-2030 construction-related health risk impacts of all other CPHP components.

Operational detail with respect to locations of TAC sources of the New Hospital and Future Phase projects is unavailable for determining risk levels quantitatively. However, a qualitative analysis is provided that considers potential TAC sources and provides mitigation measures to be implemented where the potential for significant impact may exist. It should be noted that the New Hospital and all Future Phase projects will undergo separate environmental review under CEQA.

Initial Phase Projects

A three-step process was used to calculated the human health risk associated with the construction and operations of the Initial Phase projects. The first step involved calculating TAC emissions from all new sources. Emissions from construction sources associated with the New Hospital, Irving Street Arrival, RAB and initial Aldea Housing Densification projects were calculated using CARB's CalEEMod software program to estimate average annual diesel exhaust emissions (as reported as exhaust of PM_{10}) during construction. Idling emissions associated with heavy-duty trucks (haul trucks, concrete trucks, material delivery trucks, etc.) were estimated based on the anticipated number of truck trips and idling emission factors for heavy-duty vehicles from EMFAC2017 for on-road emissions. These emissions were modeled outside of CalEEMod because the model does not accurately account for the anticipated idling activity at the campus site, which is needed for the HRA.

Operational emissions associated with the proposed building emergency diesel generators associated with the Irving Street Arrival, RAB and initial Aldea Housing Densification projects were calculated using CalEEMod to estimate the annual average DPM (as reported as exhaust PM_{10}) based on an anticipated permit limit of 50 hours per year for engine reliability (BAAQMD, 2018). Building fume hood TAC emissions were calculated using methodologies documented in a memorandum to UCSF dated December 3, 2018 that was commissioned for the approach to analysis in the UCSF Mission Bay HRA (Atmospheric Dynamics, Inc., 2018). Increases in CUP emissions were based on UCSF's BAAQMD emissions report from their most recent reporting cycle (BAAQMD, 2019a) and supplemented with emission calculation methodologies utilized for UCSF Mission Bay HRA (Atmospheric Dynamics, Inc., 2019). Detailed calculations, including all assumptions and discussion of approach to analysis, can be found in **Appendix AIR**).

Based on the increase in square footage proposed, it is estimated that operation of the combination of the Irving Street Arrival, RAB and initial Aldea Housing Densification projects would result in one additional diesel vendor truck trip per day over existing conditions, and this additional trip is assumed at the loading bay for the proposed RAB. Localized health risk component associated with minor increase in vendor truck deliveries at the campus site due to the Irving Street Arrival and the initial Aldea Housing Densification projects would be negligible, and accordingly, was not considered in the operational HRA.

The second step involved using the AERMOD (version 18081) dispersion model to convert emissions to maximum annual TAC concentrations for the cancer risk, chronic risk and $PM_{2.5}$ exposure, and also maximum 1-hour TAC concentrations for the acute risk analysis. Modeled sensitive receptor locations include residential areas, day care facilities, and schools (for children under 16 years of age). A 20-meter receptor grid co-located with the CRRP-HRA grid was modeled using a receptor height of 1.8 meters (breathing height). Please refer to Appendix AIR for further detail on risk modeling methodology.

In accordance with OEHHA *Air Toxics Hot Spots Program Guidance Manual for Preparation of Health Risk Assessments,* the last step was accomplished by applying the highest estimated concentrations of TAC at the receptors analyzed to the established cancer potency factors and acceptable reference concentrations for non-cancer health effects. Increased cancer risks were calculated using the modeled TAC concentrations and OEHHA-recommended methodologies for both a child exposure (starting at 3rd trimester) as well as daycare and school exposure. The cancer risk calculations were based on applying the OEHHA-recommended age sensitivity factors and breathing rates, as well as fraction of time at home and an exposure duration of 30 years. Age-sensitivity factors reflect the greater sensitivity of infants and small children to cancer causing air pollutants. Because health risk is a localized impact, two exposure scenarios were considered because the MEI for the construction HRA varied from the MEI for the operational HRA. The first scenario evaluated the construction impacts for each of the Initial Phase projects, and the second scenario evaluated the operational impacts only for 30 years of exposure. The full HRA calculations are in Appendix AIR.

Non-CEQA Impacts of the Environment on the Project

In the *California Building Industry Association v. Bay Area Air Quality Management District* case decided in 2015,[6] the California Supreme Court held that CEQA does not generally require lead agencies to consider how existing environmental conditions might impact a project's users or residents, except where the proposed project would exacerbate an existing environmental condition. Accordingly, the identified significance criteria related to exposure of sensitive receptors to substantial pollutant concentrations are valid only to the extent that the proposed project would in some way exacerbate air quality conditions. For this EIR, air quality impacts on the proposed sensitive receptors were considered in the context of the contributions from new emissions from the proposed project and not from existing emissions from off-site sources.

Sensitive receptors (residential population) would be added to the campus site as a result of the Aldea Housing complex densification during the Initial and the Future Phases of the CPHP. However, the proposed Aldea residential units would be located more than 1,000 feet from the nearest source of TACs. BAAQMD considers a distance of 1,000 feet as a zone of influence, beyond which TAC impacts from most sources may be considered to be less than significant. Therefore, the potential TAC exposure to sensitive receptors in the densified Aldea Housing complex would be less than significant and are not further considered below.

Sensitive receptors would also be added to the campus site with the completion of the proposed New Hospital, and the proposed West Side Housing along the future extension of 4th Avenue in the Future Phase of the CPHP. These future residents may be exposed to TAC emissions

6 *California Building Industry Association v. Bay Area Air Quality Management District,* 62 Cal.4th 369. Opinion Filed December 17, 2015.

associated with future development under full buildout of the CPHP and are considered as potential receptors in the assessment of TAC impact under the full CPHP.

Approach to Analysis of Cumulative Impacts

The contribution of a project's individual air emissions to regional air quality impacts is by its nature, a cumulative effect. Emissions from past, present and future projects in the vicinity also have or will contribute to adverse regional air quality impacts on a cumulative basis. No single project by itself would be sufficient in size to result in nonattainment of ambient air quality standards. Instead, a project's individual emissions contribute to existing cumulative air quality conditions (BAAQMD, 2009). As described above, the project-level thresholds for criteria air pollutants are based on levels at which new sources are not anticipated to contribute to an air quality violation or result in a considerable net increase in criteria air pollutants. Therefore, if a project's emissions are below the project-level thresholds, the project would not be considered to result in a considerable contribution to cumulative regional air quality impacts.

As discussed above, cumulative health risks are analyzed in accordance with BAAQMD's threshold and guidance. As described by BAAQMD considers a cancer risk of 100 per one million or less to be within the "acceptable" range of cancer risk. A cumulative cancer risk of 100 in one million is also used by the City of San Francisco for projects within its jurisdiction to determine the location of APEZ's. When a project is not located within an APEZ, the City of San Francisco applies a project level contribution of 10 in one million to represent a cumulatively considerable contribution.

Approach to Analysis of Consistency with Air Quality Plan

The applicable air quality plan is the BAAQMD's 2017 Clean Air Plan, which identifies measures to reduce emissions and ambient concentrations of air pollutants; safeguard public health by reducing exposure to air pollutants that pose the greatest health risk, with an emphasis on protecting the communities most heavily affected by air pollution; and reduce GHG emissions. Consistency with the Clean Air Plan can be determined if the project supports the goals of the plan, includes applicable control measures from the plan and would not disrupt or hinder implementation of any plan control measures. Consistency with the Clean Air Plan is the basis for determining whether the proposed project would conflict with or obstruct implementation of an applicable air quality plan.

BAAQMD guidance states that lead agencies should consider three questions in assessing consistency with the 2017 CAP: (1) Would the project support the primary goals of the Clean Air Plan? (2) Does the project include applicable control measures from the Clean Air Plan? and (3) Does the project disrupt or hinder implementation of control measures identified in the Clean Air Plan?

To meet the primary goals, the CAP recommends specific control measures and actions. The 2017 Clean Air Plan includes 85 control measures aimed at reducing air pollution in the Air Basin. A tabular comparison of applicable control measures in the 2017 CAP and existing implementation mechanisms or elements of the CPHP was completed to determine whether the proposed CPHP would meet the primary goals of the 2017 CAP and whether the CPHP includes all applicable control measures. A qualitative assessment of whether the proposed CPHP would disrupt or hinder implementation of any 2017 Clean Air Plan control measure was also completed.

Impact Analysis

Impact AIR-1: Construction of campus development under the CPHP would result in a cumulatively considerable net increase of a criteria pollutant for which the project region is non-attainment under an applicable federal or state ambient air quality standard. (Less than Significant with Mitigation)

As discussed above, the SFBAAB is a non-attainment area for ozone, PM_{10} and $PM_{2.5}$under federal and State air quality standards. The analysis below focuses on the potential for demolition and construction activities under the CPHP as a whole and for each of the Initial Phase projects to result in a cumulatively considerable net increase in construction-phase emissions of ROG and NOx (ozone precursors) as well as PM_{10} and $PM_{2.5}$. Project-related emissions of these pollutants would be considered cumulatively considerable if the estimated daily emissions from construction activities would exceed emission thresholds set forth by BAAQMD.

CPHP Construction

Construction of individual projects developed under the proposed CPHP would generate construction emissions from a variety of sources, including off-road construction equipment and on-road worker, vendor, and hauling vehicles. Construction emissions from activities over the entirety of the CPHP, would include those described below for the Initial Phase projects, including the New Hospital, as well as for Future Phase development after 2030.

As discussed in Chapter 3, Project Description, the CPHP would provide for development of approximately 2.90 million gross square feet (gsf) of new building space, or approximately 2.04 million gsf of net new building space. The CPHP Initial Phase projects, including the Irving Street Arrival, RAB, initial Aldea Housing Densification projects and New Hospital, along with other miscellaneous improvements, would be completed by 2030. Over this approximately 10-year period, there would be about 1.43 million gsf of new building construction, nearly 287,000 gsf of building demolition, and approximately 254,000 cubic yards of excavation on the campus site. Analysis provided below indicates that average daily construction related NO_X emissions during the Initial Phase would be just below the 54 pound per day threshold.

Proposed CPHP Future Phase development is assumed to be completed between approximately 2030 and the horizon year of the Plan, about year 2050. Over this approximately 20-year period, there would be an additional 1.47 million gsf of new construction, approximately 401,000 gsf of demolition, and approximately 139,000 cubic yards of excavation on the campus site. The general types of construction equipment and techniques that would be used for CPHP Future Phase projects would be similar to those for the CPHP Initial Phase projects. As a result, while on balance, the overall amount of construction in the Future Phase would be roughly comparable to that which would occur in the Initial Phase, the Future Phase construction would be generally spread out over a longer duration (20-year period) that the Initial Phase construction (10-year period).

Without details of specific construction schedules, sequencing, and overlap of the CPHP Future Phase projects, it is not possible to calculate average daily construction emissions associated with the CPHP Future Phase. However, it is reasonable to expect that there would be periods during the Future Phase when daily construction emissions generated would be generally comparable to those estimated for the CPHP Initial Phase projects and could exceed the average daily construction related threshold for criteria pollutants unless mitigated. It should be noted that the overall construction fleet that would be used during construction of CPHP Future Phase projects would be substantially less-polluting than the fleet active during the CPHP Initial Phase, as CARB's Off-Road Emissions Regulation for both new and in-use equipment discussed above in the Setting section would implemented over time.

Under the CPHP, renovations of certain existing buildings would also occur, such as the HSIR Towers and the Medical Sciences Building. These renovations are assumed to be predominantly within the interior of existing buildings, and would not involve substantial operation of off-road construction equipment. As such, renovation activities would not contribute substantially to generation of construction emissions. This would also be true for interior construction in new buildings that would be developed under the CPHP.

Notwithstanding improvements to the future fleet of construction equipment discussed above, **CPHP Mitigation Measure AIR-1a** is set forth below to address the potential for construction emissions associated with CPHP projects to exceed the threshold for criteria pollutants. Consequently, the impact of construction-related emissions for the CPHP as a whole would be less than significant with mitigation.

BAAQMD's approach to analysis of construction-related particulate emissions impacts (other than exhaust PM) is to emphasize implementation of effective and comprehensive dust control measures rather than detailed quantification of emissions. BAAQMD considers construction-related fugitive dust impacts of projects to be less than significant if a suite of recommended dust-control measures are implemented. Therefore, implementation of BAAQMD-identified BMPs for control of fugitive dust, listed below as **CPHP Mitigation Measure AIR-1b**, would reduce construction-related fugitive dust impacts of CPHP projects to less than significant levels.

CPHP Mitigation Measure AIR-1a: Clean Construction Equipment for CPHP Projects

The construction contractor(s) shall develop a plan demonstrating that the off-road equipment used to on-site to construct CPHP projects would achieve a fleet-wide average 80 percent reduction in NO_X exhaust emissions, compared to uncontrolled aggregate statewide emission rates for similar equipment. One feasible plan to achieve this reduction would include the following:

- All mobile diesel-powered off-road equipment larger than 25 horsepower and operating on the project site for more than two days continuously shall be equipped with engines meeting USEPA emissions standards for Tier 4 engines or equivalent; and
- Use of electrically-powered construction equipment to the degree available and feasible; and

Alternatively, if UCSF can demonstrate through preparation of an air quality assessment report prepared by an air quality specialist that large or contemporaneous CPHP construction projects would not exceed BAAQMD thresholds, then the above mitigation requirements may be waived.

CPHP Mitigation Measure AIR-1b: Best Management Practices for Controlling Particulate Emissions during Construction

The following BAAQMD Best Management Practices for particulate control will be required for all construction activities related to CPHP projects (BAAQMD, 2017a). These measures will reduce particulate emissions primarily during soil movement, grading and demolition activities but also during vehicle and equipment movement on unpaved project sites.

- All exposed surfaces (e.g., parking areas, staging areas, soil piles, graded areas, and unpaved access roads) shall be watered two times per day.
- All haul trucks transporting soil, sand, or other loose material off-site shall be covered.
- All visible mud or dirt track-out onto adjacent public roads shall be removed using wet power vacuum street sweepers at least once per day. The use of dry power sweeping is prohibited.
- All vehicle speeds on unpaved roads shall be limited to 15 mph.
- All roadways, driveways, and sidewalks to be paved shall be completed as soon as possible. Building pads shall be laid as soon as possible after grading unless seeding or soil binders are used.
- Idling times shall be minimized either by shutting equipment off when not in use or reducing the maximum idling time to 5 minutes (as required by the California airborne toxics control measure Title 13, § 2485 of California Code of Regulations [CCR]). Clear signage shall be provided for construction workers at all access points.
- All construction equipment shall be maintained and properly tuned in accordance with manufacturer's specifications. All equipment shall be checked by a certified mechanic and determined to be running in proper condition prior to operation.
- Post a publicly visible sign with the telephone number and person to contact at UCSF regarding dust complaints. This person shall respond and take corrective action within 48 hours. BAAQMD's telephone number shall also be visible to ensure compliance with applicable regulations.

Significance after Mitigation: Less than Significant. Implementation of CPHP Mitigation Measure AIR-1a would ensure the construction-related emissions of criteria pollutants would be less than the BAAQMD average daily thresholds for construction emissions for CPHP projects. These necessary reductions would be ensured by providing emission-controlled equipment capable of achieving necessary reductions. Implementation of CPHP Mitigation Measure AIR-1b would ensure that dust control measures implemented during construction of CPHP projects would be consistent with the guidance of BAAQMD to reduce fugitive dust-related impacts to a level that would be less than significant with mitigation.

Irving Street Arrival, Research and Academic Building, Initial Aldea Housing Densification and New Hospital Projects, and Initial Phase Improvements - Construction

As discussed in Chapter 3, *Project Description*, this EIR addresses three CPHP Initial Phase projects at a project-level (Irving Street Arrival, RAB, and initial Aldea Housing Densification projects). The proposed New Hospital is also a CPHP Initial Phase project, and generally considered programmatically in this EIR as adequate details of that project are not available at this time for a project-level analysis. However, given the anticipated concurrent construction of proposed New Hospital with the other three Initial Phase projects, the construction emissions of that project were estimated based on the amount of demolition and amount of building space that would be constructed. Accordingly, the combined construction emissions of all four Initial Phase projects are considered in this assessment for construction-related impacts.

As described in Chapter 3, *Project Description*, Initial Phase improvements are also proposed that would also include various Initial Phase utility improvements, implementation of the Parnassus Avenue Streetscape Plan, renovation of certain existing buildings, and installation of miscellaneous neighborhood investment improvements in the public realm. As with all development under the CPHP, these Initial Phase improvements would generate incremental construction-related emissions depending on the timing of implementation, but are not expected to substantially contribute to those emissions calculated below for the Initial Phase projects. Furthermore, as applicable, any Initial Phase improvements that would be constructed outside the campus site boundary, such as streetscape, utility or neighborhood investments, may involve the cooperation of the City of San Francisco and, as public works projects, would be subject to the City of San Francisco's Clean Construction Ordinance.

Construction emissions associated with demolition and construction of the four Initial Phase projects were calculated using CalEEMod. Modeling assumed construction phasing lengths for the Initial Phase projects provided by UCSF. Because certain details of construction are not known, CalEEMod default assumptions were assumed for vendor trips, construction worker trips, and off-road equipment use. Emissions from truck trips associated with off-haul of excavated materials were estimated using volume estimates provided by UCSF for each of these projects. All model inputs and outputs are presented in Appendix AIR.

Table 4.2-7 presents the average annual daily unmitigated construction emissions generated by the Initial Phase projects, inclusive of the proposed New Hospital, and compares them to significance thresholds developed by BAAQMD for criteria pollutants of concern and their precursors. Average daily emissions are averaged over all the construction days for each year of construction. As can be seen from Table 4.2-7, the combined construction related emissions from construction of these Initial Phase projects, including the New Hospital, would be less than significant for all years of analysis. Daily construction emissions associated with the Irving Street Arrival, RAB, initial Aldea Housing Densification and New Hospital projects would be less than 54 pound per day threshold for ROG, NO_x, and $PM_{2.5}$ and less than the 82 pound per day threshold for PM_{10} in all years of construction, and the construction-phase criteria pollutant impact of these projects would be less than significant.

TABLE 4.2-7
ESTIMATED DAILY CONSTRUCTION EMISSIONS
WITHOUT MITIGATION FOR THE CPHP INITIAL PHASE PROJECTS (INCLUDING NEW HOSPITAL)

Condition	ROG	NO_X	PM_{10}	$PM_{2.5}$
Construction 2022 (Irving Street Arrival Construction, and RAB demolition, grading, trenching and start concrete)	3.95	50.65	1.70	1.58
Construction 2023 (RAB and Irving Street Arrival building construction)	2.70	24.47	0.95	0.89
Construction 2024 (RAB and New Hospital building construction)[b]	9.75	50.80	1.42	1.34
Construction 2025 (RAB and New Hospital building construction)	9.90	42.91	1.04	1.00
Construction 2026 (New Hospital building construction)	4.98	50.98	1.01	0.96
Construction 2027(New Hospital building construction)	2.45	25.15	0.50	0.48
Construction 2028 (New Hospital building construction, Initial Aldea Housing Densification demolition, excavation and building construction)	21.74	25.96	0.55	0.53
Construction 2029 (New Hospital building construction and Initial Aldea Housing Densification construction)	30.72	25.81	0.56	0.53
Significance Threshold	54	54	82	54
Significant (Yes or No)?	No	No	No	No

NOTES:
a The RAB project includes demolition of UC Hall and School of Nursing building
b Demolition of the LPPI to make room for the New Hospital was previously considered in the 2014 LRDP FEIR and is not part of the proposed CPHP.

SOURCE: ESA, 2020 (see Appendix AIR)

Although not warranted for impacts related to criteria air pollutants from construction of the Initial Phase projects, **CPHP Mitigation Measure AIR-1a** is set forth below to further reduce construction-phase criteria pollutant emissions. This mitigation measure is also required to address the impact from TAC emissions identified in Impact AIR-3 for the Initial Phase projects, below. **Table 4.2-8** presents the average annual daily mitigated construction emissions. As can be seen from Table 4.2-8, with implementation of clean construction equipment identified in CPHP Mitigation Measure AIR-1a, construction-related emissions of the Initial Phase projects, would be further reduced and less than significant.[7]

As discussed above under *Analysis Methodology*, impacts from fugitive dust associated with proposed construction projects under the CPHP may be deemed less than significant if a suite of recommended dust-control measures are implemented. Therefore, implementation of BAAQMD-identified BMPs for control of fugitive dust, listed above as **CPHP Mitigation Measure AIR-1b** would reduce impacts during construction of each of the CPHP Initial Phase projects as well as the Initial Phase improvements to less than significant levels.

Mitigation: Implement CPHP Mitigation Measures AIR-1a and AIR-1b.

Significance after Mitigation: Less than Significant.

7 It should be noted that Table 4.2-8 also reflects this same mitigation being implemented for the other three Initial Phase projects (Irving Street Arrival, New Hospital, and initial Aldea Housing Densification) to address significant impacts related to exposure to DPM identified in Impact AIR-3, below.

TABLE 4.2-8
ESTIMATED DAILY CONSTRUCTION EMISSIONS
WITH IMPLEMENTATION OF CPHP MITIGATION MEASURE AIR-1a FOR THE CPHP INITIAL PHASE PROJECTS
(INCLUDING NEW HOSPITAL)

Condition	ROG	NO_X	PM_{10}	$PM_{2.5}$
Construction 2021 (Irving Street Arrival Demolition, and RAB demolition and excavation[a])	1.34	14.73	0.16	0.16
Construction 2022 (Irving Street Arrival Construction, and RAB concrete)	0.93	9.21	0.11	0.11
Construction 2023 (RAB and Irving Street Arrival building construction and New Hospital demolition and excavation)	0.81	8.83	0.06	0.06
Construction 2024 (RAB and New Hospital building construction[b])	6.45	18.49	0.08	0.08
Construction 2025 (RAB and New Hospital building construction[b])	7.44	25.59	0.12	0.12
Construction 2026 (New Hospital building construction[b])	2.66	34.68	0.14	0.14
Construction 2027(New Hospital building construction[b])	1.29	17.00	0.07	0.07
Construction 2028 (New Hospital building construction[b], Initial Aldea Housing Densification demolition, excavation and building construction	22.03	22.18	0.12	0.12
Construction 2029 (New Hospital building construction and Initial Aldea Housing Densification construction)	29.42	16.61	0.07	0.07
Significance Threshold	54	54	82	54
Significant (Yes or No)?	No	No	No	No

NOTES:
a The RAB project includes demolition of UC Hall and School of Nursing building.
b Demolition of the LPPI to make room for the New Hospital was previously considered in the 2014 LRDP FEIR and is not part of the proposed CPHP.

SOURCE: ESA, 2020 (see Appendix AIR)

Impact AIR-2: Operation of campus facilities developed under the CPHP would result in a cumulatively considerable net increase of a criteria pollutant for which the project region is non-attainment under an applicable federal or state ambient air quality standard. (Significant and Unavoidable with Mitigation)

As discussed above, the SFBAAB is a non-attainment area for ozone, PM_{10} and $PM_{2.5}$ under federal and/or State air quality standards. The analysis below focuses on the potential for operational activities under the CPHP as a whole and for each of the Initial Phase projects to result in a cumulatively considerable net increase in operational emissions of ROG and NOx (ozone precursors) as well as PM_{10} and $PM_{2.5}$. Project-related emissions of these pollutants would be considered cumulatively considerable if the estimated daily emissions from operational activities would exceed emission thresholds set forth by BAAQMD.

CPHP

Operation of proposed CPHP development, and associated increases in population, would result in an increase in criteria air pollutant and precursor emissions, including ROG, NO_X, PM_{10} and $PM_{2.5}$ from a variety of emissions sources, including onsite area sources (e.g., natural gas combustion for increased use of the CUP for space and water heating, landscape maintenance, use of consumer products such as cleaning products, etc.) and mobile on-road sources. Operational emissions of criteria pollutants for the CPHP, for purposes of this analysis, were estimated using the CalEEMod version 2016.3.2 emissions inventory model.

Increased vehicle emissions under the CPHP, notably from additional visitors, as well as students, faculty and staff, would be one of the major sources of operational emissions. The net increase in VMT that would occur under the CPHP that was used in this analysis to estimate vehicle-related emissions was derived from the transportation analysis in Section 4.15, *Transportation*. Full buildout under the proposed CPHP would generate approximately 280,900 additional daily VMT. In addition to exhaust emissions, vehicles would also generate PM_{10} and $PM_{2.5}$ emissions from entrained road dust and tire and brake wear.

Emissions from other sources under the CPHP would include natural gas combustion from increased CUP operations, maintenance operation of new backup generators, operation of landscape maintenance equipment, and maintenance application of paint and other architectural coatings.

Table 4.2-9 presents the estimated increase in operational emissions as a result of implementation of the CPHP in year 2050. Although VMT associated with mobile sources would increase over existing conditions with buildout of the CPHP, emissions of ROG and NO_X from mobile sources would not significantly increase due to the greater efficiency of the overall vehicle fleet mix predicted for year 2050. However, these predicted emissions improvements would not affect emissions of entrained road dust associated with increased VMT, and the overall increase in PM_{10} emissions would exceed the BAAQMD threshold, which would be a significant impact with respect to a net increase in criteria pollutants for which the air basin is in non-attainment.

The results presented in Table 4.2-9 reflect the incremental emissions that would occur at the buildout of the proposed CPHP (inclusive of the New Hospital), and the significant impact related to PM_{10} emissions is identified based on net new emissions in 2050. As noted earlier, due to a lack of adequate details about the operational characteristics of the New Hospital, it is not possible to estimate the operational emissions from the New Hospital at this time. The New Hospital, however, represents a large percentage of the proposed CPHP development. In fact, based on building space, the Initial Phase development program (including the New Hospital), which would be completed by 2030, makes up about 74 percent of the total new development under the CPHP. Given the size of the Initial Phase development program, it is anticipated that with the completion of the New Hospital in 2030, VMT associated with the campus site would increase substantially such that a significant impact related to PM_{10} emissions would likely begin in 2030 or shortly after.

Because this significant criteria air pollutant impact is primarily a result of the increase in VMT due to the campus site growth under the CPHP, the mitigation measures for this impact, which are set forth below, focus on minimizing all emissions but specifically those due to the increase in VMT. The mitigation measures include measures to be implemented on a project-by-project basis to minimize emissions, and enhancements to the UCSF Transportation Demand Management (TDM) program to include strategies that reduce drive-alone, taxi/TNC, and drop-off trips (which contribute the most to total and per capita VMT).

TABLE 4.2-9
UNMITIGATED OPERATIONAL CRITERIA POLLUTANT EMISSIONS: EXISTING (2019), AND WITH CPHP BUILDOUT (2050)

	Estimated Emissions (lbs/day)			
Air Pollutant	**ROG**	**NO_X**	**PM_{10}**	**$PM_{2.5}$**
Existing (2019) Conditions				
Mobile Sources[a]	128.8	267.3	133.7	40.9
Area Sources[a]	70.1	<0.01	<0.01	<0.01
Natural gas combustion (CUP)[a]	5.32	8.18	14.5	13.6
Natural gas combustion (non-CUP)	0.37	3.38	0.26	0.26
Total (2019)	204.6	278.9	148.5	54.8
With CPHP (2050) Conditions				
Mobile Sources[a]	78.4	240.7	254.2	73.6
Area Sources[a]	107.2	<0.01	<0.01	<0.01
Natural gas combustion (CUP)[a]	8.54	13.1	23.3	21.8
Natural gas combustion (non-CUP)	0.60	5.44	0.41	0.41
Total (2019)	194.7	259.2	277.9	95.8
Net Change from Existing	-9.90	-19.7	**129.4**	**41.0**
Regional Significance Threshold	54	54	82	54
Significant Impact?	No	No	**Yes**	**No**

NOTE:
[a] Mobile sources are motor vehicles and trucks. Area sources include landscape maintenance (equipment used for these activities such as gasoline-powered lawnmowers and blowers), maintenance application of paints and other interior and exterior surface coatings, and increased use of consumer products that result in emissions of ROG. Natural gas combustion is calculated separately for the CUP and non-CUP demand.

SOURCE: ESA, 2020 (see Appendix AIR).

CPHP Mitigation Measure AIR-2a: Project-Level Operational Measures

The following measures, most of which are identified in the 2017 BAAQMD *CEQA Guidelines,* shall be reviewed and incorporated into specific development projects if not already included in the development project or otherwise in place at the Parnassus Heights campus site:

- Provide and maintain secure bike parking (at least one space per 20 vehicle spaces);
- Provide and maintain showers and changing facilities for employees;
- Provide information on transportation alternatives to employees;
- Provide and maintain preferential carpool and vanpool parking for non-residential uses;
- Increase building energy efficiency below Title 24 (reduces NO_X related to natural gas combustion);
- Require use of electrically powered landscape equipment, where feasible;

- Use low VOC architectural coatings in maintaining buildings;
- Meet California Green Building Code standards in new construction (reduces NOx related to natural gas combustion); and
- Provide electric vehicle charging stations in existing parking areas to promote the use of zero emission vehicles.
- Equip all truck loading and unloading docks with a power outlet for every two-dock doors. Signs shall be posted stating "Diesel trucks are prohibited from idling more than 5 minutes and trucks requiring auxiliary power shall connect to the electrical outlets to run auxiliary equipment.

CPHP Mitigation Measure AIR-2b: TDM Program Enhancements

To reduce on- and off-campus vehicle trips and resulting air quality impacts, UCSF will implement TDM program enhancements such that the number of new average daily vehicle trips to and from the campus site is reduced by at least 15 percent from the estimated new average daily vehicle trips without these program enhancements (Fehr & Peers, 2020).

TDM program enhancements/strategies shall initially include the following:

1. *New shuttle connections to regional transit (e.g. BART):* Implement new UCSF shuttle service between the campus site and regional transit stations (e.g. BART, Caltrain) to make regional transit a more attractive option for employees, patients, and visitors.
2. *Expand telecommuting and flexible hours program for employees:* Allow employees in appropriate positions to telecommute from home and/or work a modified schedule such that they are commuting to the campus less frequently per week.
3. *Improved telehealth program for patients:* Implement an expanded telehealth program to reduce the need for patients to travel to the campus site for appointments.
4. *Carpool and vanpool credits and incentives:* Provide cash allowance or discounted parking permit rates for individuals who carpool rather than drive alone; reduce monthly fares for Vanpool riders and drivers.
5. *Discontinue monthly parking permits:* Discontinue issuance of monthly parking permits to make commute travel mode a daily decision by shifting to daily parking permits.
6. *Enhanced patient TDM program*: Enhance information provided to patients regarding travel options to the campus site, including discussion of limited parking environment and public transit options.
7. *TNC to transit subsidy*: Provide cash allowance for individuals to use TNC to travel to transit rather drive alone.

UCSF may also make improvements to its existing TDM measures to achieve the targeted reduction in daily vehicle trips. In addition, if other new and/or improved TDM strategies are identified in the future, UCSF may implement such strategies in place of or in addition to the ones listed above.

The TDM program enhancements/strategies shall be monitored annually for their combined effectiveness in meeting the performance standard set forth above. The annual monitoring and reporting program shall include: (a) an annual calculation of baseline new average daily vehicle trips without TDM program enhancements for each year starting in 2030[8]; (b) an annual calculation of new average daily vehicle trips with the TDM program enhancements; and (c) a comparison of the results of (a) and (b) against the "existing" average daily vehicle trips to determine whether the performance standard of a 15 percent reduction in new average daily vehicle trips is achieved.

As this significant impact would likely begin upon the completion of the New Hospital, the annual monitoring and reporting program shall be commenced upon the completion and occupancy of the Initial Phase projects, i.e., after 2030, and shall be conducted by a qualified transportation engineer, using data from UCSF's regularly administered travel behavior surveys for employee commute, patient and visitor travel, and resident travel. Using these survey results, the monitoring report will gauge the effectiveness of implemented TDM program enhancements at achieving the required 15 percent reduction in new average daily vehicle trips. If the annual performance standard is met, no further action from UCSF is required until the next year. In the event that the performance standard is not met, UCSF will examine the TDM program to identify areas of improvement and institute changes, which shall be evaluated for their effectiveness in the following year's monitoring report.

Significance after Mitigation: Significant and Unavoidable. VMT estimates used in this analysis included adjustments for development scale, density, and diversity of uses, distance to transit and design of the campus sites, as well as a robust number of alternative transportation trips (walk, bike, and transit) and carpooling. Therefore, many key elements of alternative mode strategies have been incorporated into the trip generation and VMT assumptions.

CPHP Mitigation Measures AIR-2a and 2b would require the implementation of additional TDM and other measures to reduce vehicle trips to and from the campus site. However, the reduction in vehicle trips that would be achieved from the implementation of these measures would be about 15 percent (Fehr & Peers, 2020). Given that mobile emissions represent approximately 91 percent of total PM_{10} emissions under the CPHP, CPHP Mitigation Measures AIR-2a and -2b would not result in the 37 percent reduction in PM_{10} emissions needed to reduce the impact to a less-than-significant level, and the impact of operational criteria air pollutant emissions under the CPHP would be significant and unavoidable.

Regional Air Quality Impacts and Health Effects and the "Friant Ranch" Decision Associated with the CPHP

In 2018, the California Supreme Court in *Sierra Club v. County of Fresno*, (2018) 6 Cal.5th 502 ("Friant Ranch"), determined that the EIR for the Friant Ranch project was inadequate because it did not make "a reasonable effort to substantively connect the project's air quality impacts to likely health consequences" and that "the EIR should be revised to relate the expected adverse air quality impacts to likely health consequences or explain in meaningful detail why it is not feasible

8 The baseline new average daily vehicle trips without TDM program enhancements would be based on the average daily vehicle trip estimates for "Existing Conditions" and "CPHP (Future Phase)" scenarios, as presented in Appendix TRANS.

at the time of drafting to provide such an analysis." As such, a discussion is warranted for the potential health effects associated with the CPHP's significant air quality impacts and the currently available modeling tools and methods to correlate the project's criteria pollutant emissions to health effects. This discussion is provided for informational purposes only and there is no related threshold of significance.

The types of adverse health effects known to occur as a result of exposure to criteria air pollutants and the potential formation of ozone have been discussed in "Ambient Air Quality - Criteria Air Pollutants" under the Environmental Setting Section, above. The analysis below summarizes the findings of a Health Impact Assessment (HIA) prepared for the proposed CPHP in support of the EIR (Ramboll, 2020). The HIA uses available models to attempt to correlate the CPHP's unmitigated criteria air pollutant emissions to elevated concentrations of such pollutants in the region, and then to identify health effects that may occur as a result of predicted increased concentrations. The following analysis reflects a good faith attempt, based on the existing tools, to relate the expected adverse air quality impacts to likely health consequences as directed by the Supreme Court in the Friant Ranch case.[9] Limitations and qualifications of the analysis are discussed in detail in the HIA which is presented in full in **Appendix HIA**. The analyses do not conclude whether the predicted health effects are significant for CEQA purposes; rather, the predicted health effects are provided for informational purposes so as to enhance the understanding of the effects of impacts determined to be significant.

For criteria pollutants, including ozone precursors NOx and ROG, as well as PM_{10} and $PM_{2.5}$, BAAQMD established CEQA significance thresholds based on the federal New Source Review program for new stationary sources of pollution, which contains more stringent thresholds than does BAAQMD's offset program for these pollutants. "These thresholds represent the emission levels above which a project's individual emissions would result in a considerable adverse contribution to the [San Francisco Bay Area Air Basin]'s existing air quality conditions" (BAAQMD, 2009). These thresholds provide a connection between a mass emission threshold and avoidance of adverse health effects. As the analysis above shows, the operational emissions from the implementation of the CPHP would be below applicable mass emissions thresholds for all pollutants except PM_{10}.

The following analysis is provided to disclose the extent to which unmitigated (without the implementation of CPHP Mitigation Measures AIR-2a [Project-Level Operational Measures] and AIR-2b [TDM Program Enhancements]) criteria air pollutant emissions from the CPHP would result in (1) changes in the concentration of criteria air pollutants in the atmosphere, and (2) correlative health effects that may occur as a result of those changes in air pollutant concentrations. CPHP Mitigation Measures AIR-2a and 2b would require the implementation of additional TDM and other measures to reduce vehicle trips to and from the campus site which would reduce PM_{10} emissions by at least 15 percent. However, conservatively, the health effects analysis is based on unmitigated emissions. Incorporation of reductions due to mitigation measures would result in lower health effect estimates.

9 *Sierra Club v. County of Fresno* (2018) 6 Cal.5th 502, 517-522.

Other conservative assumptions include the assumption that health effects occur at any concentration, including small incremental concentrations (discussed further in Attachment C of the HIA); and the assumption that all particulate matter is of equal toxicity. As such, results presented below are meant to represent an upper bound of potential health effects, and considering the inherent uncertainty in the models as well as the small contribution of CPHP emissions relative to the base case emissions, the actual health effects may be zero. Further, should health effects in fact only occur above a certain threshold, and the increment from the CPHP not cause an exceedance of that threshold, the actual health effects could be zero.

Consistent with the USEPA's assessment of health effects of PM, the HIA evaluation focuses on $PM_{2.5}$ and not PM_{10}[10] as $PM_{2.5}$ has a much larger body of evidence that this size fraction is associated with health effects due to the sources, composition, chemical properties and lifetime in the atmosphere (USEPA 2009). $PM_{2.5}$ is capable of penetrating deeper into the lungs because of their size compared to larger particles and this is believed to contribute to greater health effects. Consistent with USEPA health effects evaluations, the health effect functions in BenMAP for PM use $PM_{2.5}$ as the causal PM agent.

A photochemical grid model and Comprehensive Air Quality Model with extensions (CAMx) was used to estimate the increases in concentrations of ozone and $PM_{2.5}$ in the region as a result of the emissions of criteria and precursor pollutants from the CPHP.

The USEPA-authored program, the Benefits Mapping and Analysis Program Community Edition (BenMAP-CE, herein referred to as "BenMAP"),[11] was then used to estimate the resulting health effects from the small increases in concentrations.

Results of the HIA Analysis

Photochemical grid modeling performed using CAMx predicts slight increases in ozone and $PM_{2.5}$ concentrations with the unmitigated CPHP emissions as compared to the base case emissions. The CAMx results for the base case as compared to the base case plus the unmitigated CPHP show the following maximum increases at the most affected model grid cells:

- 0.003 parts per billion (ppb), or 0.007 percent, for annual average of maximum daily 8-hour ozone;
- 0.019 ppb, or 0.03 percent, for overall maximum of maximum daily 8-hour average ozone;
- 0.039 $\mu g/m^3$, or 0.4 percent, for annual average $PM_{2.5}$; and
- 0.118 $\mu g/m^3$, 0.4 percent, for maximum 24-hour average $PM_{2.5}$.

Note that these estimated increases are for the most affected grid cell; thus, the estimated changes in all other modeled grid cells would be less. These results generally validate the prediction that the addition of locally generated emissions could result in incremental increases in nearby ground level concentrations of ozone and $PM_{2.5}$. However, these increases are very small.

---

[10] PM_{10} is defined as particulate matter with a nominal mean aerodynamic diameter less than or equal to 10 µm.

[11] https://www.epa.gov/benmap/benmap-ce-manual-and-appendices.

Although there is a strong correlation between elevated concentrations and elevated health incidence rates, there is uncertainty when linking health incidence data with very low concentrations. In addition, as discussed below, there are several additional modeling uncertainties and assumptions embodied in the analysis. Health effects presented are conservatively estimated, and may be zero.

Overall, the estimated change in health effects from ozone and $PM_{2.5}$ associated with unmitigated CPHP emissions are minimal in light of background incidences. Specifically, for all the health endpoints quantified, the number of estimated incidences is between 0.000066 percent and 0.0011 percent of the background health incidence. The "background health incidence" is an estimate of the average number of people that suffer from some adverse health effect in a given population over a given period of time in the absence of additional emissions from the CPHP. Health incidence rates and other health data are typically collected by the government as well as the World Health Organization. When taken into context, the small increase in incidences and the very small percentage of the number of background incidences indicate that these health effects are minimal in a developed, urban environment.

Maximum $PM_{2.5}$-related health outcomes attributed to CPHP-related increases in ambient air concentrations include:

- Asthma-related emergency room visits (approximately 0.99 incidences per year),
- Asthma-related hospital admissions (approximately 0.07 incidences per year),
- All cardiovascular-related hospital admissions (not including myocardial infarctions) (approximately 0.20 incidences per year),
- All respiratory-related hospital admissions (approximately 0.42 incidences per year),
- Mortality (approximately 2.36 incidences per year),[12] and
- Nonfatal acute myocardial infarction (approximately 0.16 incidences per year across all age groups).

These numbers compare to the background incidences for the entire modeled regional area of approximately 25 million people, with asthma-related emergency room visits (126,657 per year), asthma-related hospital admissions (14,603 per year), all cardiovascular-related hospital admissions (not including myocardial infarctions) (180,325 per year), all respiratory-related hospital admissions (155,122 per year), mortality (327,475 per year), and nonfatal acute myocardial infarction (48,359 per year for all age groups). Refer to the Appendix HIA for additional discussion.[13]

Maximum ozone-related health outcomes attributed to CPHP-related increases in ambient air concentrations included:

---

[12] Mortality associated with $PM_{2.5}$ is a result of an individual's exposure to average annual $PM_{2.5}$ concentrations. As such, this analysis uses average annual $PM_{2.5}$ concentrations to estimate incidences of mortality.

[13] For background incidence rates, BenMAP projects likely mortality rates for future years, but for other health effects, incidence rates are based on population changes only and may not reflect rates for future years. The projected incidence rates are assumed conservative because incidence rates are expected to decrease over time with improved air quality.

- Respiratory-related hospital admissions (approximately 0.10 incidences per year),
- Mortality, All Cause (approximately 0.055 incidences per year), and
- Asthma-related emergency room visits (approximately 1.23 incidences per year).

These numbers compare to the background incidences for the entire modeled regional area with respiratory-related hospital admissions (155,122 per year), mortality all cause (204,688 per year), and asthma-related emergency room visits (126,658 per year). Refer to Appendix HIA for additional discussion.[14]

Modeling Assumptions

As discussed above, health outcomes presented here conservatively utilize the years corresponding to the highest annual average CPHP emissions for ozone precursors and $PM_{2.5}$, which were combined to develop a conservative emissions inventory. The emissions speciation profiles for the regional existing conditions emission inventory were assumed equivalent to the speciation profiles for the CPHP conditions, as developed by BAAQMD. As noted above, it was assumed that health effects can occur at any concentration, including small incremental concentrations. It was also assumed that all $PM_{2.5}$ emissions are of equal toxicity, regardless of the source of PM or the constituents of each PM emissions source. These assumptions all result in highly conservative health risk estimates and are intended to represent the worst-case, upper bound potential impacts.

Uncertainty of Results

As many regional-scale HIAs and this project-level analysis demonstrate, performing a quantitative HIA is complex and difficult, but some level of analyses can be performed. Nevertheless, the limitations of such analyses should be noted. The model outputs provide seemingly precise values. It would be inappropriate, however, to assume that these values give an exact understanding of the CPHP's actual impacts. The uncertainty in such analyses is inherent and unavoidable due to all of the assumptions about meteorology, photochemical reactions, and other air basin characteristics.

The HIA for the CPHP does not link the changes in ozone and $PM_{2.5}$ concentration associated with CPHP operations to any specific *individual* health impact; instead, it uses studies that report *correlations* between health effects and exposure to ozone and $PM_{2.5}$ to estimate potential effects on the population in the modeling domain.

The modeling performed to estimate a project's contribution to ambient concentrations of pollutants requires assumptions for many variables related to the proposed project and the meteorological and other characteristics of the air basin, into which the pollutants are emitted. All simulations of physical processes, whether ambient air concentrations or health effects from air pollution, have an associated level of uncertainty due to many simplifying assumptions. Each step in the modeling process, and each assumption incorporated into the model, adds a degree of uncertainty into the reported results, resulting from the usage of air pollutant emission estimates, ambient air concentration modeling, and health impact calculations using various health impact functions. The

[14] Ibid.

combination and compounding of the uncertainties from each step of the modeling analysis, in the context of the very small increments of change that are predicted, could result in large uncertainties. The modeling results should be viewed in light of these uncertainties.

There are a number of assumptions built into the application of C-R functions in BenMAP that may lead to an overestimation of health effects. For example, for all-cause mortality impacts from $PM_{2.5}$, these estimates are based on a single epidemiological study that found an association between $PM_{2.5}$ concentrations and mortality. While similar studies suggest that such an association exists, there remains uncertainty regarding a clear causal link. This uncertainty stems from the limitations of epidemiological studies, such as inadequate exposure estimates and the inability to control for many factors that could explain the association between $PM_{2.5}$ and mortality such as lifestyle factors like smoking or exposures to other air pollutants.

For both the $PM_{2.5}$ and ozone health effects calculated, each of the pollutants may be a confounder of the other and both air pollutants could contribute to the health effect outcomes evaluated, so the overall impacts may be overstated.

These assumptions and uncertainties do not necessarily mean the modeled results are invalid or uninformative. Rather, the modeled results should not be misinterpreted as an exact calculation of something as complex as photochemical grid modeling, or as an exact correlation between a given level of emissions and specific health effects. In this case, the modeled health effects may differ from the actual future health effects associated with implementation of the CPHP.

The very small increase in health effects incidence determined from the modeling, relative to the substantially larger number of background health effects incidences, demonstrates that the proposed CPHP would have a very small impact on specific health effects. The estimated increases in those health effect incidences are quite minor compared to the background health incidence values with the largest $PM_{2.5}$ health effect (all-cause mortality), representing only 0.0007 percent of the total of all deaths, and the largest effect for ozone (asthma-related emergency room visits by adults), representing 0.001 percent of all emergency room visits.

While the quantitative HIA uses the best available tools and guidance currently available, there are many compounding uncertainties which may affect the reported results such that the modeled health effects may differ from the actual future health effects associated with the proposed CPHP. The calculated health effects for the CPHP are conservatively estimated, within the models' margin of error, and may in fact be zero.

Additional discussion of modeling limitations and uncertainty is provided in Appendix HIA.

Irving Street Arrival, Research and Academic Building, and Initial Aldea Housing Densification Projects, and Initial Phase Improvements

The proposed removal of the existing UC Hall and School of Nursing building that would occur as part of the RAB project, and the removal of three existing residential apartment buildings in the Aldea Housing complex as part of the initial Aldea Housing Densification project, would result in area source and energy source criteria pollutant emission losses from these older, less efficient buildings. Emissions losses from these existing buildings being removed were estimated using the CalEEMod model. The energy and area source emissions from the operation of the initial Aldea residences and the proposed RAB were also estimated using the CalEEMod model. The proposed Irving Street Arrival is conservatively assumed to generate operational emissions equivalent to those of the existing on-site structure. As a practical matter, the space is likely to require a reduced energy demand for water and space heating as a result of improved efficiency of building materials and construction methods as compared to the existing structure.

The proposed RAB would also result in increased operation of the CUP; these emissions were calculated based on emission estimates from existing operations provided by BAAQMD and the percentage increase in operable square footage. The existing Aldea residences do not draw from the CUP operations, and similarly, the proposed new Aldea residences that would occur under the Initial Phase would not draw from the CUP.

Criteria pollutant emissions would also be generated by the increase in vehicle traffic by the Initial Phase projects. Similar to the VMT estimated for the CPHP as a whole, the net increase in VMT used to estimate vehicle-related emissions was derived from the transportation analysis in Section 4.15, *Transportation*. The proposed RAB and initial Aldea Housing Densification projects would generate approximately 51,900 additional daily VMT. In addition to exhaust emissions, vehicles would also generate PM_{10} and $PM_{2.5}$ from entrained road dust and tire and brake wear. The proposed Irving Street Arrival would not generate any new vehicle trips.

Operation of proposed Initial Phase improvements may generate incremental criteria air pollutants, but are not expected to substantially contribute to those emissions calculated below for operation of the Initial Phase projects. Once constructed, the Initial Phase improvements are not anticipated to generate incremental operational emissions, and those improvements that involve building renovations are likely to improve building efficiency with potential reduction of operational emissions of the CUP for heating and cooling.

Table 4.2-10 presents estimated operational emissions from the Irving Street Arrival, RAB and initial Aldea Housing Densification projects. As shown in Table 4.2-10, emissions of ROG, NO_X, PM_{10} and $PM_{2.5}$ would all be less than the BAAQMD thresholds of significance. The criteria pollutant impact associated with operation of these Initial Phase projects and Initial Phase improvements would be less than significant with respect to net increases of criteria pollutants and precursors within the air basin.

Mitigation: None required.

Regional Air Quality Impacts and Health Effects and the “Friant Ranch” Decision Associated with Operation of the Irving Street Arrival, Research and Academic Building, and Initial Aldea Housing Densification Projects

Incremental operational emissions associated with these Initial Phase projects, and excluding the New Hospital, were estimated for the year of buildout (2030) of these projects in the EIR. Emissions associated with these projects include emissions from architectural coatings, VOCs in consumer products, landscaping equipment, emergency generators, CUP, and emissions associated with motor vehicle use.

TABLE 4.2-10
OPERATIONAL CRITERIA POLLUTANT EMISSIONS OF THREE INITIAL PHASE PROJECTS (2030)

Air Pollutant	Estimated Emissions (pounds per day)			
	ROG	NO_X	PM_{10}	$PM_{2.5}$
New Development				
Irving Street Arrival[a]	NA	NA	NA	NA
RAB Energy Source	0.03	0.28	0.02	0.02
RAB Area Sources[b]	1.20	<0.01	<0.01	<0.01
Initial Phase Aldea Densification Energy Sources	<0.01	0.07	<0.01	<0.01
Initial Phase Aldea Densification Area Sources[b]	0.89	0.02	<0.01	<0.01
Losses from Buildings Demolished in Initial Phase)				
Irving Street Arrival	NA	NA	NA	NA
UC Hall Energy Sources (RAB)	-0.10	-0.96	-0.07	-0.07
UC Hall Area Sources[b]	-4.03	> -0.01	> -0.01	> -0.01
Existing School of Nursing building Energy Sources	-0.06	-0.59	-0.04	-0.04
Existing School of Nursing building Area Sources	-2.44	> -0.01	> -0.01	> -0.01
Existing Aldea Housing Energy Sources (Initial Phase Demolition only)	<0.01	-0.09	<0.01	<0.01
Existing Aldea Housing Area Sources[b] (Initial Phase Demolition only)	-0.84	<0.01	<0.01	<0.01
Mobile Source Emissions (RAB and Initial Aldea Housing Densification)[b]	5.5	18.6	38.7	10.5
Natural gas combustion (CUP)[b]	0.11	0.17	0.32	0.30
Emergency Generator (RAB)	0.01	0.96	0.02	0.02
Total	**0.27**	**18.48**	**39.0**	**10.7**
Significance Threshold	54	54	82	54
Significant Impact?	No	No	No	No

NOTES:
[a] The proposed Irving Street Arrival is conservatively assumed to generate operational emissions equivalent to those of the existing on-site structure. As a practical matter, the space is likely to require a reduced energy demand for water and space heating as a result of improved efficiency of building materials and methods as compared to the existing structure. The Irving Street Arrival would not generate any new vehicle trips.
[b] Mobile sources are motor vehicles and trucks. Area sources include landscape maintenance (equipment used for these activities such as gasoline-powered lawnmowers and blowers), maintenance application of paints and other interior and exterior surface coatings, and increased use of consumer products that result in emissions of ROG. Natural gas combustion is for the CUP.

SOURCE: ESA, 2020 (see Appendix AIR).

The potential health effects from the emissions associated with these Initial Phase Projects can be generally characterized using the full CPHP level modeling results and a comparison of total emissions. This is because the types and general spatial allocation of emissions is similar between the Initial Phase projects and the full buildout of the CPHP. Emissions from these Initial Phase projects would also be subject to similar meteorological and photochemical reaction conditions as the full Project assessment. Additionally, the exposed population at full buildout in 2050 is greater than the exposed population in 2030, due to project growth in the region. Therefore, linearly scaling full CPHP buildout health effects to estimate Initial Phase projects health effects is conservative.

Concentrations changes, and thus health effects, from $PM_{2.5}$ are driven by primary $PM_{2.5}$ emissions, with smaller contributions from NOx, VOC, and SO2 resulting in secondary $PM_{2.5}$ formation. Based on a ratio of total $PM_{2.5}$ emissions from the full CPHP to the three Initial Phase projects $PM_{2.5}$ emissions, approximate health effect results from $PM_{2.5}$ for these Initial Phase projects would be approximately 20 percent of the full CPHP buildout.

Concentration changes, and thus health effects, from ozone are driven primarily by emissions of VOC and NOx, with some contribution from CO. Based on a ratio of total VOC and NOx emissions from the full CPHP to the three Initial Phase projects, VOC and NOx emissions, approximate health effect results from ozone for these Initial Phase projects would be approximately 20 percent of the full CPHP buildout.

Impact AIR-3: Construction activities under the CPHP could expose sensitive receptors to substantial pollutant concentrations and exceed the LRDP EIR standard of significance by exposing receptors to toxic air contaminant emissions that (1) result in a cancer risk greater than 10 cancer cases per 1 million people exposed in a lifetime; or (2) for acute or chronic effects, result in concentrations of toxic air contaminant emissions with a Hazard Index of 1.0 or greater. (Less than Significant with Mitigation)

CPHP

Construction emissions from activities over the duration of the CPHP would include those described below for the CPHP Initial Phase projects, including the New Hospital, as well as construction emissions associated with CPHP Future Phase projects. Specific details regarding year of construction or phasing of construction for Future Phase projects that would occur beyond 2030 are not currently available. BAAQMD guidelines do not provide a specific methodology for assessing construction-related health risk impacts at the Plan level. Without specific information with respect to year of construction or the phasing sequence of the CPHP Future Phase projects, a quantitative analysis of construction-phase human health risk from the CPHP as a whole is not feasible. Accordingly, a quantitative analysis is provided below for CPHP Initial Phase projects, including the New Hospital, while a qualitative analysis is provided herein for the assessment of construction-related health risk impacts of other CPHP components to be constructed post-2030.

The CPHP Initial Phase projects, including the Irving Street Arrival, RAB, initial Aldea Housing Densification projects and New Hospital, along with other miscellaneous improvements would be completed by 2030. Construction, demolition and excavation estimates over the approximate 10-year Initial Phase are summarized in Impact AIR-1, above. Analysis provided below for the Initial Phase project indicates that calculated human health risk would exceed applicable thresholds, and consequently health risk impact from construction TAC emissions would be significant and mitigation is identified below to reduce construction-related emissions.

Proposed CPHP Future Phase development is assumed to be completed between approximately 2030 and the horizon year of the Plan, about year 2050. Construction, demolition and excavation estimates over the approximate 20-year Future Phase are summarized in Impact AIR-1, above. The general types of construction equipment and techniques that would be used for CPHP Future Phase projects would be similar to those for the CPHP Initial Phase projects. As a result, while on balance, the overall amount of construction in the Future Phase would be roughly comparable to that which would occur in the Initial Phase, the Future Phase construction would be generally spread out over a longer duration (20-year period) that the Initial Phase construction (10-year period).

Without details of specific construction schedules, sequencing, and overlap of the CPHP Future Phase projects, it is not possible to calculate average daily construction TAC emissions associated with the CPHP Future Phase. However, it is reasonable to expect that there would be periods during the Future Phase when daily construction TAC emissions generated would be generally comparable to those estimated for the CPHP Initial Phase projects. It should be noted that the overall construction fleet that would be used during construction of CPHP Future Phase projects would be substantially less-polluting than the fleet active during the CPHP Initial Phase, as CARB's Off-Road Emissions Regulation for both new and in-use equipment discussed above in the Setting section would implemented over time.

Nonetheless, the human health risk impact associated with the CPHP would be potentially significant and require mitigation. Specifically, **CPHP Mitigation Measure AIR-1a** would require the use of construction equipment with USEPA-certified Tier 4 engines (although as a practical matter, post-2030 when Future Phase construction would take place, the majority of in-use construction equipment will likely already meet these requirements).

In addition, implementation of **CPHP Mitigation Measure AIR-3** would require that for proposed CPHP construction projects that involve 12 months of active construction (i.e., exclusive of interior renovations) and are within 1,000 feet of sensitive receptors, a project-specific construction health risk analysis shall be completed to demonstrate that the construction activities of individual projects under the CPHP would not result in a significant acute, chronic non-cancer or cancer-related health risk to specific sensitive receptors. Implementation of CPHP Mitigation Measure AIR-3 would ensure potential impact related to exposure of sensitive receptors to substantial pollutant concentrations or health risk from construction activities under the CPHP would be less than significant.

Mitigation: Implement CPHP Mitigation Measure AIR-1a.

CPHP Mitigation Measure AIR-3: Project-Specific Health Risk Analysis

UCSF shall prepare and submit to UCOP for review and approval, a project-specific health risk analysis demonstrating that project construction activities will not result in a significant acute, chronic non-cancer or cancer-related health risk to sensitive receptors. This requirement shall apply to construction projects in excess of 12 months of active construction (i.e., exclusive of interior renovations) and within 1,000 feet of sensitive receptors. As a performance standard, any subsequent project-specific health risk analysis must demonstrate an excess cancer risk level of 10-in-1 million or less, a non-cancer (i.e., chronic or acute) hazard index of 1.0 or less, and an incremental increase an annual average $PM_{2.5}$ concentrations of no more than 0.3 microgram per cubic meter.

Significance after Mitigation: Less than Significant.

Irving Street Arrival, RAB, New Hospital, and Initial Aldea Housing Densification Projects, and Initial Phase Improvements

As discussed in Chapter 3, *Project Description*, this EIR addresses three CPHP Initial Phase projects at a project-level (Irving Street Arrival, RAB, and initial Aldea Housing Densification projects). While the proposed New Hospital is also a CPHP Initial Phase project and is generally considered programmatically in this EIR, given the anticipated concurrent construction of proposed New Hospital with the other Initial Phase projects, all four Initial Phase projects are considered in this assessment for construction-related health risks.

Other Initial Phase improvements would also generate incremental construction-related emissions depending on the timing of implementation, however, they are not expected to substantially contribute to the risks calculated below for the Initial Phase projects mentioned above. Furthermore, as applicable, any Initial Phase improvements that would be constructed outside the campus site boundary, such as streetscape, utility or neighborhood investments, may involve the cooperation of the City of San Francisco and, as public works projects, may be subject to the City of San Francisco's Clean Construction Ordinance which would reduce DPM emissions.

Incremental Cancer Risk from Construction of the Irving Street Arrival, RAB, Initial Aldea Housing Densification and New Hospital

For purposes of this analysis, incremental cancer risk associated with construction of the Irving Street Arrival, RAB, and initial Aldea Housing Densification, as well as the New Hospital, were estimated.

Table 4.2-11, **Table 4.2-12**, **Table 4.2-13** and **Table 4.2-14** present the unmitigated HRA results for existing receptors due to construction activities for the Irving Street Arrival, RAB, New Hospital, and the initial Aldea Housing Densification, respectively. The results represent a 30-year exposure which begins at the start of construction.

As shown in these tables, construction emissions from each of the four Initial Phase projects other than the initial Aldea Housing Densification (See Table 4.2-14) would result in a cancer risk at the maximum exposed off-site residential receptors that would exceed the 10 in one-million excess cancer risk threshold. Additionally, construction emissions from the RAB and initial Aldea Housing Densification projects would each result in a cancer risk at the maximum exposed residential receptors on the campus site that would exceed the 10 in one-million excess cancer risk threshold. Also, construction emissions from the RAB would result in a cancer risk at the maximum exposed daycare receptor that would exceed the 10 in one-million excess cancer risk threshold.

Thus, the cancer risk due to construction activities associated with each of the Initial Phase projects, including the New Hospital, would be potentially above the BAAQMD threshold of 10 in one-million and the impact would be potentially significant.

As discussed under Impact AIR-1, **CPHP Mitigation Measure AIR-1a** that includes the use of clean construction equipment would be imposed on the construction of each of the Initial Phase projects, including the New Hospital, to reduce NO_X emissions. Implementation of CPHP Mitigation Measure AIR-1a would also reduce DPM emissions generated by the construction activities associated with these Initial Phase projects. Additionally even though the other Initial Phase improvements would only incrementally add DPM emissions during construction, CPHP Mitigation Measure AIR-1a is conservatively identified to apply to these improvements as well.

Table 4.2-15, **Table 4.2-16**, **Table 4.2-17**, and **Table 4.2-18** present the mitigated human health risk to existing receptors from construction activities for the Irving Street Arrival, RAB, New Hospital, and initial Aldea Housing Densification projects, respectively. As shown in these tables, the maximum cancer risk from construction emissions for all receptors with implementation of CPHP Mitigation Measure AIR-1a would be below the 10 in one-million excess cancer risk threshold at all receptors for each of the four individual Initial Phase construction projects. With implementation of CPHP Mitigation Measure AIR-1a, impacts would also be below the 10 in one-million excess cancer risk threshold at all receptors assuming concurrent construction of these Initial Phase projects. Thus, the cancer risk due to construction activities associated with each of these Initial Phase projects would be less than significant with mitigation.

Mitigation: Implement CPHP Mitigation Measure AIR-1a.

Significance after Mitigation: Less than Significant. Implementation of CPHP Mitigation Measure AIR-1a which requires the use of clean construction equipment would result in reduced cancer risk such that maximum cancer risk for a 30-year lifetime exposure for the MEI for each Initial Phase project would be below the BAAQMD threshold of 10 in one-million, and therefore, the impact would be less than significant.

TABLE 4.2-11
UNMITIGATED PROJECT HEALTH IMPACTS ESTIMATED, IRVING STREET ARRIVAL CONSTRUCTION

Receptor Type[a]	Cancer Risk	Chronic Hazard Index[b,c]	$PM_{2.5}$ Concentration ($\mu g/m^3$)[c]
Resident – Offsite Receptor			
Project Construction[d]	**24.99**	0.02	0.09
Significance Threshold	10	1.0	0.3
Significant (Yes or No)?	**Yes**	No	No
Resident – Onsite Residence			
Project Construction[d]	5.33	<0.01	0.02
Significance Threshold	10	1.0	0.3
Significant (Yes or No)?	No	No	No
Daycare			
Project Construction[d]	1.18	<0.01	0.01
Significance Threshold	10	1.0	0.3
Significant (Yes or No)?	No	No	No
School			
Project Construction[d]	0.07	<0.01	0.01
Significance Threshold	10	1.0	0.3
Significant (Yes or No)?	No	No	No

NOTES:

[a] MEI for each receptor type are:
offsite residents = Residence on the north side of Irving Street
onsite residents = UCSF Third Avenue housing
daycare = UCSF Lucia Child Development Center
school = Haight Ashbury Community Nursery School

[b] Construction risk is from DPM exposure. There is no published DPM REL for acute risk.

[c] Hazard Impact and $PM_{2.5}$ annual concentration represent worst year of exposure not a summation.

[d] Exposure durations:
residents = duration of construction, ~1.75 years
daycare = duration of construction, ~1.75 years
school = duration of construction, ~1.75 years

SOURCE: ESA, 2020 (see Appendix AIR)

TABLE 4.2-12
UNMITIGATED PROJECT HEALTH IMPACTS ESTIMATED, RAB CONSTRUCTION

Receptor Type[a]	Cancer Risk	Chronic Hazard Index[b,c]	$PM_{2.5}$ Concentration ($\mu g/m^3$)[c]
Resident – Offsite Receptor			
Project Construction[d]	**51.03**	0.04	0.16
Significance Threshold	10	1.0	0.3
Significant (Yes or No)?	**Yes**	No	No
Resident – Onsite Residence			
Project Construction[d]	**25.50**	0.02	0.08
Significance Threshold	10	1.0	0.3
Significant (Yes or No)?	**Yes**	No	No
Daycare			
Project Construction[d]	**19.98**	0.04	0.17
Significance Threshold	10	1.0	0.3
Significant (Yes or No)?	**Yes**	No	No
School			
Project Construction[d]	0.19	<0.01	0.01
Significance Threshold	10	1.0	0.3
Significant (Yes or No)?	No	No	No

NOTES:

a MEI for each receptor type are:
offsite residents = Residence on the north side of Parnassus Avenue
onsite residents = third avenue housing
daycare = UCSF Lucia Child Development Center
school = Haight Ashbury Community Nursery School

b Construction risk is from DPM exposure. There is no published DPM REL for acute risk.

c Hazard Impact and $PM_{2.5}$ annual concentration represent worst year of exposure not a summation.

d Exposure durations:
residents = duration of construction, ~4 years
daycare = duration of construction, ~4 years
school = duration of construction, ~4 years

SOURCE: ESA, 2020 (see Appendix AIR)

TABLE 4.2-13
UNMITIGATED PROJECT HEALTH IMPACTS ESTIMATED, NEW HOSPITAL CONSTRUCTION

Receptor Type[a]	Cancer Risk	Chronic Hazard Index[b,c]	$PM_{2.5}$ Concentration ($\mu g/m^3$)[c]
Resident – Offsite Receptor			
Project Construction[d]	**67.06**	0.04	0.19
Significance Threshold	10	1.0	0.3
Significant (Yes or No)?	**Yes**	No	No
Resident – Onsite Residence			
Project Construction[d]	6.54	<0.01	0.02
Significance Threshold	10	1.0	0.3
Significant (Yes or No)?	No	No	No
Daycare			
Project Construction[d]	1.91	<0.01	0.02
Significance Threshold	10	1.0	0.3
Significant (Yes or No)?	No	No	No
School			
Project Construction[d]	0.50	0.01	0.03
Significance Threshold	10	1.0	0.3
Significant (Yes or No)?	No	No	No

NOTES:

a MEI for each receptor type are:
offsite residents = Residence on the south side of Parnassus Avenue east of the campus site
onsite residents = UCSF Third Avenue housing
daycare = Lucia Child Care Center
school = Haight Ashbury Community Nursery School

b Construction risk is from DPM exposure. There is no published DPM REL for acute risk.

c Hazard Impact and $PM_{2.5}$annual concentration represent worst year of exposure not a summation.

d Exposure durations:
residents = duration of construction, ~6.5 years
daycare = attendance years at location, ~5 years
school = attendance years at location, ~4 years

SOURCE: ESA, 2019 (see Appendix AIR)

TABLE 4.2-14
UNMITIGATED PROJECT HEALTH IMPACTS ESTIMATED, INITIAL ALDEA HOUSING DENSIFICATION CONSTRUCTION

Receptor Type[a]	Cancer Risk	Chronic Hazard Index[b,c]	$PM_{2.5}$ Concentration ($\mu g/m^3$)[c]
Resident – Offsite Receptor			
Project Construction[d]	8.99	<0.01	0.06
Significance Threshold	10	1.0	0.3
Significant (Yes or No)?	No	No	No
Resident – Onsite Residence			
Project Construction[d]	**60.81**	0.09	**0.42**
Significance Threshold	10	1.0	0.3
Significant (Yes or No)?	**Yes**	No	**Yes**
Daycare			
Project Construction[d]	0.07	<0.01	<0.01
Significance Threshold	10	1.0	0.3
Significant (Yes or No)?	No	No	No
School			
Project Construction[d]	0.01	<0.01	<0.01
Significance Threshold	10	1.0	0.3
Significant (Yes or No)?	No	No	No

NOTES:

[a] MEI for each receptor type are:
offsite residents = Residence on Christopher Drive
onsite residents = Existing Aldea Housing remaining and occupied in Initial Phase construction
daycare = Kirkham Child Development Center
school = Clarendon Alternative Elementary

[b] Construction risk is from DPM exposure. There is no published DPM REL for acute risk.

[c] Hazard Impact and $PM_{2.5}$annual concentration represent worst year of exposure not a summation.

[d] Exposure durations:
residents = duration of construction, ~1 year
daycare = duration of construction, ~1 year
school = duration of construction, ~1 year

SOURCE: ESA, 2019 (see Appendix AIR)

TABLE 4.2-15
MITIGATED PROJECT HEALTH IMPACTS ESTIMATED, IRVING STREET ARRIVAL CONSTRUCTION

Receptor Type[a]	Cancer Risk	Chronic Hazard Index[b,c]	$PM_{2.5}$ Concentration ($\mu g/m^3$)[c]
Resident – Offsite Receptor			
Project Construction[d]	1.17	<0.01	<0.01
Significance Threshold	10	1.0	0.3
Significant (Yes or No)?	No	No	No
Resident – Onsite Residence			
Project Construction[d]	0.30	<0.01	<0.01
Significance Threshold	10	1.0	0.3
Significant (Yes or No)?	No	No	No
Daycare			
Project Construction[d]	0.07	<0.01	<0.01
Significance Threshold	10	1.0	0.3
Significant (Yes or No)?	No	No	No
School			
Project Construction[d]	<0.01	<0.01	<0.01
Significance Threshold	10	1.0	0.3
Significant (Yes or No)?	No	No	No

NOTES:

a MEI for each receptor type are:
offsite residents = Residence on the north side of Irving Street
onsite residents = UCSF Third Avenue housing
daycare = UCSF Lucia Child Development Center
school = Haight Ashbury Community Nursery School

b Construction risk is from DPM exposure. There is no published DPM REL for acute risk.

c Hazard Impact and $PM_{2.5}$ annual concentration represent worst year of exposure not a summation.

d Exposure durations:
residents = duration of construction, ~1.75 years
daycare = duration of construction, ~1.75 years
school = duration of construction, ~1.75 years

SOURCE: ESA, 2019 (see Appendix AIR)

TABLE 4.2-16
MITIGATED PROJECT HEALTH IMPACTS ESTIMATED, RAB CONSTRUCTION

Receptor Type[a]	Cancer Risk	Chronic Hazard Index[b,c]	$PM_{2.5}$ Concentration ($\mu g/m^3$)[c]
Resident – Offsite Receptor			
Project Construction[d]	2.91	<0.01	0.01
Significance Threshold	10	1.0	0.3
Significant (Yes or No)?	No	No	No
Resident – Onsite Residence			
Project Construction[d]	1.44	<0.01	<0.01
Significance Threshold	10	1.0	0.3
Significant (Yes or No)?	No	No	No
Daycare			
Project Construction[d]	1.10	<0.01	0.01
Significance Threshold	10	1.0	0.3
Significant (Yes or No)?	No	No	No
School			
Project Construction[d]	0.01	<0.01	<0.01
Significance Threshold	10	1.0	0.3
Significant (Yes or No)?	No	No	No

NOTES:

[a] MEI for each receptor type are:
offsite residents = Residence on the north side of Parnassus Avenue
onsite residents = UCSF Third Avenue housing
daycare = UCSF Lucia Child Development Center
school = Haight Ashbury Community Nursery School

[b] Construction risk is from DPM exposure. There is no published DPM REL for acute risk.

[c] Hazard Impact and $PM_{2.5}$annual concentration represent worst year of exposure not a summation.

[d] Exposure durations:
residents = duration of construction, ~4 years
daycare = duration of construction, ~4 years
school = duration of construction, ~4 years

SOURCE: ESA, 2019 (see Appendix AIR)

TABLE 4.2-17
MITIGATED PROJECT HEALTH IMPACTS ESTIMATED, NEW HOSPITAL CONSTRUCTION

Receptor Type[a]	Cancer Risk	Chronic Hazard Index[b,c]	$PM_{2.5}$ Concentration ($\mu g/m^3$)[c]
Resident – Offsite Receptor			
Project Construction[d]	4.72	<0.01	0.01
Significance Threshold	10	1.0	0.3
Significant (Yes or No)?	No	No	No
Resident – Onsite Residence			
Project Construction[d]	0.50	<0.01	<0.01
Significance Threshold	10	1.0	0.3
Significant (Yes or No)?	No	No	No
Daycare			
Project Construction[d]	0.16	<0.01	<0.01
Significance Threshold	10	1.0	0.3
Significant (Yes or No)?	No	No	No
School			
Project Construction[d]	0.04	<0.01	<0.01
Significance Threshold	10	1.0	0.3
Significant (Yes or No)?	No	No	No

NOTES:

a MEI for each receptor type are:
offsite residents = Residence on the south side of Parnassus Avenue east of the campus site
onsite residents = UCSF Third Avenue housing
daycare = UCSF Lucia Child Development Center
school = Haight Ashbury Community Nursery School

b Construction risk is from DPM exposure. There is no published DPM REL for acute risk.

c Hazard Impact and $PM_{2.5}$ annual concentration represent worst year of exposure not a summation.

d Exposure durations:
residents = duration of construction, ~6.5 years
daycare = attendance years at location, ~5 years
school = attendance years at location, ~4 years

SOURCE: ESA, 2019 (see Appendix AIR)

TABLE 4.2-18
MITIGATED PROJECT HEALTH IMPACTS ESTIMATED, INITIAL ALDEA HOUSING DENSIFICATION CONSTRUCTION

Receptor Type[a]	Cancer Risk	Chronic Hazard Index[b,c]	$PM_{2.5}$ Concentration ($\mu g/m^3$)[c]
Resident – Offsite Receptor			
Project Construction[d]	0.67	<0.01	<0.01
Significance Threshold	10	1.0	0.3
Significant (Yes or No)?	No	No	No
Resident – Onsite Residence			
Project Construction[d]	4.53	0.01	0.03
Significance Threshold	10	1.0	0.3
Significant (Yes or No)?	No	No	No
Daycare			
Project Construction[d]	0.01	<0.01	<0.01
Significance Threshold	10	1.0	0.3
Significant (Yes or No)?	No	No	No
School			
Project Construction[d]	<0.01	<0.01	<0.01
Significance Threshold	10	1.0	0.3
Significant (Yes or No)?	No	No	No

NOTES:

a MEI for each receptor type are:
offsite residents = Residence on Christopher Drive
onsite residents = Existing Aldea Housing remaining and occupied in Initial Phase construction
daycare = Kirkham Child Development Center
school = Clarendon Alternative Elementary

b Construction risk is from DPM exposure. There is no published DPM REL for acute risk.

c Hazard Impact and $PM_{2.5}$ annual concentration represent worst year of exposure not a summation.

d Exposure durations:
residents = duration of construction, ~1 year
daycare = duration of construction, ~1 year
school = duration of construction, ~1 year

SOURCE: ESA, 2019 (see Appendix AIR)

Non-Cancer Health Hazard Exposure at Existing Receptors from Construction of the Irving Street Arrival, RAB, Initial Aldea Housing Densification, and New Hospital Projects, and Initial Phase Improvements

For purposes of this analysis, non-cancer health hazards associated with construction of each of the Initial Phase projects, including Irving Street Arrival, RAB, and Initial Aldea Housing Densification, as well as the New Hospital, were estimated. Hazards associated with construction of the Initial Phase improvements would not be expected to substantially further contribute to the estimated hazards.

Both acute (short-term) and chronic (long-term) adverse health impacts unrelated to cancer are measured against a hazard index (HI), which is defined as the ratio of the predicted TAC concentration from the Initial Phase projects to a published reference exposure level (REL) that could cause adverse health effects. The RELs are published by OEHHA based on epidemiological research. The ratio (referred to as the Hazard Quotient [HQ]) of each non-carcinogenic substance that affects a certain organ system is added to produce an overall HI for that organ system. The construction emissions from the Irving Street Arrival, RAB, New Hospital, and Initial Aldea Housing Densification projects are for the largest part respirable, therefore, non-inhalation pathways were not considered. The impact is considered to be significant if the overall HI is greater than 1.0.

The chronic reference exposure level for DPM was established by the California OEHHA as 5 $\mu g/m^3$ (OEHHA, 2019). Thus, the construction-related annual concentration of DPM cannot exceed 5.0 $\mu g/m^3$; resulting in a chronic acute HI of greater than 1.0 (i.e., DPM annual concentration/5.0 $\mu g/m^3$). There is no acute REL for DPM.

As shown in Tables 4.2-11 through 4.12-14, the unmitigated chronic HI from construction of the Irving Street Arrival, RAB, New Hospital, and Initial Aldea Housing Densification would each be 0.09 or less, while as shown in Tables 4.2-15 through 4.12-18, the chronic HI would each be less than 0.01 with implementation of CPHP Mitigation Measure AIR-1a. The impact related to chronic health risk from construction emissions would be less than significant.

Because construction only considers the risk from DPM emissions and because there is no acute REL for DPM, only the chronic risk from DPM is analyzed.

Mitigation: None required.

$PM_{2.5}$ Concentrations Associated with Construction of the Irving Street Arrival, RAB, Initial Aldea Housing Densification, and New Hospital Projects, and Initial Phase Improvements

For purposes of this analysis, health effects related to $PM_{2.5}$ concentrations associated with construction of each of the Initial Phase projects, including Irving Street Arrival, RAB, and Initial Aldea Housing Densification, as well as the New Hospital, were estimated. $PM_{2.5}$ concentrations associated with construction of the Initial Phase improvements would not be expected to substantially further contribute to the estimated $PM_{2.5}$ concentrations.

Dispersion modeling was used to estimate project-related concentrations of $PM_{2.5}$ at the sensitive receptors. The BAAQMD Air Quality Guidelines requires inclusion only of $PM_{2.5}$ exhaust emissions for the analysis of construction exposure because the fugitive dust emissions are addressed under BAAQMD dust control measures which are required by law to be implemented during project construction. The unmitigated annual $PM_{2.5}$ concentrations for each of the four projects are reported in Tables 4.2-11 through 4.2-14. With the exception of the initial Aldea Housing Densification project, the Initial Phase projects would not result in annual $PM_{2.5}$ concentrations at the nearest receptors that would exceed the BAAQMD thresholds. The unmitigated annual $PM_{2.5}$ concentrations from construction activities would be 0.42 $\mu g/m^3$ for the residents occupying the existing Aldea Housing during the initial Aldea Housing Densification project (see Table 4.2-14). With implementation of CPHP Mitigation Measure AIR-1a, the annual $PM_{2.5}$ concentrations from construction activities would be reduced to 0.03 $\mu g/m^3$ (see Table 4.2-18). Thus, the annual $PM_{2.5}$ concentrations due to construction and operation of the Irving Street Arrival, RAB, New Hospital, and Initial Aldea Housing Densification would each be below the BAAQMD threshold of 0.3 $\mu g/m^3$ and would be less than significant with mitigation.

Mitigation: Implement CPHP Mitigation Measure AIR-1a. (Aldea Housing Densification)

Significance after Mitigation: Less than Significant.

Impact AIR-4: Campus site operations under the CPHP could expose sensitive receptors to substantial pollutant concentrations and exceed the LRDP EIR standard of significance by exposing receptors to toxic air contaminant emissions that (1) result in a cancer risk greater than 10 cancer cases per 1 million people exposed in a lifetime; or (2) for acute or chronic effects, result in concentrations of toxic air contaminant emissions with a Hazard Index of 1.0 or greater. (Less than Significant with Mitigation)

CPHP

The proposed CPHP would result in development that would generate operational emissions of TACs and result in localized contributions to $PM_{2.5}$ concentrations from a variety of sources, including mobile sources; and stationary sources, including diesel generators, laboratory fume hood stacks and, to a lesser extent, natural gas combustion. Operational detail with respect to locations of TAC sources that may be included in the New Hospital and CPHP Future Phase projects is unavailable for determining risk levels quantitatively. However, a qualitative analysis is provided that considers potential TAC sources and mitigation is identified where the potential for significant impact may exist. It should be noted that the New Hospital and all CPHP Future Phase projects, would undergo separate CEQA analysis, as appropriate, at the time of project-specific proposal.

Operational TAC emissions that would be generated under the CPHP could impact existing sensitive receptors in the campus site vicinity, as well as proposed new residential uses that would be developed on the campus site under the CPHP (e.g., proposed new Aldea Housing, and proposed West Side Housing along the future extension of Fourth Avenue). The effects of the TAC emissions from future sources are discussed below.

Diesel Emergency Back-up Generators Air Toxics

New diesel emergency back-up generators would be required as a safety egress requirement for new buildings constructed under the proposed CPHP that would exceed 75 feet in height. Any new diesel generators larger than 50 HP would require a permit from BAAQMD and must comply with the Air Toxic Control Measure (ATCM) for Stationary Compression Ignition Engines. As a practical matter, BAAQMD will not issue a permit for a new generator that results in an operational cancer risk greater than 10 in one million. Accordingly, health risk impacts from new emergency generators would be considered less than significant.

Laboratory Air Toxics

Additional laboratory uses developed under the proposed CPHP would result in increases in chemical usage and associated TAC emissions. With the exception of RAB which is discussed below, details regarding new laboratory space, fume hoods, and chemical use in future non-residential buildings are not available at this time. Therefore, a qualitative analysis of potential health risks is provided. BAAQMD's Rule 2-1 exempts teaching laboratories used exclusively for classroom experimentation and/or demonstration. Given the potential for future development under the proposed CPHP to include both teaching laboratories as well as research laboratories, the potential exists for the requirements of Rule 2-1 not to apply. Consequently, the potential health risks from laboratory TAC emissions is considered potentially significant. Accordingly, **CPHP Mitigation Measure AIR-4a**, below, is identified to ensure that new laboratory space added to the campus site under the proposed CPHP would not result in a significant health risk.

Natural Gas Combustion of the CUP

Natural gas combustion results in emissions of benzene, formaldehyde, and toluene. Under the proposed CPHP, there would be an incremental increase in these TAC emissions due to an increase in natural gas combustion at the existing CUP. As shown in Table 4.2-19, the maximum increase in cancer risk from increased CUP operations due to the proposed Irving Street Arrival and RAB projects[15] would be 0.01 in one-million based on net new increase in building space over existing conditions. Scaling this risk based on the increase in net new square feet of development[16] between existing and buildout of the CPHP, the increased cancer risk from CUP emissions under full buildout of CPHP would be 0.3 in one million, which would be well below the significance threshold of 10 in one million. Further, this estimate is conservative because the available capacity of the CUP is less than the increase in campus site square footage that was assumed to require additional energy demand from the CUP. Therefore, health risk impacts from natural gas combustion resulting from operation of new development under the proposed CPHP would be less than significant.

Increased Operational Diesel Truck Deliveries

Additional campus development under the CPHP would generate increases in vendor deliveries to the campus site that would include diesel-powered trucks. It is estimated that such deliveries could increase from a total of 40 trips per day under existing conditions at the campus site to approximately 65 trips per day under full buildout of the CPHP. While the additional 25 truck trips per day would have a variety of access points throughout the campus site (there are presently seven existing loading areas distributed throughout the campus site), it is anticipated that many of them would likely access the campus site via the primary delivery corridor off Medical Center

[15] The proposed Aldea Housing Densification would not be served by the CUP.
[16] Excluding Aldea Housing square footage, as it would not be served by the CUP.

Way to access loading areas that serve Long Hospital and Central Receiving. These additional trips would increase local DPM emissions within the loading dock access points. Construction of the New Hospital may also result in modifications to the configuration of these loading areas; however, in the absence of project-specific details, the specific changes cannot be reliably modeled at this time to estimate resultant health risks. Therefore, **CPHP Mitigation Measure AIR-4b** is identified to ensure that increased DPM concentrations from vendor deliveries under the CPHP would not result in a significant health risk.

CPHP Mitigation Measure AIR-4a: Laboratory Fume Hood Emission Control

For any individual project that contains more than 25,000 square feet of emissions-generating laboratory space within a building and 50 fume hoods, UCSF shall conduct a health risk screening analysis and obtain a permit from BAAQMD for the proposed individual projects; this permit may be required either prior to or as a condition of approval of the proposed individual project. In accordance with BAAQMD Rules 2-1 and 2-5, new sources of emissions must implement Best Available Control Technology for Toxics (T-BACT) if individual source risks exceed 1.0 in a million for cancer and/or chronic hazard index is greater than 0.20. Additionally, a permit will be denied if project cancer risk exceeds 10.0 in a million or if the chronic or acute hazard index exceeds 1.0.

CPHP Mitigation Measure AIR-4b: Design for Diesel Delivery Truck Emissions Minimization

UCSF shall incorporate the following health risk reduction measures into the project design and construction contracts (as applicable) in order to reduce the potential health risk due to exposure to toxic air contaminant emissions from diesel trucks. Emissions from CPHP-associated diesel trucks shall be reduced through implementing the following measures, as feasible:

1. Install electrical hook-ups for diesel trucks Transportation Refrigeration Units (TRU) at loading docks.
2. Require trucks to use Transportation Refrigeration Units (TRU) that meet Tier 4 emission standards.
3. Require truck-intensive projects to use advanced exhaust technology (e.g., hybrid) or alternative fuels.
4. Prohibit trucks from idling for more than two minutes to the extent feasible.
5. Establish truck routes to avoid sensitive receptors in the project to the extent feasible. A truck route program, along with truck calming, parking, and delivery restrictions, shall be implemented

Significance after Mitigation: Less than Significant.

Irving Street Arrival, RAB, and Initial Aldea Housing Densification Projects, and Initial Phase Improvements

The following assessment focuses on potential incremental cancer risk, non-cancer health hazard exposure, and $PM_{2.5}$ concentrations associated with operation of proposed Irving Street Arrival, RAB, and Initial Aldea Housing Densification Projects. Operations of other Initial Phase improvements are not expected to generate operational emissions of TACs or result in localized contributions to $PM_{2.5}$ concentrations, and consequently, not discussed further. Operational detail with respect to locations of TAC sources of the New Hospital and Future Phase projects is unavailable for determining risk levels quantitatively. Therefore, the project-level assessment of potential TAC sources is limited to the proposed Irving Street Arrival, RAB, and initial Aldea Housing Densification projects. It should be noted that the New Hospital and all Future Phase projects will undergo separate environmental review under CEQA

Incremental Cancer Risk from Operation of the Irving Street Arrival, RAB, and Initial Aldea Housing Densification

For purposes of this analysis, potential incremental cancer risks associated with operation of the RAB were estimated. As discussed below, no new TAC sources such as emergency generators are included in the Irving Street Arrival or for the Aldea Housing Densification projects and therefore, these projects are not analyzed below for potential cancer risk from operational TAC sources.

Emissions calculations and air dispersion modeling was completed for the new emergency diesel generator for the proposed RAB, the increase in natural gas combustion at the CUP to accommodate demand from building expansion (for the proposed RAB alone, as the proposed Aldea Housing would not be served by the CUP, and the Irving Street Arrival would not result in increased CUP demand), and the new building fume hoods at the RAB. The full chemical inventory and calculated risk by each source is detailed in Appendix AIR. A summary of the risk results from operations of the RAB is presented in **Table 4.2-19**. The estimated cancer risk for a 30-year lifetime exposure from operation of the RAB project would be 0.26 per million. Thus, this increased cancer risk from operation of the RAB project would be less than significant.

Non-Cancer Health Hazard Exposure at Existing Receptors from Operation of the Irving Street Arrival, RAB, and Initial Aldea Housing Densification

For purposes of this analysis, potential non-cancer health hazards associated with operation of Irving Street Arrival and RAB were estimated. The initial Aldea Housing Densification project was not analyzed, as it does not include a source of operational TAC emissions.

Similar to the approach taken for assessment of the CPHP health effects, the operational emissions from the Initial Phase projects are for the largest part respirable, therefore non-inhalation pathways were not considered. The impact would be considered to be significant if the overall HI is greater than 1.0.

Under operations, the emergency diesel generator required for the RAB would produce chronic risk from DPM emissions. For the RAB fume hoods and associated increased operation of the CUP, the chronic and acute from each TAC are individually assessed and can be found in Appendix AIR.

The maximum operational chronic HI impact, as presented in Table 4.2-19, would be less than 0.01. Operation of the Irving Street Arrival and RAB projects are below the project-level chronic HI threshold of 1, and therefore, the impact would therefore be less than significant.

TABLE 4.2-19
ESTIMATED OPERATIONAL HEALTH IMPACTS OF THE RAB

Receptor Type	Cancer Risk	Chronic Hazard Index	Acute Hazard Index	$PM_{2.5}$ Concentration (µg/m3)[d]
Resident – Offsite Receptor				
Project Operations	0.26	<0.01	<0.01	0.01
Significance Threshold	10	1.0	1.0	0.3
Significant (Yes or No)?	No	No	No	No
Resident – Onsite Residence				
Project Operations	0.04	<0.01	<0.01	<0.01
Significance Threshold	10	1.0	1.0	0.3
Significant (Yes or No)?	No	No	No	No
Daycare				
Project Operations[e]	0.01	<0.01	<0.01	<0.01
Significance Threshold	10	1.0	1.0	0.26
Significant (Yes or No)?	No	No	No	No
School				
Project Operations[e]	<0.01	<0.01	<0.01	<0.01
Significance Threshold	10	1.0	1.0	0.3
Significant (Yes or No)?	No	No	No	No

NOTES:

[a] Cancer risk MEI for each receptor type are:
offsite residents = Residences along Edgewood Ave., east of the campus site
onsite residents =UCSF Third avenue housing
daycare = Kirkham Child Care Center
school = Haight Ashbury Community Nursery School

[b] Chronic Hazard Index MEI for each receptor type are:
offsite residents = Residences along Edgewood Ave., east of the campus site
onsite residents = UCSF Third Avenue housing
daycare = Lucia Child Care Center
school = Haight Ashbury Community Nursery School

[c] Acute Hazard Index MEI for each receptor type are:
offsite residents = Residences along Edgewood Ave., east of the campus site
onsite residents = UCSF Third Avenue housing
daycare = Lucia Child Care Center
school = Independence High School

[d] $PM_{2.5}$exposed MEI for each receptor type are:
offsite residents = Residences along Edgewood Ave., east of the campus site
onsite residents = UCSF Third Avenue housing
daycare = Kirkham Child Care Center
school = Haight Ashbury Community Nursery School

SOURCE: ESA, 2019 (see Appendix AIR)

In addition, the acute HI from operations, presented in Table 4.2-19, would also be less than 0.01. The acute HI associated with operation of the Irving Street Arrival and RAB, would be below the project-level threshold of 1 and the impact would therefore be less than significant.

$PM_{2.5}$ Concentrations Associated with Operation of the Irving Street Arrival, RAB and Initial Aldea Housing Densification

For the analysis of operational $PM_{2.5}$ emissions, sources other than combustion exhaust (i.e., particulate from building fume hoods are addressed. Therefore, $PM_{2.5}$ concentrations associated with operation of the RAB project were estimated. The Irving Street Arrival and initial Aldea Housing Densification projects were not analyzed as they do not include a source of operational $PM_{2.5}$ emissions.

The maximum annual average concentration of $PM_{2.5}$ from operation of the RAB project were estimated to be 0.01 ug/m^3 or less for sensitive receptors (Table 4.2-19). Thus, the annual $PM_{2.5}$ concentration due to the operation of RAB project would be below the BAAQMD threshold of 0.3 µg/m^{3,} and would be less than significant.

Mitigation: None required.

Impact AIR-5: The CPHP could conflict with or obstruct implementation of the *2017 Clean Air Plan*. (Less than Significant with Mitigation)

CPHP

The most recently adopted air quality plan in the SFBAAB is the *2017 Clean Air Plan* whose primary goals are to protect public health and to protect the climate (BAAQMD, 2017b). The plan includes a wide range of proposed control measures to reduce combustion-related activities, decrease fossil fuel combustion, improve energy efficiency, and decrease emissions of potent GHGs.

BAAQMD guidance states that lead agencies should consider three questions in assessing consistency with the 2017 CAP: (1) Would the project support the primary goals of the Clean Air Plan? (2) Does the project include applicable control measures from the Clean Air Plan? and (3) Does the project disrupt or hinder implementation of control measures identified in the Clean Air Plan? The proposed CPHP is evaluated relative to each of these questions below.

Support the Primary Goals of the CAP

The first of these questions is whether a project would support the primary goals of the 2017 CAP, which include:

- Attainment of air quality standards;
- Reducing population exposure and protecting public health in the Bay Area; and
- Reducing GHG emissions and protecting the climate.

To meet the primary goals, the CAP recommends specific control measures and actions. These control measures are grouped into various categories and include stationary and area source measures, mobile source measures, transportation control measures, land use measures, and energy and climate measures. The CAP recognizes that to a great extent, community design dictates individual travel mode, and that a key long-term control strategy to reduce emissions of criteria pollutants, air toxics, and GHG emissions from motor vehicles is to channel future Bay Area growth into urban communities where goods and services are close at hand, and people have a range of viable transportation options. To this end, the 2017 Clean Air Plan includes 85 control measures aimed at reducing air pollution in the Air Basin.

Under the CPHP, UCSF would continue to employ its aggressive Transportation Demand Management (TDM) program that includes an extensive shuttle system, among other alternative transportation opportunities and would serve to support the primary goals of the CAP. Based on UCSF's 2018 employee commute survey, approximately 80 percent of the campus faculty, staff and students commute by means other than driving alone. Key features of UCSF's existing TDM program include the following:

- 60 shuttles serving 17 locations, with over 2.3 million passengers per year
- 33 vanpools that travel as far as Sacramento and operate using the Green Road Safety System, which improves fuel consumption and safety
- 62 reserved carpool stalls at various sites
- Marin Commute Club buses with about 55 daily riders who live in Marin and Sonoma Counties to the north of San Francisco
- 18 City CarShare vehicles with dedicated parking spaces, along with 1,500 UCSF members who can use these vehicles by scheduling their use on-line
- 18 electric-vehicle charging stations at Parnassus Heights, Mount Zion, and Mission Bay, with plans for another 20 at Mission Bay in the Owens Street Garage and 10 at other locations
- Over 1,900 UCSF users of the ZimRide online carpool matching program
- 972 bicycle parking spaces with another 100 planned at Mission Bay, as well as bike racks on shuttles, a cyclist shower program that allows bicyclists to use UCSF showers at a discount, and other bicycle-related benefits
- More than 400 off-street motorcycle parking stalls in garages and surface parking lots
- An "emergency ride home" program to encourage use of alternative modes of transportation
- Clipper Card (public transit pass) sales at easily accessible locations, including through UCSF's website
- Close to 1,800 UCSF employees that participate in a pretax transit program, which saved UCSF employees over $700,000 on public transit commute costs in 2013

The Parnassus Heights campus site's infill location and proximity to transit reduces the distance that students and patients would drive in motor vehicles.

The proposed CPHP's impact with respect to GHGs is discussed in Section 4.7, *Greenhouse Gas Emissions*. As stated in that discussion, the proposed CPHP would be compliant with the UCSF's Greenhouse Gas Reduction Strategy. Thus, the CPHP would not result in any significant impacts associated with an increase in GHGs or conflict with measures adopted for the purpose of reducing such emissions.

Applicable Control Measures from the CAP

To meet the primary goals, the Clean Air Plan recommends specific control measures and actions. These control measures are grouped into various categories and include stationary- and area-source measures, mobile-source measures, transportation control measures, land use measures, and energy and climate measures. The Clean Air Plan recognizes that, to a great extent, community design dictates individual travel mode and that a key long-term control strategy to reduce emissions of criteria pollutants, air toxics, and GHG emissions from motor vehicles is to channel future Bay Area growth into communities where goods and services are located nearby and people have a range of viable transportation options. To this end, the Clean Air Plan includes 85 control measures aimed at reducing air pollutants in the SFBAAB.

The measures most applicable to the proposed CPHP are transportation control measures which are identified in **Table 4.2-20**, along with the existing or proposed mechanisms that UCSF would have in place to implement these measures. As discussed in Chapter 4.7, *Greenhouse Gas Emissions*, UCSF currently implements a number of programs and practices to promote sustainability at the campus, including TDM, energy supply and efficiency, water supply and conservation, and solid waste reduction and recycling. Under the proposed CPHP, UCSF would continue to implement, and update as needed, these sustainability programs and practices at the Parnassus Heights campus site.

The high availability of viable transportation options would ensure that employees, patients and visitors could bicycle, walk, and ride transit to and from the campus site instead of taking trips via private automobile. These features ensure that the CPHP would reduce growth in automobile trips and vehicle miles traveled.

The proposed CPHP includes sustainability measures that would serve to implement control measures of the 2017 CAP, including the land use/local impact measures and energy/climate measures of the 2017 CAP. The proposed development would be subject to a number of sustainability requirements, including the California CalGreen Code. The proposed RAB would also comply with the UC *Policy on Sustainable Practices*, which requires new construction meet a minimum standard of LEED-NC Silver and strive for LEED-NC Gold when possible, requires 20 percent better energy performance than Title 24 (and strives to achieve 30 percent), and requires new laboratory buildings meet Labs21 Environmental Performance Criteria.[17] This would be achieved through incorporation of a variety of design features and implementation of practices during construction and operation to provide energy and water conservation and efficiency, encourage alternative transportation, promote a healthy indoor environment, minimize waste, and maximize recycling opportunities.

[17] Labs21 Environmental Performance Criteria is a rating system specifically designed for laboratory facilities that is based on the LEED Green Building Rating System.

TABLE 4.2-20
CPHP CONSISTENCY WITH APPLICABLE CONTROL MEASURES OF THE 2017 CLEAN AIR PLAN

Control Measure	Existing or Proposed Implementation Mechanism	Consistency of Proposed CPHP with Measure
TR1 – Clean Air Teleworking Initiative	UCSF provides on-line courses for many of its offerings. Remote computer access available for access available for most employees.	Yes
TR2 – Trip Reduction Programs	UCSF implements its Transportation Demand Management (TDM) programs.	Yes, with implementation of existing TDM programs, and mitigation measures identified in this EIR
TR3 – Local and Regional Bus Service	Transit services within study area include UCSF Shuttle and Muni bus service directly to campus.	Yes
TR4 – Local and Regional Rail Service	Muni light rail station located on Irving Street adjacent to proposed Irving Street Arrival.	Yes
TR5 – Transit Efficiency and Use	UCSF shuttles are free, and City of San Francisco Muni offers Clipper card capability.	Yes
TR7 – Safe Routes to Schools and Safe Routes to Transit	TDM Program includes bicycle parking motorcycle and car-share parking that are designed to serve local area student and visitor trips.	Yes
TR8 - Ridesharing	TDM Program includes a carpool matching program and reserved stalls for carpools.	Yes
TR9 – Bicycle and Pedestrian Access and Facilities	The CPHP proposes a pedestrian overcrossing on Parnassus Avenue that would increase pedestrian access and safety.	Yes
TR10 – Land Use Strategies	The proposed CPHP would implement sustainable design strategies consistent with the regional goals and targets expressed in the *Plan Bay Area Sustainable Communities Strategy*.	Yes
TR13 - Parking Policies	UCSF's TDM Program includes parking permits and meters at all campus parking structures and lots. Anyone driving a vehicle to the campus must pay for parking.	Yes
TR14 – Cars and Light Trucks	In 2018, UCSF added 15 new all-electric, zero-emission transit vehicles to the intercampus shuttle fleet that serves UCSF employees, faculty, students, patients and guests. The long-term goal of for the fleet to be all electric.	Yes
TR15 – Public Outreach and Education	UCSF's TDM Program includes webpage with resources for all modes of transportation along with educational resources; personalized commute planning service; and new employee orientation to transportation resources.	Yes
EN1 – Decarbonize Electricity Production	UCSF has committed to the UC Carbon Neutrality 2025 Initiative to achieve net zero GHG emissions from its electrical demand.	Yes
EN2 – Decrease Electricity Demand	UCSF operates a cogeneration facility that produces electricity and decreases electrical demand from the local utility.	Yes
BL1 – Green Buildings	UCSF has committed to all new building meeting Leadership in Energy and Environmental Design (LEED) system requirements for a Silver rating at a minimum.	Yes
BL2 – Decarbonize Buildings	Implemented through the UC Carbon Neutrality 2025 Initiative to achieve net zero GHG emissions from its electrical demand.	Yes
BL3 – Market Based Solutions	UCSF has several programs to promote energy efficiency and conservation on campus. UCSF implements several energy-saving programs for building retrofits and users.	Yes

TABLE 4.2-20 (CONTINUED)
CPHP CONSISTENCY WITH APPLICABLE CONTROL MEASURES OF THE 2017 CLEAN AIR PLAN

Control Measure	Existing or Proposed Implementation Mechanism	Consistency of Proposed CPHP with Measure
BL4 – Urban Heat Island	No current identification of designing sites to reduce “heat island” effects or albedo reduction in Greenhouse Gas Reduction Strategy.	Yes, with implementation of proposed mitigation measure
NW2 – Urban Tree Planting	The CPHP contains campus design principles that address planting of shade trees. These design principals would also serve the purpose of the absorption of ambient criteria air pollutants as well as CO_2. As discussed in *Section 4.3 Biological Resources*, removal of landmark trees requires a permit and payment of costs associated with a public hearing and replacement of the tree.	Yes
WA3 – Green Waste Diversion; and WA4 – Recycling and Waste Reduction	UCSF implements a Waste Reduction and Recycling Program that serves all academic, student housing and dining, and faculty and staff housing. UCSF achieved a 78 percent waste diversion rate in 2018.	Yes
WR2 – Support Water Conservation	The UC *Policy on Sustainable Practices* resulted in UCSF implementing a Water Action Plan to reduce growth-adjusted potable water consumption 36 percent by 2025, when compared to a three-year average baseline of FY2005/06, FY2006/07, and FY2007/08. The Campus strives to reduce potable water used for irrigation by converting to recycled water, implementing efficient irrigation systems, drought tolerant planting selections, and/or by removing turf.	Yes

Although for most part, the proposed CPHP would be consistent with the relevant control measures of the 2017 Clean Air Plan, because there is one control measure in the Clean Air Plan to address urban heat island effect with which the CPHP as proposed is not consistent, this impact is considered potentially significant. Therefore a mitigation measure is set forth below to address this potentially significant impact.

With elements identified as part of the proposed CPHP, the Greenhouse Gas Reduction Program, TDM Program, and implementation of mitigation measures identified in this EIR, the proposed CPHP would be consistent with applicable control measures in the 2017 Clean Air Plan.

Disruption or Hindrance of CAP Control Measures

Examples of a project that could cause the disruption or delay of Clean Air Plan control measures are projects that would preclude the extension of a transit line or bike path or projects that propose excessive parking beyond City parking requirements. The proposed CPHP would maintain the existing character of the campus site, which includes hospitals, medical research facilities, instructional space, and residential uses within a dense, walkable urban area near a concentration of local transit service. It would not preclude the extension of a transit line or a bike path or any other transit improvement. Thus, the CPHP would not disrupt or hinder implementation of control measures identified in the Clean Air Plan.

In summary, with the mitigation identified below to ensure consistency with the Clean Air Plan control measure addressing urban heat island effect, the proposed CPHP would not conflict with, or obstruct implementation of the *2017 Clean Air Plan*, and the impact would be less than significant.

CPHP Mitigation Measure AIR-5: Implement "cool roof and pavement" design elements

UCSF shall implement "cool parking" that promotes the use of cool surface treatments for new parking facilities, as well existing surface lots undergoing resurfacing. Additionally, new building construction shall include low-albedo roofing materials to the extent it can reduce energy demand.

Significance after Mitigation: Less than Significant.

Irving Street Arrival, RAB, and Initial Aldea Housing Densification Projects, and Initial Phase Improvements

The impact of the Irving Street Arrival, RAB, and initial Aldea Housing Densification projects, and Initial Phase Improvements with respect to GHG emissions is discussed in Section 4.7, *Greenhouse Gas Emissions*. As stated in that discussion, the proposed CPHP would be compliant with the UCSF's Greenhouse Gas Reduction Strategy. Thus, the CPHP would not result in any significant impacts associated with an increase in GHGs or conflict with measures adopted for the purpose of reducing such emissions.

Although for most part, these proposed Initial Phase projects and improvements would be consistent with the relevant control measures of the 2017 Clean Air Plan, because there is one control measure in the Clean Air Plan to address urban heat island effect with which the Initial Phase projects as proposed would not be consistent, this impact is considered potentially significant. Therefore, the same mitigation measure identified for the CPHP to implement "cool roof and pavement" design elements is also identified for these Initial Phase projects and improvements, if feasible, given that rooftop mechanical equipment and or parking may limit UCSF's ability to set forth below to address this potentially significant impact.

With elements identified as part of these Initial Phase projects and improvements, the Greenhouse Gas Reduction Program, TDM Program, and implementation of mitigation measures identified in this EIR, these Initial Phase projects and improvements would be consistent with applicable control measures in the 2017 Clean Air Plan.

Mitigation: Implement CPHP Mitigation Measure AIR-5

Significance after Mitigation: Less than Significant.

Cumulative Impacts

The following analysis addresses the potential cumulative air quality impacts associated with the proposed CPHP. Impact AIR-5, above, addresses potential impacts with respect to consistency with the BAAQMD 2017 Clean Air Plan. Because the 2017 Clean Air Plan focuses on reducing population exposure to air pollutants throughout the region, the assessment in Impact AIR-5 is a cumulative analysis as it assesses consistency with a region wide air quality plan. Therefore, a separate cumulative assessment of consistency with the 2017 Clean Air Plan is not required.

Impact C-AIR-1: Implementation of the CPHP combined with cumulative development in the project area would result in a cumulatively considerable net increase of a criteria pollutant for which the project region is non-attainment under an applicable federal or state ambient air quality standard. (Significant and Unavoidable with Mitigation)

BAAQMD developed thresholds of significance for both construction and operation with consideration of individual project emission levels that would be cumulatively considerable. If a project exceeds the identified project significance levels, then its emissions would be cumulatively considerable. The analysis in Impact AIR-1 demonstrates that, with mitigation, the project's construction emissions would not exceed emission thresholds for ROG, NO_X, PM_{10} or $PM_{2.5}$.

However, the analysis under Impact AIR-2 (Table 4.2-9) shows that operational emissions under the CPHP would exceed emission thresholds for PM_{10}. Therefore, emissions of PM_{10} from the CPHP would result in a cumulatively considerable contribution to a cumulative air quality impact and the cumulative impact would be significant. CPHP Mitigation Measure AIR-2a: BAAQMD-Suggested Operational Measures and CPHP Mitigation Measure AIR-2b: TDM Program Enhancements are identified to reduce operational emissions to the degree feasible. However, CPHP Mitigation Measures AIR-2a and -2b would not result in the 37 percent reduction necessary for PM_{10} to reduce the impact to a less-than-significant level. Therefore, the cumulative impact of criteria air pollutant emissions under the full CPHP would be significant and unavoidable.

Mitigation: Implement CPHP Mitigation Measure AIR-2a and AIR-2b.

Significance after Mitigation: Significant and Unavoidable.

Impact C-AIR-2: Implementation of the CPHP could contribute considerably to cumulative emissions of TACs and $PM_{2.5}$ that could expose sensitive receptors to substantial pollutant concentrations or health risks. (Less than Significant with Mitigation*)*

Construction

There is one reasonably foreseeable off-site cumulative construction project in the project vicinity: the seismic retrofit of 350 Parnassus Avenue which would occur at approximately the same time as the Irving Street Arrival construction in 2022. Additionally, cumulative emissions of TACs and $PM_{2.5}$ from construction would be associated with the proposed Initial Phase projects and other UCSF projects within the campus site that were previously approved under the 2014 LRDP. Most notably, the demolition of the LPPI building, which would be necessary to accommodate development of the New Hospital, would occur in in 2022. The only notable contemporaneous CPHP construction project during 2022 would be the proposed Irving Street Arrival which would undergo construction work during the same year. These two activities would occur within approximately 200 feet of each other on either side of Parnassus Avenue. Receptors potentially affected by the three projects' demolition and construction activities in 2022 would be the existing residences on Irving Street between Arguello Boulevard and 2nd Avenue. Irving Street receptors would be 450 feet away from demolition activities of the LPPI and shielded by the intervening Medical Building 1, an 8-story structure.

As shown in Table 4.2-15 under Impact AIR-3, the maximum mitigated increase in cancer risk from construction activities at the campus site from the Irving Street Arrival project, would be approximately 2 in one million, or about one-fifth of the threshold for significant health risk exposure. As reported in the 2014 LRDP FEIR, the incremental cancer risk associated with construction and demolition inclusive of the LPPI, was estimated to be 0.51 in one million. Therefore, with implementation of **CPHP Mitigation Measures AIR-1a** and **-1b,** cumulative health risks from the construction of Initial Phase projects would be less than significant with mitigation.

Operation

As stated in Section 4.2.1 *Environmental Setting*, the most recent citywide modeling results indicate that the Parnassus Heights campus site and its surrounding area are not located within an APEZ, or a health vulnerable zip code. The nearest APEZ to the campus site is along Lincoln Way, west of 5th Avenue. Health risks from operations at the Parnassus Heights campus site under the 2014 LRDP were estimated in the 2014 LRDP Final EIR (UCSF, 2014) to be approximately 10 in one million incremental cancer cases at the most impacted on-site receptor. This risk estimate includes operation of cumulative sources inclusive of stationary sources such as operations of the CUP as well as from fume hood emissions and from high-volume roadways in the area (Parnassus Avenue). When added to the projected increased cancer risks from the project-level analysis presented in Table 4.2-19, resultant increased cancer risk would be well below the cumulative threshold of 100 in one million. It should be noted that the approximately 10 in one million incremental cancer risk estimated in the 2014 LRDP Final EIR and used in this impact analysis likely overstates the less than significant cumulative TAC emission risk associated with the CPHP for two reasons. First, as noted in the 2014 LRDP Final EIR, 4.46 in one million of that risk is based upon an 1989 calculation of risks from fume hoods at Parnassus Heights, and this risk is likely markedly lower in 2020 because of the substantial reduction in chemical use due to microchemistry techniques implemented and improved ventilation systems. Second, some of the risk carried forward from the 2014 LRDP Final EIR is related to 2014 LRDP projects that have not been implemented and are now part of the CPHP.

As described by BAAQMD, USEPA considers a cancer risk of 100 per one million or less to be within the "acceptable" range of cancer risk. A cumulative cancer risk of 100 in one million is also used by the City of San Francisco for projects within its jurisdiction to determine the location of APEZ's. When a project is not located within an APEZ, the City of San Francisco applies a project level contribution of 10 in one million to represent a cumulatively considerable contribution. Because the cumulative increase in cancer risk from all sources would be well below 100 in one million and because the project-level contribution would be less than 10 in one million, the CPHP's cumulative impact to local health risk and hazards would be reduced to less than significant with identified mitigation.

Additionally, under the Community Air Risk Evaluation (CARE) program, BAAQMD identified communities in the Bay Area subject to high TAC emissions, with sensitive populations that could be affected by them. The most recent CARE retrospective document (BAAQMD, 2020a) indicates that there are no cumulatively impacted communities within five miles of the campus site. Given that the proposed CPHP contributions to localized health risk would be less than significant with mitigation, as described in Impact AIR-3 for construction and in Impact AIR-4 for operations, and that there are no impacted CARE communities in the campus site vicinity, the CPHP's cumulative impact to local health risk and hazards would be reduced to less than significant with identified mitigation.

Mitigation: Implement CPHP Mitigation Measures AIR-1a and AIR-1b.

Significance after Mitigation: Less than Significant.

4.2.4 References

American Cancer Society, 2014. *Lifetime Risk of Developing or Dying from Cancer*, last revised October. 1, 2014, available online at http://www.cancer.org/cancer/cancerbasics/lifetime-probability-of-developing-or-dying-from-cancer. Accessed June, 2020.

Atmospheric Dynamics, Inc., 2018. Memorandum Subject: Draft Fume Hood Emissions Quantification Methodology (Revised). December 3, 2018.

Atmospheric Dynamics, Inc., 2019. Health Risk Assessment Final Report Submittal UCSF Mission Bay Campus. May 2019.

BAAQMD, 2009. *Revised Draft Options and Justification Report, California Environmental Quality Act Thresholds of Significance,* October, 2009, p. 67, http://www.baaqmd.gov/~/media/files/planning-and-research/ceqa/revised-draft-ceqa-thresholds-justification-report-oct-2009.pdf?la=en, accessed December, 2019.

BAAQMD, 2011. Recommended Methods for Screening and Modeling Local Risks and Hazards. May 2011.

BAAQMD, 2013. *2012 Air Monitoring Network Plan*, July 2013, www.baaqmd.gov/Divisions/Technical-Services/Ambient-Air-Monitoring/AAMN-Plan.aspx; p. 30

BAAQMD, 2015. Standards and Attainment Status, 2015, http://hank.baaqmd.gov/pln/air_quality/ambient_air_quality.htm. Accessed December, 2019.

BAAQMD, 2017a. *CEQA Air Quality Guidelines*. May 2017. Available: http://www.baaqmd.gov/~/media/files/planning-and-research/ceqa/ceqa_guidelines_may2017-pdf.pdf?la=en.

BAAQMD, 2017b. *Clean Air Plan, Spare the Air, Cool the Climate,* January 10, 2017. Available online at http://www.baaqmd.gov/~/media/files/planning-and-research/plans/2017-clean-air-plan/baaqmd_2017_cap_draft_122816-pdf.pdf?utm_campaign=CAP+2017+Draft&utm_medium=email&utm_content=article3_link1. Accessed June 9, 2020

BAAQMD, 2018. Bay Area Air Quality Management District Engineering Division Permit Handbook. October 2018. Available: http://www.baaqmd.gov/~/media/files/engineering/permit-handbook/baaqmd-permit-handbook.pdf.

BAAQMD, 2019. Bay Area Air Quality Management District Detail Pollutants – Abated, Most Recent P/O Approved (2019), UCSF/Parnassus (P# 2478). Received via Stationary Source Inquiry Form, Available: http://www.baaqmd.gov/plans-and-climate/california-environmental-quality-act-ceqa/ceqa-tools.

BAAQMD, 2020a. Bay Area Air Pollution Summary, 2014 – 2018. Available online at: https://www.baaqmd.gov/about-air-quality/air-quality-summaries. Accessed June 10, 2020.

BAAQMD, 2020b Email from Richard Lam of BAAQMD to Chris Sanchez of Environmental Science Associates, April 1, 2020.

California Air Resources Board (CARB), 1998. Fact Sheet, "The Toxic Air Contaminant Identification Process: Toxic Air Contaminant Emissions from Diesel-fueled Engines," October 1998.

CARB, 2005. *Air Quality and Land Use Handbook: A Community Health Perspective,* April 2005. Available at http://www.arb.ca.gov/ch/handbook.pdf. Accessed December, 2019.

CARB, 2007. "Recent Research Findings: Health Effects of Particulate Matter and Ozone Air Pollution," November 2007.

CARB, 2009. *California Almanac of Emissions and Air Quality - 2009 Edition*, Table 5-44 and Figure 5-12, http://www.arb.ca.gov/aqd/almanac/almanac09/chap509.htm. Accessed December, 2019.

CARB, 2011. Recommended Area Designations for the 2010 Nitrogen Dioxide Standards, Technical Support Document, January 2011, http://www.airquality.org/plans/federal/no2/NO2Enclosure_1.pdf. Accessed December, 2019.

CARB, 2019 Overview: Diesel Exhaust and Health, https://ww2.arb.ca.gov/resources/overview-diesel-exhaust-and-health, accessed December, 2019.

Code of Federal Regulations (CFR) 54 Federal Register 38044. September 14, 1989.

Fehr and & Peers, 2020. *Comprehensive Parnassus Heights Plan - Transportation Demand Management Measure Identification and Effectiveness Assessment,* June 11.

Pollution Engineering, 2006. *New Clean Diesel Fuel Rules Start*. July, 2006.

Office of Environmental Health Hazard Assessment, 2019. Consolidated Table of OEHHA/ARB Approved Risk Assessment Health Values. September 19, 2019. Available: https://ww3.arb.ca.gov/toxics/healthval/contable.pdf.

San Francisco County Transportation Authority, 2015. Chained Activity Modeling Process version 4.3.0, Average Daily Traffic Volumes, provided to ESA 2015.

San Francisco Department of Public Health, 2008. Assessment and Mitigation of Air Pollutant Health Effect from Intra-urban Roadways: Guidance for Land Use Planning and Environmental Review, May 6, 2008, p. 7.

San Francisco Department of Public Health, and San Francisco Planning Department, *San Francisco Citywide Health Risk Assessment: Technical Support Documentation*, February 2020., https://www.sfdph.org/dph/files/EHSdocs/AirQuality/Air_Pollutant_Exposure_Zone_Technical_Documentation_2020.pdf, Accessed April 1, 2020.

USEPA, 2010a. Fact Sheet: Revisions to the Primary National Ambient Air Quality Standard, Monitoring Network, and Data Reporting Requirements for Sulfur Dioxide, June 2, 2010; https://www.epa.gov/sites/production/files/2016-05/documents/final_primary_naaqs_factsheet.pdf. Accessed June, 2020.

USEPA, 2010b. *Fact Sheet Revisions to Lead Ambient Air Quality Monitoring Requirements*, https://www.gsweventcenter.com/Draft_SEIR_References/2010_1210_Leadmonitoring_FS_USEPA.pdf. Accessed June, 2020.

USEPA, Nitrogen Dioxide Designations June 2017, *https://www.epa.gov/nitrogen-dioxide-designations/2010-nitrogen-dioxide-standards-state-recommendations-and-epa*, accessed June 9, 2020.

Western Regional Air Partnership, 2006. *WRAP Fugitive Dust Handbook,* September 7, 2006. Available online at wrapair.org/forums/dejf/fdh/content/FDHandbook_Rev_06.pdf. Accessed December, 2019.

Western Regional Climate Center (WRCC), 2016. website query, http://www.wrcc.dri.edu/htmlfiles/westwinddir.html#CALIFORNIA. Accessed on 2020.

This page intentionally left blank

4.3 Biological Resources

This section assesses the potential for construction and operation of campus development under the Comprehensive Parnassus Heights Plan (CPHP or Plan), including the three Initial Phase projects and Initial Phase improvements, to result in significant impacts on biological resources. The section includes a description of the existing environmental setting as it relates to biological resources; provides a regulatory framework that discusses applicable University, federal, State, and local regulations; identifies criteria used to determine impact significance; and discusses potential impacts, and regulatory mechanisms and/or feasible mitigation measures, as necessary, to reduce potential impacts.

4.3.1 Environmental Setting

The campus site is located in the City of San Francisco between the Pacific Ocean and the Bay. The lowest elevation of the campus site is at the north campus site boundary on Irving Street [approximately 300 feet above sea level (asl)] and the highest elevation is at over 900 feet asl on Mount Sutro in the south portion of the campus site, declining to approximately 700 feet asl along the campus site south boundary at Clarendon Avenue. The temperate climate of this area is Mediterranean in nature, with relatively mild, wet winters and warm, dry summers. The high diversity of vegetation and wildlife found in the region is a result of soil, topographic, and microclimate variations that combine to create unique species and biological communities. A long history of uses has altered the natural environment of San Francisco, and the rapid pace of development in the region, has reduced the extent of natural communities and habitat for local flora and fauna.

Vegetation Communities and Wildlife Habitats

The Parnassus Heights campus site occupies about 107 acres of land at the base of and upon Mount Sutro in the Inner Sunset mixed-use neighborhood. About 46 acres of the campus site are developed with campus facilities, and 61 acres in the central and southern portions of the campus site are not developed, and are designated and preserved as the Mount Sutro Open Space Reserve (Reserve). The vegetation communities and wildlife habitats on the campus site are described below.

Urban

Urban areas include those portions of the campus site that are developed with buildings, roadways, utilities and other built features. Wildlife species utilizing urban areas are typically well-adapted to the presence of humans and their activities. Urban wildlife species expected on the campus site include common raven (*Corvus corax*), northern mockingbird (*Mimus polyglottos*), raccoon (*Procyon lotor*), Virginia opossum (*Didelphis virgiana*), and non-native species such as Norway rat (*Rattus norvegicus*) and feral cats. Other species which utilize urban areas in San Francisco include red-tailed hawk (*Buteo jamaicensis*), which prey on rodents, and Cooper's hawk (*Accipiter cooperii*) and peregrine falcon (*Falco peregrinus anatum*), which prey almost exclusively on small-to-medium-sized birds. Bats may also colonize abandoned and disused buildings within the campus site.

Landscaped

Landscaped areas support a variety of ornamental trees, shrubs and maintained non-native vegetation on the campus site. Landscaped areas in an otherwise urban environment can provide cover, foraging, and nesting habitat for a variety of bird species as well as reptiles and small mammals, especially those tolerant of disturbance and human presence. Landscaped areas on the campus site include a grove of coast redwood (*Sequoia sempervirens)* adjacent to the Dental Clinics building, and additional planted redwoods and other trees and landscaped vegetation at various locations within the campus core and Aldea Housing complex. Birds which may be found in landscaped vegetation include American robin (*Turdus migratorius*), house finch (*Carpodacus mexicanus*), dark-eyed junco (*Junco hyemalis*), western scrub jay (*Aphelocoma californica*), mourning dove (*Zenaida macroura*), and Anna's hummingbird (*Calypte anna*), as well as non-native birds such as house sparrow (*Passer domesticus*) and European starling (*Sturnus vulgaris*). Reptiles using this type of habitat, particularly in areas bordering natural lands, may include western terrestrial garter snake (*Thamnophis elegans*) and western fence lizard (*Sceloporus occidentalis*). Other wildlife present in these landscaped areas include striped skunk (*Mephitis mephitis*), raccoon, Virginia opossum, roosting bats as well as Botta's pocket gopher (*Thomomys bottae*) and other small rodents.

Reserve

Forest habitat occurs throughout the Reserve on the Parnassus Heights campus site. Dominant tree species are non-native blue gum eucalyptus (*Eucalyptus globulus*) and Monterey cypress (*Cupressus macrocarpa*), which is native to California, but not to San Francisco. Coast live oak (*Quercus agrifolia*) and redwood trees, which are native to San Francisco, are also present. Redwoods are also present in other areas of campus (see Landscaped, above).

Understory vegetation in the Reserve included nasturtium (*Nasturtium* sp.), poison oak (*Toxicodendron diversilobum*), English ivy (*Hedera helix*), Himalayan blackberry (*Rubus armeniacus*), non-native grasses, and, in the restoration area near the summit, native toyon (*Heteromeles arbutifolia*) and coyote brush (*Baccharis pilularis*).

Several avian species are common to eucalyptus and cypress forest, including native species such as American robin, chestnut-backed chickadee (*Poecile rufescens*), pygmy nuthatch (*Sitta pygmaea*), Anna's hummingbird, and California towhee (*Pipilo crissalis*). The non-native eastern gray squirrel (*Sciurus carolinensis*) is also prevalent. Special-status species that could be present in these areas include overwintering monarch butterfly (*Danaus plexippus*) populations, special-status and common bats, and nesting raptors such as red-shouldered hawk (*Buteo lineatus*) and red-tailed hawk. Coyotes (*Canis latrans*) have been sighted occasionally in Golden Gate Park and Presidio areas of San Francisco and could appear in the Reserve.

Over the years, drought, disease, and the age of the trees have led to a declining trend in the overall health of the forest in the Reserve. UCSF determined there were too many trees in the Reserve to support a healthy canopy, and that more small-diameter trees were needed to diversify the forest. To address this, UCSF developed the Mount Sutro Open Space Reserve Vegetation Management Plan, a 20-year plan to achieve short- and long-term goals to improve ecosystem health, regenerate the forest, maintain and ensure public access to the Reserve, and minimize fire risk (see Section 4.3.2 for more detail). In addition, independent of the Vegetation Management Plan, UCSF staffs two certified arborists, and conducts ongoing maintenance throughout the Reserve and its trails, including, but not limited to, management of overgrown vegetation, bi-annual removal of invasive sprouts, and scheduled tree pruning.

Sensitive Natural Communities, Including Wetlands

The California Natural Diversity Database (CNDDB) reports no sensitive natural community occurrences on the campus site (CDFW, 2019). No potentially jurisdictional wetlands or daylighted surface waters are located on the campus site. See also discussion of Wetlands and Other Waters of the United States, below.

Wildlife Movement Corridors

Wildlife movement corridors link habitat areas and mitigate the effects of fragmentation by allowing animals to move between remaining habitats, in turn allowing depleted populations to be replenished and promoting genetic exchange between separate populations. Due to urban development of the San Francisco Peninsula, remaining wildlife habitat is largely limited to disconnected small parks and open space areas. These areas sustain corridors for flying animals, including butterflies, bats, and birds, but are difficult for mammals, reptiles and amphibians to reach, due to rugged terrain, urbanization, vehicular traffic, changes in vegetation, or areas of human disturbance.

The San Francisco Peninsula is an important migratory stopover for birds along the Pacific Flyway—one of the four major migratory routes in North America. Raptors, songbirds, shorebirds and waterfowl stop in San Francisco, including Golden Gate Park, Lake Merced, the Presidio, and the Reserve during their fall and spring migrations. Numerous areas on the Parnassus Heights campus site offer suitable and attractive habitat for birds and butterflies to forage and rest along their migration route. While San Francisco’s location on the Pacific Flyway enhances the importance of the City’s open spaces to migratory birds, these areas are disconnected and do not constitute a wildlife movement corridor.

Special-Status Species

For the purpose of this EIR, special-status species include:

- Plant and wildlife species listed as rare, threatened, or endangered under the federal or State endangered species acts;
- Species that are candidates for listing under either federal or State law;

- Species designated by the USFWS as species of concern or by the CDFW as species of special concern;[1]
- Species designated as "fully protected" by the State (there are about 35, most of which are also listed as either endangered or threatened);
- Raptors (birds of prey), which are specifically protected by California Fish and Game Code Section 3503.5, thus prohibiting the take, possession, or killing of raptors and owls, their nests, and their eggs;[2] and
- Species, such as candidate species, that may be considered rare or endangered pursuant to Section 15380(b) of the CEQA Guidelines.

A comprehensive list of the special-status plant and animal species that may occur or have the potential to occur within the campus site was developed based on data obtained from the CNDDB, the California Native Plant Society (CNPS) Electronic Inventory, and the USFWS and other biological literature pertaining to the bioregion. Potential for occurrence was determined to be low, moderate, or high based on habitat suitability, previous special-status species record locations, and current site conditions. These species lists are provided in **Table BIO-1** in **Appendix BIO**. Special-status plants and wildlife recorded within 1 mile of the campus site are shown in **Figure BIO-1** and **Figure BIO-2**, respectively, in **Appendix BIO**.

Special-Status Plants

Table BIO-1 in Appendix BIO presents special-status plant species that occur in the regional vicinity (i.e., the San Francisco North 7.5-minute USGS quadrangle and the seven surrounding quadrangles), and their potential to occur on the campus site. Most special-status plant species are considered to have a low potential to occur due to the developed and disturbed nature of the project site. The Reserve mostly lacks native plants and native vegetation communities, and other areas within the campus site are primarily landscaped.

Prior to development of San Francisco, Mount Sutro supported coastal prairie, valley and foothill grasslands, coastal dunes, and coastal scrub, but these communities are no longer present. Coastal triquetrella, a California Rare Plant Rank 1B.2 moss which occurs on shaded substrate, including gravel, in coastal bluff or coastal scrub communities, is the only special-status plant with a moderate potential to occur in the vicinity of the Parnassus Heights campus site. Coastal triquetrella has been documented on Tank Hill approximately 0.25 mile east of the campus site, and in open spaces near the Douglas Playground, approximately one mile southeast of the campus

[1] A California species of special concern is one that: has been extirpated from the state; meets the State definition of threatened or endangered but has not been formally listed; is undergoing or has experienced serious population declines or range restrictions that put it at risk of becoming threatened or endangered; and/or has naturally small populations susceptible to high risk from any factor that could lead to declines that would qualify it for threatened or endangered status.

[2] The inclusion of birds protected by Fish and Game Code Section 3503.5 is in recognition of the fact that these birds are substantially less common in California than most other birds, having lost much of their habitat to development, and that the populations of these species are therefore substantially more vulnerable to further loss of habitat and to interference with nesting and breeding than most other birds. It is noted that a number of raptors and owls are already specifically listed as threatened or endangered by State and federal wildlife authorities.

site (CDFW, 2019). It is most likely to occur along roadsides in the Reserve, but could be present in gravelly roadsides that support vegetation in other parts of campus as well.

Special-Status Wildlife

Table BIO-1 in Appendix BIO presents special-status wildlife species known to occur in the region (i.e., San Francisco North and seven surrounding quadrangles), and their potential to occur on the campus site. Of the special-status wildlife listed in Table BIO-1, only species classified as having a moderate or high potential for occurrence on the campus site were considered in the impact analysis. Species addressed in detail include the following:

- Monarch butterfly
- Western bumble bee
- Peregrine falcon and other nesting birds
- Hoary bat, western red bat and other roosting bats

Aside from breeding birds, insects and roosting bats, special-status wildlife species are not likely to occur within the campus site, most of which is highly fragmented and paved or dominated by non-native ornamental or ruderal species, which provide poor habitat for most wildlife. However, monarch butterflies (*Danaus plexippus*) have been known to overwinter in eucalyptus groves of San Francisco and western red bat has been documented in Golden Gate Park foliage. These species and other species with moderate potential to occur are described below.

Monarch butterfly. This insect is a California special animal and the butterfly's overwintering sites near the coast are protected in California because they are considered vulnerable due to their restricted range and relatively limited distribution in California. This species migrates along the Pacific Coast, and often overwinters in wind-protected groves of trees, such as eucalyptus and Monterey cypress, between October and March. CNDDB has documented this species overwintering in the Presidio, Golden Gate Park, Fort Mason, and Telegraph Hill (CDFW, 2019); and they have been recorded on Twin Peaks. However, there are no records of monarchs wintering within the Reserve.

Western bumble bee. This insect is a candidate threatened species in California. It has declined precipitously in recent years, possibly from disease. It may forage on flowers in the ornamental landscaping shrubs or trees on the Parnassus Heights core campus and Aldea Housing complex, or on flowers of trees, shrubs or herbaceous plants in the Reserve. Western bumble bee burrows in soil and does not build hives. It has been recorded in the past within one mile of the campus site in Golden Gate Park, Golden Gate Heights, and Twin Peaks (CDFW, 2019).

Peregrine falcon and other migratory nesting birds. As a result of recovery efforts, peregrine falcon has been de-listed both in California and nationally. It remains a California Fully Protected species. It is known to nest on structures in downtown San Francisco and may nest on tall buildings on the campus site, and forage for pigeons and other birds. Several other raptors are known to nest in San Francisco and likely to nest in the Reserve, including red-tailed hawk, red-shouldered hawk, American kestrel (*Falco sparverius*), Cooper's hawk and great horned owl (*Bubo virginianus*), as well as other migratory special-status and common birds. The federal

Migratory Bird Treaty Act (MBTA) and California Fish and Game Code protect raptors and native migratory birds and breeding birds (see Section 4.3.2, below).

As discussed above, the San Francisco Peninsula is an important migratory stopover for birds along the Pacific Flyway—one of the four major migratory routes in North America. Raptors, songbirds, shorebirds and waterfowl stop in San Francisco, including Golden Gate Park, Lake Merced, the Presidio and the Reserve on the Parnassus Heights campus site during their fall and spring migrations. Trees on the campus site offer suitable and attractive habitat for birds, including special-status birds, to forage and rest along this migration route.

Hoary bat, western red bat, and other roosting bats. Western red bat, a Western Bat Working Group (WBWG) high priority species, has been recorded in Strybing Arboretum of Golden Gate Park, where it roosts in trees. Hoary bat, a WBWG medium priority species, has also been recorded in Strybing Arboretum, within one mile of the Parnassus Heights campus site, and Townsend's big-eared bat has been recorded at Twin Peaks (CDFW, 2019). These and other bat species may roost in tree foliage, under exfoliating bark of trees, in tree cavities, or under roof eaves or inside disused building areas within the city. Bat surveys conducted in natural areas and parks in San Francisco found that the three most commonly encountered species were Mexican free-tailed bat (*Tadaridia brasiliensis*), Yuma myotis (*Lasiurus blossevillii*), and western red bat (Krauel, 2009). Mexican free-tailed bats are widespread throughout the natural areas of San Francisco, while Yuma myotis and western red bat are typically restricted to parks with lakes (Krauel, 2009). The western red bat and hoary bat have a moderate potential to occur in forest edge habitat of the Reserve within the campus site.

Designated Critical Habitat

The USFWS designates critical habitat for certain species listed by the agency as threatened or endangered. "Critical habitat" is defined in Section 3(5)(A) of the federal Endangered Species Act (ESA) as those lands within a listed species' current range that contain the physical or biological features considered essential to the species' conservation, as well as areas outside the species' current range that are determined to be essential to its conservation. The Parnassus Heights campus site is not located within designated critical habitat for any federally listed species.

Wetlands and Other Waters of the United States

There are no wetlands or other waters of the United States or the State of California as defined by Section 404 of the federal Clean Water Act or by the Porter-Cologne Water Quality Control Act, Section 13260 of the California Water Code, within the campus site. The ravine on the eastern side of the Reserve contiguous with the City-owned Greenbelt contains Woodland Creek, an intermittent channel which conveys stormwater flows following storm events, and that may be subject to U.S. Army Corps of Engineers jurisdiction, as an "other water of the U.S." The channel bed, bank or surrounding riparian vegetation would also be subject to CDFW jurisdiction and any disturbance to the channel or riparian vegetation would require a Lake or Streambed Alteration Agreement under Section 1602 of the California Fish and Game Code. Proposed CPHP activities on the Parnassus Heights campus site would not occur within the vicinity of the channel, and therefore, impacts on this channel are not considered further in this analysis.

4.3.2 Regulatory Framework

This section briefly describes University, federal and State laws and regulations, and local plans and policies pertaining to biological resources and wetlands.

Special-Status Species

Federal Endangered Species Act

The federal Endangered Species Act (ESA) protects the fish and wildlife species, and their habitats that have been identified by the USFWS or National Marine Fisheries Service (NMFS) as threatened or endangered. The term "endangered" refers to species, subspecies, or distinct population segments that are in danger of extinction through all or a significant portion of their range. The term "threatened" refers to species, subspecies, or distinct population segments that are likely to become endangered in the near future.

The ESA is administered by the USFWS and NMFS. In general, the NMFS is responsible for the protection of ESA-listed marine species and anadromous fishes, whereas listed, proposed, and candidate wildlife, plant species, and fish species are under USFWS jurisdiction. "Take"[3] of listed species can be authorized through either the Section 7 consultation process (for actions by federal agencies) or the Section 10 permit process (for actions by non-federal agencies). Federal agency actions include activities located on federal land or that are conducted by a federal agency, funded by a federal agency, or authorized by a federal agency (including issuance of federal permits and licenses).

Under Section 7 of the ESA, the federal agency conducting, funding, or permitting an action (the federal lead agency) must consult the USFWS and/or NMFS, as appropriate, to ensure that the proposed action will not jeopardize endangered or threatened species or destroy or adversely modify designated critical habitat. If a proposed project "may affect" a listed species or designated critical habitat, the lead agency is required to prepare a biological assessment evaluating the nature and severity of the expected effect. In response, the USFWS issues a biological opinion determining whether (1) the proposed action may either jeopardize the continued existence of one or more listed species (jeopardy finding) or result in the destruction or adverse modification of critical habitat (adverse modification finding), or (2) will not jeopardize the continued existence of any listed species (no jeopardy finding) or result in adverse modification of critical habitat (no adverse modification finding).

Critical Habitat

Under the ESA, the Secretary of the Interior (or the Secretary of Commerce, as appropriate) formally designates critical habitat for certain federally listed species and publishes these designations in the Federal Register. Critical habitat is not automatically designated for all federally listed species; so many listed species have no formally designated critical habitat.

[3] The federal ESA defines the term "take" as "harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect, or to attempt to engage in any such conduct."

Critical habitat is defined as the specific areas that are essential to the conservation of a federally listed species, and that may require special management consideration or protection. Critical habitat is determined using the best available scientific information about the physical and biological needs of the species. These needs, or primary constituent elements, include: space for individual and population growth and for normal behavior; food, water, light, air, minerals, or other nutritional or physiological needs; cover or shelter; sites for breeding, reproduction, and rearing of offspring; and habitat that is protected from disturbance or is representative of the historical geographic and ecological distribution of a species. There is no federally designated critical habitat on the campus site.

California Endangered Species Act

Under the California Endangered Species Act (CESA), the CDFW has the responsibility for maintaining a list of threatened and endangered species (California Fish and Game Code, Section 2070). The CDFW also maintains a list of "candidate species," which are species formally noticed as being under review for addition to either the list of endangered species or the list of threatened species. In addition, the CDFW maintains lists of "species of special concern," which serve as watch lists.

The CESA prohibits the take of plant and animal species designated by the Fish and Game Commission as either threatened or endangered in the State of California. "Take" in the context of the CESA means to hunt, pursue, kill, or capture a listed species, as well as any other actions that may result in adverse impacts when attempting to take individuals of a listed species. The take prohibitions also apply to candidates for listing under the CESA. However, Section 2081 of the CESA allows the CDFW to authorize exceptions to the State's take prohibition for educational, scientific, or management purposes.

Pursuant to the requirements of the CESA, an agency reviewing a proposed project within its jurisdiction must determine whether any State-listed endangered or threatened species could be present on the project area and determine whether the proposed project could have a potentially significant impact on such species. In addition, the CDFW encourages informal consultation on any proposed project that could affect a candidate species.

California Native Plant Protection Act

State listing of plant species began in 1977 with the passage of the California Native Plant Protection Act (NPPA), which directed the CDFW to carry out the legislature's intent to "preserve, protect, and enhance endangered plants in this state." The NPPA gave the California Fish and Game Commission the power to designate native plants as endangered or rare and to require permits for collecting, transporting, or selling such plants. The CESA expanded on the original NPPA and enhanced legal protection for plants. The CESA established threatened and endangered species categories and grandfathered all rare animals—but not rare plants—into the act as threatened species. Thus, three listing categories for plants are employed in California: rare, threatened, and endangered.

Special-Status Natural Communities

Special-status natural communities are identified as such by the CDFW's Natural Heritage Division and include those that are naturally rare and those whose extent has been greatly diminished through changes in land use. The CNDDB tracks 135 such natural communities in the same way that it tracks occurrences of special-status species: information is maintained on each site in terms of its location, extent, habitat quality, level of disturbance, and current protection measures. The CDFW is mandated to seek the long-term perpetuation of the areas in which these communities occur. While there is no statewide law that requires protection of all special-status natural communities, CEQA requires consideration of the potential impacts of a project on biological resources of statewide or regional significance, including special-status species, sensitive natural communities, including wetlands, and wildlife corridors and nursery sites.

Federal Migratory Bird Treaty Act

The federal MBTA (United States Code, Title 16, Section 703, Supplement I, 1989) prohibits taking, killing, possessing, or trading in migratory birds, except in accordance with regulations prescribed by the Secretary of the Interior. This act encompasses whole birds, parts of birds, and bird nests and eggs. The MBTA protects active nests of all species of birds that are included in the "List of Migratory Birds" published in the Federal Register in 1995.

California Fish and Game Code

Under Section 3503 of the California Fish and Game Code, it is unlawful to take, possess, or needlessly destroy the nest or eggs of any bird, except as otherwise provided by the code or any regulation made pursuant thereto. Section 3503.5 of the code prohibits take, possession, or destruction of any birds in the orders Falconiformes (hawks) or Strigiformes (owls), or of their nests and eggs. Code Sections 3511 (birds), 4700 (mammals), 5050 (reptiles and amphibians), and 5515 (fish) allow the designation of a species as fully protected. This is a greater level of protection than is afforded by CESA. Except for take related to scientific research, all take of fully protected species is prohibited.

Wetlands and Other Waters of the United States

Wetlands are ecologically complex habitats that support a variety of both plant and animal life. The federal government defines and regulates wetlands and other waters in Section 404 of the Clean Water Act as "areas that are inundated or saturated by surface water or groundwater at a frequency and duration sufficient to support (and do support, under normal circumstances) a prevalence of vegetation typically adapted for life in saturated soil conditions" (33 CFR 328.3[b] and 40 CFR 230.3).

Under normal circumstances, the federal definition of wetlands requires the presence of three identification parameters: wetland hydrology, hydric soils, and hydrophytic vegetation. Examples of wetlands include freshwater marsh, seasonal wetlands, and vernal pool complexes that have a hydrologic link to other waters of the United States. Other waters of the U.S. include unvegetated waters of streams, lakes and ponds.

The Porter-Cologne Water Quality Control Act Section 13260 of the California Water Code requires "any person discharging waste, or proposing to discharge waste, in any region that could affect the waters of the state to file a report of discharge (an application for waste discharge requirements)." Under the Porter-Cologne Water Quality Control Act definition, the term "waters of the state" is defined as "any surface water or groundwater, including saline waters, within the boundaries of the state." Although all waters of the United States that are within the borders of California are also waters of the state, the converse is not true—in California, waters of the United States represent a subset of waters of the state. Therefore, the State of California through each of nine Regional Water Quality Control Boards retains authority to regulate discharges of waste into any waters of the State, regardless of whether the U.S. Army Corps of Engineers has concurrent jurisdiction under Clean Water Act Section 404.

University of California

UCSF 2014 LRDP

The 2014 LRDP identified campus-wide objectives and objectives specific to the Parnassus Heights campus site. The following UCSF 2014 LRDP objective for the Parnassus Heights campus site relate to biological resources:

Campus Site-Specific Objectives

1. **Parnassus Heights**

    F. Preserve the Mount Sutro Open Space Reserve as permanent open space, and serve as the steward of the Reserve by maintaining and expanding the trail system and by ensuring the safety of visitors and neighboring structures.

The UCSF 2014 LRDP also included *Community Planning Principles*, which were produced in collaboration with the UCSF Community Advisory Group:

Community Planning Principles

Land Use

LU9. Preserve the Mount Sutro Open Space Reserve as permanent open space.

UCSF Mount Sutro Open Space Reserve Vegetation Management Plan

In 2015, UCSF began a process to develop a management plan to ensure the long-term health and sustainability of the Reserve. The UCSF Mount Sutro Open Space Reserve Vegetation Management Plan was completed in March 2018 and approved by the UCSF Chancellor in April 2018.

The purpose of the Vegetation Management Plan is to provide a management framework for protecting, enhancing, and restoring vegetation in the Reserve. To achieve a healthy and stable ecosystem, the Vegetation Management Plan outlines strategies for increasing the biodiversity of vegetation, conserving existing native vegetation, improving the regeneration and recruitment of tall tree species, managing insect and disease pressure on blue gum eucalyptus, and improving structural diversity. The Vegetation Management Plan continues the University's programs of tree risk assessment and hazard tree removal, creation and management of defensible space, maintaining trail access, and conservation and stewardship of native plants.

The Vegetation Management Plan identifies three phases of forest treatment. During the first few years, forest treatments will focus on the areas of the Reserve in greatest need of treatment, including 1) removing dead, dying, unhealthy and structurally unsound trees, 2) controlling low-growing vines and shrubs that would compete with desired vegetation, 3) preventing sprouts from decayed stumps, and 4) planting new trees. In the second phase, the density of certain areas in the forest will be reduced in order to meet the desired number of trees per acre by clearing dead, dying, unhealthy and structurally unsound trees; and other forest areas would be replanted. The third phase includes extending the treatment to remaining areas of the forest, along with monitoring of the status of vegetation and wildlife in the Reserve to evaluate the results of the treatments (UCSF, 2018a).

City of San Francisco

UCSF is not subject to local land use regulation whenever using land under its control in furtherance of its educational mission. However, it is UCSF policy to be generally consistent with applicable local plans, policies and regulations to the extent feasible. City plans and regulations that are relevant to the biological resources impacts analysis are summarized below.

San Francisco Public Works Code

The San Francisco's Urban Forestry Ordinance (Article 16 of the Public Works Code) protects San Francisco's street trees, significant trees, and landmark trees regardless of species. The ordinance protects the following three categories of trees, which are defined as follows:

> A **street tree** is "any tree growing within the public right-of-way, including unimproved public streets and sidewalks, and any tree growing on land under the jurisdiction of the Department [of Public Works]" as defined in Section 802 of the ordinance. Section 806b requires entities (other than the Department of Public Works) to obtain a permit from the department prior to removing any street trees.
>
> A **significant tree** is defined in Section 810A of the ordinance as any tree: (1) located on property under the jurisdiction of the Department of Public Works or on privately owned property with any portion of its trunk within 10 feet of the public right-of-way, and (2) that satisfies at least one of the following criteria: (a) a diameter at breast height in excess of 12 inches, (b) a height in excess of 20 feet, or (c) a canopy in excess of 15 feet. Any entity other than the Department of Public Works must obtain a permit to remove significant trees according to the process described in Section 806b.
>
> A **landmark tree** is any tree that: (1) has been nominated as such by a member of the public, a landowner, the San Francisco Planning Commission, the Board of Supervisors, or the Historic Preservation Commission, (2) the Urban Forestry Council (within the San Francisco Department of the Environment) has subsequently recommended as a landmark tree, and (3) is designated a landmark tree by ordinance approved by the Board of Supervisors. According to Section 810 of the ordinance, nominated trees undergoing review are protected according to the same standards as designated landmark trees until the review process is completed.

Permits are required for planting or removing street trees and significant trees, and protection measures are required for these trees if construction work would occur within the trees' dripline. Landmark trees are protected from alteration or removal.

Standards for Bird-Safe Buildings

The San Francisco Planning Department adopted *Standards for Bird-Safe Buildings* in 2011, adding Planning Code Section 139 (San Francisco Planning Department, 2011). These standards guide the use and types of glass and façade treatments, wind generators and grates, and lighting treatments. The standards impose requirements for bird-safe glazing and lighting in structures or at sites that represent a hazard to birds and provide information on educational and voluntary programs related to bird hazards. The standards define two types of bird hazards. "Location-related hazards" are buildings located inside of, or within a clear flight path of less than 300 feet from, an Urban Bird Refuge.[4] Such buildings require treatment when new buildings are constructed; additions are made to existing buildings; or existing buildings replace 50 percent or more of the glazing within the "bird collision zone."[5] The standards require implementation of the following treatments for façades facing, or located within, an Urban Bird Refuge:

- No more than 10 percent untreated glazing is allowed on building façades within the bird collision zone.
- Lighting must be shielded, and no uplighting is permitted. No event searchlights are permitted.
- Sites are not permitted to use horizontal access windmills or vertical access wind generators that do not appear solid.

"Feature-related hazards" include building- or structure-related features that are considered potential "bird traps" regardless of location (e.g., glass courtyards, transparent building corners, or clear glass walls on rooftops or balconies). Structures that include these elements must treat 100 percent of these elements in the building with bird-safe glazing.

4.3.3 Impacts and Mitigation Measures

Significance Criteria

Would implementation of the CPHP, including the three Initial Phase projects and Initial Phase improvements:

a) Have a substantial adverse effect, either directly or through habitat modifications, on any species identified as a candidate, sensitive, or special status species in local or regional plans, policies, or regulations, or by the California Department of Fish and Wildlife or U.S. Fish and Wildlife Service?

4 An Urban Bird Refuge is defined in the Standards for Bird-Safe Buildings as: any area of open space two acres or larger that is dominated by vegetation, including vegetated landscaping, forest, meadows, grassland, water features, or wetlands; open water; and some green rooftops.

5 The "bird collision zone" is that portion of the building that begins at grade and extends upward for 60 feet.

b) Have a substantial adverse effect on any riparian habitat or other sensitive natural community identified in local or regional plans, policies, regulations or by the California Department of Fish and Wildlife or U.S. Fish and Wildlife Service?

c) Have a substantial adverse effect on State or federally protected wetlands (including, but not limited to, marsh, vernal pool, coastal, etc.) through direct removal, filling, hydrological interruption, or other means?

d) Interfere substantially with the movement of any native resident or migratory fish or wildlife species or with established native resident or migratory wildlife corridors, or impede the use of native wildlife nursery sites?

e) Conflict with any local policies or ordinances protecting biological resources?

f) Conflict with the provisions of an adopted Habitat Conservation Plan, Natural Community Conservation Plan, or other approved local, regional, or state habitat conservation plan?

g) Exceed the LRDP EIR standard of significance by damaging or removing heritage or landmark trees or native oak trees of a diameter specified in a local ordinance?

Criteria Not Analyzed

As stated in the Initial Study, there would no impact related to the following topic(s) for the reasons described:

- ***Adversely affect any riparian habitat or other sensitive natural community, or State or federally protected wetlands.*** As noted in the Initial Study, no sensitive riparian habitat, other natural communities, or wetlands or waters of the U.S., are present on or adjacent to those portions of the campus site where new buildings and other improvements would be constructed. There would be no impact.

- ***Conflict with adopted conservation plan.*** No habitat conservation plans or natural community conservation plans cover the campus site. There would be no impact.

Approach to Analysis

Impacts on biological resources are evaluated based on the likelihood that special-status plant and wildlife species, sensitive habitats, wildlife corridors, and protected trees are present within the campus site (as described in Section 4.3.1, *Environmental Setting*), and the likely effects that CPHP activities including construction, operation, and maintenance might have on these resources. Special-status resources that have no or low potential to occur on the campus site (as presented in Table BIO-1 in Appendix BIO) are not considered in the impact analysis.

Approach to Analysis of Initial Phase Projects, including New Hospital, and Initial Phase Improvements

This EIR includes project-level analysis for certain Initial Phase projects anticipated to be completed by about the year 2030; specifically, the Irving Street Arrival, Research and Academic Building (RAB), and initial Aldea Housing Densification; and Initial Phase improvements, as described below. The New Hospital is also an Initial Phase project anticipated to be completed by about the year 2030, but is analyzed at a program level in this EIR within the context of the overall CPHP and will be analyzed at a project level in a subsequent EIR when more details are available.

Impact Analysis

Impact BIO-1: Implementation of the CPHP would not have a substantial adverse effect, either directly or through habitat modifications, on species identified as candidate, sensitive, or special-status species in local or regional plans, policies, or regulations, or by the California Department of Fish and Wildlife or U.S. Fish and Wildlife Service. (Less than Significant with Mitigation)

CPHP

A list of the special-status plant and wildlife species that have the potential to occur within the San Francisco North and seven surrounding quadrangles, was developed from the California Natural Diversity Database (CNDDB), the California Native Plant Society (CNPS) Electronic Inventory, the U.S Fish and Wildlife Service (USFWS) and pertinent biological literature (see Table BIO-1 in Appendix BIO). Most of the species identified from the region are associated with specific habitat types, such as dunes, valley foothill grasslands, chaparral, coastal prairie, coastal bluff scrub, marshes and swamps, which are not present on the campus site. Those species that could occur and could be affected are discussed below.

Special-Status Plant Species. Most special-status plant species have a low potential to occur due to the developed nature of the portion of the campus site where the great majority of new building development under the CPHP is planned, and which have mainly ornamental vegetation. As discussed in Chapter 3, *Project Description*, there is also the potential for certain new development under the CPHP, including the proposed New Hospital and associated widening of Medical Center Way adjacent to the New Hospital, to result in the need to modify the Reserve boundary, which may result in loss of vegetation in those areas. UCSF would replace any Reserve area that is lost due to new development under the CPHP by designating new Reserve area elsewhere on the campus site in an amount equal to or greater than that area lost. The potential for rare plant species to be impacted on the campus site, including in the Reserve, is low because of the widespread alteration of vegetation communities that has occurred over time on the campus site. Communities that would support rare plants, such as coastal prairie, valley and foothill grasslands, coastal dunes, and coastal scrub, are no longer present on the campus site. However, coastal triquetrella, a special-status moss, may occur in open gravel areas along roadsides and hillsides, such as in the Aldea Housing area and in areas adjacent to Surge and Woods buildings. Damage or removal of this species due to construction in these areas would represent a potentially significant impact. To address this impact, **CPHP Mitigation Measure BIO-1a**, **Botanical Surveys**, which is set forth below, would require surveys for coastal triquetrella and avoidance of any identified plants. Implementation of this measure would reduce impacts on this species to a less-than-significant level.

Special-Status Wildlife Species. As discussed in Section 4.3.1 above, most special-status wildlife species known to occur in the San Francisco region are not likely to occur on the campus site because the campus core is highly developed and lacks habitat for most species. Even though the Reserve is a more natural area, it also lacks the habitats necessary to support many of the special-status wildlife species known from the San Francisco region. As noted above, the special-status wildlife species with a moderate potential to occur on the campus site include monarch butterfly, western bumble bee, peregrine falcon and other nesting birds, and hoary bat, western red bat and other roosting bats. The potential for campus development under the proposed CPHP to affect these species is analyzed below.

Mature stands of eucalyptus within the Reserve and in the vicinity of new construction provide suitable roosting conditions for wintering monarch butterflies. While there are no records of overwintering monarchs within the Reserve, the species is known to overwinter in other areas nearby. If monarchs were overwintering in the Reserve, they could be disturbed by demolition and construction activity adjacent to eucalyptus trees. Disturbing active monarch roosts during the wintering season (October 1 – February 28) would be considered a significant impact. Implementation of **CPHP Mitigation Measure BIO-1b**, **Protection of Monarch Butterflies**, which is set forth below, would require a preconstruction survey for the presence of overwintering monarch butterfly aggregations and establishment of buffers if aggregations are observed. Implementation of this measure would reduce this impact to a less-than-significant level.

Western bumble bee is moderately likely to forage within the Reserve or elsewhere on the campus site where flowering plants are present. However, this species would not be likely to burrow in an active construction area or busy campus pathway. Potential disturbance of foraging bees during construction under the CPHP would be temporary and minor. Thus, Plan activities would have a less-than-significant impact on western bumble bee, and no mitigation is required.

Peregrine falcon may nest on tall buildings on the campus site, and other raptors may nest in tall trees in the Reserve, as well as in the redwood grove near the Dental Clinics and other developed areas of the campus site. Smaller birds may nest in trees or shrubs on the campus site, though they are unlikely to nest in busy areas with frequent human and vehicular traffic. Plan activities such as building demolition, tree and shrub removal, grading, and new building construction could directly impact nesting birds, and elevated sound levels from heavy construction equipment could cause adult birds to abandon nests. Project construction activities could result in potentially significant impacts to nesting birds, including special-status birds. **CPHP Mitigation Measure BIO-1c, Protection of Nesting Birds,** which is set forth below**,** would require preconstruction nesting bird surveys and avoidance of active nests. Implementation of this measure would reduce impacts on migratory bird species to a less-than-significant level.

Western red bat, hoary bat and other bat species may potentially occur in forest edge habitat of the Reserve or the redwood grove by the Dentistry Clinics. Suitable roosting habitat for these bats includes tree foliage, underneath the exfoliating bark of trees, and in tree cavities. Other bat species may roost in abandoned or disused buildings on campus. Plan activities such as building demolition, tree and shrub removal, grading, and new building construction could directly impact roosting bats, and elevated sound levels from heavy construction equipment could cause adult bats to abandon maternity roosts. Project construction activities could result in potentially significant impacts to roosting bats, including special-status bats. Implementation of **CPHP Mitigation Measure BIO-1d**, **Protection of Roosting Bats**, which is set forth below, would require pre-construction and pre-demolition roosting bat surveys, followed by bat-safe removal if suitable bat habitat is identified in a tree or structure to be removed. Implementation of this measure would reduce impacts on bat species to a less-than-significant level.

In addition to **CPHP Mitigation Measures BIO-1a** through **-1d**, the University would also implement **CPHP Mitigation Measure-1e**, **Worker Education**, which is set forth below, a construction worker education program that would ensure that all special-status species near the construction sites are protected from inadvertent impacts.

CPHP Mitigation Measure BIO-1a. Botanical Surveys

- Within suitable habitat for special-status plant species (open gravel areas along roadsides and hillsides for coastal triquetrella), a qualified biologist approved by CDFW shall conduct a focused survey for all species with potential to be present prior to ground disturbance. If no special-status plants are observed, no further action is required.
- If special-status plant species, including coastal triquetrella are observed, the plants will be avoided with a suitable buffer, determined in coordination with CDFW The buffer zone shall be clearly demarcated using exclusion fencing. If establishing an avoidance buffer is not feasible, individual plants shall be transplanted to an area with suitable physical and biological conditions outside of the work area and monitored and adaptively managed for five years.

CPHP Mitigation Measure BIO-1b. Protection of Monarch Butterflies

- Prior to demolition activities, a qualified biologist familiar with monarch butterfly behavior and habitat shall conduct a preconstruction survey for the presence of overwintering monarch butterfly aggregations. The survey shall be conducted in December or January during the period when overwintering aggregations appear. Should an overwintering aggregation be identified in trees surrounding proposed work sites within or adjacent to the Reserve, a 200-foot buffer shall be established around the occupied trees until the aggregation has dispersed, and construction within the buffer zone will be avoided for the duration of the overwintering period.

CPHP Mitigation Measure BIO-1c. Protection of Nesting Birds

- Tree and vegetation removal or pruning associated with project construction and commencement of outdoor project construction activities shall be avoided from February 1 through August 31, the primary local bird nesting season, to the extent feasible. If tree and vegetation removal or pruning associated with project construction is proposed during the nesting period, within seven days prior to the proposed start of construction activities a qualified biologist shall conduct a nesting bird survey of all potential habitat at the construction site and within 250 feet of the perimeter of the construction site.
- If any active nests are detected during the pre-construction survey, the qualified biologist shall recommend a work-exclusion buffer zone that shall be designated around the active nest to allow for both the successful fledging of the birds and initiation of work on some portions of the project site. A qualified biologist shall monitor any occupied nest located within a protective buffer zone in order to determine if the designated buffer zone is effective and when the buffer zone is no

longer needed. If the buffer zone is determined to be ineffective, its size shall be increased until it is effective, or work within one-quarter mile of the nest shall cease until the young have fledged and are independent of the nest.

CPHP Mitigation Measure BIO-1d. Protection of Roosting Bats

- Prior to project construction, a qualified bat biologist shall conduct a pre-construction survey for roosting bats in trees to be removed or pruned and structures to be demolished within the work area and within a 50-foot radius of the work area. If no roosting bats are found, no further action is required.

- If a non-maternal roost of bats is found in a tree or structure to be removed or demolished as part of project construction, the individuals shall be safely evicted, under the direction of a qualified bat biologist, by opening the roosting area to allow airflow through the cavity. Removal or demolition should occur no sooner than at least two nights after the initial minor site modification (to alter airflow). This action allows bats to leave during darkness, thus increasing their chance of finding new roosts with a minimum of disturbance. Departure of the bats from the construction area shall be confirmed with a follow-up survey by a qualified bat biologist prior to start of construction.

- If active maternity roosts are found in trees or structures that will be removed or demolished as part of project construction, tree removal or demolition of that tree or structure shall commence and be completed before maternity roosting colonies form (generally before March 1), or shall not commence until after young are flying (generally after July 31). Active maternity roosts shall not be disturbed between March 1 and July 31.

CPHP Mitigation Measure BIO-1e. Worker Education

- A qualified biologist shall provide training to all construction workers prior to starting work on plan components. The training shall cover special-status species with potential to be found onsite, avoidance measures to be undertaken if a species is found, and best management practices for site housekeeping.

Significance after Mitigation: Less than Significant.

Irving Street Arrival

The proposed Irving Street Arrival would include modification of the existing Medical Building 1, and involve demolition and construction of an existing developed area. Minor loss of ornamental vegetation could occur during demolition, but no special-status species, nesting birds, or other biological resources would be expected at these locations. Thus, no impact to special-status species would occur.

Mitigation: None required.

Research and Academic Building

Construction of the Research and Academic Building (RAB) would entail demolition of UC Hall and the School of Nursing Building and replacement with the proposed RAB, and may also include construction of an adjoining service/utility corridor and promenade. The work at this project site would primarily involve demolition and construction in already disturbed areas. However, some loss of ornamental trees and vegetation could occur during construction. Special-status plants would not be expected in this area; however, this disturbance has the potential to impact special-status wildlife, including migratory birds and roosting bats. As discussed above for the CPHP, these impacts would be mitigated by implementation of CPHP Mitigation Measures BIO-1b through 1d. Thus, impacts would be less than significant.

Mitigation: Implement CPHP Mitigation Measures BIO-1b, BIO-1c, BIO-1d, and BIO-1e.

Significance after Mitigation: Less than Significant.

Initial Aldea Housing Densification

The initial densification of Aldea Housing would include demolition of three existing student housing buildings and construction of new housing buildings in approximately the same footprint. While the Reserve itself would not be impacted by construction, ground disturbance would occur and some trees and other vegetation presently growing within the housing complex may be removed. This disturbance has the potential to impact special-status plants (coastal trinquetrella) as well as migratory birds and roosting bats. As discussed above for the CPHP, these impacts would be fully mitigated by implementation of CPHP Mitigation Measures BIO-1a through 1e. Thus, impacts would be less than significant.

Mitigation: Implement CPHP Mitigation Measures BIO-1a, BIO-1b, BIO-1c, BIO-1d, and BIO-1e.

Significance after Mitigation: Less than Significant.

Initial Phase Improvements

The Initial Phase improvements would include various Initial Phase utility improvements, implementation of the Parnassus Avenue Streetscape Plan, renovation of certain existing buildings, and installation of miscellaneous community investments in the public realm. While most of these improvements would be located in the developed areas of the campus core, as part of the utility improvements in the Initial Phase, some tree removal and grading alteration within the hillside adjacent to Medical Center Way would occur to accommodate proposed fuel tanks. This disturbance has the potential to impact special-status plants (coastal trinquetrella) as well as migratory birds and roosting bats. As discussed above for the CPHP, these impacts would be fully mitigated by implementation of CPHP Mitigation Measures BIO-1a through 1e.

Mitigation: Implement CPHP Mitigation Measures BIO-1a, BIO-1b, BIO-1c, BIO-1d, and BIO-1e.

Significance after Mitigation: Less than Significant.

Impact BIO-2: Implementation of the CPHP would not interfere substantially with the movement of any native resident or migratory fish or wildlife species or with established native resident or migratory wildlife corridors, or impede the use of native wildlife nursery sites. (Less Than Significant with Mitigation)

CPHP

The Parnassus Heights campus site is located in the middle of San Francisco; although the Reserve is an undeveloped area, it does not provide contiguous habitat for any terrestrial species because of the presence of developed and disturbed areas on all sides. Thus, no established corridors are present on the campus site for terrestrial wildlife species. Migratory birds utilizing the Pacific Flyway do, however, use the natural habitat of the Reserve as an important stopover, along with other parklands in San Francisco, including Golden Gate Park and Buena Vista Park, which serve a similar function.

Planned development under the CPHP would be focused primarily in developed areas of the campus core and the Aldea Housing complex. Thus, these activities would have overall minimal impact on the Reserve's function as a migratory stopover. However, the construction of taller development on the campus site under the CPHP, most notably the New Hospital which would be developed adjacent to, and could require modification of, the Reserve boundary, would increase the likelihood of birds striking windows of that building during flight. Window strikes cause injury or mortality to passing migratory and resident birds. In addition, potential construction night lighting, and building night lighting associated with operation of the new development under the CPHP can attract migratory birds and increase the likelihood of strike injuries or mortality.

Bird flights close to man-made structures also risk collisions with such structures. Direct effects on resident or migratory birds moving through an area could include death or injury if birds collide with lighted structures or with glass during the daytime. Indirect effects for migratory birds include delayed arrival at breeding or wintering grounds, and reduced energy stores necessary for migration, winter survival, or subsequent reproduction (Gauthreaux and Belser, 2006). Approximately 100 million to 1 billion birds die in North America as a result of collisions each year (Seewagen, 2017). Daytime collisions occur most often when birds fail to recognize window glass because it reflects clouds and sky.

In 2011 the San Francisco Planning Department adopted *Standards for Bird-Safe Buildings* (see Section 4.3.2 above). While UCSF is not subject to local land use regulations whenever using property under its control in furtherance of its educational mission, to address the potentially significant impact of bird strikes during construction and operation, UCSF will adopt mitigation that is generally consistent with the City's *Standards for Bird-Safe Buildings* for new construction proposed under the CPHP. UCSF will implement **Mitigation Measures BIO-2a, Prevention of Harm to Migrating Birds during Construction,** and **BIO-2b, Bird-Safe Building Treatments**, which are set forth below. Implementation of these measures would reduce the potential adverse effect on resident and migrating birds to a less than significant level by reducing injuries associated with night lighting during construction and operation of the new facilities, and requiring design features be incorporated into new structures that would make buildings more visible to birds.

Mitigation Measure BIO-2a: Prevention of Harm to Migrating Birds During Construction

Construction areas requiring lights shall implement the following measures to the extent feasible:

- Construction-related lighting shall be fully shielded and focused down to ensure no significant illumination passes beyond the immediate work area. Lighting shall be positioned around the perimeter of the work area positioned toward activity and not surrounding habitat of the Reserve.
- Yellow or orange light shall be used where possible.
- Construction personnel shall reduce the amount of lighting to the minimum necessary to safely accomplish the work.
- Night construction near suitable habitat for nesting and migratory birds and bats (i.e. the Reserve forest and understory vegetation) shall be avoided during nesting season (February 15 – August 15). If night construction near these areas cannot be avoided, light shall not be allowed to shine directly into suitable habitat.

Mitigation Measure BIO-2b: Bird-Safe Building Treatments

Building designs shall:

- Avoid installation of lighting in areas where not required for public safety.
- Examine and adopt alternatives to bright, all-night, floor-wide lighting when interior lights would be visible from the exterior or when exterior lights must be left on at night, including:
  - Installing motion-sensitive lighting
  - Installing task lighting
  - Installing programmable timers
  - Installing fixtures that use lower-wattage, sodium, and yellow-red spectrum lighting (if compatible with personnel safety requirements).
- Where exterior lights are to be left on at night, install fully shielded lights to contain and direct light away from the sky.
- Employ glazing options such as use of either fritted glass, Dichroic glass, etched glass, translucent glass, or glass that reflects ultraviolet light in appropriate portions of the building façade.
- Minimize light and glare resulting from new buildings through the orientation of the building, use of landscaping materials and choice of primary façade materials. Design standards and guidelines to minimize light and glare shall be adopted for the new buildings, including: reflective metal walls and mirrored glass walls shall not be used as primary building materials for facades.

Significance after Mitigation: Less than Significant.

Irving Street Arrival

The Irving Street Arrival would construct new facilities largely within the footprint of an existing building. Although, the project would add two stories, the project site is in a developed area and does not provide stopover habitat for migratory birds. Thus, construction and operation of this facility is not likely to increase injury or mortality to migratory birds. No impact would occur.

Mitigation: None required.

Research and Academic Building

The proposed RAB project would demolish the existing UC Hall (and nearby School of Nursing), and construct a new 8-story building. While the proposed RAB would not be substantially taller than UC Hall, its construction would involve night lighting in the vicinity of the Reserve and may impact migratory birds on the Pacific Flyway. In addition, the new RAB's design could pose an increased hazard of bird strikes from reflective glass or operational lighting. As discussed above for the CPHP, these impacts would be mitigated by implementation of CPHP Mitigation Measures BIO-2a and 2b. Thus, with mitigation the impact would be less than significant.

Mitigation: Implement CPHP Mitigation Measures BIO-2a and 2b.

Significance after Mitigation: Less than Significant.

Initial Aldea Housing Densification

The initial densification of Aldea Housing would remove three 3-story buildings adjacent to the Reserve and replace them three 8-story buildings and one 5-story building. During construction, night lighting could impact passing migratory birds, and building design could pose a hazard from operational lighting, and an increased risk of window strikes from the taller structures. As discussed above for the CPHP, these impacts would be fully mitigated by implementation of CPHP Mitigation Measures BIO-2a and 2b. Thus, with mitigation the impact would be less than significant.

Mitigation: Implement CPHP Mitigation Measures BIO-2a and 2b.

Significance after Mitigation: Less than Significant.

Initial Phase Improvements

Initial Phase building renovations would include exterior building renovations, and may involve night lighting during construction. These activities could pose an increased hazard of bird strikes. As discussed above for the CPHP, these impacts would be mitigated by implementation of CPHP Mitigation Measures BIO-2a and 2b. Thus, with mitigation the impact would be less than significant.

Mitigation: Implement CPHP Mitigation Measures BIO-2a and 2b.

Significance after Mitigation: Less than Significant.

Impact BIO-3: Implementation of the CPHP would not conflict with any applicable local policies or ordinances protecting biological resources, including exceeding the LRDP EIR standard of significance by damaging or removing heritage or landmark trees or native oak trees of a diameter specified in a local ordinance. (Less than Significant)

CPHP

As discussed in Chapter 3, *Project Description*, certain tree removal would be required under the CPHP as a result of clearing, excavation and regrading activities. This includes, but is not limited to, areas within the Reserve (e.g., on the hillside east of the New Hospital, and locations adjacent to Medical Center Way), elsewhere within the campus site (e.g., redwood grove along Parnassus Avenue west of UC Hall, and miscellaneous areas of ornamental landscaping), and off-site (e.g., street trees along Parnassus Avenue and/or Irving Street).

Pursuant to the University of California's constitutional autonomy, development and uses on property under control of the University that are in furtherance of the University's educational purposes are not subject to local land use regulation, including City of San Francisco General Plan policies regarding protection of biological resources. Although UCSF is not subject to City policies and regulations, UCSF strives to be consistent with City standards, where feasible.

The San Francisco Urban Forestry Ordinance (Article 16 of the San Francisco Public Works Code) was enacted to ensure the protection of trees on private land within and adjacent to public areas. The City of San Francisco currently considers street trees, significant trees and landmark trees as protected. Significant trees are trees within 10 feet of the public right-of-way <u>and</u> are either 20 feet or greater in height, 15 feet or greater in canopy width, or 12 inches or greater in trunk diameter at 4.5 feet above grade. Landmark trees are trees that have received special designation by the San Francisco Board of Supervisors due to species rareness, size, age, structure, ecological contribution, or historical and cultural importance. Removal of such trees requires a permit and payment of costs associated with a public hearing and replacement of the tree. Pursuant to the University of California's constitutional autonomy, on university-controlled property used in furtherance of the University's educational mission, UCSF is not subject to local policies protecting biological resources. However, UCSF will avoid removal of trees that would be considered significant or protected to the maximum extent feasible. Any trees within the public right-of-way that may be removed during the course of off-site construction under the CPHP would conform to the City ordinance governing tree protection. Thus, this impact would be less than significant.

Mitigation: None required.

Irving Street Arrival

For the reasons described above for the CPHP, the potential impact of the proposed Irving Street Arrival project on biological resources, including trees, would be less than significant.

Mitigation: None required.

Research and Academic Building

For the reasons described above for the CPHP, the potential impact of the proposed RAB project on biological resources, including trees, would be less than significant.

Mitigation: None required.

Initial Aldea Housing Densification

For the reasons described above for the CPHP, the potential impact of the proposed initial Aldea Housing Densification project on biological resources, including trees, would be less than significant.

Mitigation: None required.

Initial Phase Improvements

For the reasons described above for the CPHP, the potential impact of the proposed Initial Phase improvements on biological resources, including trees, would be less than significant.

Mitigation: None required.

Cumulative Impacts

Impact C-BIO-1: Implementation of the CPHP would not result in cumulatively considerable impacts on biological resources, in combination with past, present and reasonably foreseeable future projects in the vicinity of the Parnassus Heights campus site. (Less than Significant with Mitigation)

The Parnassus Heights campus site is located in an urban setting surrounded by a mix of institutional, residential, neighborhood commercial and open space uses. As such, cumulative building projects are limited to the densification or rebuilding of existing structures. Cumulative projects occurring outside the campus site are typically in developed areas that lack sensitive biological resources, and therefore, do not have considerable cumulative effects on biological resources. With regard to projects on the campus site, the primary cumulative projects considered in this analysis include a number of demolition projects (e.g., Surge, LPPI, Proctor buildings, etc.) and utility improvements, previously authorized at the Parnassus Heights campus site under the 2014 LRDP, which have not yet been implemented. In addition, the Mount Sutro Open Space Vegetation Management Plan (UCSF, 2018a) is currently being implemented, involving phased removal of trees and understory and re-planting within the Reserve.

Implementation of the Mount Sutro Open Space Vegetation Management Plan will impact special-status species, including migratory birds and bats, within the Reserve by disturbance, as well as direct removal of habitat. However, these impacts were mitigated to a less-than-significant level with the implementation of mitigation measures that were adopted at the time of project approval. Furthermore, the Vegetation Management Plan's phased implementation was designed to minimize the extent of loss of habitat for species in the Reserve. With respect to the demolition of Surge, LPPI, Proctor and other buildings previously authorized under the 2014 LRDP, biological impacts associated with those projects would be mitigated to a less than significant level with the implementation of mitigation measures included in the 2014 LRDP EIR. As discussed above, the CPHP would result in minimal direct impacts on sensitive biological resources within the Reserve, and would mitigate for all indirect impacts to special-status species, both inside and outside of the Reserve, with **CPHP Mitigation Measures BIO-1a** through **1e**, and **BIO-2a** and **2b**. Therefore, with mitigation, campus site development under the proposed CPHP would not result in a cumulatively considerable contribution to impacts on biological resources. Thus, the project's cumulative impacts on biological resources would be less than significant.

Mitigation: Implement CPHP Mitigation Measures BIO-1a through 1e, and BIO-2a and 2b.

Significance after Mitigation: Less than Significant.

4.3.4 References

California Department of Fish and Wildlife (CDFW) California Natural Diversity Database (CNDDB), 2019. Special status species occurrences for the San Francisco North and seven surrounding U.S. Geographical Survey (USGS) 7.5-minute topographic quadrangles, Commercial Version. September 6.

California Native Plant Society (CNPS), 2019. Inventory of Rare and Endangered Plants for the San Francisco North and seven surrounding USGS 7.5-minute topographic quadrangles. Available online at http://www.rareplants.cnps.org/.

Gauthreaux, S.A., Belser, C.G., 2006. *Effects of Artificial Night Lighting on Migrating Birds*, In: Rich, C. and Longcore, T., Ecological Consequences of Night Lighting, Island Press, Covelo, CA, pp. 67–93.

Krauel, J.K., 2009. *Foraging Ecology of Bats in San Francisco*, M.S. Thesis, San Francisco State University. Available for review at the San Francisco Planning Department, 1650 Mission Street, Suite 400, in Case File No. 2001.0016E, 2009. Cited in UCSF, 2014.

Mayer, K.E. and W.F. Laundenslayer, eds., 1988. *A Guide to Wildlife Habitats of California*, California Department of Fish and Wildlife, Sacramento, CA.

New York Audubon Society, 2007. *Bird Safe Building Guidelines,* http://www.nycaudubon.org/pdf/BirdSafeBuildingGuidelines.pdf.

San Francisco Planning Department, 2011. Standards for Bird-safe Buildings. Adopted July 14, 2011. Available online at https://sfplanning.org/standards-bird-safe-buildings.

Seewagen, C. L. and C. Sheppard, 2017. Bird Collisions with Windows: An Annotated Bibliography. American Bird Conservancy, Washington, DC.

University of California, San Francisco (UCSF), 2014. *UCSF 2014 Long Range Development Plan Final EIR*. November.

UCSF, 2018a. Mount Sutro Open Space Reserve Vegetation Management Plan. March.

UCSF, 2018b. Mount Sutro Open Space Reserve Vegetation Management Plan Final Environmental Impact Report. March.

This page intentionally left blank

4.4 Cultural Resources and Tribal Cultural Resources

This section assesses the potential for construction and operation of the Comprehensive Parnassus Heights Plan (CPHP or Plan), including the three Initial Phase projects and Initial Phase improvements, to result in significant impacts on cultural resources (including architectural resources, prehistoric and historic-era archaeological resources, and human remains) and tribal cultural resources. The section includes a description of the existing environmental setting as it relates to cultural and tribal cultural resources, and provides a regulatory framework that discusses applicable federal, State, and local regulations, identifies criteria used to determine impact significance, discusses potential impacts, and identifies feasible mitigation measures, as necessary, to reduce potential significant impacts.

4.4.1 Definitions

Architectural resources include buildings, structures, objects, and historic districts. Residences, cabins, barns, industrial buildings, and bridges are examples of architectural resources. CEQA Guidelines define an architectural historical resource as: (1) a resource in the California Register of Historical Resources (California Register); (2) a resource included in a local register of historical resources as defined in Public Resources Code (PRC) Section 5020.1(k) or identified as significant in a historical resource survey meeting the requirements of PRC Section 5024.1(g); or (3) any object, building, structure, site, area, place, record, or manuscript that a lead agency determines to be historically significant or significant in the architectural, engineering, scientific, economic, agricultural, educational, social, political, military, or cultural annals of California, provided the lead agency's determination is supported by substantial evidence in light of the whole record.

Archaeological resources consist of prehistoric and historic-era archaeological resources. Prehistoric archaeological resources consist of village sites, temporary camps, lithic scatters, roasting pits/hearths, milling features, petroglyphs, rock features, and burials. Associated artifacts include obsidian and chert flaked-stone tools (e.g., projectile points, knives, scrapers) or toolmaking debris; culturally darkened soil ("midden") containing heat-affected rocks, artifacts, or shellfish remains; and stone milling equipment (e.g., mortars, pestles, handstones, or milling slabs). Historic-era archaeological resources include townsites, homesteads, agricultural or ranching features, mining-related features, refuse concentrations, and features or artifacts associated with early military and industrial land uses. Associated artifacts include stone, concrete, or adobe footings and walls; artifact-filled wells or privies; and deposits of metal, glass, and/or ceramic refuse. If a lead agency determines that an archaeological site is an historical resource, the provisions of PRC Section 21084.1 and CEQA Guidelines Section 15064.5 apply. If an archaeological site does not meet the CEQA Guidelines criteria for a historical resource, then the site may meet the criteria of PRC Section 21083.2 regarding unique archaeological resources.

Tribal cultural resources are sites, features, places, cultural landscapes, sacred places, and objects with cultural value to a California Native American tribe that are listed, or determined to be eligible for listing, on the national, state, or local register of historical resources (PRC Section 21074[a][1]).

4.4.2 Environmental Setting

Prehistoric and Ethnohistoric Context

Categorizing the prehistoric period into cultural stages allows researchers to describe a range of archaeological resources with similar cultural patterns and components during a given time frame, creating a regional chronology. Milliken et al. (2007) provide a framework for the interpretation of the San Francisco Bay Area. The authors divided human history in California into three periods: the *Early Period*, the *Middle Period*, and the *Late Period*. In many parts of California four periods are defined; the fourth being the *Paleoindian Period* (11500–8000 B.C.), characterized by big-game hunters occupying broad geographic areas. Evidence of human habitation during the Paleoindian Period has not yet been discovered in the San Francisco Bay Area. Economic patterns, stylistic aspects, and regional phases further subdivide cultural periods into shorter phases. This scheme uses economic and technological types, socio-politics, trade networks, population density, and variations of artifact types to differentiate between cultural periods.

Based on a compilation of ethnographic, historic, and archaeological data, Milliken (1995) describes a group known as the Ohlone, who once occupied the general vicinity of the Plan area. Levy (1978) describes the language group spoken by the Ohlone, known as "Costanoan." The term Costanoan is originally derived from a Spanish word designating the coastal peoples of Central California. Today Costanoan is used as a linguistic term that refers to a larger language family spoken by distinct sociopolitical groups that spoke at least eight languages (as different as Spanish is from French) of the same Penutian language group. The Ohlone once occupied a large territory from San Francisco Bay in the north to the Big Sur and Salinas Rivers in the south. Milliken (1995) notes that San Francisco was within the *Yelamu* tribal territory, a group of approximately 160 individuals at the beginning of the historic era.

Economically, Ohlone engaged in hunting and gathering. Their territory encompassed both coastal and open valley environments that contained a wide variety of resources, including grass seeds, acorns, bulbs and tubers, bear, deer, elk, antelope, a variety of bird species, and rabbit and other small mammals. The Ohlone acknowledged private ownership of goods, and village ownership of rights to land and/or natural resources; they appear to have aggressively protected their village territories (Levy, 1978).

After European contact, Ohlone society was severely disrupted by missionization, disease, and displacement (Milliken, 1995). Today, the Ohlone still have a strong presence in the San Francisco Bay Area, and are highly interested in their historic and prehistoric past. There are six culturally-affiliated tribes or individuals associated with the San Francisco area; none have been federally recognized.

No prehistoric or ethnographic archaeological resources have been recorded within the Plan area (NWIC File No. 19-0705). However, two locations within the Plan area are unofficially associated with *Ishi*, the name given to the lone survivor of the northern California tribe of Yahi Indians, who lived and worked at the Anthropology Museum on the UCSF Parnassus Heights campus site between 1911 and 1916. One location is a large rock outcropping that creates an overhang southeast of the Chancellor's residence. The second location is a cave northwest of the Chancellor's residence. In 1998, UCSF retained an archaeologist to conduct archaeological testing and excavation adjacent to the Chancellor's residence; no artifacts that may have been attributable to *Ishi* were identified (Holman, 1998). The cave and outcropping are contained within the Mount Sutro Open Space Reserve (Reserve) and would not be impacted by the proposed CPHP or through possible encroachment of the Reserve by the New Hospital or road improvements.

Historical Background

Spanish, Mexican, and Early American Periods

Initial European exploration of the San Francisco Peninsula began in 1769 and lasted until 1810. During this period, a number of Spanish expeditions penetrated the territory occupied by the Ohlone. Between 1769 and 1776, forays led by Portola, Ortega, Fages, Fages and Crespi, Anza (two expeditions), Rivera, and Moraga were carried out. Favorable reports led to the founding of seven missions in the region between 1770 and 1797.

In the spring of 1776, the site of San Francisco was chosen by Juan Batista Anza for the establishment of a mission and military post. Later that same year, the Mission San Francisco de Asís (also known as Mission Dolores) and Presidio de San Francisco were officially dedicated and Jose Joaquin Moraga (Anza's lieutenant) took formal possession in the name of King Carlos III.

The Spanish annexation and colonization of Alta California, as manifested in the religious-military mission system, produced profound changes in the cultures of the indigenous population. The missions resettled and concentrated the aboriginal hunter-gatherer population into agricultural communities. The concentration of population, coupled with the indigenous people's lack of immunity to European diseases, caused the tribes to be decimated by common diseases which were generally not fatal to Europeans. It has been estimated that the Ohlone population declined from 10,000 or more in 1770 to less than 2,000 in 1832.

Mexico established jurisdiction over Alta California in April of 1822. During the Mexican Period (1822–1848), control over this remote area by the central and local Mexican authorities was never strong. California became part of the United States as a consequence of the U.S. victory over Mexico in the Mexican War. The territory was formally ceded in the treaty of Guadalupe Hidalgo in 1848, and was admitted as a state in 1850.

Prior to the discovery of gold at Sutter's Mill on January 24, 1848, development in San Francisco consisted of the Spanish/Mexican facilities (i.e., the Presidio and Mission) and a small settlement known as Yerba Buena situated on the shores of the cove by the same name. The inhabitants of Yerba Buena were predominantly non-Spanish, English-speaking immigrants (e.g., U.S. or British citizens). Sometime before the Gold Rush, the inhabitants of Yerba Buena officially changed the name of their settlement to San Francisco. Following the discovery of gold, San Francisco transformed quickly from an isolated hamlet into a bustling center of commerce. After the discovery of gold, the population of San Francisco grew from 375 people in 1847 to 2,000 by February 1849, and by the end of 1849, there may have been as many as 20,000 people living in the City (CCSF, 2011).

University of California San Francisco, Parnassus Heights

UCSF is historically associated with the Toland Medical College, founded in downtown San Francisco in 1863. In 1873, the Toland Medical College was acquired by and became affiliated with the University of California. The original UCSF campus at Parnassus Heights was established through a combination of factors, including the appropriation of $250,000 by the state legislature in 1895 to construct three buildings to house the "Affiliated Colleges" of Dentistry, Medicine, and Pharmacy. Also, in 1895, Adolph Sutro, the former mayor of San Francisco, presented the University with a gift of its first 13 acres. The cornerstone for the Affiliated Colleges at the Parnassus Heights campus site was laid on March 27, 1897, and the campus opened in October 1898.

UC Hall (extant), originally known as UC Hospital when it was completed in 1917, was the first hospital building constructed on the campus site. Construction of additional medical facilities, academic buildings, and other support functions continued throughout the first half of the 20th century, occurring primarily along the south side of Parnassus Avenue and eventually extending from 3rd Avenue east to Hillway Avenue. Post-World War II growth continued to be concentrated in areas south of Parnassus Avenue, including Moffitt Hospital and the Medical Sciences Building (1955, both extant), as well as areas north of Parnassus Avenue to Irving Street.

In the period from the 1960s to 1980s, the University refurbished a number of the aging buildings including UC Hall and the Clinical Sciences Building (extant) which was originally completed in 1933. Other buildings were demolished in this period, including the old Medical School Building – completed in 1898 and located in what is now Saunders Court between the Medical Sciences Building and the School of Nursing.

New buildings constructed during this period include the University House (extant), which opened in 1965 to be used as the Chancellor's Residence, and two glass towers (extant) behind the Medical Science and Clinical Sciences buildings called Health Science East and West, which were completed in 1966. The School of Nursing building (extant) was competed in 1972, and the Ambulatory Care Center building (extant, today known as Medical Building 1 or ACC) on the opposite side of Parnassus Avenue was completed in 1973. Numerous new buildings were also added in the 1980s, including the new School of Dentistry/Dental Clinics building (1980, extant), the modernized Moffitt Hospital projects (1980, extant), the new Long Hospital (1983, extant), and the Koret Center (1986, extant).

Identified Cultural Resources

An inventory of extant buildings and cultural landscapes on the Parnassus Heights campus site is included in **Table CUL-1** in **Appendix CUL**. **Table 4.4-1**, below, summarizes those considered historical resources for the purposes of CEQA. Of the 71 individual buildings on the campus site, 25 are considered historical resources for the purposes of CEQA (this includes eight contributors to the Third Avenue Historic District). Additionally, two cultural landscapes are considered historical resources: Saunders Court and the Reserve.

TABLE 4.4-1
INVENTORY OF HISTORICAL RESOURCES ON UCSF PARNASSUS HEIGHTS CAMPUS SITE

Building Name	Year Built (Source)	Eligibility (Source)
Millberry Union (excluding garage)	1955 (Carey & Co., 2011)	NR[a] and CR[b] (Carey & Co., 2011)
UC Hall	1917 (Carey & Co., 2003)	CR (Carey & Co., 2003)
Dental Clinics	1979 (Carey & Co., 2011)	NR and CR with Criteria Consideration G (Carey & Co., 2011)
Clinical Sciences	1933 (Page & Turnbull, 2005)	CR (Page & Turnbull, 2005)
Saunders Court (cultural landscape)	1967 (Carey & Co., 2011)	Presumed eligible for NR and CR (Carey & Co., 2011)
Mount Sutro Open Space Reserve (cultural landscape)	1886 (Knapp & VerPlanck, 2013)	CR (Knapp & VerPlanck, 2013)
Health Sciences Instruction and Research (HSIR) West	1966 (Carey & Co., 2011), 1964 (UCSF, 2019)	Presumed eligible for NR and CR (Carey & Co., 2011)
HSIR East	1966 (Carey & Co., 2011), 1964 (UCSF, 2019)	Presumed eligible for NR and CR (Carey & Co., 2011)
Medical Sciences	1954 (Carey & Co., 2011)	NR and CR (Carey & Co., 2011)
Langley Porter Psychiatric Institute (LPPI)	1943 (Graves, 2019a), 1941 (UCSF, 2019)	NR and CR (Graves, 2019a)
Potential Third Avenue Historic District		NR and CR (Carey & Co., 2011)
1320 Third Avenue	1911 (Carey & Co., 2011), 1912 (UCSF, 2019)	Contributor
1326 Third Avenue	1911 (Carey & Co., 2011), 1912 (UCSF, 2019)	Contributor
1332 Third Avenue	1911 (Carey & Co., 2011), 1915 (UCSF, 2019)	Contributor
1338 Third Avenue	1910 (Carey & Co., 2011), 1913 (UCSF, 2019)	Contributor
1344 Third Avenue	1910 (Carey & Co., 2011), 1912 (UCSF, 2019)	Contributor
1350 Third Avenue	1911 (Carey & Co., 2011), 1912 (UCSF, 2019)	Contributor
1356 Third Avenue	1911 (Carey & Co., 2011)	Contributor
1362 Third Avenue	1909 (Carey & Co., 2011)	Contributor
1422-24 Fifth Avenue	1922 (Carey & Co., 2011), 1915 (UCSF, 2019)	NR and CR (Carey & Co., 2011)
1432-34 Fifth Avenue	1910 (Carey & Co., 2011), 1911 (UCSF, 2019)	NR and CR (Carey & Co., 2011)
1468 Fifth Avenue	1948 (Carey & Co., 2011), 1920 (UCSF, 2019)	NR and CR (Carey & Co., 2011)
Faculty Alumni House (745 Parnassus Avenue)	1915 (Carey & Co., 2011)	NR and CR (Carey & Co., 2011)
Surge	1966 (Carey & Co., 2011)	Presumed eligible for NR and CR (Carey & Co., 2011)
University House (Chancellor’s residence)	1966 (Carey & Co., 2011)	NR and CR (Carey & Co., 2011)
Aldea San Miguel Housing Complex		
Aldea San Miguel 8 (105 Behr Avenue)	1960 (Carey & Co., 2011)	NR and CR (Carey & Co., 2011)
Aldea San Miguel 12 (165 Johnstone Drive)	1960 (Carey & Co., 2011)	NR and CR (Carey & Co., 2011)
Aldea San Miguel 10 (175 Johnstone Drive)	1960 (Carey & Co., 2011)	NR and CR (Carey & Co., 2011)

NOTES:
[a] National Register of Historic Places
[b] California Register of Historical Resources

4.4.3 Regulatory Framework

Federal

Historical and archaeological resources are considered through the National Historic Preservation Act (NHPA) of 1966, as amended (54 U.S.C. 306108), and its implementing regulations. Before an "undertaking" (e.g., federal funding or issuance of a federal permit) is implemented, Section 106 of the NHPA requires federal agencies to consider the effects of the undertaking on historic properties (i.e., properties listed in or eligible for listing in the national register) and to afford the Advisory Council on Historic Preservation a reasonable opportunity to comment on any undertaking that would adversely affect properties eligible for listing in the National Register of Historic Places (National Register). Under the preservation act, a property is considered significant if it meets the National Register listing criteria A through D, at 36 Code of Federal Regulations 60.4, as follows:

> The quality of significance in American history, architecture, archaeology, engineering, and culture is present in districts, sites, buildings, structures, and objects that possess integrity of location, design, setting, materials, workmanship, feeling, and association and that:
>
> a) Are associated with events that have made a significant contribution to the broad patterns of our history, or
>
> b) Are associated with the lives of persons significant in our past, or
>
> c) Embody the distinctive characteristics of a type, period, or method of construction, or that represent the work of a master, or that possess high artistic values, or that represent a significant and distinguishable entity whose components may lack individual distinction, or
>
> d) Have yielded, or may be likely to yield, information important in prehistory or history

For a resource to be eligible for the National Register, it must also retain enough integrity to be recognizable as a historic property and to convey its significance. Resources that are less than 50 years old are generally not considered eligible for the National Register.

Federal review of the effects of undertakings on significant cultural resources is carried out under Section 106 of the NHPA and is often referred to as "Section 106 review." This process is the responsibility of the federal lead agency. Section 106 review typically involves a four-step procedure, which is described in detail in the implementing regulations of the NHPA (36 Code of Federal Regulations 800):

- Define the Area of Potential Effects in which an undertaking could directly or indirectly affect historic properties;
- Identify historic properties in consultation with the State Historic Preservation Office and interested parties;
- Assess the significance of effects of the undertaking on historic properties; and
- Consult with the State Historic Preservation Officer, other agencies, and interested parties to develop an agreement that addresses the treatment of historic properties and notify the

Advisory Council on Historic Preservation and proceed with the project according to the conditions of the agreement.

State

The State of California implements the NHPA of 1966, as amended, through its statewide comprehensive cultural resource surveys and preservation programs. The California Office of Historic Preservation, as an office of the California Department of Parks and Recreation, implements the policies of the preservation act on a statewide level. The Office of Historic Preservation also maintains the California Historical Resources Inventory. The State Historic Preservation Officer is an appointed official who implements historic preservation programs within the state's jurisdictions.

CEQA and the California Register of Historical Resources

The California Register is "an authoritative listing and guide to be used by state and local agencies, private groups, and citizens in identifying the existing historical resources of the state and to indicate which resources deserve to be protected, to the extent prudent and feasible, from substantial adverse change" (PRC Section 5024.1[a]). Certain resources are determined by the statute to be automatically included in the California Register, including those formally determined eligible for or listed in the National Register (PRC 5024.1[d][1]). These resources are termed "historical resources."

Based on Section 15064.5(a) of the CEQA Guidelines, historical resources include, but are not limited to, any object, building, structure, site, area, place, record, or manuscript that is historically or archaeologically significant or that is significant in the architectural, engineering, scientific, economic, agricultural, educational, social, political, military, or cultural annals of California. Generally, a resource is considered by a lead agency to be "historically significant" if the resource meets the criteria for listing in the California Register (PRC Section 5024.1), or qualifies as a "unique historical resource" (PRC Section 21083.2).

To be eligible for the California Register, a cultural resource must meet one or more 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.

For a resource to be eligible for the California Register, it must also retain enough integrity of location, design, setting, materials, workmanship, feeling, and association to be recognizable as a historical resource and to convey its significance. Resources that are less than 45 years old are generally not considered eligible for the California Register.

Impact assessment under CEQA considers only historically significant cultural resources; that is, resources that meet CEQA criteria for eligibility to the California Register (historical resources) or qualify as unique archaeological resources, as detailed below. Impacts on resources that do not meet these criteria are not considered in impact assessment under CEQA. Similarly, for projects with federal involvement, only resources that meet the criteria of eligibility for the National Register receive further consideration in impact analysis.

CEQA considers archaeological resources as an intrinsic part of the physical environment and thus requires that, for any project, the potential of the project to adversely affect archaeological resources be analyzed (CEQA Section 21083.2). For a project that may have an adverse effect on a significant archaeological resource, CEQA requires preparation of an environmental impact report (CEQA Section 21083.2 and CEQA Guidelines Section 15065). CEQA recognizes two different categories of significant archaeological resources: "unique" archaeological resource (CEQA Section 21083.2) and an archaeological resource that qualifies as a "historical resource" under CEQA (CEQA Section 21084.1 and CEQA Guidelines Section 15064.5).

Assembly Bill 52

In September of 2014, the California Legislature passed Assembly Bill 52, which added provisions to the PRC regarding the evaluation of impacts on tribal cultural resources under CEQA, and consultation requirements with California Native American tribes. In particular, Assembly Bill 52 now requires lead agencies to analyze project impacts on "tribal cultural resources" separately from archaeological resources (PRC Sections 21074; 21083.09). The bill defines "tribal cultural resources" in a new section of the PRC Section 21074. Assembly Bill 52 also requires lead agencies to engage in additional consultation procedures with respect to California Native American tribes (PRC Sections 21080.3.1, 21080.3.2, 21082.3).

Specifically, PRC Section 21084.3 states:

a) Public agencies shall, when feasible, avoid damaging effects to any tribal cultural resource.

b) If the lead agency determines that a project may cause a substantial adverse change to a tribal cultural resource, and measures are not otherwise identified in the consultation process provided in Section 21080.3.2, the following are examples of mitigation measures that, if feasible, may be considered to avoid or minimize the significant adverse impacts:

    1) Avoidance and preservation of the resources in place, including, but not limited to, planning and construction to avoid the resources and protect the cultural and natural context, or planning greenspace, parks, or other open space, to incorporate the resources with culturally appropriate protection and management criteria.

    2) Treating the resource with culturally appropriate dignity taking into account the tribal cultural values and meaning of the resource, including, but not limited to, the following:

        (A) Protecting the cultural character and integrity of the resource.

        (B) Protecting the traditional use of the resource.

        (C) Protecting the confidentiality of the resource.

3) Permanent conservation easements or other interests in real property, with culturally appropriate management criteria for the purposes of preserving or utilizing the resources or places.

4) Protecting the resource.

Finally, Assembly Bill 52 required the Office of Planning and Research to update Appendix G of the CEQA Guidelines to provide sample questions regarding impacts on tribal cultural resources (PRC Section 21083.09).

California Public Resources Code Sections 5097.98 and 5097.99

PRC Section 5097.98 (and reiterated in CEQA Guidelines Section 15064.59 [e]) identifies steps to follow in the event of the accidental discovery or recognition of any human remains in any location other than a dedicated cemetery. PRC Section 5097.99, as amended, states that no person shall obtain or possess any Native American artifacts or human remains which are taken from a Native American grave or cairn. Any person who knowingly or willfully obtains or possesses any such artifacts or human remains is guilty of a felony which is punishable by imprisonment. Any person who removes, without authority of law, any such items with an intent to sell or dissect or with malice or wantonness is also guilty of a felony which is punishable by imprisonment.

California Health and Safety Code Section 7050.5

Section 7050.5 of the California Health and Safety Code protects human remains by prohibiting the disinterring, disturbing, or removing of human remains from any location other than a dedicated cemetery.

California Native American Historic Resource Protection Act

The California Native American Historic Resources Protection Act of 2002 imposes civil penalties, including imprisonment and fines up to $50,000 per violation, for persons who unlawfully and maliciously excavates upon, removes, destroys, injures, or defaces a Native American historic, cultural, or sacred site that is listed or may be listed in the California Register.

University of California

UCSF 2014 LRDP

The UCSF 2014 LRDP identified campus-wide objectives and objectives specific to the Parnassus Heights campus site. The following UCSF 2014 LRDP objectives relate to cultural resources:

Campus-Wide Objectives

4. **Promote Environmental Sustainability**

   A. Optimize the use of existing facilities, sites, and campus space through repurposing, renovation, densification, and consolidation where appropriate.

Campus Site-Specific Objectives

1. Parnassus Heights

F. Preserve the Mount Sutro Open Space Reserve as permanent open space, and serve as the steward of the Reserve by maintaining and expanding the trail system and by ensuring the safety of visitors and neighboring structures.

The UCSF 2014 LRDP also included *Community Planning Principles*, which were produced in collaboration with the UCSF Community Advisory Group:

Community Planning Principles

Building and Public Realm Design

BD3. Consider adaptive reuse of building structures.

BD8. Respect historically significant resources whenever possible.

City of San Francisco

UCSF is not subject to local land use regulation whenever using land under its control in furtherance of its educational mission. However, it is UCSF policy to be generally consistent with applicable local plans, policies and regulations to the extent feasible. City plans and regulations that are relevant to the cultural resource impacts analysis are summarized below.

San Francisco City Landmarks

San Francisco City Landmarks are buildings, properties, structures, sites, districts, and objects that possess special character or special historical, architectural or aesthetic interest or value and that are an important part of the City's historical and architectural heritage. City Landmarks are important to San Francisco's history and are significant and unique examples of the past. Adopted in 1967 as Article 10 of the City Planning Code, City Landmarks are protected from inappropriate alterations and demolitions, with all significant alterations reviewed by the San Francisco Historic Preservation Commission. There are currently 287 landmark sites and 14 historic districts in San Francisco subject to Article 10, and none of these are located within the Parnassus Heights campus site.

4.4.4 Impacts and Mitigation Measures

Significance Criteria

Would implementation of the CPHP, including the three Initial Phase projects and Initial Phase improvements:

a) Cause a substantial adverse change in the significance of a historical resource pursuant to §15064.5;

b) Cause a substantial adverse change in the significance of an archaeological resource pursuant to §15064.5; or

c) Disturb any human remains, including those interred outside of formal cemeteries.

d) Cause a substantial adverse change in the significance of a tribal cultural resource, defined in PRC Section 21074 as either a site, feature, place, cultural landscape that is geographically defined in terms of the size and scope of the landscape, sacred place, or object with cultural value to a California Native American tribe, and that is:

  i) Listed or eligible for listing in the California Register of Historical Resources, or in a local register of historical resources as defined in PRC Section 5020.1(k), or

  ii) A resource determined by the lead agency, in its discretion and supported by substantial evidence, to be significant pursuant to criteria set forth in subdivision (c) of PRC Section 5024.1. In applying the criteria set forth in subdivision (c) of PRC Section 5024.1, the lead agency shall consider the significance of the resource to a California Native American tribe.

Approach to Analysis

Architectural Resources

Potential impacts on architectural resources are assessed by identifying any activities (either during construction or operations) that could affect resources that have been identified as historical resources for the purposes of CEQA. Once a resource has been identified as a CEQA historical resource, it then must be determined whether the project would "cause a substantial adverse change in the significance" of the resource (CEQA Guidelines Section 15064.5[b]). A substantial adverse change in the significance of an historical resource means "physical demolition, destruction, relocation, or alteration of the resource or its immediate surroundings such that the significance of an historical resource would be materially impaired" (CEQA Guidelines Section 15064[b][1]). A historical resource is considered materially impaired through the demolition or alteration of the resource's physical characteristics that convey its historical significance and that justify its inclusion in the California Register (CEQA Guidelines Section 15064.5[b][2][A]).

As discussed in Section 4.0, *Introduction to Environmental Analysis*, several demolition projects at the Parnassus Heights campus site were previously approved under the 2014 LRDP that have not yet been implemented, including demolition of the LPPI. However, since the LPPI was recently determined to be individually eligible for the National Register and California Register (Graves, 2019a), this EIR addresses the potential effect of demolition of the LPPI on historic resources as part of the CPHP.

Archaeological Resources

Archaeological resources can include historical resources according to CEQA Guidelines Section 15064.5 as well as unique archaeological resources as defined in CEQA Guidelines Section 21083.2(g). The significance of most prehistoric and historical archaeological sites is usually assessed under National Register and California Register criteria D/4. These criteria stress the importance of the information potential contained within the site, rather than its significance as a surviving example of a type or its association with an important person or event. Although it is less common, archaeological resources may also be assessed under California Register criteria 1, 2, and/or 3.

Impacts to unique archaeological resources or archaeological resources that qualify as historical resources are assessed pursuant to Section 21083.2 of the CEQA statute, which states that the lead agency shall determine whether the project may have a significant effect on archaeological resources. As with architectural resources above, whether the impacts of the project would “cause a substantial adverse change in the significance” of the resource must be determined (CEQA Guidelines Section 15064.5[b]).

Human Remains

Human remains, including those buried outside of formal cemeteries, are protected under several state laws, including PRC Section 5097.98 and Health and Safety Code Section 7050.5. These laws are identified above in the Regulatory Framework. This analysis considers impacts on human remains, including intentional disturbance, mutilation, or removal of interred human remains.

Tribal Cultural Resources

A tribal cultural resource is defined as a site feature, place, cultural landscape, sacred place or object, which is of cultural value to a tribe that is either on or eligible for the California Register or a local historic register, or the lead agency, at its discretion, chooses to treat the resource as a tribal cultural resource. Impacts to tribal cultural resources are assessed in consultation with affiliated Native American tribe in accordance with PRC Section 21080.3. This analysis considers whether campus development under the proposed CPHP would cause damaging effects to any tribal cultural resource.

Approach to Analysis of Initial Phase Projects, including New Hospital, and Initial Phase Improvements

This EIR includes project-level analysis for certain Initial Phase projects anticipated to be completed by about the year 2030; specifically, the Irving Street Arrival, Research and Academic Building (RAB), and initial Aldea Housing Densification; and Initial Phase improvements, as described below. The New Hospital is also an Initial Phase project anticipated to be completed by about the year 2030, but is analyzed at a program level in this EIR within the context of the overall CPHP, and will be analyzed at a project level in a subsequent EIR when more details are available.

Impact Analysis

Impact CUL-1: Implementation of the CPHP would result in a substantial adverse change in the significance of known historical resources. (Significant and Unavoidable with Mitigation)

CPHP

Under the proposed CPHP, the following historical resources would be demolished, the effects of which are discussed below:

- UC Hall (eligible for listing in the California Register), which includes the Zakheim murals in Toland Hall;

- Millberry Union (eligible for listing in the National and California Registers) - demolished either wholly or partially;
- School of Dentistry (individually eligible for listing in the National and California Registers);
- LPPI (individually eligible for listing in the National and California Registers);[1]
- Aldea San Miguel Housing Building 8 (individually eligible for listing in the National and California Registers);
- Aldea San Miguel Housing Building 10 (individually eligible for listing in the National and California Registers); and
- Aldea San Miguel Housing Building 12 (individually eligible for listing in the National and California Registers).

As explained further below, the demolition of these buildings under the proposed CPHP would be considered a significant impact.

In addition, under the proposed CPHP, the following historical resources could be physically altered:

- Expansion of Saunders Court (presumed individually eligible for listing in the National and California Registers as a cultural landscape);
- Modification of Reserve boundary (individually eligible for listing in the California Register as a cultural landscape);
- Renovation of HSIR East (presumed individually eligible for listing in the National and California Registers);
- Renovation of HSIR West (presumed individually eligible for listing in the National and California Registers); and
- Renovation of Medical Sciences building (individually eligible for listing in the National and California Registers).

The specific details of proposed alterations and improvements to these historical resources are not known at this time, and consequently, these alterations are presumed to result in significant impacts.

UC Hall

As discussed in the Environmental Setting, UC Hall, built in 1917, is one of the oldest building on the Parnassus Heights campus site. It has been determined to be potentially eligible for the California Register under criterion 1 for its association with the broad pattern of development of medical research centers and hospitals in San Francisco and criterion /3 as an early work of architect Lewis P. Hobart, as an excellent example of the Beaux-Arts style in San Francisco, and for the murals in Toland Hall that were painted by Bernard Zakheim, a student of Diego Rivera, between 1935 and 1938 (Carey & Co., 2003; Page & Turnbull, 2005). A reconnaissance-level

[1] The three support buildings associated with the LPPI building – LPPI Butler, LPPI Paint Shed, and LPPI OPI – have been determined to be ineligible for listing in the National Register and California Register (Carey, 2011). These buildings are not identified on any local registers or surveys and are not considered historical resources for CEQA purposes.

pedestrian survey of this building by ESA in 2019 found that it is essentially unchanged since its original evaluation in 2003, and as such, its historic status would remain unchanged. It should be noted that under the 1996 LRDP, UC Hall was slated for demolition, and under the 2014 LRDP, UC Hall was proposed to be retained and seismically retrofitted for conversion to residential use (in part). Under the proposed CPHP, UC Hall would be demolished to allow for construction of a new Research and Academic Building (RAB). The demolition of UC Hall would be considered a significant impact on a historic resource.

The series of Zakheim murals are located within the single-story Toland Hall auditorium in UC Hall. These murals were commissioned as part of the Works Progress Administration (WPA) Federal Art Project and depict, in 10 panels, scenes of the history of science and medicine in California — including portrayals of traditional Native American medicine; scenes from Spanish, early American and Gold Rush California; and the founders of the UC Medical School. The murals were painted using the same traditional method of creating frescoes developed during the Italian Renaissance in which pigment is rapidly applied directly to wet plaster so that it becomes an integral part of the plaster, resulting in a chemical reaction that forms a surface of calcium carbonate on top of the pigment. Original skylights also remain in the auditorium, and the two surviving original interior stairwells feature marble treads and steel balustrades topped by a clear varnished wood handrail. A "Carved Frame" oak carving (Carved Frame) by Michael Von Meyer and James Warrender was also commissioned as part of the WPA Federal Art Project and is located in Toland Hall. Although UC Hall's interior has been extensively modified, Toland Hall and its corresponding murals remain intact (UCSF, 2005).

In 2005, UCSF completed Historic American Buildings Survey (HABS)-like documentation of UC Hall that includes a narrative report and photographic documentation (Page & Turnbull, 2005). As specified below, HABS-like documentation is required as part of mitigation for the demolition of this building, and this effort provides a documentary record of the building in its existing condition, and documents the significant interior and exterior features of the building.

As noted above, under the 1996 LRDP, UC Hall was designated for demolition. UCSF's second amendment to the 1996 LRDP in 2005 (2005 LRDP Amendment) continued to propose the demolition of UC Hall, however, unlike the 1996 LRDP EIR, the 2005 LRDP Amendment EIR concluded that demolition of UC Hall would result in a significant impact to a historical resource due to then-current revisions to CEQA regarding resource eligibility. When certifying the 2005 LRDP Amendment EIR, the Regents adopted a mitigation measure which not only included HABS-like documentation of UC Hall, but also included the removal of the Zakheim murals from UC Hall's Toland Hall prior to demolition and their subsequent conservation at an appropriate facility. The 2005 LRDP Amendment EIR concluded that, even with these mitigation measures, the impact of the proposed demolition of UC Hall would remain significant and unavoidable. At the time, the Regents did not approve funding for demolition of UC Hall or approve the demolition itself in connection with adoption of the 2005 LRDP Amendment.

Since then, in 2020, UCSF completed two independent studies that include detailed technical assessments on how the Zakheim murals could be physically preserved, removed and relocated from their current location in UC Hall. (Page & Turnbull, 2020; Architectural Resources Group, 2020.) Given the nature of the frescoes and their vulnerability to cracking, the physical condition of some of the panels which have experienced water damage over the years, the murals' large size, the curved shape of the walls on which most of the panels are painted, ground movements, and the aging of UC Hall (all described in the above noted studies), UCSF has determined that it may be infeasible to remove and relocate the Zakheim murals as there is no guarantee that any effort to remove the Zakheim murals would be successful. Based on those independent studies, there is a likelihood that removal of the Zakheim murals may potentially cause serious damage to at least some of the panels such that the integrity of the entire series is destroyed (Page & Turnbull, 2020). In addition, UCSF has determined that the estimated $7.6 million cost of physical preservation, removal and relocation is prohibitive in light of UCSF's primary responsibility to support its academic health care mission.

Because UCSF has determined that it will not attempt to remove the Zakheim murals, UCSF has notified the U.S. General Services Administration (GSA), which inventories artworks created under the WPA, the family and surviving heirs of Bernard Zakheim, as well as philanthropists and nonprofit groups with an art-related purpose, in order to determine if a third-party will assume the responsibility of physically removing, preserving and relocating the Zakheim murals. Although a search of UCSF's records did not indicate that any interest to the Zakheim murals was preserved by GSA on behalf of the United States, UCSF provided notice of the Zakheim murals' potential destruction in accordance with GSA's stated policies and guidance for disposal of artwork and sculptures commissioned under the WPA. (Legal Title to Art Work Produced Under the 1930s and 1940s New Deal Administration, 2019.) Following receipt of UCSF's notice to GSA regarding the potential destruction of the Zakheim murals, GSA has now asserted an ownership interest in the Zakheim murals on behalf of the United States, and has indicated that documentation exists to demonstrate that the Zakheim murals and the Carved Frame are on loan to UCSF. UCSF will continue to discuss the federal ownership claim of the Zakheim murals and the Carved Frame directly with GSA. UCSF also analyzed the Visual Artists' Rights Act (17 U.S.C. § 106A et seq.) and the California Art Preservation Act (California Civil Code § 987 et seq.) to identify their applicability to the Zakheim murals. While UCSF has determined that both sets of laws likely have limited or no application to the Zakheim murals, UCSF extended a written notice of UCSF's intent to demolish UC Hall and the Zakheim murals contained therein as a courtesy to the family of Bernard Zakheim. Finally, UCSF will publish a written notice as a display advertisement in the San Francisco Chronicle informing the public of its intention to demolish UC Hall and the Zakheim murals. (Cal. Civ. Code, § 989(e)(2)(A).) An existing organization with an art-related purpose will then have the opportunity to contact UCSF within 30 calendar days of the date that the notice is published in the San Francisco Chronicle, if such an organization wishes to preserve, remove and relocate the Murals.

Pursuant to Article 10 of the City Planning Code, the City of San Francisco has also initiated City Landmark designation procedures with the Board of Supervisors for the Zakheim murals. However, as UCSF is a constitutionally created state entity, it is not subject to local land use regulation whenever using land under its control in furtherance of its educational mission. While UCSF may consider the requirements of Article 10 of the City Planning Code when demolishing UC Hall and the Zakheim murals therein, it is not bound by the City's plans and policies. Similarly, if it is determined that GSA, on behalf of the United States, has retained federal ownership of the Zakheim murals, GSA also will not be bound by the City's plans and policies. The potential City Landmark designation would make no practical difference for purposes of the foregoing CEQA analysis because UC Hall and the Zakheim murals therein are already considered to be historical resources for CEQA purposes.

At this time, it is unknown whether the GSA, the family and surviving heirs of Bernard Zakheim, or any other nonprofit or community group will be interested and/or capable of removing the Zakheim murals without destroying their artistic integrity. For purposes of this EIR and to provide a conservative analysis, it is assumed that the Zakheim murals will be damaged or destroyed when UC Hall is demolished under the CPHP; this would be considered a significant impact. Although imposition of CPHP Mitigation Measure CUL-1b (Document Historical Resources Prior to Demolition or Alteration) and CPHP Mitigation Measure CUL-1d (Digital-Imaging and Virtual Preservation of Zakheim Murals in UC Hall) would reduce this impact, it would not mitigate it to a less-than-significant level and therefore would be considered significant and unavoidable.

Millberry Union

Built in 1955, Millberry Union was determined individually eligible for inclusion in the National Register and California Register (Carey & Co., 2011).[2] This evaluation found that the building is historically significant under National Register/California Register criteria A/1 as the first and only location on campus where students and faculty could share in social, cultural, and recreational activities. A reconnaissance-level pedestrian survey of this building by ESA in 2019 found that it is essentially unchanged since its original evaluation in 2011, and as such, its historic status would remain unchanged. Millberry Union is considered a historical resource for CEQA purposes.

Under the Future Phase of the proposed CPHP, the Millberry Union's two towers would be partially or completely demolished and replaced with a new building that could contain clinical, instruction, research, and campus community spaces. Partial or complete demolition of this building under the CPHP would be considered a significant impact.

School of Dentistry

Built in 1979, the School of Dentistry was determined individually eligible for inclusion in the National Register and California Register (Carey & Co., 2011). This evaluation found that the building is historically significant under National Register/California Register criteria A/1 because it was designed in response to a public controversy in the 1970s regarding building height and massing that directly influenced future development of the campus. Additionally, the building was found to be significant under criteria C/3 because it embodies the distinctive characteristics of the International Style, possesses high artistic value, represents the work of master architect John Funk. Although the building is less than 50 years of age, it was found to be "of exceptional architectural importance and captures a particularly important period in the late-twentieth-century history of UCSF," and it is therefore eligible under Criteria Consideration G (properties that have achieved significance within the last 50 years). A reconnaissance-level

[2] Carey & Co.'s evaluation was an update to the 2006 evaluation by Historic Resource Associates of the "Millberry Union complex," which includes the Millberry Union building, the women's residence hall, and the men's residence hall. The Millberry Union Garage was not explicitly identified as part of the Millberry Union Complex.

pedestrian survey of this building by ESA in 2019 found that it is essentially unchanged since its original evaluation in 2011, and as such, its historic status would remain unchanged. The School of Dentistry is considered a historical resource for CEQA purposes.

Under the Future Phase of the proposed CPHP, the School of Dentistry would be demolished and replaced with a new building or buildings that would include primarily research and academic space. Demolition of this building under the CPHP would be considered a significant impact.

LPPI

LPPI (including three small support structures) would be demolished to allow for construction of the New Hospital. LPPI, constructed in 1941, has been determined to be eligible for listing in the National Register and California Register under criteria A/1 for its association with pioneering efforts by the University of California and the State of California to jointly address mental illness. The period of significance is 1943-73. Additionally, the building is eligible for listing under criteria A/1 for its association with LGBTQ history, particularly related to developments in legal and medical perspectives and treatment. The period of significance is 1943-ca. 1955 (Graves, 2019a). The building is proposed to be demolished under the CPHP, which would be considered a significant impact.

In 2019, UCSF completed HABS-like documentation of LPPI that includes a narrative report (Graves, 2019b). As specified below, HABS-like documentation is required as part of mitigation for the demolition of this building, and this effort provides a documentary record of the building in its existing condition and documents the significant interior and exterior features of the building.[3]

Aldea San Miguel Housing Buildings 8, 10, and 12

Constructed in 1960, the Aldea San Miguel Married Student Housing complex was originally comprised of 13 apartment buildings designed in the Second Bay Tradition, a regional aesthetic that dates from the 1920s to the 1960s. All but three of the original buildings – Aldea San Miguel 8, 10, and 12 – have been demolished. Each of these remaining buildings has been determined to be individually eligible for listing in the National Register and California Register under criteria C/3 as intact examples of the Second Bay Tradition. Under the proposed CPHP, these three buildings would be demolished to accommodate the initial Aldea Housing Densification project. Demolition of Aldea San Miguel Housing Buildings 8, 10, and 12 would be considered a significant impact.

Saunders Court

With the completion of the Health Sciences Instruction & Research building in 1967, the old Medical School Building was demolished. In its place Saunders Court was constructed, which forms one of the few designed open spaces on campus. Designed by renowned landscape architect Robert Royston, Saunders Court features columns from the old Medical School Building as well as the cornerstone from one of the original Affiliated Colleges buildings from 1898. It is

[3] The National Park Service's *Preservation Brief 17: Architectural Character – Identifying the Visual Aspects of Historic Buildings as an Aid to Preserving Their Character* provides the following guidance: "Even though buildings may be of historic, rather than architectural significance, it is their tangible elements that embody its significance for association with specific events or persons and it is those *tangible elements* both on the exterior and interior that should be preserved."

named after John B. De C. M. Saunders (1903-1991), UCSF's first Provost (1958-1964) and first Chancellor (1964-1966).

Saunders Court was evaluated in 2011, at which time it was 43 years old, and was found to be a significant cultural landscape that may become eligible for listing in the National Register and California Register when it reaches 50 years of age (i.e., in 2018). As the only space on campus that embodies both the original Affiliated Colleges campus and the postwar expansion of the university, it appeared to be eligible under criteria A/1, and as the work of master Robert Roysten, it appeared to be eligible under criteria C/3. It is therefore presumed individually eligible for listing in the National and California Registers as a historical resource.

Under the proposed CPHP, Saunders Court would be expanded and connected on its west side to the proposed Promenade, a new east-west pedestrian corridor. Because detailed plans are not yet available, proposed alterations are presumed to result in a significant impact to Saunders Court.

Mount Sutro Open Space Reserve

The potential historical significance of the Reserve as a cultural landscape was evaluated as part of the UCSF *Mount Sutro Management Plan EIR* (UCSF, 2013). The analysis completed by Bradley, et al. (2013) found that the Reserve is a historical resource for the purposes of CEQA and is eligible for inclusion in the California Register of Historical Resources for its association with Adolph Sutro and his development of the Sutro Forest (the period of this significance is 1886-98) as well as for its association with the history of San Francisco and the informal development of this naturalistic landscape as a recreational area and green space for the City (the period of this significance is 1886 – present (UCSF, 2013).

The character-defining features of the Reserve that convey its historical significance include: (1) the presence of a forest that covers the overwhelming majority of the land area and whose dominant species is eucalyptus, (2) the presence of the Historic and Fairy Gates trails as part of a consciously laid out trail system and the presence of informal or social trails which have developed over time related to land use activities and to provide connections into Mount Sutro from the surrounding neighborhoods, and (3) the natural topographic characteristics of the site, including the steep terrain, the rock outcrops, Stanyan Canyon, and the summit (UCSF, 2013).

Under the proposed CPHP, the proposed New Hospital and associated widening of Medical Center Way adjacent to the New Hospital may require modification of the Reserve. Because detailed plans are not yet available, proposed alterations are presumed to result in a significant impact to the Reserve.

Summary

As discussed above, the proposed CPHP would result in the demolition of buildings that are individually eligible for listing in the National Register and/or California Register: UC Hall (including the Zakheim murals), Millberry Union, School of Dentistry, LPPI, and Aldea San Miguel Housing Buildings 8, 10, and 12. In addition, in the absence of detailed plans at this stage, other historical resources, including cultural landscapes, could be significantly physically altered under the CPHP: Saunders Court, Reserve, HSIR East, HSIR West, and Medical Sciences building. The demolition or significant alteration of these individually eligible resources would be considered a significant impact because, once demolished or significantly altered, they would no longer be eligible as historical resources under CEQA.

While the impact on individual historical resources cannot be mitigated to a less-than-significant level, implementation of **CPHP Mitigation Measures CUL-1a**, **CUL-1b**, and **CUL-1c** would require that UCSF identify character-defining features of the individually eligible resources, prepare HABS-like documentation, and develop a public interpretation and salvage plan. Additionally, **CPHP Mitigation Measure CUL-1d** would address the digital-imaging and virtual preservation of the Zakheim murals in UC Hall. Implementation of these measures would lessen the severity of the significant impact on historical resources but would not reduce this impact to a less-than-significant level.

CPHP Mitigation Measure CUL-1a: Identify Character-Defining Features

Prior to any demolition work or significant alterations initiated at the known historical resources, UCSF shall ensure that a qualified architectural historian who meets the Secretary of the Interior's Professional Qualification Standards identifies character-defining features of each historical resource. Despite being presumed or having been previously determined eligible for listing in the National Register and/or California Register, character-defining features of the historical resources that would be demolished or may be significantly altered under the CPHP have not been explicitly or adequately identified. According to guidance from the National Park Service, a historical resource "must retain… the essential physical features [i.e., character-defining features] that enable it to convey its historic identity. The essential physical features are those features that define both *why* a property is significant…and *when* it was significant" (National Park Service, 1997). The identification of character-defining features is necessary for complete documentation of each historical resource as well as appropriate public interpretation and salvage plans.

CPHP Mitigation Measure CUL-1b: Document Historical Resources Prior to Demolition or Alteration

Prior to any demolition work or significant alterations initiated at the known historical resources, UCSF shall ensure that a qualified architectural historian who meets the Secretary of the Interior's Professional Qualification Standards thoroughly documents each building and associated landscaping and setting. Documentation shall include still photography and a written documentary record of the building to the National Park Service's standards of the Historic American Buildings Survey (HABS) or the Historic American Engineering Record (HAER), including accurate scaled mapping and architectural descriptions. If available, scaled architectural plans will also be included. Photos include large-format (4"x5") black-and-white negatives and 8"x10" enlargements. Digital photography may be substituted for large-format negative photography if archived locally. The record shall be accompanied by a report containing site-specific history and appropriate contextual information. This information shall be gathered through site-specific and comparative archival research and oral history collection as appropriate. Copies of the records shall be submitted to the Northwest Information Center at Sonoma State University and the UCSF Kalmanovitz Library Archives and Special Collections.

CPHP Mitigation Measure CUL-1c: Public Interpretation and Salvage Plan

Prior to any demolition or significant alteration activities that would remove character-defining features of, or demolish, an individual historical resource on the project site, UCSF shall determine whether any such features may be salvaged, in whole or in part, during demolition/alteration. If it is determined that features are present that will be salvaged, a Salvage Plan shall be prepared by a qualified architectural historian or historic architect who meets the Secretary of the Interior's Professional Qualification Standards and presented to UCSF Planning staff.

Prior to any demolition or significant alteration activities that would remove character-defining features of, or demolish, an individual historical resource on the project site, UCSF shall prepare a plan for interpretive displays. The specific location, media, and other characteristics of such interpretive display(s) shall be included in this proposal. The historic interpretation plan shall be prepared in coordination with an architectural historian or historian who meets the Secretary of the Interior's Professional Qualification Standards and an exhibit designer or landscape architect with historical interpretation design experience. Interpretive display(s) shall document the individually eligible resources to be demolished or altered. The interpretative plan should also explore contributing to digital platforms that are publicly accessible. A proposal describing the general parameters of the interpretive program and the substance, media, and other elements of such interpretive display shall be approved by UCSF Planning staff prior to commencement of any demolition activities. Following any demolition or alteration activities within the project site, UCSF shall provide within publicly accessible areas of the project site a permanent display(s) of interpretive materials concerning the history and architectural features of the individual historical resources.

CPHP Mitigation Measure CUL-1d: Digital-Imaging and Virtual Preservation of Zakheim Murals in UC Hall

Prior to the commencement of demolition activities at UC Hall, UCSF Planning staff shall work with a conservator experienced in digital preservation to develop and implement a digital imaging and virtual preservation proposal for the Zakheim murals in UC Hall. The proposal shall include a plan to digitally preserve the Zakheim murals through high-resolution three-dimensional digital recording that would be made available both online and through a planned interpretive virtual reality interpretive exhibit on campus to be maintained by the UCSF Library's Archives and Special Collections department. UCSF Planning staff shall ensure that the murals have been digitally recorded per the digital imaging and virtual preservation proposal prior to any demolition activities in Toland Hall. The digital recording shall be made available to the public online and the interpretive virtual reality interpretive exhibit shall be installed on campus within six months of the murals being digitally recorded.

Significance after Mitigation: Significant and Unavoidable.

Irving Street Arrival

The proposed Irving Street Arrival project would modify a portion of Medical Building 1 that functions as a pedestrian entrance extending from Irving Street to Parnassus Avenue. This would entail the modification or demolition of a portion of the Medical Building 1. In addition, the Irving Street Arrival project would replace the façades or reskin two Millberry Union and

Medical Building 1 parking garages. None of the affected buildings qualify as historical resources. The Irving Street Arrival project would have no impact on known historical resources.

Mitigation: None required.

Research and Academic Building

The proposed RAB project would require the demolition of UC Hall, a historical resource, to accommodate a new research and academic building. The demolition of UC Hall is discussed above under the impact of the CPHP as a whole. As stated above, UC Hall is historically significant under criteria A/1 for its association with the broad pattern of development of medical research centers and hospitals in San Francisco. It is also eligible under criteria C/3 as an early work of architect Lewis P. Hobart, as an excellent example of the Beaux-Arts style in San Francisco, and for the murals in Toland Hall that were painted by Bernard Zakheim, which are considered to be a character-defining feature of the building. Under the proposed project, UC Hall would be demolished. The demolition of UC Hall would materially change the significance of the historical resource, resulting in a significant impact.

Mitigation: Implement CPHP Mitigation Measures CUL-1a through -1d.

Significance after Mitigation: Because demolition of UC Hall under the CPHP would result in a substantial adverse change in the significance of a historical resource, no measures would fully mitigate these actions to a less-than-significant level. Therefore, even with implementation of CPHP Mitigation Measures CUL-1a, CUL-1b, CUL-1c, and CUL-1d, the impact would be significant and unavoidable.

Significance after Mitigation: Significant and Unavoidable.

Initial Aldea Housing Densification

The proposed initial Aldea Housing Densification project would demolish three historical resources – Aldea San Miguel Housing Buildings 8, 10 and 12. The demolition of these resources is discussed above under the impact of the CPHP as a whole. As stated above, these three resources are individually eligible under criteria C/3 as intact examples of the Second Bay Tradition of architecture. The demolition of these buildings would materially change the significance of historical resources, resulting in a significant impact.

Mitigation: Implement CPHP Mitigation Measures CUL-1a through -1c.

Significance after Mitigation: Because demolition of Aldea San Miguel Housing Buildings 8, 10, and 12 under the Initial Phase of CPHP would result in a substantial adverse change in the significance of historical resources, no measures would fully mitigate these actions to a less-than-significant level. Therefore, even with implementation of CPHP Mitigation Measures CUL-1a, CUL-1b, and CUL-1c, the impact would be significant and unavoidable.

Significance after Mitigation: Significant and Unavoidable.

Initial Phase Improvements

As described in Chapter 3, *Project Description*, the Initial Phase improvements would include various Initial Phase utility improvements, implementation of the Parnassus Avenue Streetscape Plan, renovation of certain existing buildings, and installation of miscellaneous community investments in the public realm. Opportunity sites for notable renovations to known historical resources include the HSIR East, HSIR West, and Medical Sciences buildings. In addition, as part of the utility improvements in the Initial Phase, some tree removal and grading alterations within the hillside portion of the Reserve adjacent to Medical Center Way would occur to accommodate proposed fuel tanks.

As discussed above, since the specific details of proposed alterations and improvements to these historical resources are not known at this time, they are presumed to result in significant impacts.

> **Mitigation:** Implement CPHP Mitigation Measures CUL-1a through -1c.
>
> **Significance after Mitigation:** Because these alterations and improvements may result in substantial adverse change in the significance of historical resources, no measures would fully mitigate these actions to a less-than-significant level. Therefore, even with implementation of CPHP Mitigation Measures CUL-1a, CUL-1b, and CUL-1c, the impact would be significant and unavoidable.
>
> **Significance after Mitigation:** Significant and Unavoidable.

Impact CUL-2: Implementation of the CPHP would result in a substantial adverse change in the significance of potential future historical resources that may become eligible by the full build-out of the CPHP in 2050. (Significant and Unavoidable with Mitigation)

CPHP

The following buildings would be altered or demolished under the proposed CPHP. These buildings either already meet or will meet the 45-year age criterion by the full build-out of the CPHP in 2050. They have not been previously evaluated and may become eligible for listing in the National and/or California Registers:

- Millberry Union Garage;
- 75 Behr Avenue;
- 80 Behr Avenue;
- 85 Behr Avenue;
- 90 Behr Avenue;
- 95 Behr Avenue;
- 45 Johnstone Drive;
- 50 Johnstone Drive;
- 20 Adolph Sutro Court; and
- 30 Adolph Sutro Court.

The eligibility of these buildings is not known at this time, and consequently, demolition or significant alteration of these buildings in the Future Phase is conservatively presumed to result in significant impacts to historical resources.

While the impact on individual historical resources cannot be mitigated to a less-than-significant level, implementation of **CPHP Mitigation Measures CUL-1a**, **CUL-1b**, and **CUL-1c** would require that UCSF identify character-defining features of potentially eligible resources, prepare HABS-like documentation, and develop a public interpretation and salvage plan. Implementation of these measures would lessen the severity of the significant impact but would not reduce this impact to a less-than-significant level.

> **Mitigation:** Implement CPHP Mitigation Measures CUL-1a through -1c.
>
> **Significance after Mitigation:** Because demolition or significant alteration of potential historical resources could result in a substantial adverse change in the significance of historical resources, no measures would fully mitigate these actions to a less-than-significant level. Therefore, even with implementation of CPHP Mitigation Measures CUL-1a, CUL-1b, and CUL-1c, the impact would be significant and unavoidable.
>
> **Significance after Mitigation:** Significant and Unavoidable.

Impact CUL-3: Implementation of the CPHP could cause a substantial adverse change in the significance of an archaeological resource pursuant to CEQA Guidelines Section 15064.5. (Less than Significant with Mitigation)

CPHP

Based on a review of site distribution and the environmental context, there are no previously recorded archaeological resources in the Plan area, and majority of the Plan area where development would occur under the CPHP is highly disturbed from extensive use and prior development. Furthermore, the largely undisturbed slope east of Medical Center Way that would be encroached by the proposed New Hospital and widened Medical Center Way is steep and not conducive to use or occupation.

The Plan area has a low potential to uncover previously undiscovered prehistoric archaeological resources. Background research indicates that no previously recorded prehistoric archaeological resources are within the Plan area. Previous researchers have not identified resources attributable to Ishi in areas of archaeological testing (Holman, 1998).[4] The nearest prehistoric archaeological resources are located over three miles to the east near Mission Bay or over three miles to the west near Ocean Beach (NWIC, 2019). Based on the extensive use and previous disturbance of the Plan area there is also a very low potential to uncover historic-era archaeological resources.

In the unlikely event that archaeological materials are discovered during construction (including grading, excavation and other earthmoving activities), a substantial adverse change to a resource found to qualify as an historical resource per CEQA Guidelines Section 15064.5 or a unique archaeological resource, as defined in CEQA Section 21083.2(g), could be potentially significant. With implementation of **CPHP Mitigation Measure CUL-3**, campus site development under the

---

4 Ishi was the lone survivor of the northern California tribe of Yahi Indians, who lived and worked at the Anthropology Museum on the UCSF Parnassus Heights campus site between 1911 and 1916.

proposed CPHP would have a less-than-significant impact on previously unknown archaeological resources. Therefore, this impact would be less than significant with mitigation.

CPHP Mitigation Measure CUL-3: Inadvertent Discovery of Archaeological Resources and Tribal Cultural Resources

Prior to commencement of construction activities, all on-site personnel shall attend a mandatory pre-project training to outline the general archaeological and tribal cultural sensitivity of the project area. The training will include a description of the types of resources that could be encountered and the procedures to follow in the event of an inadvertent discovery of resources.

If prehistoric or historic-era archaeological resources are encountered by construction personnel during ground-disturbing activities, all construction activities within 100 feet shall halt and the contractor shall notify the UCSF Environmental Coordinator (EC). The UCSF EC shall retain a Secretary of the Interior-qualified archaeologist (qualified archaeologist) to inspect the find within 24 hours of discovery. If it is determined that the project could damage a historical resource or a unique archaeological resource, construction shall cease in an area determined by the qualified archaeologist until a mitigation plan has been prepared and implemented [CEQA Guidelines 15064.5(b)(4)]. If the find is a potential tribal cultural resource, the UCSF EC shall contact a Native American representative or representatives (as provided by the Native American Heritage Commission) [PRC 21074(2)(c)]. The qualified archaeologist, in consultation with the UCSF EC and the Native American representative(s), shall determine when construction can resume.

If the resource is determined to be a historical resource or a unique archaeological resource, the preferred mitigation shall be preservation in place. In accordance with PRC Section 21083.2(b), preservation in place shall be accomplished through: (1) modifying the construction plan to avoid the resource; (2) incorporating the resource within open space; (3) capping and covering the resource; or (4) deeding the resource site into a permanent conservation easement. If preservation in place is not feasible, the qualified archaeologist, in consultation with the UCSF EC and the Native American representative(s) (if the resource is prehistoric), shall prepare and implement a detailed treatment plan. In all cases treatment will be carried out with dignity and respect (including protecting the cultural character, traditional use, and confidentiality of the resource). For prehistoric resources, the Native American representative(s) will be consulted on the research approach, methods, and whether burial or data recovery or alternative mitigation is appropriate for the find. Treatment for most resources could consist of (but shall not be limited to) sample excavation, site documentation, and historical research, as appropriate to the discovered prehistoric resource. The treatment plan shall include provisions for analysis of data in a regional context as appropriate to the discovered prehistoric resource, reporting of results within a timely manner, and dissemination of reports to local and state repositories, libraries, and interested professionals.

Significance after Mitigation: Less than Significant.

Irving Street Arrival

Due to prior ground disturbance and development on the project site, excavation and other ground disturbing activities associated with the Irving Street Arrival project would have a low potential to affect previously unknown archaeological resources. However, if archaeological resources were encountered and inadvertently damaged during construction, the impact could be potentially significant.

Mitigation: Implement CPHP Mitigation Measure CUL-3.

Significance after Mitigation: Less than Significant.

Research and Academic Building

Due to prior ground disturbance and development of UC Hall on the project site, excavation and other ground disturbing activities associated with the RAB project would also have a low potential to affect previously unknown archaeological resources. However, if archaeological resources were encountered and inadvertently damaged during construction, the impact could be potentially significant.

Mitigation: Implement CPHP Mitigation Measure CUL-3.

Significance after Mitigation: Less than Significant.

Initial Aldea Housing Densification

The proposed densification project would be located on the same areas that are currently occupied by Aldea Housing Buildings 8, 10, and 12. Excavation and other ground disturbing activities associated with the initial Aldea Housing Densification project would have a low potential to affect previously unknown archaeological resources. However, if archaeological resources were encountered and inadvertently damaged during construction, the impact could be potentially significant.

Mitigation: Implement CPHP Mitigation Measure CUL-3.

Significance after Mitigation: Less than Significant.

Initial Phase Improvements

The majority of Initial Phase improvements would occur in previously disturbed areas. Limited excavation and other ground disturbing activities associated with construction of Initial Phase improvements would have a low potential to affect previously unknown archaeological resources. However, if archaeological resources were encountered and inadvertently damaged during construction, the impact could be potentially significant. Implementation of CPHP Mitigation Measure CUL-3 would ensure construction of Initial Phase improvements within the campus site would have a less-than-significant impact on previously unknown archaeological resources. Any Initial Phase improvements that would be constructed outside the campus site boundary would be subject to similar applicable measures as imposed by the City.

Mitigation: Implement CPHP Mitigation Measure CUL-3.

Significance after Mitigation: Less than Significant.

Impact CUL-4: Implementation of the CPHP could disturb human remains, including those interred outside of dedicated cemeteries. (Less than Significant with Mitigation)

CPHP

There are no known human remains, including those interred outside of dedicated cemeteries, located in the Plan area. In the event that construction activities disturb unknown human remains within the Plan area, any inadvertent damage to human remains could be considered a significant impact. With implementation of **CPHP Mitigation Measure CUL-4**, campus development under the proposed CPHP would have a less-than-significant impact on previously unknown human remains. Therefore, this impact would be less than significant with mitigation.

CPHP Mitigation Measure CUL-4: Inadvertent Discovery of Human Remains

In the event of discovery or recognition of any human remains during ground-disturbing activities, treatment shall comply with all applicable state and federal laws. All construction activities within 100 feet shall halt and the contractor shall notify the UCSF Environmental Coordinator (EC). In accordance with PRC 5097.98, the UCSF EC shall contact the San Francisco Office of the Medical Examiner (Medical Examiner) to determine that no investigation of the cause of death is required. The Medical Examiner shall contact the Native American Heritage Commission (NAHC) within 24 hours if it is determined that the remains are Native American. The NAHC will then identify the person or persons it believes to be the most likely descendant (MLD) from the deceased Native American. Within 48 hours, the MLD shall make recommendations to the UCSF EC of the appropriate means of treating the human remains and any grave goods. Whenever the NAHC is unable to identify an MLD, the MLD fails to make a recommendation, or the parties are unable to agree on the appropriate treatment measures, the human remains shall be reinterred with appropriate dignity on the property in a location not subject to further and future subsurface disturbance.

Significance after Mitigation: Less than Significant.

Irving Street Arrival

Due to prior ground disturbance and development on the project site, excavation and other ground disturbing activities associated with the Irving Street Arrival project would have a low potential to encounter unknown human remains. However, if human remains were encountered and inadvertently damaged during construction, the impact could be potentially significant.

Mitigation: Implement CPHP Mitigation Measure CUL-4.

Significance after Mitigation: Less than Significant.

Research and Academic Building

Due to prior ground disturbance and development of UC Hall on the project site, excavation and other ground disturbing activities associated with the RAB project would also have a low potential to affect previously unknown human remains. However, if human remains were encountered and inadvertently damaged during construction, the impact could be potentially significant.

Mitigation: Implement CPHP Mitigation Measure CUL-4.

Significance after Mitigation: Less than Significant.

Initial Aldea Housing Densification

The proposed densification project would be located on the same areas that are currently occupied by Aldea Housing Buildings 8, 10 and 12. Excavation and other ground disturbing activities associated with the initial Aldea Housing Densification project would have a low potential to affect previously unknown human remains. However, if human remains were encountered and inadvertently damaged during construction, the impact could be potentially significant.

Mitigation: Implement CPHP Mitigation Measure CUL-4.

Significance after Mitigation: Less than Significant.

Initial Phase Improvements

The majority of Initial Phase improvements would occur in previously disturbed areas. Limited excavation and other ground disturbing activities associated with construction of Initial Phase improvements would have a low potential to affect previously unknown human remains. However, if human remains were encountered and inadvertently damaged during construction, the impact could be potentially significant. Implementation of CPHP Mitigation Measure CUL-4 would ensure construction of Initial Phase improvements within the campus site would have a less-than-significant impact on previously unknown human remains. Similarly, any Initial Phase improvements that would be constructed outside the campus site boundary would be subject to applicable measures as imposed by the City.

Mitigation: Implement CPHP Mitigation Measure CUL-4.

Significance after Mitigation: Less than Significant.

Impact CUL-5: Implementation of the CPHP could cause a substantial adverse change in the significance of a tribal cultural resource, defined in PRC Section 21074 as either a site, feature, place, cultural landscape that is geographically defined in terms of the size and scope of the landscape, sacred place, or object with cultural value to a California Native American tribe. (Less than Significant with Mitigation)

CPHP

Based on the background research and environmental context, there are no known tribal cultural resources in areas proposed for ground disturbance or other improvements within the Plan area. Proposed improvements would not occur within a reported location of geographic features associated with UCSF's early 19th century Native American resident *Ishi*. On September 9, 2019, UCSF sent notification letters of UCSF's proposal to undertake the CPHP to the applicable representatives for the Amah Mutsun Tribal Band of Mission San Juan Bautista; Coastanoan Rumsen Carmel Tribe; Ohlone Indian Tribe; Indian Canyon Mutsun Band of Costanoan; Torres Martinez Desert Cahuilla Indians; and Muwekma Ohlone Indian Tribe of the San Francisco Bay

Area. No responses to the notification letters were received from the tribes within the 30-day response period, consistent with the requirements of PRC 21080.3.1(d).

There remains, however, the potential that ground disturbance could impact previously undiscovered or buried archaeological resources that could also be considered tribal cultural resources. Impacts to tribal cultural resources could be potentially significant. With implementation of **CPHP Mitigation Measure CUL-3**, the Plan would have a less-than-significant impact on previously unknown tribal cultural resources. Therefore, this impact would be less than significant with mitigation.

Mitigation: Implement CPHP Mitigation Measure CUL-3.

Significance after Mitigation: Less than Significant.

Irving Street Arrival

Due to prior ground disturbance and development on the project site, excavation and other ground disturbing activities associated with the Irving Street Arrival project would have a low potential to encounter unknown tribal cultural resources. However, if such resources were encountered and inadvertently damaged during construction, the impact could be potentially significant.

Mitigation: Implement CPHP Mitigation Measure CUL-3.

Significance after Mitigation: Less than Significant.

Research and Academic Building

Due to prior ground disturbance and development of UC Hall on the project site, excavation and other ground disturbing activities associated with the RAB project would also have a low potential to affect previously unknown tribal cultural resources. However, if such resources were encountered and inadvertently damaged during construction, the impact could be potentially significant.

Mitigation: Implement CPHP Mitigation Measure CUL-3.

Significance after Mitigation: Less than Significant.

Initial Aldea Housing Densification

The proposed densification project would be located on the same areas that are currently occupied by Aldea Housing Buildings 8, 10, and 12. Excavation and other ground disturbing activities associated with the initial Aldea Housing Densification project would have a low potential to affect previously unknown tribal cultural resources. However, if such resources were encountered and inadvertently damaged during construction, the impact could be potentially significant.

Mitigation: Implement CPHP Mitigation Measure CUL-3.

Significance after Mitigation: Less than Significant.

Initial Phase Improvements

The majority of Initial Phase improvements would occur in previously disturbed areas. Limited excavation and other ground disturbing activities associated with construction of Initial Phase improvements would have a low potential to affect previously unknown tribal cultural resources. However, if tribal cultural resources were encountered and inadvertently damaged during construction, the impact could be potentially significant. Implementation of CPHP Mitigation Measure CUL-3 would ensure construction of Initial Phase improvements within the campus site would have a less-than-significant impact on previously unknown tribal cultural resources. Similarly, any Initial Phase improvements that would be constructed outside the campus site boundary would be subject to applicable measures as imposed by the City.

Mitigation: Implement CPHP Mitigation Measure CUL-3.

Significance after Mitigation: Less than Significant.

Cumulative Impacts

Impact C-CUL-1: Implementation of the CPHP would result in cumulatively considerable impacts on cultural and/or tribal cultural resources, in combination with past, present and reasonably foreseeable future projects in the vicinity of the Parnassus Heights campus site. (Significant and Unavoidable with Mitigation for Historical Resources; Less than Significant with Mitigation for Archaeological Resources, Human Remains, and Tribal Cultural Resources)

Historical Resources

Implementation of the proposed CPHP could result in the demolition or substantial alteration of historical resources at the Parnassus Heights campus site. As discussed above, there are 71 individual buildings on the campus, 25 of which are considered historical resources for the purposes of CEQA. Additionally, two cultural landscapes are considered historical resources: Saunders Court and the Reserve. Under the proposed CPHP, five historical resources would be partially or completely demolished, and four additional historical resources could be physically altered. Furthermore, 13 other buildings that would be altered or demolished under the proposed CPHP will meet the 45-year age criterion by the full build-out of the CPHP in 2050, and they may become eligible for listing in the National and/or California Registers.

In addition to the demolition of the LPPI (addressed in Impact CUL-1, above), the 2014 LRDP authorized the demolition of several other buildings on the Parnassus Heights campus site: Koret Vision Center, EHS, Surge, Woods, and Proctor buildings. Of these, the Surge building was determined to be a historical resource and would be demolished over the course of the CPHP. The Surge building, constructed in 1966, is presumed eligible for the National and California Registers. Feasible mitigation was identified in the 2014 LRDP FEIR to address the loss of this building. However, the mitigation was determined to not reduce the impact to a less-than-significant level. The Koret Vision Center was determined ineligible for listing in the National and California Registers, even though it was not yet age-eligible in 2014. It is possible that additional historical perspective could be gained and the Koret Vision Center could be determined eligible prior to its demolition under the CPHP. Since cumulative impacts to historical resources have been determined to be considerable, demolition of the Koret Vision Center would not alter the cumulative context to the degree that the CPHP's contribution would change. The result would still be a cumulatively considerable impact on historical resources.

Similarly, despite mitigation, the demolition of UC Hall and the Aldea Housing Buildings 8, 10 and 12, and the demolition or alteration of 13 other buildings that may become eligible by the full build-out of the CPHP in 2050 would combine with known or reasonably foreseeable demolition or alteration projects on the campus site and its vicinity to result in cumulatively considerable impacts. UC Hall is the oldest extant building on the campus site and the oldest hospital built for use by the UC's School of Medicine. It is the only remaining building on the campus site designed and built in the Beaux-Arts style of architecture. Furthermore, it is prominently sited on the south side of Parnassus Avenue and is highly visible due to its steeply sloped site. Therefore, cumulative impacts to historical resources from the implementation of the CPHP are considered significant and unavoidable.

Mitigation: Implement CPHP Mitigation Measures CUL-1a through -1d.

Significance after Mitigation: Significant and Unavoidable.

Archaeological Resources, Human Remains, and Tribal Cultural Resources

The geographic scope for cumulative effects on archaeological resources, human remains, and tribal cultural resources includes the immediate vicinity of locations where the proposed CPHP could cause disturbance to archaeological resources, human remains, and/or tribal cultural resources. Cumulative projects in the vicinity could have a significant impact on previously undiscovered archaeological resources, including human remains interred outside of formal cemeteries, during ground-disturbing activities. The potential impacts of the CPHP when considered together with similar impacts from other probable future projects in the vicinity could result in a significant cumulative impact on buried archaeological resources or human remains. However, implementation of CPHP Mitigation Measures CUL-3 and CUL-4 would require that work halt in the vicinity of a find until it is evaluated by a Secretary of the Interior-qualified archaeologist, and in the case of human remains the County Coroner. In addition, cumulative projects undergoing CEQA review would have similar types of inadvertent discovery measures. Therefore, with implementation of CPHP Mitigation Measures CUL-3 and CUL-4, the proposed project's contribution to cumulative impacts would not be considerable, and the impact would be less than significant with mitigation.

Mitigation: Implement CPHP Mitigation Measures CUL-3 and CUL-4.

Significance after Mitigation: Less than Significant.

4.4.5 References

Bradley, Denise and Knapp & VerPlanck Preservation Architects, 2013. *Final Mount Sutro Open Space Reserve Cultural Landscape Evaluation Report,* October 3, 2011; revised January 10, 2013.

Carey & Co.,2003. *University of San Francisco Parnassus Heights Campus, Historic Resource Evaluation Report*. September.

Carey & Co., 2011. *UCSF Historic Resources Survey*. February.

Graves, Donna, 2019a. *Historic Evaluation for Langley Porter Psychiatric Institute,* April 2019.

Graves, Donna, 2019b. *Langley Porter Psychiatric Hospital & Clinics, Historic American Buildings Survey (HABS)-Like Documentation,* April 2019.

Holman & Associates, 1998. *Summary of Findings of the Archaeological Testing of the Proposed Handicapped Access Ramp at the Chancellor's Residence, Near the Rock Shelter Known as Ishi's Cave*, May 7.

Levy, Richard S., 1978. Costanoan: In *Handbook of North American Indians Volume 8: California*, R. F. Heizer, ed., pp. 485–495. Washington, Smithsonian Institution.

Milliken, Randall. 1995. *A Time of Little Choice: The Disintegration of Tribal Culture in the San Francisco Bay Area, 1769–1810.* Menlo Park, CA: Ballena Press Publishers' Services.

Milliken, Randall, Richard T. Fitzgerald, Mark G. Hylkema, Randy Groza, Tom Origer, David G. Bieling, Alan Leventhal, Randy S. Wiberg, Andrew Gottsfield, Donna Gillette, Viviana Bellifemine, Eric Strother, Robert Cartier, and David A. Fredrickson, 2007. Punctuated Cultural Change in the San Francisco Bay Area. In *California Prehistory: Colonization, Culture, and Complexity*. Jones, Terry L., Klar, Kathryn A., ed., Altamira Press, Maryland.

National Park Service (NPS), 1988. *Preservation Brief 17: Architectural Character – Identifying the Visual Aspects of Historic Buildings as an Aid to Preserving Their Character,* September. Accessed March 15, 2020, at https://www.nps.gov/tps/how-to-preserve/briefs/17-architectural-character.htm.

NPS, 1997. *National Register Bulletin: How to Apply the National Register Criteria for Evaluation.*

Page & Turnbull, 2005. *UC Hospital, 533 Parnassus Avenue, University of California, San Francisco Parnassus Heights Campus San Francisco, California, Historic American Building Survey Documentation*, November.

Page & Turnbull, 2020. Email from Greg Yanito to Patti Mitchell, April 22.

University of California, San Francisco (UCSF), 2005. *Environmental Impact Report for LRDP Amendment No. 2 – Hospital Replacement Program.* January 14.

UCSF, 2013. *Mount Sutro Management Project Draft Environmental Impact Report*. December.

UCSF, 2014. UCSF 2014 Long Range Development Plan. November.

Northwest Information Center (NWIC), 2019. California Historical Resources Information System Database at Sonoma State University, Rohnert Park, California. File No. 19-0705.

4.5 Energy

Section 21100(b) of the California Public Resources Code (PRC) directs all State Agencies, Boards, and Commissions to assess the environmental impacts of projects for which they are a Lead Agency under CEQA to determine whether a project could result in significant effect on the environment, including effects from the wasteful, inefficient, and unnecessary consumption of energy, and to identify mitigation measures to minimize any such significant effects.

This section discusses the existing energy-related profiles for the state and for the Parnassus Heights campus site. The current regulatory and policy frameworks that govern the production and consumption of energy resources and aim to increase energy efficiency while reducing reliance on fossil fuels are also described. The potential for the construction and operation of the Comprehensive Parnassus Heights Plan (CPHP or Plan), including the three Initial Phase projects and other Initial Phase improvements, is then assessed to result in significant impacts based on the California energy profile (i.e., mix of energy resources and consumption characteristics), the regional energy production and transmission profile of Pacific Gas & Electric Company (PG&E; the regional purveyor of natural gas and electricity throughout the Bay Area and much of central and northern California) as well as the local energy profile for the Parnassus Heights campus site., and the section examines the proposed CPHP's energy usage characteristics to determine whether the CPHP could result in any significant energy-related environmental impacts during its construction or operation activities. The section also includes an analysis of cumulative energy impacts. Lastly, this section identifies feasible mitigation measures that could mitigate any potentially significant impacts.

4.5.1 Environmental Setting

State Setting

Energy Profile

Total energy usage in California was 7,881 trillion British Thermal Units (Btu) in 2017 (the most recent year for which this specific data is available), which equates to an average of 200 million Btu per capita. These figures place California 2nd among the nation's 50 states in total energy use and 48th in per capita consumption. Of California's total energy usage, the breakdown by sector is roughly 40 percent transportation, 23 percent industrial, 19 percent commercial, and 18 percent residential. Electricity and natural gas in California are primarily consumed by stationary users such as residences and commercial and industrial facilities, whereas petroleum-based fuel consumption is generally accounted for by transportation-related energy use (EIA, 2019a).

California relies on a regional power system composed of a diverse mix of natural gas, renewable, hydroelectric, and nuclear generation sources. Approximately 68 percent of the electrical power needed to meet California's demand is produced in the state; the balance, approximately 32 percent, is imported from the Pacific Northwest and the Southwest. In 2018, California's in-state electricity generation was derived from natural gas (47 percent); large hydroelectric resources (11 percent); nuclear sources (9 percent); renewable resources that include geothermal, biomass, small hydroelectric resources, wind, and solar (32 percent); coal (less than 1 percent); and petroleum coke/waste heat (less than 1 percent) (CEC, 2019a).

Electricity

In 2018, total system electric generation for California was 285,488 gigawatt-hours (GWh), down two percent from 2017's total generation of 278,939 GWh. Electricity from non-CO_2 emitting electric generation categories (i.e., nuclear, large hydroelectric, and renewable generation) accounted for more than 53 percent of total in-state generation for 2018, compared to 56 percent in 2017. As a result, California's in-state generation dropped by 6 percent (11,494 GWh) to 194,842 GWh. This decrease was due, in part, to reduced generation from hydroelectric power plants as dry conditions returned to the state. Net imports increased by 6 percent (4,944 GWh) to 90,648 GWh, partially offsetting the decline (CEC, 2019a).

The overall decline observed in California's total electric system generation for 2018 is consistent with energy demand trends. In recent years, electricity demand has been flat or slightly declining as energy efficiency programs have resulted in end-use energy savings and as customers install behind-the-meter solar photovoltaic (PV) systems that directly displace utility-supplied generation. In 2018, behind-the-meter solar generation[1] was estimated to be 13,582 GWh, a 20 percent increase from 2017. The strong growth in solar PV has had a measurable impact on utility-served load and, consequently, on total system electric generation (CEC, 2019a).

Increasingly, electricity is used in multiple transportation modes, including light-duty vehicles, transit buses, and light and heavy rail. In California, its use is forecast to emerge in battery-electric medium-duty trucks, battery-electric buses, catenary-electric port drayage trucks, and high-speed rail. The California Energy Commission (CEC) forecasts the statewide electricity demand for the transportation sector will increase from its 2017 level of 2,000 GWh annually to between approximately 12,000 and 18,000 GWh per year by 2030, depending on technology development and market penetration of the various vehicle types (CEC, 2018a).

Natural Gas

Californians consumed about 12,640 million therms of natural gas in 2018, which is equal to 1,264,000,000 million Btu (MMBtu) (CEC, 2019b). The natural gas market is evolving and service options expanding, but its use falls mainly into the following four sectors: residential, commercial, industrial, and electric power generation. In addition, natural gas is a viable alternative to petroleum fuels for use in cars, trucks, and buses. Nearly 45 percent of the natural gas burned in California is used for electricity generation, and most of the remainder is consumed in the residential (21 percent), industrial (25 percent), and commercial (9 percent) sectors. California depends on out-of-state imports for nearly 90 percent of its natural gas supply. Natural gas has become an increasingly important source of energy since the majority of the state's power plants rely on this fuel (CEC, 2019c).

---

[1] Behind-the-meter solar generation refers to on-site solar generation facilities that are designed for a single building or facility. Since the power is generated and used on-site, it is not connected to the regional power grid, and thus referred to as "behind the meter."

Transportation Fuels

The energy consumed by the transportation sector accounts for roughly 40 percent of California's total energy consumption (EIA, 2019b). Gasoline and diesel, both derived from petroleum (also known as crude oil), are the two most common fuels used for vehicular travel. According to the U.S. Energy Information Administration, the state relies on petroleum-based fuels for 98 percent of its transportation needs (EIA, 2019c). Gasoline accounted for about 58 percent of total transportation sector energy consumption, 46 percent of total petroleum consumption, and 17 percent of total U.S. energy consumption (EIA, 2019d). California is the largest consumer of gasoline in the U.S. In 2018, approximately 31 percent of California's crude oil was obtained from within the state, about 11 percent came from Alaska, and the remaining 58 percent came from foreign lands (CEC, 2019d).

In 2018, taxable gasoline sales (including aviation gasoline) in California amounted to approximately 15.5 billion gallons (CBE, 2019), and taxable diesel fuel sales amounted to approximately 3.7 billion gallons (CEC, 2019e). The CEC forecasts demand for gasoline in California will range from 12.3 billion to 12.7 billion gallons in 2030, with most of the demand generated by light-duty vehicles. While the models show an increase in light-duty vehicles along population and income growth over the forecast horizon, total gasoline consumption is expected to decline, primarily due to increasing fuel economy (stemming from federal and state regulations) and gasoline displacement from the increasing market penetration of zero emission vehicles (ZEVs). For diesel, demand is forecast to increase modestly by 2030, following the growth of California's economy, but would be tempered by an increase in fleet fuel economy and market penetration of alternative fuels, most prominently by natural gas in the medium- and heavy-duty vehicle sectors (CEC, 2017).

California's oil fields comprise the fourth-largest petroleum-producing area in the U.S., behind federal offshore production, Texas, and North Dakota (EIA, 2019e). Crude oil is moved from area to area within California through a network of pipelines that carry it from both onshore and offshore oil wells to the refineries that are located in the San Francisco Bay Area, the Los Angeles area, and the Central Valley. Currently, 16 petroleum refineries operate in California, processing approximately two million barrels of crude oil per day (CEC, 2019f).

Other transportation fuel sources used in California include alternative fuels, such as methanol and denatured ethanol (alcohol mixtures that contain no less than 70 percent alcohol), natural gas (compressed or liquefied), liquefied petroleum gas, hydrogen, and fuels derived from biological materials (i.e., biogas).

Regional Setting

Pacific Gas and Electric Company

The nine-county Bay Area, including the Parnassus Heights campus site, is served by PG&E, an investor-owned utility company that provides electricity and natural gas supplies and services throughout a 70,000-square-mile service area that extends from Eureka in the north, to Bakersfield in the south, and from the Pacific Ocean on the west to the Sierra Nevada on the east.

Operating characteristics of PG&E's electricity and natural gas supply and distribution systems are provided below. Also discussed are regional consumption of transportation fuels.

Electric Utility Operations

PG&E provides "bundled" services (i.e., electricity generation, transmission, and distribution services) to most of the six million customers in its service territory, including residential, commercial, industrial, and agricultural consumers. Customers also can obtain electricity from alternative providers such as municipalities, or community choice aggregators as allowed under Assembly Bill 117 (2002), as well as from self-generation distributed resources, such as rooftop solar installations. In San Francisco alone, electricity consumption in 2018 was 5,602 GWh (CEC, 2019g).

In recent years, PG&E has continued to make improvements to its electric transmission and distribution systems to accommodate the integration of new renewable energy resources, distributed generation resources, and energy storage facilities, and to help create a platform for the development of new Smart Grid technologies that help with load balancing and ensuring reliable electricity delivery to end customers. In December 2014, the California Public Utilities Commission (CPUC) issued Decision D.14-12-079 that permits the California investor-owned electric utilities to own electric vehicle (EV) retail charging equipment in their respective service territories to help meet the state's goal of reducing greenhouse gas (GHG) emissions by promoting cleaner transportation. On February 9, 2015, PG&E filed an application to request that the CPUC approve their proposal to develop, maintain, and operate an EV-charging infrastructure in its service territory. In 2016, the CPUC established a three-year electric vehicle (EV) program of $130 million to deploy up to 7,500 charging stations (PG&E, 2018a). Further deployment of light duty EV infrastructure was considered and approved in a second phase of the program with a total PG&E budget of over $236 million per CPUC Decision D.18-05-040 (EPIC, 2018).

PG&E is required to maintain physical generating capacity adequate to meet the demand of its customers for electricity ("load"), including peak demand, to be delivered to locations and at times as may be necessary to provide reliable electric service. PG&E is required to dispatch or schedule all of the electricity resources within its portfolio in the most cost-effective way. PG&E obtains its electricity supplies from power plants in northern California and from electricity purchased outside its service area and delivered through high-voltage transmission lines that form the PG&E power grid (PG&E 2020).

In 2018, PG&E generated and/or procured a total of 48,832 gigawatt hours (GWh) of electricity generated by fossil fuel-fired and other non-renewable power plants (17 percent), nuclear power plants (34 percent), large hydroelectric power plants (22 percent), renewable power plants (39 percent), and other unspecified sources mainly comprised of net California Independent System Operator open market purchases (11 percent) (PG&E, 2019a). Of this total, PG&E owns 7,686 megawatts (MW) of generating capacity. The remaining electrical power is purchased from other sources in and outside of California. Approximately 20 percent of the electricity generated by PG&E comes from fossil fuel (natural gas)-fired sources (PG&E, 2019a).

Renewable Energy Resources

California law requires load-serving entities, such as PG&E, to gradually increase the amount of renewable energy they deliver to their customers to at least 33 percent of their total annual retail sales by 2020, 44 percent by 2024, 52 percent by 2027, and 60 percent by 2030. This program, known as the Renewables Portfolio Standard (RPS), became effective in December 2011, and has since been enhanced with the passage of Senate Bill (SB) 350 and SB 100 (see *Regulatory Setting*, for more information). Renewable generation resources, for purposes of the RPS program, include bioenergy such as biogas and biomass, small hydroelectric facilities (30 MW or less), wind, solar, and geothermal energy. As shown in **Table 4.5-1**, in 2018 approximately 39 percent of PG&E's energy deliveries were from qualifying renewable energy sources.

TABLE 4.5-1
PG&E RENEWABLE ENERGY SOURCES IN 2018

Source	Percent of Total Energy Portfolio
Biopower	4.4
Geothermal	3.7
Wind	10.0
RPS-Eligible Hydroelectric	2.7
Solar	18.1
Total	**38.9**

SOURCE: PG&E, 2019a, 2018 Joint Annual Report to Shareholders.

Electricity Transmission

Transmission lines are high voltage power lines that transmit electricity between electric substations. PG&E owns approximately 19,200 circuit miles of interconnected transmission lines operating at voltages ranging from 60 kilovolts (kV) to 500 kV. PG&E also operates approximately 92 electric transmission substations with a capacity of approximately 64,700 megavolt amperes (MVA). PG&E's electric transmission system is interconnected with electric power systems in the Western Electricity Coordinating Council, which includes many western states, Alberta and British Columbia, and parts of Mexico (Reuters, 2020).

PG&E periodically upgrades substations and reconductors transmission lines to improve maintenance and system flexibility, reliability, and safety. PG&E expects to undertake various new transmission projects over the next several years to upgrade and expand the capacity of its transmission system to secure access to renewable generation resources and replace aging or obsolete equipment and improve system reliability (PG&E, 2018a).

Electricity Distribution

Distribution power lines are lower voltage power lines that transmit electricity from electric substations to end user, such as residential and other land use developments. PG&E's electricity distribution network consists of approximately 107,200 circuit miles of distribution lines (of which approximately 20 percent are underground and approximately 80 percent are overhead), approximately 19,200 circuit miles of high voltage electric transmission lines, 59 transmission switching substations, and 605 distribution substations, with a capacity of approximately 31,800 MVA (PG&E, 2018b).

These distribution substations serve as the central hubs for PG&E's electric distribution network. Emanating from each substation are primary and secondary distribution lines connected to local transformers and switching equipment that link distribution lines and provide delivery to end-users. In some cases, PG&E sells electricity from its distribution facilities to entities, such as municipal and other utilities, that resell the electricity. PG&E also operates electric distribution control center facilities in Concord, Rocklin, and Fresno, California (PG&E, 2018b).

Natural Gas Operations

PG&E provides natural gas transmission services to "core" customers and to "non-core" customers (i.e., industrial, large commercial, and natural gas-fired electric generation facilities such as the Parnassus Central Utility Plant) that are connected to its gas system in its service territory. Core customers can purchase natural gas procurement service (i.e., natural gas supply) from either PG&E or non-utility third-party gas procurement service providers (referred to as core transport agents). When core customers purchase gas supply from a core transport agent, PG&E still provides gas delivery, metering, and billing services to those customers. When PG&E provides both transmission and procurement services, PG&E refers to the combined service as "bundled" natural gas service. Currently, more than 95 percent of core customers, representing nearly 80 percent of the annual core market demand, receive bundled natural gas service from PG&E (PG&E, 2018c).

PG&E does not provide procurement service to non-core customers, who must purchase their gas supplies from third-party suppliers. PG&E offers backbone gas transmission, gas delivery (local transmission and distribution), and gas storage services as separate and distinct services to its non-core customers. Access to PG&E's backbone gas transmission system is available for all natural gas marketers and shippers, as well as non-core customers. PG&E also delivers gas to off-system customers (i.e., outside of PG&E's service territory) and to third-party natural gas storage customers. In 2018, total consumption of natural gas in San Francisco was 228 million therms, or 22,800,000 MMBtu (CEC, 2019b).

Natural Gas Supplies

PG&E receives natural gas from all the major natural gas basins in western North America, including basins in western Canada, the Rocky Mountains, and the southwestern United States. PG&E also is supplied by natural gas fields in California. PG&E purchases natural gas to serve its core customers directly from producers and marketers in both Canada and the United States. The contract lengths and natural gas sources of PG&E's portfolio of natural gas purchase contracts have fluctuated generally based on market conditions. PG&E provides approximately 970 billion cubic feet of natural gas per year to its customers (PG&E, 2019b).

Natural Gas System Assets

PG&E owns and operates an integrated natural gas transmission, storage, and distribution system that includes most of northern and central California. PG&E's natural gas system consists of approximately 42,800 miles of distribution pipelines, over 6,400 miles of backbone and local transmission pipelines, and various storage facilities. PG&E owns and operates eight natural gas compressor stations on its backbone transmission system and one small station on its local transmission system that are used to move gas through PG&E's pipelines. PG&E's backbone transmission system is used to transport gas from PG&E's interconnection with interstate pipelines, other local distribution companies, and California gas fields to PG&E's local transmission and distribution systems.

Transportation Fuels

The energy consumed by the transportation sector accounts for roughly 41 percent of California's petroleum demand. Gasoline and diesel, both derived from petroleum (also known as crude oil), are the two most common fuels used for vehicular travel. According to the CEC, the state relies on petroleum-based fuels for 96 percent of its transportation needs. The transportation sector, including on-road and rail transportation (but excluding aviation), accounts for more than 96 percent of all motor gasoline use in the U.S., at roughly 3.4 million barrels in 2017. California is the third largest consumer of gasoline in the world, behind the U.S. (as a whole) and China (EIA, 2018). In 2018, approximately 31 percent of California's crude oil was produced within the state, about 11 percent was produced in Alaska, and the remaining 58 percent was produced in foreign lands (CEC, 2019b).

Gasoline and diesel fuel are by far the largest transportation fuels used by volume in San Francisco Bay Area. The total estimated 2018 sales of gasoline in San Francisco was 120 million gallons and the total estimated 2018 sales of diesel fuel in San Francisco was 10 million gallons (CEC, 2019e).

Other transportation fuel sources used in California include alternative fuels, such as methanol and denatured ethanol (alcohol mixtures that contain no less than 70 percent alcohol), natural gas (compressed or liquefied), liquefied petroleum gas (LPG), hydrogen, and fuels derived from biological materials (i.e., biomass).

Local Setting at Parnassus Heights Campus Site

The Parnassus Heights campus site is served by three cogeneration/steam (high, medium, and low pressure) networks that provide electricity and steam for heating and one chilled water network for cooling, all of which originate at the Parnassus Heights Central Utility Plant (CUP). The CUP cogeneration systems provide the primary source of electricity and water heating and cooling for the campus. The current fuel source for the cogeneration systems is natural gas obtained from PG&E's system. Three separate PG&E distribution power lines provide electricity to the campus to supplement the electricity generation capacity of the CUP during peak use periods. Following are discussions of the CUP and PG&E-provided services to the Parnassus Heights campus site obtained from the *UCSF Parnassus Heights Utility Master Plan* (UCSF, 2019).

Parnassus Heights Central Utility Plant

The CUP provides heating for the entire campus site via the steam networks, and provides cooling for six campus site buildings [Clinical Sciences Building (CSB), Medical Science Building (MSB), Dolby Regeneration Medicine Building (RMB), Health Sciences Instruction and Research Towers West and East (HSIR West and East), and Parnassus Services Building (PSB)]. The campus thermal loads were recently documented from existing CUP data provided by UCSF. This included chilled water and steam loads from several months during 2017 and 2018, including the hottest day experienced at the campus in recent history, and a typical design heating period. These loads formed the basis of assessing the peak heating and cooling capacity for the campus.

Chilled water data provided by UCSF includes plant load and building loads from the MSB, RMB, and HSIR West and East. The unit of measure to express amounts of cooled water is ton of refrigeration, defined as the rate of heat transfer that results in the freezing of one short ton (2,000 pounds) of pure ice in 24 hours. A ton of refrigeration is approximately equivalent to 12,000 Btu/hour or 3.5 kilowatts (kW). The current campus site cooling load is approximately 8,800 tons, of which only 2,400 tons is connected to the existing 5,400-ton capacity chilled water network. While maintaining a 1,200-ton redundancy at the CUP, this leaves excess capacity of 1,800 tons for use elsewhere on the campus site. Steam data includes low, medium, and high pressure loads for most Parnassus Heights campus site buildings. Steam demand, which encompasses heating and process steam, is divided by existing buildings due to a higher granularity of available data.

Equipment within the CUP is nearing the end of life based on the date it was placed in service. However, the light use of the equipment, especially chillers, combined with regular maintenance is expected to allow the equipment to extend beyond these time frames until approximately 2030 for most major systems.

Cooling (Chilled Water)

The existing CUP chiller plant has a capacity of 5,400 tons of cooling. The existing chilled water system consists of three 1,200-ton low pressure single stage absorption chillers, a 1,200-ton electric centrifugal chiller, and a 600-ton electric centrifugal chiller. The five chillers are in a parallel arrangement connected to the primary loop of a primary-secondary chilled water pumping system.

The CSB, MSB, RMB, HSIR West and East, and PSB buildings are served by 26-inch diameter secondary chilled water supply and return piping, which narrows in diameter as it extends to each served building.

Heating (Cogeneration / Steam)

The CUP cogeneration system includes two 54,000 lbs/hr heat recovery steam generators (HRSGs) that generate steam from the exhaust flues of two gas combustion cogeneration turbines (one HRSG per turbine). Low pressure steam is produced by one backpressure steam turbine generator (STG) and is used by the three existing absorption chillers for campus distribution. Two gas- and oil-fired boilers join the HRSGs to produce high pressure steam for use in the STG, distribution to campus facilities, and medium pressure steam production.

Steam is distributed through three networks to the campus for use in heating and process loads (e.g., sterilization). High pressure steam and low pressure steam are distributed to the majority of campus site buildings, while medium pressure steam is supplied to the clinical and medical buildings only. For three buildings, Kalmanovitz Library, Moffitt Hospital, and Long Hospital, high pressure steam is used to power an absorption chiller for cooling.

Electrical and Emergency Power

The CUP provides electrical service to 16 buildings on the Parnassus Heights campus site through a 12 kV distribution network. The total assumed connected loads associated with the 16 buildings served by the CUP is 27,276 kW. The term “total connected load” is the sum of the ratings of all equipment connected to the electrical system, regardless of their status of operation. The total assumed connected load is based on power per square foot (W/ft^2) dependent on the building’s use.

During a recent period of high electricity demand on the Parnassus Heights campus site that occurred during the last 2 weeks of October 2017, the average total demand was 9.69 MW, which was serviced by the CUP’s two gas-turbines and steam turbine, with the exception of 0.34 MW that was serviced by PG&E. The peak demand of 12.68 MW occurred on October 24, 2017 at 7:55 a.m., with over 2.82 MW being serviced by PG&E.

CUP Capacity

The CUP currently supplies a substantial majority (98 percent) of the electricity service to the Parnassus Heights campus site by means of gas and steam turbine generators. The CUP has two gas turbine generators, each rated 5,000 kW/5,938 kVA, and one steam turbine generator rated 3,750 kW/4688 kVA, all of which operate at 4,160 volts. The combined electricity generation capacity of the CUP is 13.75 MW. However, the steam turbine’s generation capacity is limited by the demand of steam on the campus site, typically generating below 1 MW. The CUP has proved itself to be a reliable source of electricity in the past 20 years and is expected to continue to do so past 2030 with proper maintenance. However, its generation capacity is already exceeded by the campus site’s power demands. A network of underground duct bank 12 kV feeders distribute the generated electricity throughout the campus.

The CUP has three emergency diesel generators (EDGs), each rated 2 MW/2.75 MVA at 12 kV. These generators are operated in parallel with each other and provide a combined 6 MW/7.5 MVA in the event of a CUP or PG&E outage. The EDGs are able to operate with the cogeneration plants when the campus site operates in “island mode,” i.e., disconnected from PG&E services. The CUP has an approximately five-day supply of diesel fuel to provide emergency backup to the campus in five 30,000-gallon tanks. The fuel tanks are located south of the CUP beneath Medical Center Way.

Currently, the emergency generators are not able to provide true emergency power, defined by CEC as a 10 second transition, to all of the campus site facilities that they serve. Most of the buildings on the campus site have their own emergency power sources. The only buildings on campus that rely on the CUP for 10 second transition emergency power are the School of Nursing, HSIR East and West, and MSB.

PG&E Capacity

The Parnassus Heights campus site receives PG&E electrical service from three different 12 kV distribution feeders along Parnassus Avenue. The campus site ties into these utility circuits via three spliced feeders, that exist in parallel with the CUP generation to meet the campus site electrical demand. In the event of a CUP co-generation outage, the PG&E service can pick up the demand without power interruption. The combined electrical capacity from the PG&E feeders is 22.5 MW, of which 15 MW is available at one time. The PG&E distribution circuits originate from two separate PG&E substations serving the area, including Mission Substation and Judah Substation. One of the three PG&E circuits serves as a backup or redundant service, and is not normally connected and supporting load at the campus site. PG&E can perform switching to connect that feeder to the Parnassus Heights campus site during abnormal conditions. All three PG&E feeders are capable of providing 7.5 MW/8.32 MVA each.

Demand loads are near the limit of generation capacity at the CUP during peak hour demand. While the option of using the existing third "spare" PG&E feeder to meet future demand is available, it would eliminate redundancy of electrical service to the campus that provides a degree of reliability. The spare feeder provides redundancy at the level of the CUP, but no redundancy exists in the PG&E distribution system. Use of the spare feeder would require UCSF to pay extra for "Special Facilities" and reserve capacity for a redundant feeder.

Total Available Capacity

The total available capacity from CUP generators and PG&E services available to the campus site 12 kV distribution system is 25.8 MW. As discussed above, this is because one of the PG&E circuits (7.5 MW) is a backup service, so only two PG&E circuits are available at once. The steam generator is limited by the amount of steam being produced for the campus site, and rarely generates beyond 1 MW of power. If the full output from the steam turbine and third PG&E service were available, the generation capacity would be over 36 MW. From October 2017 data, the peak campus demand is rarely above 13 MW. The existing generation and utility capacity are sufficient to serve the campus site at present, even if one of the CUP generators is unavailable.

Campus 12 kV Distribution System

The 12 kV feeders are served from switchgear located at the CUP. The distribution system is installed in underground duct banks. The switchgear can be connected together through a tiebreaker to ensure power is maintained.

4.5.2 Regulatory Framework

Federal

Federal policies and regulations set broad energy efficiency standards and incentives for consumer products, automobile and fuel efficiency, etc. Such requirements, as those listed below, tend to be applicable to the manufacturing sector and are not directly applicable to the CPHP. Nonetheless they are listed here for informational purposes.

National Energy Conservation Policy Act

The National Energy Conservation Policy Act (NECPA) serves as the underlying authority for federal energy management goals and requirements. Signed into law in 1978, it has been regularly updated and amended by subsequent laws and regulations. This act is the foundation of most federal energy requirements. NECPA established energy-efficiency standards for consumer products and includes a residential program for low-income weatherization assistance, grants and loan guarantees for energy conservation in schools and hospitals, and energy-efficiency standards for new construction. Initiatives in these areas continue today.

National Energy Policy Act of 2005

The National Energy Policy Act of 2005 sets equipment energy efficiency standards and seeks to reduce reliance on nonrenewable energy resources and provide incentives to reduce current demand on these resources. For example, under the act, consumers and businesses can attain federal tax credits for purchasing fuel-efficient appliances and products, including hybrid vehicles; constructing energy-efficient buildings; and improving the energy efficiency of commercial buildings. Additionally, tax credits are available for the installation of qualified fuel cells, stationary microturbine power plants, and solar power equipment.

Executive Order 13423 (Strengthening Federal Environmental, Energy, and Transportation Management), signed in 2007, strengthens the key energy management goals for the federal government and sets more challenging goals than the National Energy Policy Act of 2005. The energy reduction and environmental performance requirements of Executive Order 13423 were expanded upon in Executive Order 13514 (Federal Leadership in Environmental, Energy, and Economic Performance), and signed in 2009.

Energy Independence and Security Act of 2007

The Energy Independence and Security Act of 2007 sets federal energy management requirements in several areas, including energy reduction goals for federal buildings, facility management and benchmarking, performance and standards for new buildings and major renovations, high-performance buildings, energy savings performance contracts, metering, energy-efficient product procurement, and reduction in petroleum use, including by setting automobile efficiency standards, and increase in alternative fuel use. This act also amends portions of the National Energy Policy Conservation Act.

Corporate Average Fuel Economy (CAFE) Standards

Established by the U.S. Congress in 1975, the CAFE standards reduce energy consumption by increasing the fuel economy of cars and light trucks. The National Highway Traffic Safety Administration (NHTSA) and United States Environmental Protection Agency (U.S. EPA) jointly administer the CAFE standards. The U.S. Congress has specified that CAFE standards must be set at the "maximum feasible level" with consideration given to: (1) technological feasibility; (2) economic practicality; (3) effect of other standards on fuel economy; and (4) need for the nation to conserve energy.[2]

State

Warren-Alquist Act

The 1975 Warren-Alquist Act established the California Energy Resources Conservation and Development Commission, now known as the California Energy Commission (CEC). The Act established a state policy to reduce wasteful, uneconomical, and unnecessary uses of energy by employing a range of measures.

California Energy Action Plan

California's *2008 Energy Action Plan Update* updates the *2005 Energy Action Plan II,* which is the state's principal energy planning and policy document. The plan maintains the goals of the original *Energy Action Plan*, describes a coordinated implementation plan for state energy policies, and identifies specific action areas to ensure that California's energy is adequate, affordable, technologically advanced, and environmentally sound. First-priority actions to address California's increasing energy demands are to promote energy efficiency, demand response (i.e., reducing customer energy usage during peak periods to address power system reliability and support the best use of energy infrastructure), and use of renewable power sources. To the extent that these strategies are unable to satisfy increasing energy and capacity needs, the plan supports clean and efficient fossil-fuel fired generation.

State of California Integrated Energy Policy

In 2002, the Legislature passed Senate Bill 1389, which required the CEC to develop an integrated energy plan biannually for electricity, natural gas, and transportation fuels, for the California Energy Report. SB 1389 requires the CEC to prepare a biennial Integrated Energy Policy Report (IEPR) that assesses major energy trends and issues facing the state's electricity, natural gas, and transportation fuel sectors and provides policy recommendations to conserve resources; protect the environment; ensure reliable, secure, and diverse energy supplies; enhance the state's economy; and protect public health and safety (Public Resources Code Section 25301[a]). The IEPR has replaced the Energy Action Plan as the chief program intended to provide a comprehensive statewide energy strategy to guide energy investments, energy-related regulatory efforts and greenhouse gas (GHG) reduction measures.

2 For more information on the Corporate Average Fuel Economy standards, refer to https://www.nhtsa.gov/laws-regulations/corporate-average-fuel-economy.

The most recent update to the IEPR (2018) examines how California's energy system must be transformed to meet the state's 2030 GHG reduction goal, including implementation of SB 350 (De Leon, Chapter 547, Statues of 2015) to double the energy efficiency of existing buildings and SB 100's target of achieving 60 percent renewables in the electricity supply by 2030. The report also covers policies and trends in integrated resource planning, distributed energy resources, transportation electrification, barriers faced by disadvantaged communities, demand response, transmission and landscape-scale planning, the California Energy Demand Preliminary Forecast, the preliminary transportation energy demand forecast, renewable gas (in response to Senate Bill 1383), the natural gas outlook, and solutions to increase resiliency in the electricity sector. The key strategies identified in the most recent, 2018 IEPR Update, are summarized below (CEC, 2018b).

Title 24 - California Energy Efficiency Standards

The Energy Efficiency Standards for residential and nonresidential buildings specified in Title 24, Part 6 of the California Code of Regulations were established in 1978 in response to a legislative mandate to reduce California's energy consumption. The standards are updated approximately every three years to allow for consideration and possible incorporation of new energy-efficiency technologies and methods. The current standards became effective on January 1, 2020.

California Green Building Standards Code (CALGreen, or Title 24 Part 11)

Part 11 of the Title 24 Building Energy Efficiency Standards is referred to as the California Green Building Standards (CALGreen) Code. CALGreen is intended to encourage more sustainable and environmentally friendly building practices, require low-pollution emitting substances that cause less harm to the environment, conserve natural resources, and promote the use of energy-efficient materials and equipment. Since 2011, the CALGreen Code is mandatory for all new residential and non-residential buildings constructed in the state. Such mandatory measures include energy efficiency, water conservation, material conservation, planning and design, and overall environmental quality. The CALGreen Code was most recently updated in 2020, with new measures taking effect on January 1, 2020.

Renewables Portfolio Standard (RPS)

The State of California adopted standards to increase the percentage that retail sellers of electricity, including investor-owned utilities and community choice aggregators, must provide from renewable resources. The standards are referred to as the RPS. Qualifying renewables under the RPS include bioenergy such as biogas and biomass, small hydroelectric facilities (30 MW or less), wind, solar, and geothermal energy. The CPUC and the CEC jointly implement the RPS program. The CPUC's responsibilities include: (1) determining annual procurement targets and enforcing compliance; (2) reviewing and approving each investor-owned utility's renewable energy procurement plan; (3) reviewing contracts for RPS-eligible energy; and (4) establishing the standard terms and conditions used in contracts for eligible renewable energy (CPUC, 2019).

Executive Orders S-14-08 and S-21-09

In November 2008, Governor Schwarzenegger signed Executive Order S-14-08, which expanded the state's RPS to 33 percent renewable power by 2020. In September 2009, Governor

Schwarzenegger continued California's commitment to the RPS by signing Executive Order S-21-09, which directed the California Air Resources Board (CARB) under its AB 32 authority to enact regulations to help the state meet its RPS goal of 33 percent renewable energy by 2020.

SB 350 - Clean Energy and Pollution Reduction Act of 2015

SB 350, known as the Clean Energy and Pollution Reduction Act of 2015, was enacted on October 7, 2015, and provides a new set of objectives in clean energy, clean air, and pollution reduction by 2030. The objectives include the following:

- To increase from 33 percent to 50 percent by December 31, 2030, the procurement of the state's electricity from renewable sources.
- To double the energy efficiency savings in electricity and natural gas final end uses of retail customers through energy efficiency and conservation.

Senate Bill 100

On September 10, 2018, Governor Brown signed SB 100, establishing that 100 percent of all electricity in California must be obtained from renewable and zero-carbon energy resources by December 31, 2045. SB 100 also creates new standards for the RPS goals that were established by SB 350 in 2015. Specifically, the bill increases required energy from renewable sources for both investor-owned utilities and publicly-owned utilities from 50 percent to 60 percent by 2030. Incrementally, these energy providers must also have a renewable energy supply of 33 percent by 2020, 44 percent by 2024, and 52 percent by 2027. The updated RPS goals are considered achievable, since many California energy providers are already meeting or exceeding the RPS goals established by SB 350.

On the same day that SB 100 was signed, Governor Brown signed Executive Order B-55-18 with a new statewide goal to achieve carbon neutrality (zero-net GHG emissions) by 2045 and to maintain net negative emissions thereafter.

Appliance Efficiency Regulations, California Code of Regulations Title 20

California's Appliance Efficiency Regulations (20 CCR Part 160-1608) contain standards for both federally regulated appliances and non-federally regulated appliances. The regulations are updated regularly to allow consideration of new energy efficiency technologies and methods. The current regulations were adopted by the CEC on November 18, 2009. The standards outlined in the regulations apply to appliances that are sold or offered for sale in California. More than 23 different categories of appliances are regulated, including refrigerators, freezers, water heaters, washing machines, dryers, air conditioners, pool equipment, and plumbing fittings.

Transportation Energy

AB 1007 (Pavley)-Alternative Fuel Standards

Assembly Bill 1007 (Pavley, Chapter 371, Statutes of 2005) required the CEC to prepare a state plan to increase the use of alternative fuels in California (State Alternative Fuels Plan). The CEC prepared the State Alternative Fuels Plan in partnership with the CARB and in consultation with other state, federal, and local agencies. The final State Alternative Fuels Plan, published in December 2007, attempts to achieve an 80 percent reduction in GHG emissions associated with personal modes of transportation, even as California's population increases.

California Assembly Bill 1493 (AB 1493, Pavley)

In response to the transportation sector accounting for more than half of California's carbon dioxide (CO_2) emissions, AB 1493 (commonly referred to as CARB's Pavley regulations), enacted on July 22, 2002, requires CARB to set GHG emission standards for new passenger vehicles, light duty trucks, and other vehicles manufactured in and after 2009 whose primary use is non-commercial personal transportation. Phase I of the legislation established standards for model years 2009 through 2016 and Phase II established standards for model years 2017 through 2025 (CARB, 2017 and U.S. EPA, 2012). Refer to Section 4.7, *Greenhouse Gas Emissions*, of this EIR for additional details regarding this regulation.

Low Carbon Fuel Standard

The Low Carbon Fuel Standard (LCFS), established in 2007 through Executive Order S-1-07 and administered by CARB, requires producers of petroleum-based fuels to reduce the carbon intensity of their products that started with a 0.25 percent reduction in 2011, and culminated in a 10 percent total reduction in 2020. In September 2018, CARB extended the LCFS program to 2030, making significant changes to the design and implementation of the program, including a doubling of the carbon intensity reduction to 20 percent by 2030.

Petroleum importers, refiners, and wholesalers can either develop their own low carbon fuel products or buy LCFS credits from other companies that develop and sell low carbon alternative fuels, such as biofuels, electricity, natural gas, and hydrogen.

Executive Order B-16-12 - 2025 Goal for Zero Emission Vehicles

In March 2012, Governor Brown issued an executive order establishing a goal of 1.5 million ZEVs on California roads by 2025. In addition to the ZEV goal, Executive Order B-16-12 stipulated that by 2015 all major cities in California will have adequate infrastructure and be 'zero-emission vehicle ready' so that by 2020 the state will have established adequate infrastructure to support 1 million ZEVs; and that by 2050, virtually all personal transportation in the state will be based on ZEVs, and GHG emissions from the transportation sector will be reduced by 80 percent below 1990 levels.

CARB's Advanced Clean Car Program

The Advanced Clean Cars emissions-control program was approved by CARB in 2012 and is closely associated with the Pavley regulations (CARB, 2017). The program requires a greater number of zero-emission vehicle models for years 2015 through 2025 to control smog, soot, and GHG emissions. This program includes the Low-Emissions Vehicle regulations to reduce criteria pollutants and GHG emissions from light- and medium-duty vehicles; and the ZEV regulations to require manufactures to produce an increasing number of pure ZEV's (meaning battery and fuel cell electric vehicles) with the provision to produce plug-in hybrid electric vehicles (PHEV) between 2018 and 2025.

CARB's Mobile Source Strategy

The Mobile Source Strategy (2016) includes an expansion of the Advanced Clean Cars program (which further increases the stringency of GHG emissions for all light-duty vehicles, and 4.2 million zero-emission and plug-in hybrid light-duty vehicles by 2030). It also calls for more stringent GHG requirements for light-duty vehicles beyond 2025 as well as GHG reductions from medium-duty and heavy-duty vehicles and increased deployment of zero-emission trucks primarily for classes 3 through 7 "last mile" delivery trucks in California. Statewide, the Mobile Source Strategy would result in a 45 percent reduction in GHG emissions, and a 50 percent reduction in the consumption of petroleum-based fuels. CARB's Mobile Source Strategy includes measures to reduce total light-duty vehicle miles travelled (VMT) by 15 percent compared to business-as-usual in 2050.

Executive Order B-48-18

On January 26, 2018, Governor Brown issued an executive order establishing a goal of 5 million ZEVs on California roads by 2030 and to spur the installation and construction of 250,000 plug-in electric vehicle chargers, including 10,000 direct current fast chargers, and 200 hydrogen refueling stations by 2025.

University of California

University of California Sustainability Policy

The University of California's system-wide goal is to achieve carbon neutrality by 2025, using the following strategies:

- Annual two percent reduction in energy use;
- Cost-effective renewable energy installations; and
- System-wide purchasing pool for clean energy, biogas, and offsets by 2025.

Further policies include:

- The energy performance of new buildings must exceed Title 24 requirements by 20 percent;
- The energy performance of new buildings should exceed Title 24 requirements by 30 percent; and
- No new combustion is allowed for buildings and retrofits after June 30, 2019.

Healthcare buildings are subject to the same Title 24 requirements, and are also subject to the overall carbon neutrality goal.

UC Strategic Energy Plan

The UC Strategic Energy Plan (SEP) was prepared in 2008 for all UC campuses, to fulfill a goal of UC's Policy on Sustainable Practices to implement energy efficiency projects in existing buildings. The UCSF portion of the SEP analyzes energy use and GHG trends, and identifies potential energy efficiency retrofit projects at all buildings over 50,000 square feet at UCSF (primarily lighting, HVAC, commissioning and central plant measures). Energy savings, GHG emissions savings, and financial returns are estimated for hundreds of projects, which are grouped into Tier 1 (high priority) and Tier 2 (longer term planning) projects based on their energy savings and financial payback. The SEP project list is intended to be regularly updated by each campus to evaluate the feasibility of additional energy-saving measures.

University of California, San Francisco

UCSF has an aggressive sustainability program covering sustainability activities across the entire campus and medical center. Through its Office of Sustainability, UCSF has created work groups addressing sustainability in the following areas, some of which are directly related to energy consumption: Carbon Neutrality, Zero Waste, Water Conservation, Sustainable Food, Toxics Reduction, Green Procurement, Green Buildings, and Sustainable Operations.

UCSF Climate Action Plan and GHG Reduction Strategy

As part of implementing the UC *Sustainable Practices Policy*, UCSF developed a Climate Action Plan in 2009, a long-term strategy for voluntarily meeting the State of California's goal for reducing GHG emissions to 1990 levels by 2020, pursuant to AB 32. In addition, as part of the 2014 LRDP, UCSF developed a GHG Reduction Strategy (GHGRS) to provide streamlined analysis under CEQA for future development projects. Both of these documents were updated in 2017 to create a combined UCSF Climate Action Plan – Greenhouse Gas Reduction Strategy to reflect changes that have occurred since 2014 relative to the goals outlined in the UC *Sustainable Practices Policy* and the addition of new campus projects unforeseen at the time of LRDP adoption.

Specifically, the update includes strategies to meet UC goals to achieve climate neutrality from scope 1 and scope 2 emissions by 2025, and from scope 3 emissions by 2050. Additionally, the update recognizes updated GHG reduction targets of the 2017 update to the state's Climate Change Scoping Plan to achieve a 40 percent reduction in GHGs compared to 1990 levels by year 2030. The update also considers the completion of the Five Points Solar Park, a 60-megawatt solar power installation built to supply renewable energy to the University of California.

UCSF Transportation Demand Management

UCSF employs an aggressive Transportation Demand Management (TDM) program that includes an extensive shuttle system, among other alternative transportation opportunities. Based on UCSF's 2018 employee commute survey, approximately 80 percent of the campus faculty, staff and student population commutes by means other than driving alone. For the key features of UCSF's existing TDM program, refer to the UCSF Transportation Demand Management discussion in Section 4.7, *Greenhouse Gas Emissions*.

UCSF 2014 LRDP

Current development at UCSF is guided by the 2014 LRDP, which includes specific policies related to future program development and space needs at all UCSF campus sites, including the Parnassus Heights campus site. The 2014 LRDP identified campus-wide objectives related to energy:

Campus-Wide Objectives

4. **Promote Environmental Sustainability**

   F. Facilitate growth in an environmentally responsible manner while reducing UCSF's greenhouse gas emissions in compliance with the UC *Sustainable Practices Policy* and the goals of Assembly Bill 32 (AB32), the California Global Warming Solutions Act.[3]

The UCSF 2014 LRDP also included *Community Planning Principles*, which were produced in collaboration with the UCSF Community Advisory Group:

Community Planning Principle

Sustainability

S1. Meet or exceed guidelines and standards in the University of California's *Sustainable Practices Policy* when planning and developing projects. Policy goals are categorized as follows: Green Building; Clean Energy; Climate Protection Practices (including greenhouse gas reduction); Sustainable Transportation; Sustainable Building Operations; Recycling and Waste Management; Environmentally Preferable Purchasing Practices; Sustainable Foodservices Practices.

4.5.3 Impacts and Mitigation Measures

Significance Criteria

Would implementation of the CPHP, including three Initial Phase projects and Initial Phase improvements:

a) Result in potentially significant environmental impact due to wasteful, inefficient, or unnecessary consumption of energy resources, during project construction or operation?

b) Conflict with or obstruct a state or local plan for renewable energy or energy efficiency?

Approach to Analysis

This impact analysis evaluates the potential for the proposed CPHP to result in the wasteful use of energy or wasteful use of energy resources during project construction and operation, consistent with Public Resources Code 21100(b)(3). The impact analysis is based on Section 15126.2(b) and Appendix F of the State CEQA Guidelines. The analysis provides construction and operational energy use estimates for the proposed CPHP. This information is used to determine whether this energy use would be considered wasteful, inefficient, or unnecessary, taking into account available energy supplies and existing use patterns, the project's energy efficiency features, and compliance with applicable standards and policies aimed to reduce energy consumption, including the state's Title 24 Energy Efficiency Standards. Energy quantification details supporting the CPHP estimates presented in this section are based on the energy use assumptions and GHG emission estimates for the GHG emissions assessment presented in Section 4.7,

[3] UCSF is required to develop a long-term strategy for voluntarily meeting the State of California's goal for reducing GHG emissions to 1990 levels by 2020, pursuant to the California Global Warming Solutions Act of 2006 (AB32).

Greenhouse Gas Emissions. The construction and operation of CPHP, including Initial Phase projects and improvements, are also assessed for consistency with *UC Sustainable Practices Policy* provisions that are designed to conserve and reduce energy consumption.

Approach to Analysis of Initial Phase Projects, including New Hospital, and Initial Phase Improvements

This EIR includes project-level analysis for certain Initial Phase projects anticipated to be completed by about the year 2030; specifically, the Irving Street Arrival, Research and Academic Building (RAB), and initial Aldea Housing Densification; and Initial Phase improvements, as described below. The New Hospital is also an Initial Phase project anticipated to be completed by about the year 2030, but is analyzed at a program level in this EIR within the context of the overall CPHP and will be analyzed at a project level in a subsequent EIR when more details are available.

Impact Analysis

Impact ENE-1: Implementation of the CPHP would not result in a potentially significant environmental impact due to wasteful, inefficient, or unnecessary consumption of energy resources, during project construction or operation. (Less than Significant)

CPHP

Construction Energy Use

Construction of individual projects developed under the proposed CPHP would result in the consumption of energy in the form of transportation fuels (i.e., gasoline and diesel fuel) from a variety of sources, including off-road construction equipment and on-road worker, vendor, and hauling vehicles. The level of energy consumption would fluctuate depending on the type of construction activities underway during any particular time period. Energy use would be higher during the period of construction involving the initial site clearance and earth-moving/grading, where the largest and most powerful equipment would be required to excavate, lift, and transport large volumes of soil and demolished materials (such as concrete slabs and asphalt) from the site. Gasoline and diesel fuel would be the primary energy source for vehicles driven by construction crews and to power the large trucks used to deliver and remove construction equipment, materials, and debris. Electricity would be used to transport (pump) water to the site, and to power automated hand tools and smaller types of construction machinery such as compressors for painting applications. Construction-related fuel consumption from activities over the entirety of the CPHP would include those described below for the Initial Phase projects, including the New Hospital, as well as for Future Phase development after 2030.

As discussed in Chapter 3, *Project Description*, CPHP Initial Phase projects, including the Irving Street Arrival, RAB, New Hospital, and initial Aldea Housing Densification projects, and other miscellaneous Initial Phase activities would be completed by 2030. Analysis provided below indicates that the Initial Phase projects and activities would result in the consumption of approximately 45,000 gallons per year of diesel fuel and approximately 6,000 gallons per year of gasoline.

Without details of specific construction schedules, sequencing, and overlap of the CPHP Future Phase projects, it is not possible to directly calculate the energy demand associated with the CPHP Future Phase. However, when considering the amount and type of CPHP Future Phase demolition and construction, and timeframe over which these activities would occur, it is expected that construction energy demand on average that would be experienced during the CPHP Future Phase may be comparable, but somewhat less than, that discussed for the CPHP Initial Phase projects, as the Future Phase demolition and construction activities would occur over a twenty-year period.

Operational Energy Use

CPHP operations would require long-term consumption of energy in the form of electricity, natural gas, gasoline, and diesel fuel. The electricity, natural gas, and water usage that would be required for operation of the proposed buildings have been estimated based on specific building area estimates, historical data, and CalEEMod default factors for water use, as discussed above. Natural gas consumption at the CUP would increase for the generation of electricity, and for the purposes of heating and cooling. Natural gas consumption for the full CPHP was estimated based on the UCSF Parnassus Heights Campus GHG inventory for the most recent inventory year (2018) and the proposed net increase in developed square footage. In addition, water use for buildings would require the consumption of electricity to supply, treat, and distribute potable water to the buildings and to treat wastewater generated in the buildings.

Mobile source fuel use associated with operation of the CPHP was estimated based on vehicle miles travelled (VMT) obtained from the transportation analysis for existing conditions (2019) and for conditions in 2050 under full buildout (existing plus CPHP). The VMT data were used to estimate electricity, natural gas, diesel fuel, and gasoline consumption volumes for both existing (2019) and existing plus CPHP (2050) conditions based on vehicle fleet-average fuel and electricity consumption rates (per mile) estimated using the EMFAC2017 emissions model. The increment of increased energy consumption under the CPHP was then determined by subtracting existing emissions from the resultant emissions under CPHP full buildout. The increase in mobile source electricity that would be associated with the CPHP is based on the expected increase in San Francisco's overall electric vehicle fleet in 2050. The increased electricity use associated with local and regional mobile sources generated by the CPHP would generally not be expected to occur at the Parnassus Heights campus site, but would be dispersed throughout the greater San Francisco area. While charging stations are currently available and would be available at the Parnassus Heights campus site under the CPHP, the bulk of long-term charging is expected to occur at the owners' residences. The annual energy use requirements estimated for full buildout operations of the CPHP relative to existing conditions are summarized in **Table 4.5-2** by energy use type.

Analysis of Factors Identified in CEQA Guidelines Appendix F

Appendix F of the CEQA Guidelines identifies factors relating to whether a project would result in the wasteful, inefficient, or unnecessary consumption of fuel or energy, and conversely whether the project would fail to incorporate renewable energy or energy efficiency measures into building design, equipment use, transportation or other project features. The Appendix F factors are addressed below and used as guidance to evaluate the energy impact of the CPHP relative to the identified significance criteria.

TABLE 4.5-2
CPHP FULL BUILDOUT OPERATIONAL ENERGY USE (ANNUAL)

Energy Use Type	Existing Conditions in 2019	CPHP Full Buildout (2050) Operational Usage	Net New Energy Use under CPHP
Electricity from PG&E Grid (MWh/year)			
Campus Facilities	2,609	4,200	1,591
Water Use	2,039	3,137	1,098
Mobile Sources	443	3,639	3,196
Total Electricity Use	**5,091**	**10,976**	**5,885**
Natural Gas (MMBtu/year)			
Central Utility Plant	1,023,258	1,647,446	624,188
Rest of Campus Facilities	12,579	20,253	7,674
Mobile Sources[1]	8,648	18,850	10,202
Total Natural Gas Use	**1,044,485**	**1,686,549**	**642,064**
Diesel (gallons/year)			
Mobile Sources	662,666	1,167,963	505,297
Generator Testing	19,157	30,800	11,643
Total Diesel Use	**681,823**	**1,198,763**	**516,940**
Gasoline (gallons/year)			
Mobile Sources	4,246,449	5,178,022	931,573
Total Gasoline Use	4,246,449	5,178,022	**931,573**

NOTES: kBtu = thousand British Thermal Unit; MWh = Megawatt-hour; and EV = electric vehicle.

1 EMFAC2017 includes compressed natural gas in terms of diesel gallon equivalents. This is converted into Btu per the U.S. Department of Energy Alternative Fuel Data Center conversion: 1 DGE of CNG = 128,488 Btu. Available at: https://afdc.energy.gov/fuels/equivalency_methodology.html.

Appendix F.II.C.1: Energy Requirements and Energy Use Efficiencies

CEQA Guidelines Appendix F, Section II.C.1, includes the following impact guidance factor:

> *The project's energy requirements and its energy use efficiencies by amount and fuel type for each stage of the project including construction, operation, maintenance and/or removal. If appropriate the energy intensiveness of materials may be discussed.*

The energy inventories prepared for this evaluation include electricity and natural gas, and fuels used for construction and operation of the proposed CPHP. The estimated energy use levels are summarized below in Table 4.5-2 for the full buildout operational activities as well as the change from the existing conditions to full buildout; and the construction-phase energy use estimates for the three Initial Phase projects and activities are presented in Table 4.5-3. As shown in these tables, considerable amounts of electricity, natural gas, diesel, and gasoline would be consumed during the construction and operational phases of the CPHP. For the effects of the CPHP on the local and regional energy supplies and on the need for additional capacity, refer to the Appendix F.II.C.2 discussion, below.

In addition to direct construction- and operation-related energy consumption, indirect energy use would be involved to produce electricity, refine fuels, and make the materials and components used in construction, including the energy used for extraction of raw materials, manufacturing, and transportation. Energy intensiveness of electricity generation, fuel refining, and materials, also referred to as the energy “lifecycle,” is not addressed in this analysis because the California Natural Resources Agency (CNRA) has indicated that lifecycle analyses are not required under CEQA (CNRA, 2009). The CNRA explained in the context of greenhouse gas emissions, that: (1) there exists no standard regulatory definition for lifecycle, and (2) even if a standard definition for lifecycle existed, the term might be interpreted to refer to emissions beyond those that could be considered ‘indirect effects’ as defined by CEQA Guidelines, and therefore, beyond what an EIR is required to estimate and mitigate (CNRA, 2009). This reasoning was reaffirmed in Section 15126.2(b) of the November 2018 CEQA Guidelines, which cautions that the analysis of energy impacts is subject to the rule of reason, and must focus on energy demand caused by the project, signaling that a full “lifecycle” analysis that would account for energy used in building materials and consumer projects will generally not be required (CNRA, 2018).

Nonetheless, recycling reduces indirect energy consumption associated with making materials and components, and reduces the energy used for extraction of raw materials, manufacturing, and transportation. California has a statewide goal of 75 percent waste diversion by 2020. The CPHP would require recycling containers to be located within public areas, and a waste diversion and recycling program could be implemented within the campus to divert all non-hazardous and non-health care related waste that can be safely recycled or composted. Operations of the CPHP would comply with the state goal by implementing waste diversion policies and infrastructure. With regard to the construction phases of the project, the CPHP would comply with the requirements of the CALGreen mandatory measures. These recycling efforts would reduce the effects of the project’s indirect energy use.

Appendix F.II.C.2: Local and Regional Energy Supplies

CEQA Guidelines Appendix F, Section II.C.2, includes the following impact guidance factor:

> *The effects of the project on local and regional energy supplies and on requirements for additional capacity.*

As discussed above, the CPHP would result in the consumption of electricity, natural gas, gasoline, and diesel associated with mobile vehicle sources, building energy uses, operations of the CUP, emergency generator operations, and construction activities. The Parnassus Heights campus site is currently supplied both electricity and natural gas by PG&E. However, the majority of electricity used at the campus site is generated on-site at the CUP. PG&E has established contracts and commitments to ensure there is adequate electricity generation and natural gas capacity to meet its current and future energy loads. Total energy use requirements for the proposed CPHP at buildout, and the change from existing conditions to full buildout of CPHP operations, are presented in Table 4.5-2; and energy use during the construction of the proposed Initial Phase projects and activities are presented in Table 4.5-3.

Electricity

Annual average electricity consumption that would be required for the construction period would be substantially less than annual electricity consumption required for CPHP operations. Therefore, this discussion focuses on electricity demand that would occur during full buildout of CPHP operations. To put the CPHP's operational electricity requirements in context, in 2018 the total generated electricity for California was 285,488 GWh of electricity (CEC, 2019a), of which consumers in San Francisco used 5,602 GWh (CEC, 2019g). The CEC estimates that state-wide electricity demand will increase to 339,160 GWh in 2030 based on an average annual mid-energy demand growth rate of 1.27 percent (CEC, 2018c). As shown in Table 4.5-2, the CPHP's anticipated long-term operational increase in PG&E-delivered electricity usage from 5,091 megawatt-hours (MWh) per year for existing conditions in 2019 to 10,976 MWh per year by full buildout of the CPHP in 2050, reflects an increase of 5,885 MWh per year in electricity usage. This represents 0.002 percent of the total 2018 state-wide electricity usage and 0.11 percent of San Francisco electricity usage.

As mentioned in the environmental setting, demand loads can approach the limit of generation capacity at the CUP during peak demand periods; therefore, unless the CUP is upgraded to a higher nameplate capacity, the campus buildout under the CPHP may be required to rely on the PG&E electricity grid for its increased electricity demand. Given that the PG&E grid currently only supplies approximately two percent of the campus electrical demand and is capable of supplying all the demand in the event that the CUP goes offline, it appears that the PG&E feeders have adequate capacity to serve the increased electrical demand. However, an assessment of the available capacity of the PG&E distribution feeders would be required to determine if the PG&E facilities would be adequate to serve the increased demand. If required, PG&E's spare feeder could be used; however, that may require UCSF to install a redundant feeder for reserve capacity (UCSF, 2019). PG&E's service planning and substation teams would review the anticipated proposed electricity load to ensure that there is adequate capacity at the electric substations that would serve the CPHP to support the increase in the proposed load.

Based on a comparison to the state-wide and San Francisco annual energy demand and the projected demand growth rate, the CPHP-related increase in electricity consumption would not cause adverse effects on local and regional energy supplies or require additional generation capacity beyond the state-wide planned increase to accommodate projected energy demand growth. In addition, the CPHP's operational electricity demand estimates conservatively exclude the benefits of LEED Gold design that would occur pursuant to the UC *Policy on Sustainable Practices* that requires all new buildings to achieve a LEED "Silver" certification at a minimum, as well as due to future revisions to Title 24 energy standards, which would further reduce electricity demand.

The transition toward electric power sources for on-road vehicles, including the installation of additional electric vehicle charging stations, would result in an increase in the calculated total electricity usage, as shown in Table 4.5-2, above; however, the associated increased electricity use associated with mobile sources would not be expected to occur at the Parnassus Heights campus site, but would be dispersed throughout the greater San Francisco area and would not significantly impact overall electricity supply or infrastructure. While charging stations are currently available and would be available at the Parnassus Heights campus site under the CPHP, the bulk of long-term charging is expected to occur at the owners' residences.

Natural Gas

There would be no natural gas consumption associated with CPHP construction activities. The CPHP's annual operational natural gas consumption is estimated to increase by 642,064 MMBtu from 1,044,485 MMBtu for the existing conditions in 2019 to 1,686,549 MMBtu at full buildout in 2050 (see Table 4.5-2). The majority of this increase would be associated with the potential increased consumption at the CUP. In comparison, state-wide natural gas consumption in 2018 was 1,264,000,000 MMBtu and San Francisco natural gas demand was 22,800,000 MMBtu in 2018 (CEC, 2019b). The CPHP's increase in natural gas consumption would account for approximately 0.05 percent of the 2018 statewide annual consumption and approximately 2.82 percent of the 2018 San Francisco-wide consumption. It is projected that California natural gas demand will decrease at an annual rate of 1.1 percent to 2026 due to continued implementation of renewable generation projects and the penetration of energy efficient products in the state. After 2026, California natural gas demand is projected to increase due to population growth and associated demand (CEC, 2015).

An assessment of the available capacity of the existing natural gas transmission line that serves the CUP would be required to ensure that the existing PG&E facilities would be adequate to serve the increased demand. Additionally, UCSF's Greenhouse Gas Reduction Strategy identifies measures that improve efficiency of existing buildings, while new buildings are required to surpass Title 24 energy efficiency standards and at a minimum, attain LEED silver certification or equivalent. These measures would reduce consumption of natural gas by improving building insulation and by requiring the flow rate and consumption at individual zones to be monitored in order to identify unusual consumption points, promote conservation, and in turn reduce energy costs as well as minimize the adverse environmental impact., etc.

Transportation Fuels

Regarding CPHP-related fuel consumption, it is estimated that off-road construction equipment and on-road vehicles would consume an annual average of approximately 44,952 gallons diesel fuel per year and on-road worker vehicles would consume an annual average of approximately 6,003 gallons per year of gasoline during the construction phases of the proposed Initial Phase CPHP projects between 2020 and 2030 (see Table 4.5-3). Without details of specific construction schedules, sequencing, and overlap of the CPHP Future Phase projects, it is not possible to directly calculate the energy demand associated with the CPHP Future Phase. However, it is expected that construction energy demand that would be experienced during the CPHP Future Phase would be comparable, but somewhat less than that estimated for the CPHP Initial Phase projects as the Future Phase demolition and construction activities would occur over a twenty-year period. During operations, it is estimated that the net annual increase in consumption of diesel fuel for full buildout of the CPHP would be approximately 516,940 gallons per year and the net annual increase in consumption of gasoline would be approximately 931,573 gallons per year (see Table 4.5-2). These annual average diesel use amounts for construction and operations are equivalent to approximately 0.5 percent and 5.2 percent, respectively, of the diesel fuel sold in San Francisco, and the gasoline use amounts for construction and operations are equivalent to less than 0.01 percent and approximately 0.8 percent, respectively, of the total gasoline fuel sold in San Francisco (see “Transportation Fuels” in Section 4.5.1, *Environmental Setting*).

The overall energy use requirements would not be substantial relative to the total sales of transportation fuels in San Francisco. In addition, implementation of Mitigation Measure AIR-1b, *Best Management Practices for Controlling Particulate Emissions during Construction*, would help avoid wasteful or inefficient use of energy during construction by requiring that equipment be well maintained, and requiring that idling be minimized either by shutting equipment off when not in use or reducing the maximum idling time to 5 minutes in accordance with the Title 13, Section 2485, of the California Code of Regulations. Also, vehicle use associated with operations of the CPHP would be reduced pursuant to UCSF’s aggressive TDM program that includes an extensive shuttle system, among other alternative transportation opportunities.

The CPHP would not require additional power generation plants, natural gas transmission facilities, or fuel refineries to be constructed. Through use of renewable energy, energy efficiency standards, and electric vehicle charging infrastructure, the CPHP would minimize impacts on the local and regional energy supply. While charging stations are currently available and would be available at the Parnassus campus site under the CPHP, the bulk of long-term charging is expected to occur at the owners’ residences.

Appendix F.II.C.3: Peak and Base Period Demands

CEQA Guidelines Appendix F, Section II.C.3, includes the following impact guidance factor:

> *The effects of the project on peak and base period demands for electricity and other forms of energy.*

Peak period electrical demand is the short period of time during which electrical power is needed when electricity is in highest demand. Base period electrical load is the minimum amount of electrical demand needed over a 24-hour time period. Wasteful, inefficient, or unnecessary consumption or use of energy during the peak period of electrical demand has greater potential to cause adverse environmental effects compared to during the base period because of the higher demand during the peak period. The CPHP would not have a substantial impact on the peak and base period demands for electricity or other forms of energy. The CPHP’s base energy consumption compared to regional and statewide energy consumption is discussed above. Further details and reasoning on the peak demand are described below.

In 2018, California’s peak grid demand was 46,424 MW. On the same day, PG&E reached a maximum demand of 19,245 MW (Cal ISO, 2019). In comparison, the CPHP’s maximum demand is expected to be at most 22 MW, most of which would be served by electricity generated at the CUP, but would be supplemented by direct-feed PG&E electricity. This estimate conservatively excludes the benefits of LEED and improvements in demand response due to future updates to the Title 24 energy standards, which would further reduce peak demand through its performance standards that are based on the time dependent valuation of energy, which uses the value of the electricity or natural gas used at every hour of the year to incentivize load shifting off of the peak use periods. In addition, the mixed-use nature of the CPHP naturally allows for a balanced energy load, as not all uses would have maximum occupancy at the same time of day.

Overall, the CPHP peak demand represents approximately 0.11 percent of PG&E's peak demand and would have a relatively minor effect on PG&E's system-wide peak demands.

Appendix F.II.C.5: Energy Resources

CEQA Guidelines Appendix F, Section II.C.5, includes the following impact guidance factor:

> *The effects of the project on energy resources.*

The CPHP's energy use, including electricity, natural gas, gasoline, and diesel consumption, would primarily be associated with construction activities, vehicle travel, building operations, and emergency generator testing and maintenance. Total energy use requirements are shown in Table 4.5-3 for construction activities and in Table 4.5-2 for the change from existing conditions to full buildout operations. Refer to the Appendix F.II.C.2 and F.II.C.3 discussions, above, for the effects that the CPHP would have on energy resources. The CPHP's use of energy would not have a substantial adverse effect on statewide or regional energy resources relative to wasteful, inefficient, or unnecessary use of energy.

Appendix F.II.C.6: Transportation Energy Use

CEQA Guidelines Appendix F, Section II.C.6, includes the following impact guidance factor:

> *The project's projected transportation energy use requirements and its overall use of efficient transportation alternatives.*

The UCSF's transportation energy use requirements in terms of gasoline and diesel quantities for construction of the Initial Phase project and operation of the CPHP are presented in Tables 4.5-3 and 4.5-2, respectively. The quantification of VMT associated with project operations, which is used to quantify the total operational transportation-related energy use requirements, is discussed in detail under *Operational Energy Use*, above. Pursuant to UCSF's TDM program, the CPHP would include reductions in transportation and associated energy usage at full buildout.

In addition, as discussed above, implementation of Mitigation Measure AIR-1b, *Best Management Practices for Controlling Particulate Emissions during Construction*, would help avoid wasteful or inefficient use of energy during construction by requiring that equipment be well maintained, and requiring that idling be minimized either by shutting equipment off when not in use or reducing the maximum idling time to 5 minutes in accordance with the Title 13, Section 2485, of the California Code of Regulations. The CPHP would also be well positioned to take advantage of the many public transit options in the vicinity of UCSF. The 16th Street Bay Area Rapid Transit (BART) station is located near the campus and UCSF has a wide array of shuttle bus services that serve the campus. In general, vehicle trip-generating developments near public transit facilities result in reduced energy use by projects compared to projects not in the vicinity of such facilities. According to the California Air Pollution Control Officers Association (CAPCOA, 2010), "[l]ocating a project with high density near transit will facilitate the use of transit by people traveling to or from the Project site. The use of transit results in a mode shift and therefore reduced VMT."

Impact Conclusion Summary

Based on the above analysis, the CPHP would not result in a potentially significant environmental impact due to wasteful, inefficient, or unnecessary consumption of fuel or energy.

Mitigation: None required.

Irving Street Arrival, RAB and Initial Aldea Housing Densification

The energy evaluation for the Initial Phase projects applies the same methodology that was applied to the assessment of the energy effects of the CPHP. Estimated energy resource use during the construction of the Initial Phase projects is presented below in **Table 4.5-3**.

TABLE 4.5-3
CONSTRUCTION ENERGY RESOURCE USE FOR THE INITIAL PHASE PROJECTS

Energy Use Type	Unit of Measure	Project Construction Usage
Diesel		
On-road vehicles	gallons/project	95,786
Off-road equipment	gallons/project	241,351
Total Diesel Use	gallons/project	337,137
Annual Average Diesel Use[1]	**gallons/year**	**44,952**
Gasoline		
On-road vehicles[2]	gallons/project	45,024
Total Gasoline Use	gallons/project	45,024
Annual Average Gasoline Use[1]	**gallons/year**	**6,003**

NOTES:

1 Annual averages are estimated by dividing the total energy use by the expected duration of 7.5 years of construction activities associated with Irving Street Arrival, RAB, and Initial Aldea Housing Densification projects.

SOURCE: ESA, 2019, Energy Consumption Calculations for the proposed UCSF CPHP.

As described above for the CPHP, implementation of Mitigation Measure AIR-1b, *Best Management Practices for Controlling Particulate Emissions during Construction*, would help avoid wasteful or inefficient use of energy during construction of the Initial Phase projects by requiring that equipment be well maintained, and requiring that idling be minimized either by shutting equipment off when not in use or reducing the maximum idling time to 5 minutes in accordance with the Title 13, Section 2485, of the California Code of Regulations.

With regard to long-term operational energy use requirements, it is estimated that the Initial Phase projects would result in an increase in transportation fuels consumption of approximately 12 percent compared to the existing 2018 consumption, and onsite consumption of electricity, natural gas, and diesel would increase by only two percent relative to the existing 2018 consumption. These increases in energy demand would not be expected to cause a significant environmental impact due to wasteful, inefficient, or unnecessary consumption of fuel or energy. Impacts would be less than significant.

Mitigation: None required.

Initial Phase Improvements

As described in Chapter 3, *Project Description*, other Initial Phase activities would include various Initial Phase utility improvements, implementation of the Parnassus Avenue Streetscape Plan, renovation of certain existing buildings, and installation of miscellaneous neighborhood investment improvements in the public realm. Construction and operation of these improvements would incrementally contribute to the Initial Phase energy resources required. However, for the same reasons discussed above for the Irving Street Arrival, RAB and Initial Aldea Housing Densification projects, construction and operational energy use would similarly not be expected to cause a significant environmental impact due to wasteful, inefficient, or unnecessary consumption of fuel or energy. Impacts would be less than significant.

Mitigation: None required.

Impact ENE-2: Implementation of the CPHP would not conflict with or obstruct a state or local plan for renewable energy or energy efficiency. (Less than Significant)

CPHP; and Irving Street Arrival, RAB and Initial Aldea Housing Densification and Initial Phase Improvements

All relevant *UC Sustainable Practices Policy* provisions that are designed to conserve and reduce energy consumption would be implemented. In addition, the CPHP and Initial Phase projects and activities would address UCSF's achievement of goals set forth in the adopted Carbon Neutrality Initiative (CNI), which has goals more stringent than the statewide target of achieving 80 percent below 1990 emission levels by 2050. The goals also have the effect of reducing overall energy usage. The CPHP, including the three Initial Phase projects and other activities, would continue UCSF's substantial energy conservation efforts at the Parnassus Heights campus site by reducing energy demand through investments in achieving deep energy efficiency of the buildings and facilities on campus. Individual projects under the proposed CPHP would be required to comply with the *UC Policy on Sustainable Practices*, which requires new construction of facilities to meet a minimum standard of LEED-NC Silver and strive for LEED-NC Gold when possible and requires 20 percent better energy performance than Title 24 (and strives to achieve 30 percent). New development under the proposed CPHP is not expected to conflict with the University's policy.

Mitigation: None required.

Cumulative Impacts

Impact C-ENE-1: The CPHP, combined with cumulative development in the Parnassus Heights campus site vicinity and citywide, would not result in significant cumulative energy impacts. (Less than Significant)

Geographic Context

The geographic scope of potential cumulative effects with respect to energy resources includes PG&E's electric grid and natural gas transmission system that would serve the CPHP, the energy systems at the Parnassus Heights campus site that would serve the CPHP, the area from which transportation fuels would be provided (for this EIR, publicly available fuel sources in the vicinity of the CPHP site), and the cumulative projects discussed in Section 4.0.

Cumulative Impact and CPHP Contribution

Given UCSF's implementation of energy reduction measures within its Greenhouse Gas Reduction Strategy that would serve to improve efficiency of existing buildings, require new buildings to surpass Title 24 energy efficiency standards and, at a minimum, attain LEED silver certification or equivalent, the CPHP would not contribute to a significant cumulative impact related to the use of large amounts of fuel or energy in a wasteful or inefficient manner and the cumulative impact would be less than significant.

Given the relatively small percentage of the CPHP's other fuel and energy uses compared to existing fuel and energy use in the region, the CPHP's less-than-significant incremental impacts related to the use of other forms of fuel or energy in a wasteful or inefficient manner would not be expected to combine with the incremental impacts of other projects to cause an adverse cumulative impact. The operational electricity requirements of the CPHP would not be cumulatively considerable and the estimated consumption rates would not be substantial compared to the 2018 citywide consumption.

Project-related transportation fuel impacts could overlap with the transportation needs (including fuel needs) of previously approved past projects, as well as other present or future projects that would occur during the CPHP's construction and operation. However, there is no apparent significant cumulative condition to which the CPHP could contribute. In addition, implementation of Mitigation Measure AIR-1b, *Best Management Practices for Controlling Particulate Emissions during Construction*, would help avoid wasteful or inefficient use of energy during construction by requiring that equipment be well maintained, and requiring that idling be minimized either by shutting equipment off when not in use or reducing the maximum idling time to 5 minutes. Vehicle use associated with operations of the CPHP would be reduced due to implementation of UCSF's TDM program, which would include reductions in transportation and associated energy usage at full buildout. Therefore, the project's incremental impact associated with its energy use would be less than significant.

Cumulative projects could require increased peak and base energy demands and, therefore, could cause or contribute to adverse cumulative conditions. However, the cumulative projects would be expected to have relatively small energy requirements compared to the CPHP, and would be subject to the same applicable federal, state, and local energy efficiency requirements (e.g., the State's Title 24 requirements) that would be required of the CPHP, which would result in efficient energy use during their construction and operation. Adverse CPHP-related impacts to electricity demand would be negligible, and would not significantly impact peak or base power demands during construction, operation, or maintenance. Accordingly, the CPHP's incremental contribution to cumulative peak and base demands would not be cumulatively considerable.

Conclusion

Based on the above analysis, the potential for the CPHP to result in a cumulatively considerable environmental impact due to wasteful, inefficient, or unnecessary consumption of fuel or energy would be less than significant.

Mitigation: None required.

4.5.4 References

California Air Pollution Control Officers Association (CAPCOA), 2010. Quantifying Greenhouse Gas Mitigation Measures. August. http://www.capcoa.org/wp-content/uploads/2010/11/CAPCOA-Quantification-Report-9-14-Final.pdf. Accessed June 6, 2019.

California Air Resources Board (CARB), 2017. Clean Car Standards—Pavley, Assembly Bill 1493, last reviewed January 11, 2017. http://www.arb.ca.gov/cc/ccms/ccms.htm. Accessed March 2019.

California Energy Commission (CEC), 2015. Draft Staff Report: 2015 Natural Gas Outlook. November 3, 2017. http://docketpublic.energy.ca.gov/PublicDocuments/15-IEPR-03/TN206501_20151103T100153_Draft_Staff_Report_2015_Natural_Gas_Outlook.pdf. Accessed June 3, 2019.

CEC, 2017, Transportation Energy Demand Forecast, 2018-2030. Publication Number: CEC-200-2017-010. December 4, 2017. Available at: https://efiling.energy.ca.gov/Lists/DocketLog.aspx?docketnumber=17-IEPR-05. Accessed March 25, 2019.

CEC, 2018a. Revised Transportation Energy Demand Forecast 2018-2030. 17-IEPR-05. https://efiling.energy.ca.gov/Lists/DocketLog.aspx?docketnumber=17-IEPR-05. Docketed April 19, 2018. Accessed November 1, 2019.

CEC, 2018b. 2018 Integrated Energy Policy Report Update. https://www.energy.ca.gov/data-reports/reports/integrated-energy-policy-report/2018-integrated-energy-policy-report-update. Accessed May 18, 2020.

CEC, 2018c. California Energy Demand 2018-2030 Revised Forecast. https://efiling.energy.ca.gov/URLRedirectPage.aspx?TN=TN222287_20180120T141708_The_California_Energy_Demand_20182030_Revised_Forecast.pdf. Docketed January 22, 2018. Accessed December 23, 2019.

CEC, 2019a. 2018 Total System Electric Generation in Gigwatt Hours. https://www.energy.ca.gov/almanac/electricity_data/total_system_power.html. Accessed November 1, 2019.

CEC, 2019b. Gas Consumption by County. http://www.ecdms.energy.ca.gov/gasbycounty.aspx. Accessed November 1, 2019.

CEC, 2019c. Supply and Demand of Natural Gas in California. https://ww2.energy.ca.gov/almanac/naturalgas_data/overview.html. Accessed November 1, 2019.

CEC, 2019d. Oil Supply Sources to California Refineries, Available at: https://ww2.energy.ca.gov/almanac/petroleum_data/statistics/crude_oil_receipts.html. Accessed November 19, 2019.

CEC, 2019e. 2018 California Annual Retail Fuel Outlet Report Results (CEC-A15), Energy Assessment Division, July 1, 2019. http://www.ecdms.energy.ca.gov/elecbycounty.aspx. Accessed December 2, 2019.

CEC, 2019f. California's Oil Refineries, https://ww2.energy.ca.gov/almanac/petroleum_data/refineries.html. Accessed December 2, 2019.

CEC, 2019g. Electricity Consumption by County. http://www.ecdms.energy.ca.gov/elecbycounty.aspx. Accessed December 3, 2019.

California Independent System Operator (Cal ISO), 2019. 2018-2019 Transmission Plan, March 29, 2019. http://www.caiso.com/Documents/ISO_BoardApproved-2018-2019_Transmission_Plan.pdf. Accessed December 24, 2019.

California Natural Resources Agency (CNRA), 2009. Final Statement of Reasons for Regulatory Action: Amendments to the State CEQA Guidelines Addressing Analysis and Mitigation of Greenhouse Gas Emissions Pursuant to SB97, pp. 71 and 72, December 2009. http://resources.ca.gov/ceqa/docs/Final_Statement_of_Reasons.pdf. Accessed May 31, 2019.

CNRA, 2018. Final Statement of Reasons for Regulatory Action, Amendments to the State CEQA Guidelines, pg 41. http://resources.ca.gov/ceqa/docs/2018_CEQA_Final_Statement_of%20Reasons_111218.pdf. November 2018. Accessed May 2019.

California Public Utilities Commission (CPUC), 2019. RPS Program Overview, 2018. http://www.cpuc.ca.gov/RPS_Overview. Accessed March 2019.

California State Board of Equalization (CBE), 2019. Net Taxable Gasoline Gallons, Including Aviation Gasoline. https://www.cdtfa.ca.gov/taxes-and-fees/MVF-10-Year-Report.pdf. Accessed March 25, 2019.

The EPIC Energy Blog (EPIC), 2018. Update on Electric Vehicle CPUC Decision and Other Related Legislation, Legislative Update. Posted on June 2018. https://epicenergyblog.com/2018/06/01/update-on-electric-vehicle-cpuc-decision-and-other-related-legislation/. Accessed on December 3, 2019.

U.S. Energy Information Administration (EIA), 2018. Motor Gasoline Consumption, Price, and Expenditure Estimates 2018. Accessed May 18, 2020.

EIA, 2019a. California State Profile and Energy Estimates, updated October 17, 2019. http://www.eia.gov/state/data.cfm?sid=CA#ConsumptionExpenditures. Accessed October 31, 2019.

EIA, 2019b. California Energy Consumption by End-Use Sector, 2018. Last Updated: January 16, 2020. https://www.eia.gov/state/?sid=CA#tabs-2. Accessed June 11, 2020.

EIA, 2019c. Transportation Sector Energy Consumption Estimates 2017. https://www.eia.gov/state/seds/sep_sum/html/pdf/sum_btu_tra.pdf. Accessed December 2, 2019.

EIA, 2019d. Gasoline Explained, Use of Gasoline, https://www.eia.gov/energyexplained/gasoline/use-of-gasoline.php. Accessed December 2, 2019.

EIA, 2019e. California State Profile and Energy Estimates, https://www.eia.gov/state/analysis.php?sid=CA. Accessed December 2, 2019.

Pacific Gas & Electric (PG&E), 2018a. 2018 Corporate Responsibility and Sustainability Report. www.pgecorp.com/sustainability. Accessed June, 2019.

PG&E, 2018b. PG&E Overview, http://www.pgecorp.com/corp_responsibility/reports/2018/bu01_pge_overview.html. Accessed December 2019.

PG&E, 2018c. 2017 Joint Annual Report to Shareholders, https://s1.q4cdn.com/880135780/files/doc_financials/2017/annual/2017-Annual-Report-Final.pdf. Accessed February 5, 2020.

PG&E, 2019a. 2018 Joint Annual Report to Shareholders, filed with the Securities and Exchange Commission on February 28, 2019.

PG&E, 2019b. Learn about the PG&E Natural Gas System, https://www.pge.com/en_US/safety/how-the-system-works/natural-gas-system-overview/natural-gas-system-overview.page. Accessed December 2019.

PG&E, 2020. PG&E's Electric System, https://www.pge.com/includes /docs/pdfs/shared/edusafety/systemworks/electric/pge_electric_system.pdf. Accessed February 5, 2020.

Reuters, 2020. Profile: Pacific Gas and Electric Co. (PCG_pa.A), https://in.reuters.com/finance/stocks/company-profile/PCG_pa.A. Accessed February 5, 2020.

United States Environmental Protection Agency (U.S. EPA), 2012. EPA and NHTSA Set Standards to Reduce Greenhouse Gases and Improve Fuel Economy for Model Years 2017 through 2025 Cars and Light Trucks. August 2012. https://nepis.epa.gov/Exe/ZyPDF.cgi/P100EZ7C.PDF?Dockey=P100EZ7C.PDF. Accessed March 2019.

University of California, San Francisco (UCSF), 2019. UCSF Parnassus Heights Utility Master Plan, October 1, 2019.

4.6 Geology and Soils

This section describes and evaluates the potential for the construction and operation of the Comprehensive Parnassus Heights Plan (CPHP or Plan), including the three Initial Phase projects and Initial Phase improvements, to result in significant impacts to geology and soils conditions and seismic hazards, including paleontological resources. The section contains a description of the existing regional and local conditions of the campus site and the surrounding areas as it pertains to geology and soils; includes a summary of the University, federal, State, and local regulations related to geology and soils and seismic hazards; identifies criteria used to determine impact significance, and provides an analysis of the potential impacts related to geology and soils associated with the implementation of the CPHP as well as identifies feasible mitigation measures that could mitigate any potentially significant impacts.

The section is based on a review of published maps and data from the United States Geological Survey, California Geological Survey, University of California Museum of Paleontology, and also site-specific geotechnical investigations of the landslide hazards on Mount Sutro.

4.6.1 Environmental Setting

Regional Setting

The campus site is located within the Coast Ranges geomorphic province which is characterized by marine sedimentary and volcanic rocks that form the Franciscan Assemblage occurring in northwest-trending ridges and valleys (CGS 2002).[1] The present physiography and geology of the Coast Ranges are the result of deformation and faulting associated with the tectonic boundary between the North American plate and the Pacific plate. Plate boundary movements are largely concentrated along the well-known fault zones, which in the area include the San Andreas, Hayward, and Calaveras as well as other lesser-order faults. These faults run in a general northwest/southeast alignment and have helped form the subparallel northwest trending mountain ranges (typically ranging in elevation from 2,000 to 4,000 feet above sea level and occasionally 6,000 feet) and valley. The Coast Ranges province is bounded on the west by the Pacific Ocean and the east by the Great Valley province where the bedrock units of the Coast Ranges dip below the thick alluvium sequences of that province.

The Coast Ranges are composed of thick sedimentary strata that are heavily deformed by tectonic forces. The northern and southern ranges are separated by a depression containing the San Francisco Bay. The northern Coast Ranges are dominated by irregular, knobby, landslide-topography of the Franciscan Assemblage also referred to as the Franciscan Complex. In several areas, Franciscan rocks are overlain by volcanic cones and flows of the Quien Sabe, Sonoma, and Clear Lake volcanic fields. The dominant feature of the province, the San Andreas fault zone, is more than 600 miles long, extending from Point Arena to the Gulf of California.

[1] The Franciscan Assemblage is a name applied to the various rock units that form the bulk of the Coast Range Mountains.

Campus Site Geology

The campus site is largely situated on the north-facing slope of Mount Sutro, in the west-central portion of San Francisco. Ridges and isolated hills, including Mount Sutro, are composed of exposed basement rocks of the Franciscan Complex (Rutherford & Chekene, 2019). The Franciscan Complex is a highly deformed sequence of little to highly metamorphosed rocks representing former oceanic crust, pelagic (deep-water) deposits, and turbidites (sediment or rock deposited by turbidity currents). Mount Sutro and the surrounding region are underlain by a depositional environment that includes pillow basalt, radiolarian chert, and sandstone and shale (Blake and others, 2000, as cited in Rutherford & Chekene, 2019). The predominant bedrock units underlying Mount Sutro is radiolarian chert, but meta-sandstone, shale and greenstone (meta-volcanic rock) are also present, particularly along the lower slopes of the mountain. Chert exposed in road cuts typically is moderately weathered and strongly fractured. Much of the rock is friable, with strong rock present where less fracturing has occurred. The bedrock in this area is typically overlain by a thin mantle of weathered slope debris, which generally consists of a very well graded mixture of angular rock fragments in a matrix of sand, silt, and clay.

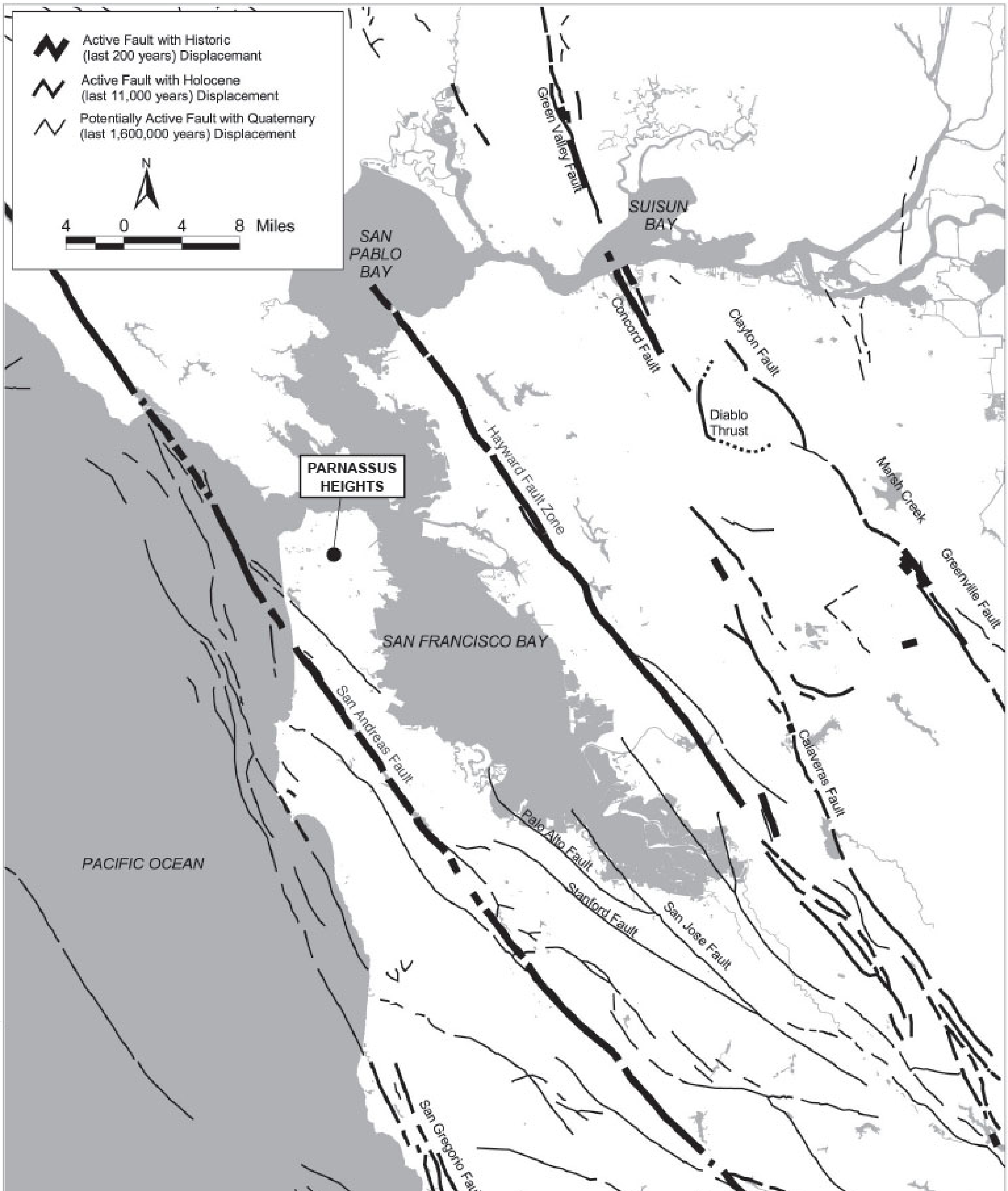
Fault Rupture

Background

The campus site lies within a region of California that contains many active and potentially active faults, as shown in **Figure 4.6-1**. Fault rupture is defined as the displacement that occurs along the surface of a fault during an earthquake. Based on criteria established by the California Geological Survey (CGS), faults are classified as either active, potentially active, or inactive.[2] Faults are considered active when they have shown evidence of movement within the past 11,000 years (i.e., Holocene epoch). Potentially active faults are those that have shown evidence of movement between 11,000 and 1.6 million years ago (Quaternary age). Faults showing no evidence of surface displacement within the last 1.6 million years are considered inactive.

The Alquist-Priolo Earthquake Fault Zoning Act (formerly known as the Alquist-Priolo Special Studies Zones Act) established state policy to identify active faults and determine a boundary zone on either side of a known fault trace, called the Alquist-Priolo Earthquake Fault Zone. The delineated width of an Alquist-Priolo Earthquake Fault Zone is based on the location precision, complexity, or regional significance of the fault and can be between 200 and 500 feet in width on either side of the fault trace. If a project site lies within a designated Alquist-Priolo Earthquake Fault Zone, a geologic fault rupture investigation must be performed to demonstrate that a proposed building site is not threatened by surface displacement from the fault, before development permits may be issued.

2 The CGS was formerly called the California Division of Mines and Geology (CDMG).



SFO/D190291.00 - UCSF CPHP EIR/2. Graphics/Illustrator

SOURCE: Jennings, 2010

UCSF Comprehensive Parnassus Heights Plan EIR

Figure 4.6-1
Active and Potentially Active Bay Area Earthquake Faults

ESA

Campus Site

Based on the available geologic data, no active or potentially active faults with the potential to cause surface fault rupture are known to be located beneath or in the vicinity of the Parnassus Heights campus site. The closest and most notable active fault to the campus site with surface rupture potential is the San Andreas Fault Zone, located approximately 4 miles to the west. The campus site is not located within or near a designated Alquist-Priolo Earthquake Fault Zone.

Ground Shaking

As indicated in Figure 4.6-1, and described in **Table 4.6-1**, the campus site is located within 50 miles of many active or potentially active faults that are capable of producing very strong ground shaking. The San Andreas Fault Zone is located offshore in its closest location to the campus site but is still considered to have a high potential for being the source of a substantive earthquake event. The famous magnitude 1906 (M 8.25) earthquake on this fault caused major damage in San Francisco and surrounding areas. Other significant historic earthquakes that have occurred relatively near the campus site include the 1989 Loma Prieta Earthquake (M7.1) on a remote segment of the San Andreas Fault Zone; the 1836 and 1868 (M 4.5) on the Hayward fault; and the 2000 West Napa Earthquake (M5.2) on the West Napa Fault Zone.

TABLE 4.6-1
ACTIVE FAULTS IN THE VICINITY OF SAN FRANCISCO

Fault	Distance and Direction from Campus Site[a]	Recency of Movement	Fault Classification[b]	Historical Seismicity, Richter Magnitude[c]	Maximum Moment[d] Magnitude Earthquake
San Andreas	4 miles west	Historic (1906; 1989 ruptures) Holocene	Active	M 7.1, 1989 M 8.25, 1906 M 7.0, 1838 Many <M 6	7.9
Hayward	10 miles east	Historic (1836; 1868 ruptures) Holocene	Active	M 6.8, 1868 Many <M 4.5	7.1
San Gregorio–Seal Cove	6 miles southwest	Holocene – Late Quaternary	Active	Many M 3–M 6.4	7.3
Rodgers Creek	25 miles northeast	Historic Holocene	Active	M 6.7, 1898 M 5.6, M 5.7, 1969	7.0
Calaveras	25 miles east	Historic (1861 rupture) Holocene	Active	M 5.6–M 6.4, 1861 M 4–M 4.5 swarms 1970, 1990	6.8
Concord–Green Valley	25 miles east	Historic (1955) Holocene	Active	Historic active creep	6.9
West Napa	32 miles northeast	Historic (2014)	Active	M 6.0 2014 M 5.0 2000	6.5

NOTES:
[a] Fault distance is referenced from the fault's closest point to the county of San Francisco (excluding Treasure Island). Actual fault distance from specific project locations may therefore vary from those listed.
[b] Faults are considered active when they have shown evidence of movement within the past 11,000 years (i.e., Holocene epoch). Potentially active faults are those that have shown evidence of movement between 11,000 and 1.6 million years ago (Quaternary age). Faults showing no evidence of surface displacement within the last 1.6 million years are considered inactive.
[c] Richter magnitude (M) and year for recent and/or large events. The Richter magnitude scale reflects the maximum amplitude of a particular type of seismic wave.
[d] Moment magnitude provides a physically meaningful measure of the size of an earthquake [California Geological Survey (CGS) 2002]. The maximum moment magnitude earthquake, derived from the joint CGS/USGS Probabilistic Seismic Hazard Assessment for the State of California, 1996. CGS OFR 96-08 and USGS OFR 96-706).

SOURCES: Hart (2007); Jennings (2010); and Peterson et al. (1996)

The effects of seismic shaking are dependent on the distance from the epicenter, the causative fault, and the underlying geotechnical characteristics of the onsite geology. The U.S. Geological Survey (USGS) Working Group on California Earthquake Probabilities (also known as UCERF3) evaluated the likelihood of one or more earthquakes of moment magnitude 6.7 or higher occurring in the San Francisco Bay Area.[3] The result of the most recent evaluation indicated a 72 percent likelihood that such an earthquake event will occur in the Bay Area sometime in the next 30 years, beginning 2014 (USGS 2015). Within this 72 percent probability, the Hayward-Rodgers Creek and Calaveras fault systems are the two most likely fault systems to cause the event (USGS WG02, 2015).

The secondary effects of seismic shaking potentially include subsidence, liquefaction, settlement, landslides, and lateral spreading, described below.

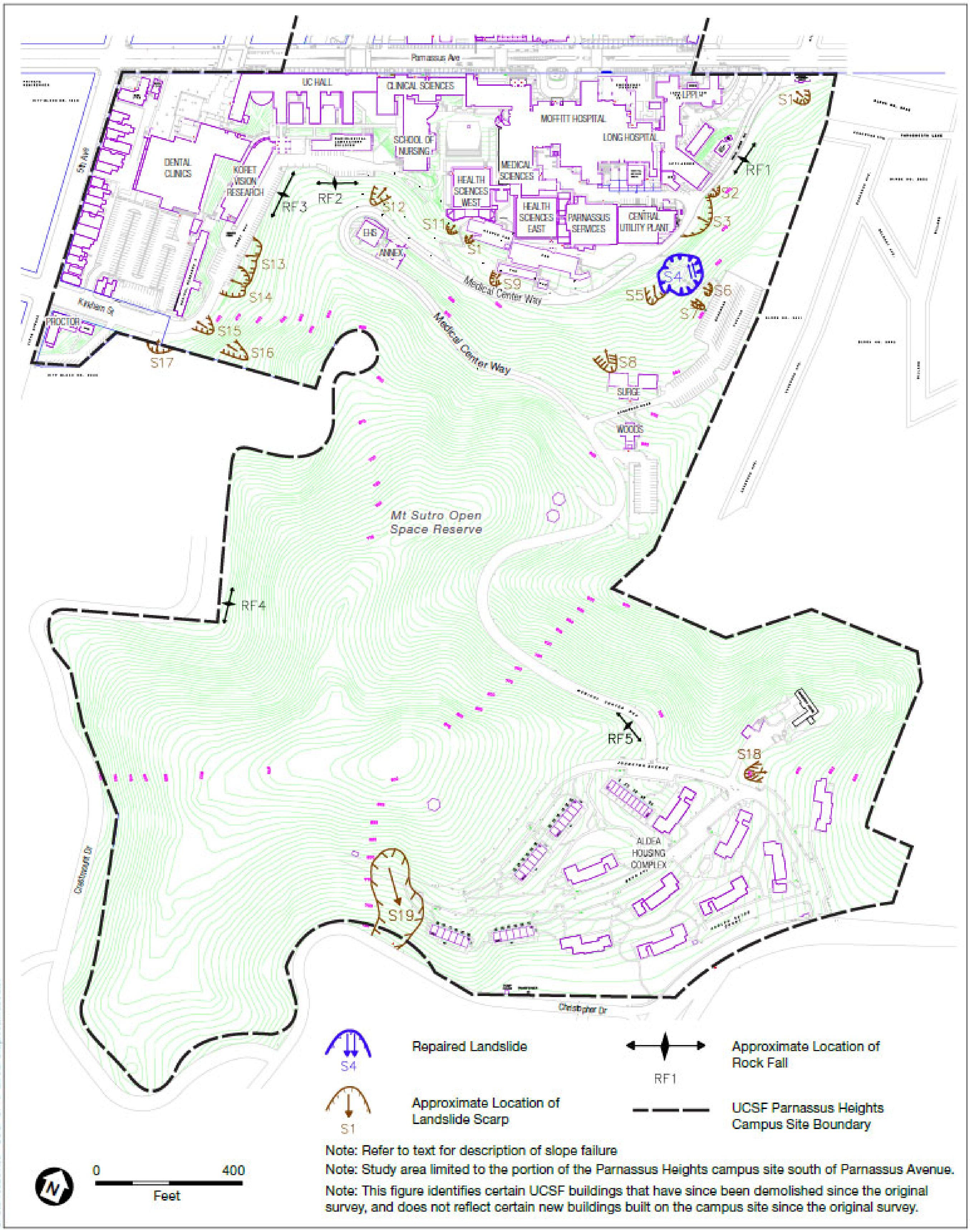
Landslides and Slope Stability

Slope failures, commonly referred to as landslides, include many phenomena that involve the downslope displacement and movement of material, either triggered by static (i.e., gravity) or dynamic (i.e., earthquake) forces. A slope failure is a mass of rock, soil, and debris displaced downslope by sliding, flowing, or falling. Exposed rock slopes undergo rockfalls, rockslides, or rock avalanches, while soil slopes experience shallow soil slides, rapid debris flows, and deep-seated rotational slides. Landslides 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 transverse ridges.

There have been numerous studies on landslides and slope stability for the campus site. In 1999, Rutherford & Chekene performed a campus-wide slope stability evaluation based on a review of topographical maps, boundary surveys, aerial photographs, geologic reports and maps, and field reconnaissance of the campus. Mapped locations of previous slope failures, including those identified since the 1999 evaluation, are depicted in **Figure 4.6-2**.

A city-wide 2000 study by Wilson *et al* determined that several landslides were present on Mount Sutro. Since this analysis was not based on the collection of site specific data, the study produced a table of susceptible geologic units, rather than a hazard map (Rutherford & Chekene, 2019). In 2006, Rutherford & Chekene performed a substantive slope stability risk assessment for the Parnassus Heights campus site (Rutherford & Chekene, 2006) that utilized historical borehole logs and unpublished reports on file at Rutherford & Chekene, most notably a series of short reports by Marliave (1948a, b, c; 1951) and Woodward Lundgren & Associates (1974a, 1974b, and 1974c), as cited therein. The historical unpublished reports indicated that slope failures coincided with the construction of certain roads and new buildings on the campus site in the late 1800s. Notably, however, there were no reports of slope failure following the 1906 earthquake. The first historical reference to a slope failure on Mount Sutro was in a 1948 report by Marliave,

3 Moment magnitude is related to the physical size of a fault rupture and movement across a fault. The Richter magnitude scale reflects the maximum amplitude of a particular type of seismic wave. Moment magnitude provides a physically meaningful measure of the size of a faulting event [California Geological Survey (CGS) 2002].



Note: Refer to text for description of slope failure

Note: Study area limited to the portion of the Parnassus Heights campus site south of Parnassus Avenue.

Note: This figure identifies certain UCSF buildings that have since been demolished since the original survey, and does not reflect certain new buildings built on the campus site since the original survey.

SOURCE: Rutherford + Chekene, 2019

Figure 4.6-2
Approximate Location of Previous Slope Failure at Parnassus Heights Campus Site

ESA

which alluded to a failure along the then cut slope to the southeast of the Langley Porter Clinic (now known as the Langley Porter Psychiatric Institute, or LPPI) (Rutherford & Chekene, 2019).

A 2006 risk assessment prepared by Rutherford & Chekene included a probabilistic slope analysis using dry and wet seismic conditions. Topographic data was collected using LiDAR to develop a digital elevation model, which then served as a basis to prepare slope hazard maps.[4] The 2006 risk assessment determined that there was a high probability for the occurrence of seismic-induced landslides under the rare combination of high pore pressure distribution in the affected earth materials occurring at the same time as an earthquake (Rutherford & Chekene, 2006).

A slope stability risk assessment prepared by Rutherford & Chekene in 2019 reviewed the 2006 study and compared the data used in 2006 with updated LiDAR data[5] from 2018, previous slope hazard mapping, past slope improvement projects, and field reconnaissance conducted in 2018. From this data comparison, Rutherford & Chekene qualitatively assessed the slope hazards in terms of size and frequency of potential movement events, and also evaluated the relative risk of potential adverse effects to roads and facilities from slope movement. The findings of the 2019 investigation determined that, in general, slope failures in the form of rockfall types are expected to occur in the study area much more frequently than larger, and potentially more damaging, hillside landslides. The 2019 risk assessment concluded there was no evidence of large-scale slope movements during the 2006-2018 period; that there was evidence of small movements in some cut slopes, especially steep vegetated slopes; and that water and trees were the primary agents of observed small movements (Rutherford & Chekene, 2019).

Subsidence

Subsidence is characterized as a sinking of ground surface relative to surrounding areas and can occur when underlying soils fail to support new loadings, such as structures or placement of additional fill materials. Subsidence in areas of thick alluvial deposits can also be associated with regional fluid (groundwater and/or petroleum) withdrawal, peat oxidation, or hydrocompaction. Subsidence can result in the development of ground cracks and damage to subsurface vaults, pipelines, and other improvements.

Subsidence can occur from immediate settlement, consolidation, shrinkage of expansive soil (see discussion below), and/or liquefaction (discussed below). Immediate settlement occurs when a load from a structure or placement of new fill material is applied, causing distortion in the underlying materials. This settlement occurs quickly and is typically complete after placement of the final load. Consolidation settlement occurs in saturated clay from the volume change caused by squeezing out water from the pore spaces. Consolidation occurs over a period of time and is

---

4 LiDAR stands for *Light Detection and Ranging,* a remote sensing method using light in the form of a pulsed laser to measure surface topography. These light pulses, combined with other data recorded by the airborne system, generate precise, three-dimensional information about the shape of the ground surface and its characteristics. The LiDAR data used by Rutherford & Chekene 2006 was collected and compiled by Haneberg Geoscience, GeoInsite, and Rutherford & Chekene in 2005.

5 The updated LiDAR data was obtained on September 9, 2018 by Quantum Spatial and included as an appendix in the Rutherford & Chekene 2019 report.

followed by secondary compression, which is a continued change in void ratio under the continued application of the load. Soils tend to settle at different rates and by varying amounts depending on the load weight or changes in properties over an area, which is referred to as differential settlement. Commonplace in redevelopment of older structures, the presence of undocumented fill materials makes them suspect to adequately support new improvements unless site preparations, such as removal of artificial fill and recompaction or replacement with engineered fill is conducted.

Liquefaction

Liquefaction is a form of earthquake-induced ground failure that occurs when relatively shallow, loose, granular, water-saturated soils behave similarly to a liquid when subject to high-intensity ground shaking. Liquefaction occurs when three general conditions exist: (1) shallow (50 feet bgs or less) groundwater; (2) low-density non-cohesive (granular) soils; and (3) high-intensity ground motion. Liquefaction is typified by a buildup of pore-water pressure in the affected soil layer to a point where a total loss of inherent shear strength occurs, thus causing the soil to behave as a liquid. Saturated, loose to medium-dense, near-surface non-cohesive soils and cohesive soils exhibit the highest liquefaction potential. Liquefaction usually results in horizontal and vertical movement of soils from lateral spreading (i.e., lateral displacement of gently sloping ground) of liquefied materials and post-earthquake settlement of liquefied materials. The effects of liquefaction on level ground include potential seismic settlement, sand boils, ground oscillation, and bearing capacity failures below structures.

Hazard maps compiled by ABAG based on CGS data depict liquefaction hazards for areas throughout the Bay Area, in categories ranging from very low to very high liquefaction susceptibility. According to these maps, the majority of the developed core of Parnassus Heights campus site is located in an area considered to have a moderate potential for liquefaction, while the rest of the campus site is an area designated with a low potential for liquefaction (ABAG, 2019). The campus site is not located within any Seismic Hazard Zones for potential liquefaction (ABAG, 2019).

Seismically Induced Settlement

Settlement of the ground surface can be accelerated and accentuated by earthquakes. During an earthquake, settlement can occur as a result of the relatively rapid compaction and settling of subsurface materials (particularly loose, uncompacted, and variable sandy sediments above the water table) due to the rearrangement of soil particles during prolonged ground shaking. Settlement can occur both uniformly and differentially (i.e., where adjoining areas settle at different amounts). Areas underlain by artificial fill can be particularly susceptible to this type of settlement if not addressed adequately in geotechnical site preparations (e.g., recompaction of site soils or replacement with engineered fill).

Expansive Soils

Expansive soils are soils that possess what is described as “shrink-swell” behavior because they include clay minerals characterized by their ability to undergo significant volume change (shrink or swell) due to variation in moisture content. Typically, soils that exhibit expansive characteristics comprise the upper five feet of the surface. Sandy soils are generally not expansive, while clayey soils have a higher potential to be expansive. Changes in soil moisture content can result from rainfall, irrigation, pipeline leakage, perched groundwater, drought, or other factors. Volumetric change of expansive soils may cause excessive cracking and heaving of structures with shallow foundations, concrete slabs-on-grade, or pavements supported on these materials over long periods of cyclical changes in volume. Structural damage is usually the result of inadequate soil and foundation engineering or the placement of structures directly on expansive soils.

Soil Erosion

Erosion is the wearing-away of soil and rock by processes such as mechanical or chemical weathering, mass wasting, and the action of waves, wind, and underground water. Excessive soil erosion can eventually lead to damage of building foundations and roadways. In general, areas that are most susceptible to erosion are those that would be exposed during the construction phase when earthwork activities disturb soils and require stockpiling. Typically, the soil erosion potential is reduced once the soil is graded and covered with concrete, structures, asphalt, or landscaping. However, changes in drainage patterns can also cause areas to be susceptible to the effects of erosion.

Paleontological Setting

As indicated above, the campus site is mostly composed of radiolarian chert of the Franciscan Complex with exposures of meta-sandstone, shale, greenstone also present (Rutherford & Chekene, 2019). Geologic mapping by Blake et al. (2000) confirms the presence of these rocks types and indicates the presence of some Quaternary-age Dune Sand and Undifferentiated surficial deposits (Blake et al., 2000a), which overlie the Franciscan chert. The Franciscan Complex is mainly composed of Mesozoic-age, low to- high grade metamorphosed rocks; and while a majority of the Franciscan Complex is highly deformed from past faulting and metamorphism, it also contains unmetamorphosed sedimentary rocks. The sedimentary rocks of the Franciscan Complex have produced several marine invertebrate fossils (UCMP, 2019); however, marine invertebrate fossils are generally common and well-documented and would generally not be considered a unique paleontological resource. There have been two previously recorded vertebrate fossil localities from the Franciscan Complex; one in Franciscan chert from San Joaquin County and one in Franciscan limestone from San Luis Obispo County (UCMP, 2019). Due to the nature of a majority of the Franciscan Complex (i.e., being too highly metamorphosed to have preserved fossil remains) and the general lack of vertebrate fossil localities, this formation is considered to have low paleontological sensitivity. Based on the University of California Museum of Paleontology (UCMP) Locality Search online database search, no known paleontological resources were identified within the campus site.

4.6.2 Regulatory Setting

State

Alquist-Priolo Fault Zoning Act

The Alquist-Priolo Earthquake Fault Zoning Act (Public Resources Code Section 2621) was enacted by the State of California in 1972 to address the hazard of surface faulting to structures for human occupancy. The primary purpose of the Alquist-Priolo Earthquake Fault Zoning Act is to prevent the construction of buildings intended for human occupancy on the surface traces of active faults. The Alquist-Priolo Earthquake Fault Zoning Act is also intended to provide the citizens with increased safety and to minimize the loss of life during and immediately following earthquakes by facilitating seismic retrofitting to strengthen buildings against ground shaking.

The Alquist-Priolo Earthquake Fault Zoning Act requires the State Geologist to establish regulatory "earthquake fault zones" around the surface traces of active faults and to issue appropriate maps to assist cities and counties in planning, zoning, and building regulation functions. The Alquist-Priolo Earthquake Fault Zoning Act and its regulations are presented in CGS Special Publication (SP) 42, Fault-Rupture Hazard Zones in California (Hart 2007). As discussed previously, the campus site is not located within an Alquist-Priolo Fault Rupture Hazard Zone and, therefore, would be not be subject to the requirements of the Alquist-Priolo Earthquake Fault Zoning Act.

Seismic Hazards Mapping Act

In order to address the effects of strong ground shaking, liquefaction, landslides, and other ground failures due to seismic events, the State of California passed the Seismic Hazards Mapping Act of 1990 (Public Resources Code Section 2690-2699). Under the Seismic Hazards Mapping Act, the State Geologist is required to delineate "seismic hazard zones." There are areas of the Mount Sutro Open Space Reserve (Reserve) within the campus site that are mapped as being susceptible to seismically-induced landslide hazards. Improvements located within a seismically-induced landslide hazard area are required to adhere to CGS Special Publication (SP) 117A, Guidelines for Evaluating and Mitigating Seismic Hazards in California.

California Building Code

The 2019 California Building Code (CBC), Title 24 of the California Code of Regulations, is a compilation of building standards, including seismic safety standards, for new buildings. CBC standards are based on building standards that have been adopted by State agencies without change from a national model code; building standards based on a national model code that have been changed to address particular California conditions; and building standards authorized by the California legislature but not covered by the national model code. The CBC applies to all occupancies in California, except where stricter standards have been adopted by local agencies. The CBC is published on a triennial basis, and supplements and errata can be issued throughout the cycle. The 2019 CBC became effective on January 1, 2020.

Office of Statewide Health Planning and Development

UCSF's hospitals fall under the jurisdiction of the *Alfred E. Alquist Hospital Facilities Seismic Safety Act (Alquist Seismic Safety Act*) and Senate Bill 1953 (SB 1953), an amendment of the *Alquist Seismic Safety Act*, passed in 1994. The *Alquist Seismic Safety Act* and subsequent bill require all hospital facilities to comply with seismic safety building standards as defined by the Office of Statewide Health Planning and Development (OSHPD).

OSHPD is responsible for carrying out the provisions of SB 1953. A department of the California Health and Human Services Agency, OSHPD's primary goals include assessing California's healthcare infrastructure, managing the healthcare workforce, providing healthcare outcomes information to the public, insuring healthcare facilities development loans, and operating the Hospital Seismic Safety Program, which enforces building seismic safety. OSHPD's Hospital Building Safety Board further advises the director of the OSHPD on the administration of SB 1953 and acts as a board of appeals for hospital seismic safety issues.

SB 1953 was adopted in part so that, after a major earthquake or disaster, hospital facilities can continue to provide care to their current occupants as well as any new patients that might arrive after the event.

All of UCSF's hospital buildings must meet certain OSHPD standards. If a building is to remain classified as an acute-care hospital facility[6] and thus, be compliant with SB 1953, the owner of the building must complete seismic evaluations in accordance with the Seismic Evaluation Procedures as specified in SB 1953; prepare a comprehensive plan and schedule for how each building will become compliant with SB 1953, within three years of the evaluation; and submit the report and a compliance plan to OSHPD for review and approval (California State Senate, 1994).

In the process of compliance, OSHPD and a hospital building owner evaluate both nonstructural components (communications, medical gas, etc.) and structural components (actual building structure) of acute-care hospital facilities that might sustain damage during a seismic event. Each acute-care facility is assigned a Structural Performance Category (SPC) rating and a Nonstructural Performance Category (NPC) rating. After the evaluation process, OSHPD either confirms or changes the rating. The hospital then receives guidance from OSHPD on how upgrades can continue (OSHPD, 2019a). **Table 4.6-2** presents OSHPD SPC and NPC ratings and descriptions for acute-care hospital facilities.

In general, low scores mean hospital building systems are not prepared for a disaster, and high scores mean hospital building systems are prepared. If the building is not in compliance with SB 1953 based on the scores, seismic retrofit regulations (Division III-R) are applied to the building to help in its retrofit. Replacing older hospitals with modern hospitals is intended to increase the score of UCSF's medical facilities. A number of laws have amended SB 1953 since passing, including AB 2190, SB90, SB 306, and SB 499, which have mainly adjusted timelines for facilities to complete the requirements.

6 An acute-care hospital provides emergency services and general medical and surgical treatment for acute disorders rather than long-term residential care for chronic illness.

TABLE 4.6-2
OSHPD STRUCTURAL PERFORMANCE CATEGORIES AND NONSTRUCTURAL PERFORMANCE CATEGORIES FOR ACUTE-CARE HOSPITAL FACILITIES

Performance Categories	OSHPD Performance Categories Description
Structural Performance Category (SPC)	
SPC-0	No rating was reported to OSHPD.
SPC-1	These buildings have a high risk of collapse in an earthquake, and are a significant safety hazard to the public. These buildings had to be retrofitted, replaced, or removed from acute care classification by 2020.
SPC-2	These buildings are in compliance with pre-1973 California Building Code, but are not in compliance with the Alquist Hospital Facilities Seismic Safety Act. These buildings do not pose a significant safety hazard, but might not be functional after a strong earthquake. These buildings must be compliant with the Alquist Act by January 1, 2030 or removed from acute care classification.
SPC-3	These buildings are compliant with the Alquist Hospital Facilities Seismic Safety Act. These buildings might sustain structural damage and might not be able to provide care after an event, but they have been constructed or reconstructed under OSHPD building permits. They can be used to January 1, 2030 and beyond.
SPC-4	These buildings are compliant with the Alquist Hospital Facilities Seismic Safety Act. These buildings may sustain structural damage and might not be able to provide care after an event, but they have been constructed or reconstructed under OSHPD building permits. They can be used to January 1, 2030 and beyond.
SPC-5	These buildings are compliant with the Alquist Hospital Facilities Seismic Safety Act. These buildings are reasonably capable of providing care after an event, and they have been constructed or reconstructed under OSHPD building permits. They can be used to January 1, 2030 and beyond.
Nonstructural Performance Category (NPC)	
NPC-0	No rating was reported to OSHPD.
NPC-1	Basic systems used in life safety and care are not properly anchored, and will not survive an earthquake event. Communications, emergency power, medical gas, and fire alarm systems must be anchored by January 1, 2002.
NPC-2	Communications systems, emergency power supplies, bulk medical gas systems, fire alarm systems, and emergency lighting and exit signs are properly anchored.
NPC-3	Basic systems used in life safety and care are properly anchored in critical areas of the hospital. If there is not significant structural damage, basic emergency medical care should be able to continue.
NPC-4	All architectural, mechanical, electrical systems, components and equipment, and hospital equipment are properly anchored. If there is not significant structural damage and problems with water and sewer systems, basic emergency medical care should be able to continue.
NPC-5	All basic systems used in life safety and care are properly anchored. In addition, the building has water and wastewater holding tanks (integrated into the plumbing system) and an on-site fuel supply that will last through 72 hours of acute care operations. Radiological service can also continue.

SOURCE: OSHPD, 2019a

For the Parnassus Heights campus site, all applicable buildings have an SPC-3 or higher rating with the exception of Moffitt Hospital, which has an SPC-2 rating, while all the buildings have an NPC-3 rating.

Public Resources Code Section 5097.5 and Section 30244

State requirements for paleontological resource management are included in PRC Section 5097.5 and Section 30244. Section 5097.5 prohibits the removal of any paleontological site or feature from public lands without permission of the jurisdictional agency. It requires reasonable mitigation of adverse impacts to paleontological resources from developments on public (State, county, city, district) lands. Section 30244 requires that, where development would adversely impact archaeological or paleontological resources as identified by the State Historic Preservation Officer, reasonable mitigation measures shall be required.

University of California

University of California Policy on Seismic Safety

The University of California's *Seismic Safety Policy* originally developed in 1975 and last updated January 9, 2017[7] requires that all buildings and facilities where University operations and activities occur be acquired, built, maintained, and rehabilitated to an acceptable level of earthquake safety. The purpose of this policy is to use current earthquake engineering practices and University resources to provide an acceptable level of earthquake safety for students, employees, and the public who occupy University buildings and other facilities, at all locations of University operations and activities to the maximum extent feasible. This policy addresses a number of topics, including but not limited to: surveying of existing buildings and facilities; interim use plans; a program for abatement of seismic hazards in buildings and other facilities; seismic rehabilitation standards; post-earthquake response; standards for new construction and renovation, and seismic peer review.

UCSF 2014 LRDP

The UCSF 2014 LRDP identified campus-wide objectives and objectives specific to the Parnassus Heights campus site. The following UCSF 2014 LRDP campus-wide objectives relate to geology and soils:

Campus-Wide Objectives

3. **Ensure UCSF's Facilities are Seismically Safe**
   - A. Ensure inpatient facilities meet state seismic requirements, as set forth in the *Alquist Seismic Safety Act* (SB 1953), by constructing and maintaining modern, seismically safe hospitals and facilities that will remain operational in the event of a major earthquake.
   - B. Plan new facilities and implement improvements to comply with UC's Seismic Safety Policy, to ensure a seismically safe environment for UCSF patients, visitors, physicians and staff.
   - C. Designate buildings for renovation, demolition, and replacement as warranted.

7 This policy is periodically updated and the most recent version can be found at https://policy.ucop.edu/doc/3100156/.

4.6.3 Impacts and Mitigation Measures

Significance Criteria

Would implementation of the CPHP, including the three Initial Phase projects and Initial Phase improvements:

a) Directly or indirectly cause 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 Division of Mines and Geology Special Publication 42;

    ii. Strong seismic ground shaking;

    iii. Seismic-related ground failure, including liquefaction; or

    iv. Landslides.

b) Result in substantial soil erosion or the loss of topsoil;

c) Be located on a geologic unit or soil that is unstable, or that would become unstable as a result of the project, and potentially result in on- or off-site landslide, lateral spreading, subsidence, liquefaction or collapse;

d) Be located on expansive soil, as defined in Table 18-1-B of the Uniform Building Code (1994), creating substantial direct or indirect risks to life or property;

e) Have soils incapable of adequately supporting the use of septic tanks or alternative waste water disposal systems where sewers are not available for the disposal of waste water; or

f) Directly or indirectly destroy a unique paleontological resource or site or unique geological feature.

g) Exceed the LRDP EIR standard of significance by exposing people to structural hazards in an existing building rated Level V (Poor), or Level VI (Very Poor), under the University's seismic performance rating system, or substantial nonstructural hazards.

Criteria Not Analyzed

As stated in the Initial Study, there would no impact related to the following topics for the reasons described below:

- ***Fault rupture.*** The campus site is not located within or immediately adjacent to any known active fault, and therefore, the potential for fault rupture to adversely affect the site is very low.
- ***Expansive soils.*** Expansive soils are commonly addressed in required geotechnical evaluations of onsite geotechnical hazards, and past geotechnical investigations at the campus site has not revealed the presence of expansive soils. Furthermore, the University requires all new facilities to adhere to the current CBC, which includes detailed provisions to ensure that the design of new facilities is appropriate to site soil conditions, including requirements to address expansive and otherwise problematic soils. With adherence to the CBC, impacts related to site soil

conditions – including but not limited to expansive soils, if any are present – would be less than significant.

- ***Septic systems.*** The proposed CPHP does not include any activities that would require the utilization of septic systems or alternative wastewater disposal systems. No impact would occur.
- ***LDRP EIR standard of significance.*** None of the structures planned for renovation under the proposed CPHP are rated Level V (Poor), or Level VI (Very Poor) under the University's seismic performance rating system for structural hazards. No impact would occur.

Approach to Analysis

Geology and Soils

The potential for significant impacts related to geology and soils from the construction and operation of the campus facilities developed under the proposed CPHP was determined based on a thorough review of the existing conditions informed by data compiled by USGS, CGS, ABAG and site specific slope stability studies prepared by Rutherford & Chekene (2006 and 2019) for the campus site.

In 2015, the California Supreme Court held that CEQA generally does not require a lead agency to consider the impacts of the existing environment on the future residents or users of a project [*California Building Industry Association v. Bay Area Air Quality Management District* (2015) 62 Cal. 4th 369.]. However, if a project exacerbates a condition in the existing environment, the lead agency is required to analyze the impact of that exacerbated condition on the environment, which may include future occupants of the project. As stated in *Ballona Wetlands Land Trust v. City of Los Angeles* [(2011) 201 Cal.App.4th 455, 473]: "[T]he purpose of an EIR is to identify the significant effects of a project on the environment, not the significant effects of the environment on the project." While the potential for increased exposure of people or structures to risks associated with seismic occurrences and location of people or structures on unstable geologic units as a result of the location of CPHP activities are discussed in this section for informational purposes, the effects of the preexisting hazards on users of the proposed development under the CPHP are not environmental impacts under CEQA.

Paleontological Resources

The Society of Vertebrate Paleontology (SVP) has established standard guidelines that outline professional protocols and practices for conducting paleontological resource assessments and surveys, monitoring and mitigation, data and fossil recovery, sampling procedures, and specimen preparation, identification, analysis, and curation. Most practicing professional vertebrate paleontologists adhere closely to the SVP's assessment, mitigation, and monitoring requirements as specifically provided in its standard guidelines. Most state regulatory agencies with paleontological resource-specific Laws, Ordinances, Regulations, and Standards (LORS) accept and use the professional standards set forth by the SVP.

Significant paleontological resources are determined to be fossils or assemblages of fossils that are unique, unusual, rare, uncommon, or diagnostically important. Significant fossils can include remains of large to very small aquatic and terrestrial vertebrates or remains of plants and animals previously not represented in certain portions of the stratigraphy. Assemblages of fossils that might aid stratigraphic correlation, particularly those offering data for the interpretation of tectonic events, geomorphologic evolution, and paleoclimatology are also critically important.[8,9]

Based on the significance definitions of the SVP,[10] all identifiable vertebrate fossils are considered to have significant scientific value because vertebrate fossils are relatively uncommon, and only rarely will a fossil locality yield a statistically significant number of specimens of the same genus. Furthermore, all geologic units in which vertebrate fossils have previously been found are considered to have high sensitivity. Identifiable plant and invertebrate fossils are considered significant if found in association with vertebrate fossils or if defined as significant by project paleontologists, specialists, or local government agencies.

In its "Standard Guidelines for the Assessment and Mitigation of Adverse Impacts to Non-renewable Paleontologic Resources," the SVP[11] defines four categories of paleontological sensitivity (potential) for rock units: high, low, undetermined, and no potential**.** For geologic units with high potential, full-time monitoring is generally recommended during any Project-related ground disturbance. For geologic units with low potential, protection or salvage efforts will not generally be required. For geologic units with undetermined potential, field surveys by a qualified vertebrate paleontologist should be conducted to specifically determine the paleontologic potential of the rock units present within the study area.

Approach to Analysis of Initial Phase Projects, including New Hospital, and Initial Phase Improvements

This EIR includes project-level analysis for certain Initial Phase projects anticipated to be completed by about the year 2030; specifically, the Irving Street Arrival, Research and Academic Building (RAB), and initial Aldea Housing Densification; and Initial Phase improvements, as described below. The New Hospital is also an Initial Phase project anticipated to be completed by about the year 2030, but is analyzed at a program level in this EIR within the context of the overall CPHP, and will be analyzed at a project level in a subsequent EIR when more details are available.

---

8 Scott, E. and K. Springer, 2003. CEQA and Fossil Preservation in California. The Environmental Monitor.

9 Scott, E., K. Springer, and J. C. Sagebiel, 2004. Vertebrate paleontology in the Mojave Desert: the continuing importance of "follow-through" in preserving paleontologic resources. In The human journey and ancient life in California's deserts: Proceedings from the 2001 Millennium Conference. Ridgecrest: Maturango Museum Publication 15: 65-70.

10 Society of Vertebrate Paleontology, 1995. Assessment and mitigation of adverse impacts to nonrenewable paleontologic resources: standard guidelines. Society of Vertebrate Paleontology News Bulletin 163:22-27.

11 Society of Vertebrate Paleontology. 2010. Standard procedures for the assessment and mitigation of adverse impacts to paleontological resources. Available: http://vertpaleo.org/Membership/Member-Ethics/SVP_Impact_ Mitigation_Guidelines.aspx Accessed January 3, 2017.

Impact Analysis

Impact GEO-1: New development under the CPHP would not directly or indirectly cause substantial adverse effects, including the risk of loss, injury, or death involving strong seismic ground shaking. (Less than Significant)

CPHP

As discussed above in Section 4.6.1, *Environmental Setting*, the Bay Area region is considered seismically active and will likely experience a substantive regional earthquake within the operational life of the CPHP. And while implementation of the CPHP would not cause or exacerbate seismic ground shaking hazards, there is a potential for strong to very strong intensity ground shaking to occur within the campus site over the course of the CPHP that would be associated with such an earthquake. The intensity of such an event would depend on the causative fault and the distance to the epicenter, the magnitude, the duration of shaking, and the nature of the geologic materials on which the project components would be constructed. Intense ground shaking and high ground accelerations would affect the entire area and the primary and secondary effects of ground shaking could damage structural foundations, distort or break infrastructure, and place people at risk of injury or death. Implementation of the CPHP would result in new building development and rehabilitation of certain older structures, and an increase in population at the campus site, including on-site residents, as well as daily faculty, staff, patients and visitors, being subject to considerable seismic ground shaking from a substantive earthquake.

As discussed in Section 4.6.2, *Regulatory Setting*, above, in compliance with the CBC all structural improvements and association improvements that would occur under the CPHP would be required to prepare and implement appropriate design-level geotechnical evaluations prior to final design and construction. The final design-level geotechnical evaluation would include any necessary recommendations for site preparations (e.g., compaction requirements, engineered fill criteria, and moisture limitations) and/or foundation systems necessary to reduce seismic-related hazards to less than significant levels consistent with the applicable seismic design criteria of the CBC. Implementing the regulatory requirements of the CBC, and ensuring that buildings, structures, and related improvements are constructed in compliance with the law is the responsibility of the state licensed project engineers and building officials. The CBC describes required standards for the construction, alteration, movement, replacement, location, and demolition of every building or structure or any appurtenances connected or attached to such buildings or structures throughout California. The standards include earthquake design requirements that determine the seismic design category and then describe the structural design requirements. The geotechnical engineer, as a registered professional with the State of California, is required to comply with the CBC while applying standard engineering practice and the appropriate standard of care for anticipated seismic events. The California Professional Engineers Act (Building and Professions Code Sections 6700–6799), and the Codes of Professional Conduct, as administered by the California Board of Professional Engineers and Land Surveyors, provide the basis for regulating and enforcing engineering practice in California.

In addition, construction of proposed facilities considered essential services buildings would require design, site preparation and foundation construction in accordance with the most current version of the seismic standards of SB 1953 and the Office of Statewide Health Planning and Development (OSHPD) requirements for proposed hospital facilities. Geotechnical review of the foundation design of new hospital facilities would be required to adhere to the guidelines presented in *California Geological Survey – Note 48, Checklist for the Review of Engineering Geology and Seismology Reports for California Public Schools, Hospitals, and Essential Services Buildings*. Renovation of existing buildings also would be required to adhere to all applicable seismic requirements as contained in the most recent version of the CBC and UC *Seismic Safety Policy*.

With compliance with the regulatory requirements and the implementation of geotechnical design recommendations consistent with seismic design criteria, impacts relative to seismic shaking associated with earthquakes that may occur over the course of the CPHP would be less than significant.

Mitigation: None required.

Irving Street Arrival, Research and Academic Building, and Initial Aldea Housing Densification Projects, and Initial Phase Improvements

As with all projects under the CPHP, the Irving Street Arrival, Research and Academic Building (RAB), and initial Aldea Housing Densification would involve new construction and in some cases, redevelopment (e.g., the Irving Street Arrival improvements would occur within existing Medical Building 1 and on the exterior of the Medical Building 1 and Millberry Union parking garages; and the Aldea Housing Densification may reuse existing building foundations). As described in Chapter 3, *Project Description*, the Initial Phase improvements would include various Initial Phase utility improvements, implementation of the Parnassus Avenue Streetscape Plan, renovation of certain existing buildings, and installation of miscellaneous community investments in the public realm. As with all development under the CPHP, these Initial Phase projects and Initial Phase improvements could be subject to substantive ground shaking associated with an earthquake on a nearby fault. Similar to above, Initial Phase projects and improvements at the campus site would all be subject to existing regulatory requirements including the CBC, and the UC Seismic Safety Policy, and as applicable, SB 1953 and OSHPD seismic requirements. Furthermore, as applicable, any Initial Phase improvements that would be constructed outside the campus site boundary would be subject to the City's building department permit review process to ensure compliance with City building code provisions.

With compliance with the regulatory requirements and the implementation of geotechnical design recommendations, impacts relative to seismic shaking for the Initial Phase projects and Initial Phase improvements would be less than significant.

Mitigation: None required.

Impact GEO-2: New development under the CPHP would not directly or indirectly cause substantial adverse effects, including the risk of loss, injury, or death involving strong seismic related ground failure including liquefaction. (Less than Significant)

CPHP

As discussed in Section 4.6.1, *Environmental Setting*, the campus site is not located within a Seismic Hazard Zone for liquefaction susceptibility (ABAG, 2019). According to mapping compiled by ABAG based on CGS data, the majority of the developed campus core in the northern portion of the campus site is located in an area mapped as having a moderate potential for liquefaction. If present and not addressed adequately during site preparations for new construction, liquefiable subsurface materials can cause ground failures and differential settlement that can lead to substantive structural damage. The presence of liquefiable materials can only be definitively determined through a site-specific geotechnical investigation of underlying materials. As discussed above, all proposed new development under the CPHP would be required to adhere to seismic design criteria of the CBC and to be consistent with the UC *Seismic Safety Policy*. In addition, structures considered essential services buildings such as the new hospital are required to be designed and constructed in accordance with the most current version of the seismic standards of SB 1953 and the Office of Statewide Health Planning and Development (OSHPD) requirements for proposed hospital facilities. Geotechnical review of the foundation design of new hospital facilities would be required to adhere to the guidelines presented in *California Geological Survey – Note 48, Checklist for the Review of Engineering Geology and Seismology Reports for California Public Schools, Hospitals, and Essential Services Buildings.*

Therefore, all proposed new development would be required to perform a geotechnical investigation to determine the potential for liquefaction present on a site specific basis, and identify both site preparation measures (e.g., use of engineered fill or treatment of liquefiable soils) and foundation design measures in a final design level geotechnical report. Implementation of the recommendations within the final design level report would ensure that any potential liquefaction as well as any associated ground failure induced by seismic activity would be minimized. As a result, the potential impacts related to ground failure including liquefaction under the CPHP would be less than significant.

Mitigation: None required.

Irving Street Arrival, Research and Academic Building, and Initial Aldea Housing Densification Projects, and Initial Phase Improvements

As with all projects under the CPHP, the Irving Street Arrival, RAB, and initial Aldea Housing Densification projects, and Initial Phase improvements would be designed and constructed in accordance with a required site-specific design level geotechnical report that would include measures to address any liquefaction hazards, if discovered on the project sites. The investigation and final recommendations for these projects and improvements at the campus site would be consistent with regulatory requirements including the CBC, SB 1953 and OSHPD, and the UC Seismic Safety Policy. Furthermore, as applicable, any Initial Phase improvements that would be constructed outside the campus site boundary would be subject to City’s building department permit review process to ensure compliance with applicable City building code provisions. As such, any liquefaction hazards, if present, would be reduced to less than significant levels.

Mitigation: None required.

Impact GEO-3: New development under the CPHP would not directly or indirectly cause substantial adverse effects, including the risk of loss, injury, or death involving landslides. (Less than Significant with Mitigation)

CPHP

As discussed in the Environmental Setting, the campus site includes relatively steep terrain within the Reserve that has been subject to numerous slope stability studies. A 2006 slope stability risk assessment determined that there is a high probability for the occurrence of seismic-induced landslides under the rare combination of high pore pressure distribution (wet conditions) in the affected earth materials occurring at the same time as the scenario earthquake (Rutherford & Chekene 2006). A 2019 slope stability risk assessment using newly available high resolution LiDAR data integrated with field reconnaissance concluded that the areas of concern identified in 2006 remain unchanged; there is no evidence of large-scale slope movements during the intervening 2006-2018 period; evidence of small movements are noted in some cut slopes, especially steep vegetated slopes; and water and trees are the primary agents of observed small movements where root growth tends to open and widen existing cracks in near surface bedrock materials. Rockfalls are anticipated to be a maintenance item for the main roads where chert rock is exposed in cut slopes (Medical Center Way, Koret Way; see also Figure 4.6-2 in the Environmental Setting). Although rocks have a potential to impact vehicles and pedestrians, they are mostly small events requiring removal of fallen debris (Rutherford & Chekene, 2019).

While there continues to be no evidence of a deep seated landslide hazard at the campus site, the presence of smaller slope stability hazards could still result in damage or injury if not addressed appropriately. The 2019 slope stability report included several recommendations to improve slope stability and safety. With implementation of **CPHP Mitigation Measure GEO-3**, however, the impact associated with landslide hazards would be reduced to a less than significant level.

Slope stability hazards could also be caused by the excavation and grading activities for building construction that would occur under the CPHP. Current estimates indicate that nearly 400,000 cubic yards (cy) of total excavation would occur under the CPHP. The majority of this excavation would occur in the vicinity of the campus core related to regrading of ground elevations; accommodating new or widened roadways; constructing new foundations and basements for new structures, including excavation and potential slope cut excavation for the New Hospital and widening of Medical Center Way; and for accommodating the new service corridor and subsurface utilities.

If not managed appropriately, excavation and slope cut excavation could exacerbate slope instability, create unstable slopes or sidewalls that could damage improvements or threaten the stability of neighboring structures. However, similar to that discussed in Impact GEO-1, all development that would include excavation and grading activities, including slope cut excavation, would be required to prepare appropriate site specific design-level geotechnical evaluations prior to final design and commencement of construction. While the great majority of proposed improvements under the CPHP are located within the campus core, for any proposed disturbances that might occur adjacent to or within the Reserve that coincides with areas mapped as susceptible to earthquake-induced landslides, construction would also require compliance with the Seismic Hazards Mapping Act and CGS SP 117A. The final design-level geotechnical evaluation would include any necessary recommendations for shoring and anchoring of sidewalls to ensure that the impact due to slope stability hazards is reduced to a less than significant level. In addition, if applicable, the final design-level geotechnical report would be required to adhere to CGS SP 117A.

CPHP Mitigation Measure GEO-3: UCSF shall implement the following geotechnical recommendations contained within the Rutherford & Chekene March 2019 report:

- Remove selected trees located on or at the crest of steep rock slopes on which tree root wedging decreases stability. Determination of specific trees to be removed shall be made in association with a certified arborist and state licensed geotechnical engineer or engineering geologist. Removal will involve cutting trees and leaving stumps such that the root system can rot in situ with minimal disturbance to the surface geology.

- Conduct qualitative monitoring of identified slopes by a state licensed geotechnical engineer or engineering geologist or as directed by said professional. Monitoring shall occur, at a minimum, after each moderate to major storm or earthquake, as defined by the geotechnical professional. The geotechnical professional shall submit a report of findings to UCSF that includes recommendations for additional slope stability improvements, if deemed necessary, to maintain continued safety in accordance with geotechnical standards and building code requirements.

Significance after Mitigation: Implementation of these geotechnical recommendations would improve slope stability at the campus site and reduce the potential landslide hazards to less than significant.

Irving Street Arrival, Research and Academic Building, and Initial Aldea Housing Densification Projects, and Initial Phase Improvements

As with all projects under the CPHP, the Irving Street Arrival, RAB, and initial Aldea Housing Densification projects, and Initial Phase improvements would be designed and constructed in accordance with a required site specific design-level geotechnical report that would include measures to address any landslide or slope stability hazards. The investigation and final recommendations for these projects and improvements at the campus site would be consistent with regulatory requirements including the CBC, SB 1953 and OSHPD, as applicable, and the UC Seismic Safety Policy as it applies to slope stability. Furthermore, as applicable, any Initial Phase improvements that would be constructed outside the campus site boundary would be subject to City's building department permit review process to ensure compliance with applicable City building code provisions. As such, any landslide hazards would be reduced to less than significant levels.

Mitigation: Implement CPHP Mitigation Measure GEO-3.

Significance after Mitigation: Implementation of these geotechnical recommendations would improve slope stability for the areas in the vicinity of the Initial Phase projects and Initial Phase improvements at the campus site, and compliance with applicable codes and regulations would reduce the potential landslide hazards to less than significant.

Impact GEO-4: Construction and operation of development associated with the CPHP would not have the potential to result in the substantial erosion or the loss of topsoil. (Less than Significant)

CPHP

The areas of the campus site where the majority of proposed ground disturbing activities would occur are in areas that have already been developed and native topsoil is no longer present. However, as discussed in Impact GEO-3, above, the CPHP would also involve large volumes of excavation. Erosion of exposed soils can occur as a result of the forces of wind or water, and could be worsened during these ground disturbing activities.

Projects that disturb more than one acre of land during construction are required to file a Notice of Intent with the State Water Resources Control Board (SWRCB) to be covered under the National Pollution Discharge Elimination System (NPDES) Construction General Permit for discharges of stormwater associated with construction activity (also discussed further in Section 4.9, Hydrology and Water Quality). The Construction General Permit requires the preparation and implementation of a Stormwater Pollution Prevention Plan (SWPPP) which would include erosion control measures in the form of best management practices (BMPs) that would be effective in reducing the potential for erosion during construction. BMPs would include, but would not be limited to, filtering runoff during construction, avoiding heavy grading and earthwork operations during the rainy season, and incorporating landscaping as early as possible. Once construction is completed for each element of the CPHP, the area of disturbance would be either covered by a structure, road or pathway, or landscaped such that the potential for erosion is minimized. Therefore, with adherence to existing regulatory requirements that would require implementation of erosion control BMPs during construction, the potential for erosion or loss of topsoil would be reduced to less than significant levels.

Mitigation: None required.

Irving Street Arrival, Research and Academic Building, and Initial Aldea Housing Densification Projects, and Initial Phase Improvements

As with all projects under the CPHP, the Irving Street Arrival, RAB, and Initial Aldea Housing Densification projects, and as applicable, Initial Phase improvements, would be subject to the requirements of the NPDES Construction General Permit. Construction work that involves ground disturbing activities would be required to prepare and implement a SWPPP with erosion control BMPs. Furthermore, as applicable, any Initial Phase improvements that would be constructed outside the campus site boundary would be subject to construction site runoff requirements and post-construction stormwater controls in accordance with the City Public Works Code and in compliance with the City's Stormwater Management Ordinance. As such, erosion and loss to topsoil hazards would be reduced to less than significant levels.

Mitigation: None required.

Impact GEO-5: Development and redevelopment associated with the CPHP would not be located on a geologic unit or soil that is unstable, or that would become unstable as a result of the project, and potentially result in on- or off-site landslide, lateral spreading, subsidence, liquefaction or collapse. (Less than Significant)

CPHP

Implementation of the CPHP would involve development and redevelopment projects on the campus site, primarily within the already developed campus core in the northern portion of the campus site, and to a lesser extent, in the Aldea Housing complex in the southeast portion of the campus site. As discussed above, existing structures within the campus range in age and were constructed under different stages of building code requirements and undocumented site preparation measures. Underlying subsurface materials likely include a variety of geotechnical conditions that could include artificial fills and other compressible soils or conditions that are otherwise unsuitable for new or redevelopment without adequate site preparations. While, as discussed above, there would be substantive amounts of excavation under the CPHP that could remove any existing near surface fills or other unsuitable soils, there could be areas with soils that are considered incapable of adequately supporting the new loadings (weight of new structures, foundations and/or engineered fill).

Landslide hazards are discussed above in Impact GEO-3, but unstable slopes could also be created by excavations for new development proposed under the CPHP that could result in on- or off-site landslides. However, as noted above, all construction activities would be required to adhere to CBC requirements which include measures to ensure that excavations are adequately protected from instability, largely through shoring requirements, that would be effective in minimizing the potential for on-or off-site landslides. Therefore, with conformance to the CBC and a required design-level geotechnical report that includes recommendations for excavation stability, the potential impact related to landslides and sidewall stability would be less than significant.

Lateral spreading, a phenomenon related to liquefaction where liquefiable materials can be displaced on exposed slopes, and liquefaction are addressed in Impact GEO-2, above. Adherence to CBC requirements and implementation of the design-level geotechnical report would be sufficient to reduce lateral spreading and liquefaction hazards, if present, to less than significant levels.

Subsidence and collapse are additional geotechnical hazards that would be evaluated as part of preliminary geotechnical investigations as required by the CBC. Each project specific final design-level geotechnical report would then use collected subsurface data to determine site preparation measures, such as the re-compaction of existing soils or placement of engineered fill, and foundation design measures in accordance with CBC, for the new loadings (weight of new structures) proposed. Implementation of these design-level criteria to geotechnical site preparation and foundation design would ensure that the potential for subsidence or collapse is reduced to less than significant levels

Therefore, as required by the CBC, the preparation of site specific design-level geotechnical reports would include recommendations for site preparation and foundation design that would ensure that any unstable soils would be minimized and the potential impacts would be less than significant.

Mitigation: None required.

Irving Street Arrival, Research and Academic Building, and Initial Aldea Housing Densification Projects, and Initial Phase Improvements

As with all development under the CPHP, the Irving Street Arrival, RAB, and Initial Aldea Housing Densification projects, and Initial Phase improvements at the campus site would be designed and constructed in accordance with the requirements of the CBC which would include site specific geotechnical evaluations and design-level reports that contain recommendations for site preparation and foundations. Furthermore, as applicable, any Initial Phase improvements that would be constructed outside the campus site boundary would be subject to City's building department permit review process to ensure compliance with applicable City building code provisions. As such, any hazards associated with unstable soils would be reduced to less than significant levels.

Mitigation: None required.

Impact GEO-6: Construction associated with the CPHP could have the potential to directly or indirectly destroy a unique paleontological resource or site or unique geologic feature. (Less than Significant with Mitigation)

CPHP

A direct effect on a unique paleontological resource would result from the direct damage or destruction of such a resource. Indirect impacts are not specifically caused by a development project, but may be a reasonably foreseeable result of such a project. Typical indirect impacts to paleontological resources include the destruction or loss of surface fossils from increased erosion or the non-scientific or unauthorized surface collection or subsurface excavation of a fossil or paleontological site.

Following the guidelines of the Society of Vertebrate Paleontology (SVP),[12,13] a review of the scientific literature and geologic mapping were used to determine paleontological sensitivities of

---

12 Society of Vertebrate Paleontology, 1995. Assessment and mitigation of adverse impacts to nonrenewable paleontologic resources: standard guidelines. Society of Vertebrate Paleontology News Bulletin 163:22-27.

13 Society of Vertebrate Paleontology, 2010. Standard procedures for the assessment and mitigation of adverse impacts to paleontological resources. Available: http://vertpaleo.org/Membership/Member-Ethics/SVP_Impact_Mitigation_Guidelines.aspx

the geologic units present on the campus site that would be subject to ground-disturbing activities.

As discussed in the Paleontological Setting, based on the University of California Museum of Paleontology (UCMP) Locality Search online database search, no known paleontological resources were identified within the campus site. The surficial Quaternary deposits that overlie the Franciscan Complex on the campus site have no paleontological potential. Furthermore, while invertebrate fossils have been discovered in the Franciscan Complex, they are not considered unique due to their abundance. The potential for encountering vertebrate fossils in the Franciscan sedimentary rocks is considered very rare because of the high deformity for most of the units. As a result, the Franciscan Complex has a low paleontological sensitivity. In addition, the vast majority of building sites on the campus site under the CPHP are already either developed with structures or have been previously disturbed in conjunction with prior development. Therefore, the potential to encounter intact paleontological resources is low.

However, the unmetamorphized sedimentary rocks of the Franciscan would have a higher sensitivity for containing paleontological resources. Should any new building development under the CPHP involve deep excavations that may encounter these less disturbed and potentially sensitive units, there could be the potential for encountering paleontological resources. Without any site-specific subsurface information or information regarding the maximum depths of excavation involved with each development project proposed under the CPHP, there can be no guarantee that paleontological resources would not be impacted. As a result, subsurface construction under the CPHP would have the potential, albeit low, to directly or indirectly destroy a previously unknown unique paleontological resource, which would be a significant impact. The impact would be reduced to a less-than-significant level by implementation of CPHP Mitigation Measure GEO-6, which would require that work halt in the event that paleontological resources are discovered during construction and appropriate action is taken.

> **CPHP Mitigation Measure GEO-6:** Prior to commencement of construction activities, all on-site personnel shall attend a mandatory pre-project training to outline the general paleontological sensitivity of the project area. The training will include a description of the types of resources that could be encountered and the procedures to follow in the event of an inadvertent discovery of resources.
>
> If paleontological resources, such as fossilized bone, teeth, shell, tracks, trails, casts, molds, or impressions are discovered during ground-disturbing activities, work shall stop in that area and within 100 feet of the find until a qualified paleontologist meeting the Society of Vertebrate Paleontology (SVP) Standards can assess the nature and importance of the find and, if necessary, develop appropriate salvage measures in conformance with SVP standards (2010). If the discovery can be avoided and no further impacts will occur, no further effort shall be required. If the resource cannot be avoided and may be subject to further impact, a qualified paleontologist shall evaluate the resource and determine whether it is "unique" under CEQA.
>
> Any discovered paleontological resources that are determined by the qualified paleontologist to be "unique" in accordance with CEQA shall be given appropriate salvage measures in conformance with SVP standards (2010).

Significance after Mitigation: Implementation of CPHP Mitigation Measure GEO-6 would ensure that paleontological resources would be identified before they are damaged or destroyed, and are properly evaluated and treated. Thus, the impact would be considered less than significant.

Irving Street Arrival, Research and Academic Building, and Initial Aldea Housing Densification Projects, and Initial Phase Improvements

As with all development under the CPHP, the Irving Street Arrival, RAB, and initial Aldea Housing Densification projects, and Initial Phase improvements would also include earthwork activities that could encounter paleontological resources and would have a potential to directly or indirectly destroy a unique paleontological resource. The impact would be potentially significant.

Mitigation: Implement CPHP Mitigation Measure GEO-6.

Significance after Mitigation: Less than Significant.

Cumulative Impacts

Impact C-GEO-1: Implementation of the CPHP could have the potential to combine with past, present and reasonably foreseeable future projects to result in cumulatively considerable impacts related to geology and soils. (Less than Significant with Mitigation)

The geographic scope considered for the cumulative analysis is the greater Bay Area which is considered at high risk of experiencing a seismic event. As noted above, the Bay Area is considered to have a high probability of a substantive earthquake occurring over the next 30 years (USGS, 2015). Development of the CPHP along with the other cumulative projects would not directly or indirectly exacerbate those seismic risks. However, current and future project development at the campus site and elsewhere in the entire Bay Area region could expose additional people and structures to potentially adverse effects associated with earthquakes including seismic ground shaking, seismic related ground failure, and seismically-induced landslides. However, site-specific geotechnical studies required by the local agencies which typically adopt CBC seismic requirements would determine how future development projects could be designed to minimize exposure of people to these impacts. Therefore, current and future development would be constructed to more current standards which could potentially provide greater protection than the older structures throughout the region. Other current and future projects within the Bay Area region would also be required to adhere to current building standards with seismic design criteria that incorporates the most current science and understanding of geotechnical and seismic hazards such that damage or injury would be minimized.

Ground disturbing activities could expose soils in a manner that lead to increased erosion if not managed properly. Such erosion could cause unstable ground surfaces and result in eventual damage to roads, foundations and other improvements. Cumulative effects of increased erosion on receiving water quality is addressed in Section 4.9, Hydrology and Water Quality, Impact 4.9-7.

Construction activities at the campus site, as well as other current and future cumulative projects greater than 1 acre in size, which would apply to the vast majority of the cumulative projects, would be required to comply with the NPDES Construction General Permit, which contains erosion control requirements that would minimize the potential for soil erosion. The NPDES program requires the preparation and implementation of Stormwater Pollution Prevention Programs (SWPPPs) for construction activities that include BMPs that ensure erosion control measures are included during construction. All cumulative projects, including the CPHP, would be required to comply with these regulations, as would other nearby reasonably foreseeable development and other construction projects. In addition, once construction is completed, the cumulative projects generally include the cover of site soils with either landscaping or impervious surfaces, which limits the potential for erosion.

Many of the cumulative projects, like the campus site, are located within areas that could contain significant fossil resources. The associated subsurface disturbances for the construction of foundations and utilities increases the likelihood that paleontological resources could be uncovered, and it is therefore possible that cumulative development would result in the demolition or destruction of significant paleontological resources. This potential loss of resources is considered a significant cumulative impact. However, the destruction of paleontological resources is site specific and with the required mitigation above, CPHP Mitigation Measure GEO-6, the CPHP would not contribute considerably to the loss of paleontological resources, and the impact would be less than significant.

Mitigation: Implement CPHP Mitigation Measure GEO-6.

Significance after Mitigation: Less than Significant.

4.6.4 References

Association of Bay Area Governments (ABAG), 2019. Liquefaction Susceptibility and Liquefaction Seismic Hazard Zones, http://gis.abag.ca.gov/website/Hazards/?hlyr=liqSusceptibility. Accessed September 23, 2019.

Blake M. C. Jr., R.W. Graymer, and D.L. Jones, 2000. Geologic Map and Map Database of Parts of Marin, San Francisco, Alameda, Contra Costa, and Sonoma Counties, California. United States Geological Survey (USGS). Map. Scale 1:75,000.

California Geological Survey (CGS), 2002. Note 32, *How Earthquakes are Measured*.

California State Senate, 1994. Senate Bill 1953, September 22, 1994.

Hart, Earl and Bryant, William (Hart), 2007. *Fault Rupture Hazard Zones in California*, Interim Revision. 2007.

Jennings C. W., 2010. 2010 Fault Activity Map of California.

Office of Statewide Health Planning and Development (OSHPD), 2019a. Seismic Performance Ratings and Definitions, https://oshpd.ca.gov/construction-finance/seismic-compliance-and-safety/seismic-performance-ratings/. Accessed November 19, 2019.

OSHPD, 2019b. SPC/NPC Ratings of Acute Care Hospital Buildings as of 10/31/19, https://oshpd.ca.gov/ml/v1/resources/document?rs:path=/Construction-And-Finance/Documents/Seismic-Compliance/SPC-NPC-Ratings-List.pdf. Accessed October 31, 2019.

Peterson, Mark et. al., California Geologic Survey (Peterson), 1996. *Probabilistic Seismic Hazard Assessment State of California.*

Rutherford and Chekene, 2006. Slope Stability Risk Assessment, University of California San Francisco, San Francisco, California. August 26, 2006.

Rutherford and Chekene, 2019. New Campus-Wide Slope Stability Risk Assessment, University of California San Francisco, Parnassus Campus, San Francisco, California. March 29, 2019.

University of California Museum of Paleontology (UCMP), 2019. Locality Search online database. Accessed September 30, 2019.

United States Geologic Survey (USGS), 2015. *UCERF3: A New Earthquake Forecast for California's Complex Fault System,* March 2015.

4.7 Greenhouse Gas Emissions

This section describes and evaluates potential for the construction and operation of the Comprehensive Parnassus Heights Plan (CPHP or Plan), including the three Initial Phase projects and the Initial Phase improvements, to result in significant impacts on greenhouse gas (GHG) emissions and global climate change. The section includes a description of the existing regional and local conditions, and an existing regulatory framework governing GHG emissions; presents the significance criteria used to evaluate impacts on GHG emissions, and the results of the impact assessment, including any significant impacts and associated feasible mitigation measures. The proposed CPHP is evaluated for consistency with plans and policies of the State of California, the University of California, and *Plan Bay Area 2040* related to GHG emissions and climate change.

4.7.1 Environmental Setting

Gases that trap heat in the atmosphere are referred to as greenhouse gases (GHGs) because they capture heat radiated from the sun as it is reflected back into the atmosphere, much like a greenhouse does. The accumulation of GHGs contributes to global climate change. Climate change, which is discussed in more detail below, refers to any significant change in measures of climate (such as temperature, precipitation, or wind) lasting for an extended period (decades or longer). Climate change may result from:

- Natural factors, such as changes in the sun's intensity or slow changes in the Earth's orbit around the sun;
- Natural processes within the climate system (e.g., changes in ocean circulation, reduction in sunlight from the addition of GHG and other gases to the atmosphere from volcanic eruptions); and
- Human activities that change the atmosphere's composition (e.g., through burning fossil fuels) and the land surface (e.g., deforestation, reforestation, urbanization, desertification).

The primary effect of global climate change has been a rise in the average global tropospheric temperature of 0.2 degree Celsius (°C) per decade, determined from meteorological measurements worldwide between 1990 and 2005. Climate change modeling using 2000 emission rates shows that further warming is likely to occur, which would induce further changes in the global climate system during the current century (IPCC, 2007).

Greenhouse Gases

The primary GHGs, or climate pollutants, are carbon dioxide (CO_2), black carbon, methane (CH_4), nitrous oxide (N_2O), ozone, and water vapor.

While the primary GHGs are naturally occurring, CO_2, CH_4, and N_2O are also emitted from human activities, accelerating the rate at which these compounds occur within the earth's atmosphere. Emissions of CO_2 are largely by-products of fossil fuel combustion, whereas CH_4 results from off-gassing associated with agricultural practices and landfills. N_2O is a byproduct of various industrial processes. Black carbon has emerged as a major contributor to global climate change, possibly second only to CO_2. Black carbon is produced naturally and by human activities as a result of the incomplete combustion of fossil fuels, biofuels, and biomass (Center for Climate and Energy Solutions, 2010). Other GHGs include hydrofluorocarbons, perfluorocarbons, and sulfur hexafluoride, and are generated in certain industrial processes. GHGs are typically reported in "carbon dioxide-equivalent" measures (CO_2e).[1]

Effects of Climate Change

The scientific community's understanding of the fundamental processes responsible for global climate change has improved over the past decade, and its predictive capabilities are advancing. However, there remain significant scientific uncertainties in, for example, predictions of local effects of climate change, occurrence, frequency, and magnitude of extreme weather events, effects of aerosols, changes in clouds, shifts in the intensity and distribution of precipitation, and changes in oceanic circulation. Due to the complexity of the Earth's climate system and inability to accurately model it, the uncertainty surrounding climate change may never be completely eliminated. Nonetheless, the *Fifth Assessment Report, Summary for Policy Makers* of the Intergovernmental Panel on Climate Change (IPCC) states that, "it is *extremely likely* that more than half of the observed increase in global average surface temperature from 1951 to 2010 was caused by the anthropogenic increase in greenhouse gas concentrations and other anthropogenic forc[es [*sic*] together" (IPCC, 2014). A report from the National Academy of Sciences concluded that 97 to 98 percent of the climate researchers most actively publishing in the field support the tenets of the IPCC in that climate change is very likely caused by human (i.e., anthropogenic) activity (Anderegg *et al*, 2010).

The Fourth California Climate Change Assessment (Fourth Assessment), published in 2018, finds that the potential impacts in California due to global climate change include: loss in snow pack; sea level rise; more extreme heat days per year; more high ozone days; more extreme forest fires; more severe droughts punctuated by extreme precipitation events; increased erosion of California's coastlines and sea water intrusion into the Sacramento and San Joaquin Deltas and associated levee systems; and increased pest infestation (OPR, 2018a).

The Fourth Assessment's findings are consistent with climate change studies published by the California Natural Resources Agency (CNRA) since 2009, starting with the *California Climate Adaptation Strategy* as a response to the Governor's Executive Order (EO) S-13-2008 (CNRA, 2009). In 2014, the CNRA rebranded the first update of the 2009 adaptation strategy as the *Safeguarding California Plan* (CNRA, 2014). The 2018 update to *Safeguarding California* identifies hundreds of ongoing actions and next steps State agencies are taking to safeguard Californians from climate impacts within a framework of 81 policy principles and recommendations (CNRA, 2018a). In 2016, the CNRA released *Safeguarding California: Implementation Action Plans* in accordance with EO B-30-15, identifying a lead agency to lead adaptation efforts in each sector. In accordance with the 2009 *California Climate Adaptation*

---

[1] Because of the differential heat absorption potential of various GHGs, GHG emissions are frequently measured in "carbon dioxide-equivalents," which present a weighted average based on each gas's heat absorption (or "global warming") potential.

Strategy, the CEC was directed to develop a website on climate change scenarios and impacts that would be beneficial for local decision makers. The website, known as Cal-Adapt, became operational in 2011.[2] The information provided on the Cal-Adapt website represents a projection of potential future climate scenarios comprised of local average values for temperature, sea level rise, snowpack and other data representative of a variety of models and scenarios, including potential social and economic factors.

Below is a summary of some of the potential effects that could be experienced in California as a result of global warming and climate change.

Temperature Increase

As noted above, the primary effect of adding GHGs to the atmosphere has been a rise in the average global temperature. The impact of human activities on global temperature is readily apparent in the observational record. Since 1895, the contiguous U.S. has observed an average temperature increase of 1.5°F per century. The last five-year period (2014–2018) is the warmest on record for the contiguous U.S. (NOAA, 2019), while the 20 warmest years have occurred over the past 22-year period (Climate Central, 2019).

The Fourth Assessment indicates that average temperatures in California could rise by 5.6°F to 8.8°F by the end of the century, depending on the global trajectory of GHG emissions (OPR, 2018a). With climate change, extreme heat conditions and heat waves are predicted to impact larger areas, last longer, and have higher temperatures. Heat waves, defined as three or more days with temperatures above 90°F, are projected to occur more frequently by the end of the century. Extreme heat days and heat waves can negatively impact human health. Heat-related illness includes a spectrum of illnesses ranging from heat cramps to severe heat exhaustion and life-threatening heat stroke (CalEPA, 2013).

Wildfires

The expected hotter and drier conditions expected with climate change will make forests more susceptible to extreme wildfires. A recent study found that, if GHG emissions continue to rise, the frequency of extreme wildfires burning over approximately 25,000 acres would increase by nearly 50 percent, and the average area burned statewide each year would increase by 77 percent, by the year 2100. In the areas that have the highest fire risk, wildfire insurance is estimated to see costs rise by 18 percent by 2055 and the fraction of property insured would decrease (Westerling, 2018).

Air Quality

Higher temperatures, conducive to air pollution formation, could worsen air quality in California and make it more difficult for the State to achieve air quality standards. Climate change may increase the concentration of ground-level ozone in particular, which can cause breathing problems, aggravate lung diseases such as asthma, emphysema, and chronic bronchitis, and cause chronic obstructive pulmonary disease. Emissions from wildfires can lead to excessive levels of particulate matter, ozone, and volatile organic compounds (Kenward *et al*, 2013). Additionally,

[2] The Cal-Adapt website address is: http://cal-adapt.org.

severe heat accompanied by drier conditions and poor air quality could increase the number of heat-related deaths, illnesses, and asthma attacks throughout the State (CalEPA, 2013).

Water Supply and Water Quality

There is a high degree of uncertainty with respect to the overall impact of global climate change on future water supplies in California. Studies indicate considerable variability in predicting precise impacts of climate change on California hydrology and water resources. Increasing uncertainty in the timing and intensity of precipitation will challenge the operational flexibility of California's water management systems. Warmer, wetter winters would increase the amount of runoff available for groundwater recharge; however, this additional runoff would occur at a time when some basins are either being recharged at their maximum capacity or are already full. Conversely, reductions in spring runoff and higher evapotranspiration because of higher temperatures could reduce the amount of water available for recharge (CNRA, 2014).

Climate change could alter water quality in a variety of ways, including through higher winter flows that reduce pollutant concentrations (through dilution) or increase erosion of land surfaces and stream channels, leading to higher sediment, chemical, and nutrient loads in rivers. Water temperature increases and decreased water flows can result in increasing concentrations of pollutants and salinity. Increases in water temperature alone can lead to adverse changes in water quality, even in the absence of changes in precipitation.

Sea Level Rise

Climate changes could potentially affect: the amount of snowfall, rainfall and snow pack; the intensity and frequency of storms; flood hydrographs (flash floods, rain or snow events, coincidental high tide and high runoff events); sea level rise and coastal flooding; coastal erosion; and the potential for salt water intrusion (CNRA, 2014).

Agriculture

California has a massive agricultural industry that represents 11.3 percent of total U.S. agricultural revenue. Higher CO_2 levels can stimulate plant production and increase plant water-use efficiency. However, a changing climate presents significant risks to agriculture due to "potential changes to water quality and availability; changing precipitations patterns; extreme weather events including drought, severe storms, and floods; heat stress; decreased chill hours; shifts in pollinator lifecycles; increased risks from weeds, pest and disease; and disruptions to the transportation and energy infrastructure supporting agricultural production" (CNRA, 2014).

Ecosystems and Wildlife

Increases in global temperatures and the potential resulting changes in weather patterns could have ecological effects on a global and local scale. With climate change, ecosystems and wildlife will be challenged by the spread of invasive species, barriers to species migration or movement in response to changing climatic conditions, direct impacts to species health, and mismatches in timing between seasonal life-cycle events such as species migration and food availability (CNRA, 2014).

Public Health[3]

Global climate change is also anticipated to result in more extreme heat events (OPRa et al, 2018). These extreme heat events increase the risk of death from dehydration, heart attack, stroke, and respiratory distress, especially with people who are ill, children, the elderly, and the poor, who may lack access to air conditioning and medical assistance. A warming planet is expected to bring more severe weather events, worsening wildfires and droughts, cause a decline in air quality, and result in rising sea levels, and increases in allergens and in vector-borne diseases, all of which present significant health and wellbeing risks for California populations (CNRA, 2018a).

Emissions Inventories

An emissions inventory that identifies and quantifies the primary human-generated sources and sinks of GHGs is a well-recognized and useful tool for addressing human society's contributions to climate change. This section summarizes the latest information on global, United States, California, and local GHG emission inventories.

Global Emissions

Global estimates are based on country inventories developed as part of programs of the United Nations Framework Convention on Climate Change. Worldwide man-made emissions of GHGs were approximately 49 billion metric tons (MT) CO_2e in 2010, including ongoing emissions from industrial and agricultural sources and emissions from land use changes (e.g., deforestation). Emissions of CO_2 from fossil fuel use and industrial processes account for 65 percent of this total CO_2e, while CO_2 emissions from all sources accounts for 76 percent of the total CO_2e. Methane emissions account for 16 percent and N_2O emissions for 6.2 percent. Worldwide emissions of GHGs in 1970 were 27 billion MT of CO_2e per year (IPCC, 2014), indicating that emissions have almost doubled in a span of 40 years.

U.S. Emissions

In 2017, the United States emitted about 6,457 million metric tons (MMT) of CO_2e, with 76.1 percent of those emissions coming from fossil fuel combustion. Of the major sectors nationwide, transportation accounts for the highest amount of GHG emissions (approximately 29 percent), followed by electricity (28 percent), industry (22 percent), agriculture (9 percent), commercial buildings (6 percent), and residential buildings (5 percent). Between 1990 and 2017, total U.S. GHG emissions rose by 1.3 percent, but emissions have generally decreased since peaking in 2005. Since 1990, U.S. emissions have increased at an average annual rate of 0.4 percent (USEPA, 2019).

State of California Emissions

The California Air Resources Board (CARB) compiles GHG inventories for the State of California. Based on the 2016 GHG inventory data (i.e., the latest year for which data are available from CARB) prepared by CARB in 2018, California emitted 429.4 MMT of CO_2e including emissions

3 As discussed in Chapter 2.0 Project Description, one of the primary objectives of implementation of the CPHP is to expand access to public health care.

resulting from imported electrical power (CARB, 2019). Between 1990 and 2016, the population of California grew by approximately 9.4 million (from 29.8 to 39.2 million) (California Department of Finance, 2018a). This represents an increase of approximately 31 percent from 1990 population levels. In addition, the California economy, measured as gross state product, grew from $773 billion in 1990 to $2.62 trillion in 2016 representing an increase of approximately 239 percent (just over three times the 1990 gross state product) (California Department of Finance, 2018b). Despite the population and economic growth, CARB's 2016 statewide inventory indicated that California's net GHG emissions in 2016 were just below 1990 levels, which is the 2020 GHG reduction target codified in California Health and Safety Code (HSC), Division 25.5, also known as The Global Warming Solutions Act of 2006 (AB 32). **Table 4.7-1** identifies and quantifies statewide anthropogenic GHG emissions and sinks (e.g., carbon sequestration due to forest growth) in 1990 and 2017. As shown in the table, the transportation sector is the largest contributor to statewide GHG emissions at approximately 40 percent in 2017.

TABLE 4.7-1
STATE OF CALIFORNIA GREENHOUSE GAS EMISSIONS

Category	Total 1990 Emissions using IPCC SAR ($MMTCO_2e$)	Percent of Total 1990 Emissions SAR/AR4	Total 2017 Emissions using IPCC AR4 ($MMTCO_2e$)	Percent of Total 2017 Emissions
Transportation	150.7	35%/35%	169.9	40%
Electric Power	110.6	26%/26%	62.4	15%
Commercial Fuel Use	14.4	3%/3%	15.1	4%
Residential	29.7	7%/7%	26.0	6%
Industrial	103.0	24%/24%	89.4	21%
Recycling and Waste[a]	–	–	8.9	2%
High GWP/Non-Specified[b]	1.3	<1%/<1%	19.9	5%
Agriculture/Forestry	23.6	6%/5%	32.4	8%
Forestry Sinks	-6.7		-- [c]	--
Net Total (IPCC SAR)	**426.6**	**100%[e]**	--	--
Net Total (IPCC AR4)[d]	**431**	**100%**	**424.1**	**100%**

NOTES:

IPCC = Intergovernmental Panel on Climate Change; SAR = Second Assessment Report; AR4 = Fourth Assessment Report.

a Included in other categories for the 1990 emissions inventory.
b High global warming potential (GWP) gases are not specifically called out in the 1990 emissions inventory.
c Revised methodology under development (not reported for 2017).
d CARB revised the State's 1990 level GHG emissions using GWPs from the IPCC AR4.
e Values may not total to 100 % due to rounding

SOURCES: California Air Resources Board, Staff Report – California 1990 Greenhouse Gas Emissions Level and 2020 Emissions Limit, (2007); California Air Resources Board, "California Greenhouse Gas 2000-2017 Inventory by Scoping Plan Category – Summary," http://www.arb.ca.gov/cc/inventory/data/data.htm. Accessed May 2020.

Bay Area Emissions Inventory

Based on 2015 data, in the nine county San Francisco Bay Area, GHG emissions from the transportation sector represent the largest source of the Bay Area's GHG emissions at 41 percent, followed by the stationary industrial sources at 26 percent, electricity generation and co-generation at 14 percent, and fuel use (primarily natural gas) by buildings at 10 percent. The remaining

8 percent of emissions is composed of fluorinated gas emissions and emissions from solid waste and agriculture. Of the total transportation emissions in 2015, on-road sources accounted for approximately 87 percent, while off-road sources accounted for the remainder (BAAQMD, 2017).

UCSF Emissions Inventory

To achieve consistency in reporting across different geographies, the GHG Protocol established by the World Research Institute, developed a GHG emissions classification system that classifies GHG emissions into three categories based on the nature and source of the emissions and the level of operational control exercised by the organization over the emission source. This classification system is listed in the University of California *Sustainable Practices Policy* and is used by the University, including UCSF, to gather data on its annual GHG emissions for reporting to the California Climate Action Registry (CCAR) and The Climate Registry (TCR).

Scope 1 Emissions are emitted on the project site/facility and are associated with on-site combustion of natural gas, fuel use in vehicle fleets, and fugitive emissions of gases used for refrigeration and scientific research. Fugitive gases include hydrofluorocarbon gases, perfluorocarbon gases, and sulfur hexafluoride (SF6).

Scope 2 Emissions are those associated with the consumption of purchased energy from off-site sources. Scope 2 electricity emissions reflect emissions from all energy used at the electricity-generating power plant, but exclude transmission and distribution losses, which are reported under Scope 3.

Scope 3 Emissions are indirect emissions not covered in Scope 2, including sources such as GHG emissions from employee commuting, business air and ground travel, electricity transmission and distribution losses, off-site wastewater treatment, and off-site municipal solid waste disposal.

The UC *Sustainability Practices Policy* requires each campus to report a GHG emissions inventory to an independent reporting organization. UCSF reported calendar year 2008 Scope 1 and Scope 2 emissions to the CCAR. UCSF currently reports its annual Scope 1 and Scope 2 GHG emissions inventory to TCR. TCR is a nonprofit collaboration among North American states, provinces, territories and Native Sovereign Nations that sets consistent and transparent standards to calculate, verify and publicly report greenhouse gas emissions into a single registry. The most recent inventory reported to TCR was for calendar year 2017. UCSF emissions inventories reported to outside agencies are verified by accredited independent auditors.

Since 2008, UCSF has also been required to report its Scope 1 emissions from its Central Utility Plant (CUP) at the Parnassus Heights campus site to CARB annually under the AB 32 Reporting Rule. UCSF tracks and reports its progress towards meeting its GHG emissions goals in its Annual Sustainability Report. The most recent inventory reported to CARB was for fiscal year 2017/2018. UCSF also reports to the UC Regents annually on its progress in meeting the goals in the UC *Sustainable Practices Policy*.[4] The most recent Annual Report on Sustainable Practices is

[4] The University of California system-wide Annual Sustainability Reports are available at: http://sustainability.universityofcalifornia.edu/reports.html

for 2018/2019. **Table 4.7-2** below presents the UCSF GHG emissions inventory through 2018 as reported in its latest Annual Sustainability Report.

TABLE 4.7-2
UCSF GREENHOUSE GAS EMISSIONS INVENTORY (MT CO2E/YEAR)

Scope	Emission Category	1990	1990%	2008	2008%	2018	2018%
1	Buildings and Facilities – Natural Gas	44,923	40.9%	90,026	57.6%	80,420	50.8%
1	Buildings and Facilities – Other Fuels	114	0.1%	NA	NA	197	0.1%
1	UCSF Fleet	1,944	1.8%	3,200	2.0%	2,714	1.7%
1	Refrigerants and Medical Gases	3,500	3.2%	3,500	2.2%	1,656	1.0%
1	CCAR Acquisition Adjustment	10,178	9.3%	NA	NA	NA	NA
2	Buildings and Facilities - Electricity	24,529	22.3%	24,962	16.0%	29,108	18.4%
	Scope 1 and 2 Subtotal	*85,188*	*77.6%*	*121,688*	*77.8%*	*114,095*	*72.0%*
3	Business Air Travel	7,549	6.9%	12,582	8.0%	18,748	11.8%
3	Commute	17,080	15.6%	22,069	14.1%	25,529	16.1%
	Scope 1, 2, and 3 Total	**109,817**	**100.0%**	**156,339**	**100.0%**	**158,372**	**100.0%**

NOTE: 2018 inventory does not reflect 4,396 MT Co2e of offsets taken by UCSF. This allows equal comparison across years. Note that emissions reported in the Annual Sustainability Report only include Scope 3 mobile emissions under UCSF's control from employee air travel and commute. Emissions from travel by patients and visitors are not included therein but are considered in the impact analysis in Section 3.7.3 Impacts and Mitigation Measures.

SOURCE: University of California, San Francisco (UCSF), *UCSF Climate Action Plan –Greenhouse Gas Reduction Strategy*, April 2017 and TCR 2018 Summary, 2019.

Greenhouse Gas Emission Estimates and Energy Providers in California

Electricity in San Francisco is primarily provided by the Pacific Gas and Electricity Company (PG&E) and the San Francisco Public Utilities Commission (SFPUC). In 2010, electricity consumption in San Francisco was approximately 6.1 million megawatt-hours (MWh). Of this total, PG&E produced approximately 73 percent of the electricity distributed (4.5 million MWh; about 79 percent of San Francisco's electricity-driven GHG emissions), and the SFPUC produced approximately 14 percent of the electricity distributed (0.9 million MWh; about 0.01 percent of San Francisco's electricity-driven GHG emissions) (SFDOE, 2013).

Muni, City buildings, and a limited number of other commercial accounts in San Francisco are provided energy by the SFPUC, which operates three hydroelectric power plants that are part of San Francisco's Hetch Hetchy water supply and distribution system. This system has the lowest GHG emissions of any large electric utility in California.

The UC Regents has adopted a Direct Access Program for the purchase of carbon-free electricity, which contributes to achieving carbon neutrality in Scope 2 (indirect) emissions and has the ability to purchase up to 100 percent renewable electricity. As of 2018, UCSF purchases approximated 6 percent of the electricity supplied to the Parnassus Heights campus site as renewable power. UCSF has committed to purchasing electricity that is carbon-free electrical usage by 2025.

City of San Francisco Greenhouse Gas Footprint

The majority of San Francisco's GHG emissions are from electricity and natural gas used in buildings (45.1percent), and fuel used in cars and trucks (43.7 percent). The remaining emissions are from the landfilling of organic waste (6.4 percent), municipal operations (3.0 percent), agriculture/urban soils (1.6 percent), and wastewater treatment (0.1 percent). GHG emissions for calendar year 2018 totaled 5,138,095 MT CO_2e which represents a reduction of 15 percent from baseline 1990 levels (SF Environment, 2020).

4.7.2 Regulatory Framework

Federal

U.S. Environmental Protection Agency "Endangerment" and "Cause or Contribute" Findings

The U.S. Supreme Court held that the United States Environmental Protection Agency (USEPA) must consider regulation of motor vehicle GHG emissions. In *Massachusetts v. Environmental Protection Agency* et al., twelve states and cities, including California, together with several environmental organizations sued to require the USEPA to regulate GHGs as pollutants under the CAA (127 S. Ct. 1438 (2007)). The Supreme Court ruled that GHGs fit within the CAA's definition of a pollutant and the USEPA had the authority to regulate GHGs.

On December 7, 2009, the USEPA Administrator signed two distinct findings regarding GHGs under Section 202(a) of the CAA:

- ***Endangerment Finding*:** The current and projected concentrations of the six key GHGs—CO_2, CH_4, N_2O, HFCs, PFCs, and SF_6—in the atmosphere threaten the public health and welfare of current and future generations.
- ***Cause or Contribute Finding*:** The combined emissions of these GHGs from new motor vehicles and new motor vehicle engines contribute to the GHG pollution that threatens public health and welfare.

These findings did not, by themselves, impose any requirements on industry or other entities. However, these actions were a prerequisite for implementing GHG emissions standards for vehicles.

Vehicle Emissions Standards

In 1975, Congress enacted the Energy Policy and Conservation Act, which established the first fuel economy standards for on-road motor vehicles in the United States. Pursuant to the act, the USEPA and National Highway Traffic Safety Administration (NHTSA) are responsible for establishing additional vehicle standards. In August 2012, standards were adopted for model year 2017 through 2025 for passenger cars and light-duty trucks. By 2025, vehicles are required to achieve both 54.5 mpg (if GHG reductions are achieved exclusively through fuel economy improvements) and 163 grams of CO_2 per mile. According to the USEPA, a model year 2025 vehicle would emit one-half of the GHG emissions from a model year 2010 vehicle (USEPA, 2012). Notably, the State of California harmonized its vehicle efficiency standards through 2025 with the federal standards (see Advanced Clean Car program below).

In January 2017, USEPA issued its Mid-Term Evaluation of the GHG emissions standards, finding that it would be practical and feasible for automakers to meet the model year 2022-2025 standards through a number of existing technologies.

In August 2018, the USEPA revised its 2017 determination, and issued a proposed rule that maintains the 2020 Corporate Average Fuel Economy (CAFE) and CO_2 standards for model years 2021 through 2026.[5] The estimated CAFE and CO_2 standards for model year 2020 are 43.7 mpg and 204 grams of CO_2 per mile for passenger cars and 31.3 mpg and 284 grams of CO_2 per mile for light trucks, projecting an overall industry average of 37 mpg, as compared to 46.7 mpg under the standards issued in 2012. On February 7, 2019, the State of California, joined by 16 other states and the District of Columbia, filed a petition challenging the USEPA's proposed rule to revise the vehicle emissions standards, arguing that the USEPA had reached erroneous conclusions about the feasibility of meeting the existing standards.[6] As of April, 9, 2019, the case was pending and oral arguments had not been scheduled.[7] Accordingly, due to the uncertainty of future federal regulations, this analysis assumes that the existing CAFE standards remain in place.

State

California has promulgated a series of executive orders, laws, and regulations aimed at reducing both the level of GHGs in the atmosphere and emissions of GHGs from commercial and private activities within the State. The major components of California's climate protection initiative are reviewed below.

California Environmental Quality Act and Senate Bill 97

Under CEQA lead agencies are required to disclose the reasonably foreseeable adverse environmental effects of projects they are considering for approval. GHG emissions have the potential to adversely affect the environment because they contribute to global climate change. In turn, global climate change has the potential to raise sea levels, alter rainfall and snowfall, and affect habitat.

Senate Bill (SB) 97, signed in August 2007, acknowledges that climate change is a prominent environmental issue requiring analysis under CEQA. This bill directed the Governor's Office of Planning and Research (OPR) to prepare, develop, and transmit to the CNRA guidelines for the feasible mitigation of GHG emissions or the effects of GHG emissions, as required by CEQA, no later than July 1, 2009. The CNRA was required to certify or adopt those guidelines by January 1, 2010. On December 30, 2009, the CNRA adopted amendments to the State CEQA Guidelines, as required by SB 97. The State CEQA Guidelines amendments provide guidance to public agencies

5 Federal Register. Vol. 83, No. 165. August 24, 2018. Proposed Rules.

6 Amicus brief, 2019. USCA Case #18-1114, Doc#1772455_filed February 14, 2019. Available: http://climatecasechart.com/case/california-v-epa-4/. Accessed April 17, 2019.

7 Amicus brief, 2019_USCA Case #18-1114 _Doc #1781696_filed 04.08.19. Available: http://blogs2.law.columbia.edu/climate-change-litigation/wp-content/uploads/sites/16/case-documents/2019/20190207_docket-18-1114_brief-1.pdf. Accessed April 17, 2019.

regarding the analysis and mitigation of the effects of GHG emissions in CEQA documents. The amendments became effective March 18, 2010.

State CEQA Guidelines

The State CEQA Guidelines are embodied in the California Code of Regulations (CCR), Public Resources Code, Division 13, starting with Section 21000. The current State CEQA Guidelines section 15064.4 specifically addresses the significance of GHG emissions, requiring a lead agency to make a "good-faith effort" to "describe, calculate or estimate" GHG emissions in CEQA environmental documents (CNRA, 2018b). Section 15064.4 further states that the analysis of GHG impacts should include consideration of (1) the extent to which the project may increase or reduce GHG emissions, (2) whether the project GHG emissions would exceed a threshold of significance that the lead agency determines applies to the project, and (3) the extent to which the project would comply with "regulations or requirements adopted to implement a statewide, regional, or local plan for the reduction or mitigation of greenhouse gas emissions (see, e.g., section 15183.5(b))."

The CEQA Guidelines also state that a project's incremental contribution to a cumulative effect is not cumulatively considerable if the project will comply with the requirements in a previously approved plan or mitigation program (including plans or regulations for the reduction of greenhouse gas emissions) that provides specific requirements that will avoid or substantially lessen the cumulative problem within the geographic area in which the project is located (State CEQA Guidelines section 15064(h)(3)).

The CEQA Guidelines do not require or recommend a specific analytical methodology or provide quantitative criteria for determining the significance of GHG emissions, nor do they set a numerical threshold of significance for GHG emissions. Section 15064.7(c) clarifies that "when adopting or using thresholds of significance, a lead agency may consider thresholds of significance previously adopted or recommended by other public agencies or recommended by experts, provided the decision of the lead agency to adopt such thresholds is supported by substantial evidence."

When GHG emissions are found to be significant, CEQA Guidelines section 15126.4(c) includes the following direction on measures to mitigate GHG emissions:

> "Consistent with Section 15126.4(a), lead agencies shall consider feasible means, supported by substantial evidence and subject to monitoring or reporting, of mitigating the significant effects of greenhouse gas emissions. Measures to mitigate the significant effects of greenhouse gas emissions may include, among others:
>
> (1) Measures in an existing plan or mitigation program for the reduction of emissions that are required as part of the lead agency's decision;
>
> (2) Reductions in emissions resulting from a project through implementation of project features, project design, or other measures;
>
> (3) Off-site measures, including offsets that are not otherwise required, to mitigate a project's emissions;
>
> (4) Measures that sequester greenhouse gases; and

(5) In the case of the adoption of a plan, such as a general plan, long range development plan, or plans for the reduction of greenhouse gas emissions, mitigation may include the identification of specific measures that may be implemented on a project-by project basis. Mitigation may also include the incorporation of specific measures or policies found in an adopted ordinance or regulation that reduces the cumulative effect of emissions."

State of California Executive Orders

Executive Order S-3-05. In 2005, in recognition of California's vulnerability to the effects of climate change, then-Governor Arnold Schwarzenegger issued EO S-3-05, which set forth a series of target dates by which statewide emissions of GHGs would be progressively reduced, as follows:

- By 2010, reduce GHG emissions to 2000 levels;
- By 2020, reduce GHG emissions to 1990 levels; and
- By 2050, reduce GHG emissions to 80 percent below 1990 levels.

Executive Order S-1-07. EO S-1-07, which was signed by then-Governor Schwarzenegger in 2007, proclaims that the transportation sector is the main source of GHG emissions in California, generating more than 40 percent of statewide emissions. It established a low carbon fuel standard (LCFS) with a goal to reduce the carbon intensity of transportation fuels sold in California by at least 10 percent by 2020.

In September 2018, CARB extended the LCFS program to 2030, making significant changes to the design and implementation of the program, including a doubling of the carbon intensity reduction to 20 percent by 2030.

Executive Orders S-14-08 and S-21-09. In November 2008, then-Governor Schwarzenegger signed EO S-14-08, which expands the State's Renewable Portfolio Standard (RPS) to 33 percent renewable power by 2020. In September 2009, then-Governor Schwarzenegger continued California's commitment to the RPS by signing EO S-21-09, which directs CARB under its AB 32 authority to enact regulations to help the State meet its RPS goal of 33 percent renewable energy by 2020.

Executive Order S-13-08. Governor Schwarzenegger signed EO S-13-08 on November 14, 2008. The order called on State agencies to develop California's first strategy to identify and prepare for expected climate impacts. As a result, the *2009 California Climate Adaptation Strategy (CAS)* report was developed to summarize the best known science on climate change impacts in the State to assess vulnerability and outline possible solutions that can be implemented within and across State agencies to promote resiliency. The State has also developed an Adaptation Planning Guide (CNRA, 2012) to provide a decision-making framework intended for use by local and regional stakeholders to aid in the interpretation of climate science and to develop a systematic rationale for reducing risks caused or exacerbated by climate change. The State's third major assessment on climate change explores local and statewide vulnerabilities to climate change, highlighting opportunities for taking concrete actions to reduce climate-change impacts.

Executive Order B-16-12. In March 2012, Governor Jerry Brown issued an executive order establishing a goal of 1.5 million zero emission vehicles (ZEVs) on California roads by 2025. In addition to the ZEV goal, EO B-16-12 stipulated that by 2015 all major cities in California will have adequate infrastructure and be 'zero-emission vehicle ready'; that by 2020 the State will have established adequate infrastructure to support 1 million ZEVs; that by 2050, virtually all personal transportation in the State will be based on ZEVs, and that GHG emissions from the transportation sector will be reduced by 80 percent below 1990 levels.

Executive Order B-30-15. Governor Brown signed EO B-30-15 on April 29, 2015, which directed the following:

- Established a new interim statewide reduction target to reduce GHG emissions to 40 percent below 1990 levels by 2030.
- Ordered all State agencies with jurisdiction over sources of GHG emissions to implement measures to achieve reductions of GHG emissions to meet the 2030 and 2050 reduction targets.
- Directed CARB to update the Climate Change Scoping Plan to express the 2030 target in terms of million metric tons of carbon dioxide equivalent.

Executive Order B-48-18. On January 26, 2018, Governor Brown issued an executive order establishing a goal of 5 million ZEVs on California roads by 2030.

Executive Order B-55-18. On September 10, 2018, Governor Brown signed EO B-55-18, committing California to total, economy-wide carbon neutrality by 2045. EO B-55-18 directs CARB to work with relevant State agencies to develop a framework to implement and accounting that tracks progress toward this goal.

State of California Policy and Legislation

Assembly Bill 1493. In 2002, then-Governor Gray Davis signed Assembly Bill (AB) 1493. AB 1493 requires that CARB develop and adopt, by January 1, 2005, regulations that achieve "the maximum feasible reduction of greenhouse gases emitted by passenger vehicles and light-duty trucks and other vehicles determined by CARB to be vehicles whose primary use is noncommercial personal transportation in the State."

To meet the requirements of AB 1493, in 2004 CARB approved amendments to the California Code of Regulations (CCR) adding GHG emissions standards to California's existing standards for motor vehicle emissions. All mobile sources are required to comply with these regulations as they are phased in from 2009 through 2016.

Because the Pavley standards (named for the bill's author, State Senator Fran Pavley) would impose stricter standards than those under the CAA, California applied to the USEPA for a waiver under the CAA. In 2008, the USEPA denied the application. In 2009, however, the USEPA granted the waiver. The waiver has been extended consistently since 2009; however, in 2018 the USEPA and NHTSA indicated their intent to revoke California's waiver, and prohibit future State emissions standards enacted under the CAA. As of April 2019, the waiver was still in place and the status of the federal government's revocation of the waiver was uncertain.

Senate Bills 1078 and 107. SB 1078 (Chapter 516, Statutes of 2002) requires retail sellers of electricity, including investor-owned utilities and community choice aggregators, to provide at least 20 percent of their supply from renewable sources by 2017. SB 107 (Chapter 464, Statutes of 2006) changed the target date to 2010.

California Health and Safety Code, Division 25.5 – California Global Warming Solutions Act of 2006 – California Global Warming Solutions Act (Assembly Bill 32 and Senate Bill 32). In September 2006, then-Governor Arnold Schwarzenegger signed the California Global Warming Solutions Act (AB 32). AB 32 establishes regulatory, reporting, and market mechanisms to achieve quantifiable reductions in GHG emissions and establishes a cap on statewide GHG emissions. AB 32 requires that statewide GHG emissions be reduced to 1990 levels by 2020. This reduction will be accomplished by enforcing a statewide cap on GHG emissions that will be phased in starting in 2012. To effectively implement the cap, AB 32 directs CARB to develop and implement regulations to reduce statewide GHG emissions from stationary sources. AB 32 specifies that regulations adopted in response to AB 1493 should be used to address GHG emissions from vehicles. However, AB 32 also includes language stating that if the AB 1493 regulations cannot be implemented, then CARB should develop new regulations to control vehicle GHG emissions under the authorization of AB 32.

In 2016, Senate Bill (SB) 32 and its companion bill AB 197 amended HSC Division 25.5 and established a new climate pollution reduction target of 40 percent below 1990 levels by 2030 and included provisions to ensure the benefits of State climate policies reach into disadvantaged communities.

Climate Change Scoping Plan. A specific requirement of AB 32 was to prepare a Climate Change Scoping Plan for achieving the maximum technologically feasible and cost-effective GHG emission reduction by 2020. CARB developed and approved the initial Scoping Plan in 2008, outlining the regulations, market-based approaches, voluntary measures, policies, and other emission reduction programs that would be needed to meet the 2020 statewide GHG emission limit and initiate the transformations needed to achieve the State's long-range climate objectives (CARB, 2008).

The First Update to the Scoping Plan was approved by CARB in May 2014 and built upon the initial Scoping Plan with new strategies and recommendations. CARB approved the 2017 Climate Change Scoping Plan Update (2017 Scoping Plan Update) in December 2017. The 2017 Scoping Plan Update outlines the proposed framework of action for achieving the 2030 GHG target of 40 percent reduction in GHG emissions relative to 1990 levels (CARB, 2017). The 2017 Scoping Plan Update identifies key sectors of the State's implementation strategy, which includes improvements in low carbon energy, industry, transportation sustainability, natural and working lands, waste management, and water. Through a combination of data synthesis and modeling, CARB determined that the target statewide 2030 emissions limit is 260 MMT CO_2e, and that further commitments will need to be made to achieve an additional reduction of 50 MMT CO_2e beyond current policies and programs. The cornerstone of the 2017 Scoping Plan Update is an expansion of the Cap-and-Trade program to meet the aggressive 2030 GHG emissions goal and ensure achievement of the 2030 limit set forth by EO B-30-15.

The 2017 Scoping Plan Update's strategy for meeting the State's 2030 GHG target incorporates the full range of legislative actions and State-developed plans that have relevance to the year 2030, including the following, described elsewhere in this section:

- Extending the low carbon fuel standard beyond 2020 and increasing the carbon intensity reduction requirement to at least 18 percent by 2030;
- SB 350, which increase renewables portfolio standard (RPS) to 50 percent and requires a doubling of energy efficiency for existing buildings by 2030;
- The 2016 Mobile Source Strategy to reduce emissions from mobile sources, including an 80 percent reduction in smog-forming emissions and a 45 percent reduction in diesel particulate matter from 2016 level in the South Coast Air Basin, a 45 percent reduction in GHG emissions, and a 50 percent reduction in the consumption of petroleum-based fuels;
- The Sustainable Freight Action Plan to improve freight efficiency and transition to zero emission freight handling technologies (described in more detail below);
- SB 1383, which requires a 50 percent reduction in anthropogenic black carbon and a 40 percent reduction in hydrofluorocarbon and methane emissions below 2013 levels by 2030; and
- Assembly Bill 398, which extends the State Cap-and-Trade Program through 2030.

In the 2017 Scoping Plan Update, CARB recommends statewide targets of no more than six metric tons CO_2e per capita by 2030 and no more than two metric tons CO_2e per capita by 2050. CARB acknowledges that because the statewide per capita targets are based on the statewide GHG emissions inventory that includes all emissions sectors in the State, it is appropriate for local jurisdictions to derive evidence-based local per-capita goals based on local emissions sectors and growth projections.

To demonstrate how a local jurisdiction can achieve their long-term GHG goals at the community plan level, CARB recommends developing a geographically-specific GHG reduction plan (i.e., climate action plan) consistent with the requirements of CEQA section 15183.5(b). A so-called "CEQA-qualified" GHG reduction plan, once adopted, can provide local governments with a streamlining tool for project-level environmental review of GHG emissions, provided there are adequate performance metrics for determining project consistency with the plan. Absent conformity with such a plan, CARB recommends "that projects incorporate design features and GHG reduction measures, to the degree feasible, to minimize GHG emissions. Achieving no net additional increase in GHG emissions, resulting in no contribution to GHG impacts, is an appropriate overall objective for new development" (CARB, 2017).[8] While acknowledging that recent land use development projects in California have demonstrated the feasibility to achieve zero net additional GHG emissions (e.g., Newhall Ranch Resource Management and Development Plan), the 2017 Scoping Plan Update states that "Achieving net zero increases in GHG emissions, resulting in no contribution to GHG impacts, may not be feasible or appropriate

8 At pages 100 - 101.

for every project, however, and the inability of a project to mitigate its GHG emissions to net zero does not imply the project results in a substantial contribution to the cumulatively significant environmental impact of climate change under CEQA. Lead agencies have the discretion to develop evidence-based numeric thresholds (mass emissions, per capita, or per service population) consistent with this Scoping Plan, the State's long-term GHG goals, and climate change science…To the degree a project relies on GHG mitigation measures, CARB recommends that lead agencies prioritize on-site design features that reduce emissions, especially from VMT, and direct investments in GHG reductions within the project's region that contribute potential air quality, health, and economic co-benefits locally" (CARB, 2017).[9]

Cap-and-Trade Program. Initially authorized by the California Global Warming Solutions Act of 2006 (AB 32), and extended through the year 2030 with the passage of Assembly Bill 398 (2017), the California Cap-and-Trade Program is a core strategy that the State is using to meet its GHG reduction targets for 2020 and 2030, and ultimately achieve an 80 percent reduction from 1990 levels by 2050. CARB designed and adopted the California Cap-and-Trade Program to reduce GHG emissions from "covered entities"[10] (e.g., electricity generation, petroleum refining, cement production, and large industrial facilities that emit more than 25,000 metric tons CO_2e per year), setting a firm cap on statewide GHG emissions and employing market mechanisms to achieve reductions.[11] Under the Cap-and-Trade Program, an overall limit is established for GHG emissions from capped sectors. The statewide cap for GHG emissions from the capped sectors commenced in 2013. The cap declines over time. Facilities subject to the cap can trade permits to emit GHGs.[12]

Up to eight percent of a covered entity's compliance obligation can be met using carbon offset credits, which are created through the development of projects, such as renewable energy generation or carbon sequestration projects, that achieve a reduction of emissions or an increase in the removal of carbon from the atmosphere from activities not otherwise regulated, covered under the cap, or resulting from government incentives. Offsets are verified reductions of emissions whose ownership can be transferred to others. As required by AB 32, any reduction of GHG emissions used for compliance purposes must be real, permanent, quantifiable, verifiable, enforceable, and additional. Offsets used to meet regulatory requirements must be quantified according to CARB-adopted methodologies, and CARB must adopt a regulation to verify and enforce the reductions. The criteria developed will ensure that the reductions are quantified accurately and are not double-counted within the system (CARB, 2008).

If California's direct regulatory measures reduce GHG emissions more than expected, then the Cap-and-Trade Program will be responsible for relatively fewer emissions reductions. If California's direct regulatory measures reduce GHG emissions less than expected, then the Cap-and-Trade Program will require relatively more emissions reductions. In other words, the Cap-and-Trade Program can be adaptively managed by the State to ensure achievement of California's

[9] At page 102.

[10] "Covered Entity" means an entity within California that has one or more of the processes or operations and has a compliance obligation as specified in subarticle 7 of the Cap-and-Trade Regulation; and that has emitted, produced, imported, manufactured, or delivered in 2008 or any subsequent year more than the applicable threshold level specified in section 95812 (a) of the Regulation.

[11] 17 CCR §§ 95800 to 96023.

[12] See generally 17 CCR §§ 95811, 95812.

2020 and 2030 GHG emissions reduction mandates, depending on whether other regulatory measures are more or less effective than anticipated.

Senate Bill 375. Signed into law on October 1, 2008, SB 375 supplements GHG reductions from new vehicle technology and fuel standards with reductions from more efficient land use patterns and improved transportation. Under the law, CARB approved GHG reduction targets in February 2011 for California's 18 federally designated regional planning bodies, known as Metropolitan Planning Organizations (MPOs). CARB may update the targets every four years and must update them every eight years. MPOs in turn must demonstrate how their plans, policies and transportation investments meet the targets set by CARB through Sustainable Communities Strategy. The original target reductions for the Bay Area are a regional reduction of per-capita CO_2 emissions from cars and light-duty trucks by 7 percent by 2020 and by 15 percent by 2035, compared to a 2005 baseline. The year 2035 reduction target has since been revised in 2018 to reduce per capita vehicular GHG emissions 19 percent by 2035 from a 2005 baseline. ABAG addresses these goals in *Plan Bay Area*, which identifies Priority Development areas near transit options to reduce use of on-road vehicles.

Senate Bill X 1-2. Senate Bill X 1-2, signed by Governor Brown in April 2011, enacted the California Renewable Energy Resources Act. The law obligates all California electricity providers, including investor-owned and publicly-owned utilities, to obtain at least 33 percent of their energy from renewable resources by the year 2020.

Advanced Clean Cars Program. In January 2012, pursuant to Recommended Measures T-1 and T-4 of the Scoping Plan, CARB approved the Advanced Clean Cars Program, a new emissions-control program for model year 2017 through 2025.The program combines the control of smog, soot, and GHGs with requirements for greater numbers of zero-emission vehicles. By 2025, when the rules will be fully implemented, the new automobiles will emit 34 percent fewer global warming gases and 75 percent fewer smog-forming emissions.

The program also requires car manufacturers to offer for sale an increasing number of zero-emission vehicles (ZEVs) each year, including battery electric, fuel cell, and plug-in hybrid electric vehicles. In December 2012, CARB adopted regulations allowing car manufacturers to comply with California's GHG emissions requirements for model years 2017-2025 through compliance with the USEPA GHG requirements for those same model years.

Senate Bill 743. In 2013, Governor Brown signed Senate Bill (SB) 743, which added Public Resources Code section 21099 to CEQA, to change the way that transportation impacts are analyzed under CEQA to better align local environmental review with statewide objectives to reduce GHG emissions, encourage infill mixed-use development in designated priority development areas, reduce regional sprawl development, and reduce vehicle miles traveled (VMT) in California.[13]

[13] Steinberg. 2013. Available online at http://leginfo.legislature.ca.gov/faces/billNavClient.xhtml?bill_id=201320140SB743, accessed on March 10, 2017.

As required under SB 743, OPR developed potential metrics to measure transportation impacts that may include, but are not limited to, total VMT, VMT per capita, automobile trip generation rates, or automobile trips generated. The new VMT metric is intended replace the use of automobile delay and level of service (LOS) as the metric to analyze transportation impacts under CEQA. In its 2018 Technical Advisory on Evaluating Transportation Impacts in CEQA, OPR recommends different thresholds of significance for projects depending on land use types. For example, residential and office space projects must demonstrate a VMT level that is 15 percent less than that of existing development to determine whether the mobile-source GHG emissions associated with the project are consistent with statewide GHG reduction targets. With respect to retail land uses, any net increase of VMT may be sufficient to indicate a significant transportation impact (OPR, 2018b). In 2016, the City of San Francisco adopted local VMT metrics to implement the directive from SB 743.

Mobile Source Strategy (2016). Implementing CARB's Mobile Source Strategy includes measures to reduce total light-duty VMT by 15 percent from the business-as-usual in 2050. The Mobile Source Strategy includes an expansion of the Advanced Clean Cars Program (which further increases the stringency of GHG emissions for all light-duty vehicles, and 4.2 million zero-emission and plug-in hybrid light-duty vehicles by 2030). It also calls for more stringent GHG requirements for light-duty vehicles beyond 2025 as well as GHG reductions from medium-duty and heavy-duty vehicles and increased deployment of zero-emission trucks primarily for class 3 – 7 "last mile" delivery trucks in California. Statewide, the Mobile Source Strategy would result in a 45 percent reduction in GHG emissions, and a 50 percent reduction in the consumption of petroleum-based fuels by 2030/2031.

California Sustainable Freight Action Plan (2016). California Sustainable Freight Action Plan includes strategies to improve freight efficiency and transition to zero emission freight handling technologies. It includes goals to achieve 25 percent improvement of freight system efficiency by 2030, and to deploy over 100,000 freight vehicles and equipment capable of zero emission operation by 2030, and maximize near-zero emission freight vehicles and equipment powered by renewable energy by 2030 (Caltrans, 2016).

Senate Bill 350. The Clean Energy and Pollution Reduction Act of 2015. SB 350 (Chapter 547, Statutes of 2015) was approved by Governor Brown on October 7, 2015. SB 350 increased the standards of the California Renewable Portfolio Standards (RPS) program by requiring that the amount of electricity generated and sold to retail customers per year from eligible renewable energy resources be increased from 33 percent to 50 percent by December 31, 2030. The Act requires the State Energy Resources Conservation and Development Commission to establish annual targets for statewide energy efficiency savings and demand reduction that will achieve a cumulative doubling of statewide energy efficiency savings in existing electricity and natural gas final end uses of retail customers by January 1, 2030.

Senate Bill 100. On September 10, 2018, Governor Brown signed SB 100, establishing that 100 percent of all electricity in California must be obtained from renewable and zero-carbon energy resources by December 31, 2045. SB 100 also creates new standards for the RPS goals that were established by SB 350 in 2015. Specifically, the bill increases required energy from renewable sources for both investor-owned utilities and publicly-owned utilities from 50 percent to 60 percent by 2030. Incrementally, these energy providers must also have a renewable energy supply of 33 percent by 2020, 44 percent by 2024, and 52 percent by 2027. The updated RPS goals are considered achievable, since many California energy providers are already meeting or exceeding the RPS goals established by SB 350.

SB 1383 (Short-lived Climate Pollutants). Senate Bill 1383, passed in 2016, requires statewide reductions in short-lived climate pollutants (SLCPs) across various industry sectors. The SLCPs covered under AB 1383 include methane, fluorinated gases, and black carbon – all GHGs with a much higher warming impact than carbon dioxide and with the potential to have detrimental effects on human health. SB 1383 requires CARB to adopt a strategy to reduce methane by 40 percent, hydrofluorocarbon gases by 40 percent, and anthropogenic black carbon by 50 percent below 2013 levels by 2030. The methane emission reduction goals include a 75 percent reduction in the level of statewide disposal of organic waste from 2014 levels by 2025.

California Assembly Bill 341. AB 341, which became law in 2011, establishes a new statewide goal of 75 percent recycling through source reduction, recycling, and composting by 2020, and changed the way that the State measures progress toward the 75 percent recycling goal, focusing on source reduction, recycling and composting. AB 341 also requires all businesses and public entities that generate 4 cubic yards or more of waste per week to have a recycling program in place. The purpose of the law is to reduce GHG emissions by diverting commercial solid waste to recycling efforts and expand the opportunity for additional recycling services and recycling manufacturing facilities in California (CalRecycle, 2019).

California Assembly Bill 1826. AB 1826, known as the **Commercial Organic Waste Recycling Law**, became effective on January 1, 2016, and requires businesses and multi-family complexes (with 5 units or more) that generate specified amounts of organic waste (compost) to arrange for organics collection services. The law phases in the requirements on businesses with full implementation realized in 2019:

- ***First Tier*:** Commencing in April 2016, the first tier of affected businesses included those that generate eight or more cubic yards of organic materials per week.
- ***Second Tier*:** In January 2017, the affected businesses expanded to include those that generate four or more cubic yards of organic materials per week.
- ***Third Tier*:** In January 2019, the affected businesses are further expanded to include those that generate four or more cubic yards of commercial solid waste per week.

State of California Building Codes

California Building and Energy Efficiency Standards (Title 24). The CEC first adopted Energy Efficiency Standards for Residential and Nonresidential Buildings (CCR, Title 24, Part 6) in 1978 in response to a legislative mandate to reduce energy consumption in the State. Although not originally intended to reduce GHG emissions, increased energy efficiency and reduced consumption of electricity, natural gas, and other fuels would result in fewer GHG emissions from residential and nonresidential buildings subject to the standard. The standards are updated periodically (typically every three years) to allow for the consideration and inclusion of new energy efficiency technologies and methods (CEC, 2015).

The current Title 24, Part 6 standards (2016 standards) were made effective on January 1, 2017. The next update to the Title 24 energy efficiency standards (2019 standards) goes into effect on January 1, 2020.

California Green Buildings Standards Code (CALGreen). Part 11 of the Title 24 Building Energy Efficiency Standards is referred to as the California Green Building Standards (CALGreen) Code. CALGreen is intended to encourage more sustainable and environmentally friendly building practices, require low-pollution emitting substances that cause less harm to the environment, conserve natural resources, and promote the use of energy-efficient materials and equipment. Since 2011, the CALGreen Code is mandatory for all new residential and non-residential buildings constructed in the State. Such mandatory measures include energy efficiency, water conservation, material conservation, planning and design and overall environmental quality. The CALGreen Code was most recently updated in 2016 to include new mandatory measures for residential and nonresidential uses; the new measures took effect on January 1, 2017 (California Building Standards Commission, 2016).

University of California

Policies and Plans of the UC Regents and University of California Office of the President (UCOP)

In 2007, the Chancellor of UCSF signed the *American College and University Presidents' Climate Commitment* (ACUPCC) to complete an emissions inventory, set target dates and interim milestones for becoming climate-neutral,[14] take steps to reduce GHG emissions, and prepare public progress reports (American College, 2007). As an intermediate target, UCOP established the goals of reducing GHG emissions to 2000 levels by 2014; 1990 levels by 2020; and achieving climate neutrality as soon as possible after reaching the 2014 and 2020 reduction targets. More recently, UCSF committed to achieving net zero Scope 1 and Scope 2 emissions by the year 2025.[15] These goals pertain to Scope 1 and Scope 2 emissions of the six Kyoto greenhouse gases originating from sources specified in the ACUPCC,[16] as well as Scope 3 emissions from business airline travel and commuting by UCSF staff and students. The Regents' policy specifies that these goals will be pursued while maintaining the primary research and education mission of the University.

As outlined in UCSF's *Climate Action Plan* of December 2009, the UC President adopted the *Policy on Sustainable Practices (Sustainable Practices Policy)* in 2007, which committed UC to

[14] Climate neutrality for UCSF is defined as the University having a net-zero impact on the Earth's climate; it will be achieved by minimizing GHG emissions as much as possible and using other measures to mitigate the remaining GHG emissions (*UCSF Climate Action Plan*, December 2009).

[15] This is the current commitment made under the ACUPCC and the goal that is referenced in UCSF's Annual Progress Report to the UC Regents.

[16] The six greenhouse gases identified in the Kyoto Protocol/ACUPCC are carbon dioxide, methane, nitrous oxide, sulfur hexafluoride, hydrofluorocarbons, and perfluorocarbons.

implementing actions intended to minimize the University's impact on the environment and reduce the University's dependence on non-renewable energy. The policy was most recently revised in July 2019, and now covers the areas of green building design, clean energy, climate protection, sustainable transportation, sustainable building operations for campuses, zero waste, sustainable procurement, sustainable foodservices, sustainable water systems, and sustainability at UC Health. The UC *Sustainable Practices Policy* will continue to be updated over time.[17]

In addition, the *Sustainable Practices Policy* sets the following requirements and goals relevant to GHG emissions reduction:

New Buildings

- All new building projects, other than acute care facilities, shall be designed, constructed, and commissioned to outperform the CBC energy-efficiency standards by at least 20% or meet the whole-building energy performance targets. The University will strive to design, construct, and commission buildings that outperform CBC energy efficiency standards by 30% or more, or meet the stretch whole-building energy performance targets.
- Acute care/hospital facilities and medical office buildings shall be designed, constructed, and commissioned to outperform ASHRAE 90.1 - 2010 by at least 30% or meet the whole-building energy performance targets.
- No new building or major renovation that is approved after June 30, 2019 shall use onsite fossil fuel combustion (e.g., natural gas) for space and water heating (except those projects connected to an existing campus central thermal infrastructure).
- All new buildings will achieve a USGBC LEED "Silver" certification at a minimum. All new buildings will strive to achieve certification at a USGBC LEED "Gold" rating or higher, whenever possible within the constraints of program needs and standard budget parameters.
- All new building projects will achieve at least two points within the available credits in LEED-BD+C's Water Efficiency category.

Renovated Buildings

- Major renovations of buildings are defined as projects that require 100% replacement of mechanical, electrical and plumbing systems and replacement of over 50% of all non-shell areas (interior walls, doors, floor coverings and ceiling systems) shall at a minimum comply with III.A.4 or III.A.5, above. Such projects shall outperform CBC Title 24, Part 6, currently in effect, by 20%. This does not apply to acute care facilities.
- Acute care facilities and medical office buildings undertaking major renovations as defined above will outperform ASHRAE 90.1- 2010 by 30%.
- Renovation projects with a project cost of $5 million or greater that do not constitute a Major Renovation, shall at a minimum achieve a LEED-ID+C Certified rating and register with the utilities' Savings by Design program, if eligible. This does not apply to acute care facilities.

[17] The current version of the *Policy on Sustainable Practices* is available at: https://policy.ucop.edu/doc/3100155/SustainablePractices

Clean Energy

- *Energy Efficiency*: Each location will implement energy efficiency actions in buildings and infrastructure systems to reduce the location's energy use intensity by an average of least 2 percent annually.
- *On-campus Renewable Electricity*: Campuses and health locations will install additional on-site renewable electricity supplies and energy storage systems whenever cost-effective and/or supportive of the location's Climate Action Plan or other goals.
- *Off-campus Clean Electricity*: By 2025, each campus and health location will obtain 100% clean electricity. By 2018, the University's Wholesale Power Program will provide 100% clean electricity to participating locations.
- *On-campus Combustion*: By 2025, at least 40% of the natural gas combusted on-site at each campus and health location will be biogas. This goal may be realized when supply and transport of biogas is financially feasible and CARB certification is available.

Climate Protection

- Each campus and the UC Office of the President will develop strategies for meeting the following UC goals:
  - Climate neutrality from scope 1 and 2 sources by 2025
  - Climate neutrality from specific scope 3 sources (as defined by Second Nature's Carbon Commitment) by 2050 or sooner
  - Reduce greenhouse gas (GHG) emissions to 1990 levels by 2020, pursuant to the California Global Warming Solutions Act of 2006.

Sustainable Transportation

- Each location will reduce GHG emissions from its fleet and report annually on its progress. Locations shall implement strategies to reduce fleet emissions and improve fuel efficiency of all university-owned or operated fleet vehicles and equipment where practical options exist through acquisition and fleet operation protocols. By 2025, zero emission vehicles or hybrid vehicles shall account for at least 50% of all new light-duty vehicle acquisitions.
- The University recognizes that single-occupant vehicle (SOV) commuting is a primary contributor to commute GHG emissions and localized transportation impacts.
  - By 2025, each location shall strive to reduce its percentage of employees and students commuting by SOV by 10% relative to its 2015 SOV commute rates.
  - By 2050, each location shall strive to have no more 40% of its employees and no more than 30% of all employees and students commuting to the location by SOV.
- Consistent with the State of California goal of increasing alternative fuel – specifically electric – vehicle usage, the University shall promote purchases and support investment in alternative fuel infrastructure at each location.
  - By 2025, each location shall strive to have at least 4.5% of commuter vehicles be ZEV.
  - By 2050, each location shall strive to have at least 30% of commuter vehicles be ZEV.

- Each location will develop a business-case analysis for any proposed parking structures serving University affiliates or visitors to campus to document how a capital investment in parking aligns with each campus' Climate Action Plans and/or sustainable transportation policies.

Sustainable Building Operations for Campuses

- Each campus will submit for certification one pilot building at a LEED-O+M "Certified" level or higher.
- Each campus shall register a master site to certify campus-wide LEED-O+M credits and prerequisites to streamline the certification of multiple buildings through the LEED-O+M rating system by July 1, 2015. Each campus shall certify their campus-wide credits as soon as possible after the master site has been registered.
- Each campus shall seek to certify as many buildings as possible through the LEED-O+M rating system, within budgetary constraints and eligibility limitations.
- All locations shall implement an ongoing Green Lab Assessment Program supported by a department on campus to assess operational sustainability of research groups and the laboratories and other research spaces they use by Summer 2018.
  - At least one staff or faculty member from the location must have the role of managing the Green Lab Assessment Program.
  - Any green lab assessment programs and related efforts will adhere to all relevant UC, state and national policies and laws. Safety will never be compromised to accommodate sustainability goals.
  - All locations shall submit a UC Green Laboratories Action Plan by Summer 2018.

Zero Waste

- The University prioritizes waste reduction in the following order: reduce, reuse, and then recycle and compost.
- The University supports the integration of waste, climate and other sustainability goals, including the reduction of embodied carbon in the supply chain through the promotion of a circular economy and the management of organic waste to promote atmospheric carbon reduction. In support of this goal, waste reporting will include tracking estimated scope 3 greenhouse gas emissions.
- The University will reduce per capita total municipal solid waste generation at all locations other than health locations as follows:
  - Reduce waste generation per capita to Fiscal Year (FY) 2015/16 levels by 2020
  - Reduce waste generation by 25% per capita from FY2015/16 levels by 2025
  - Reduce waste generation by 50% per capita from FY2015/16 levels by 2030
- The University will achieve zero waste by 2020 at all locations other than health locations. Minimum compliance for zero waste is 90% diversion of municipal solid waste from landfill.
- By 2020, the University will prohibit the sale, procurement or distribution of packaging foam, such as food containers and packaging material, other than that utilized for laboratory supply or medical packaging and products. The University seeks to reduce, reuse and find alternatives for

packaging foam used for laboratory and medical packaging products. No packaging foam or expanded polystyrene shall be used in foodservice facilities for takeaway containers.

Sustainable Procurement

- The University values the health and wellbeing of its students, staff, faculty, visitors, and suppliers. The University seeks to provide healthy and accessible conditions for the communities it serves and this will be considered as a fundamental factor when making procurement decisions. Where functional alternatives to harmful products or impacts exist, they are to be strongly preferred.
- The University prioritizes waste reduction in the following order: reduce, reuse, and then recycle. Accordingly, sustainable procurement will look to reduce unnecessary purchasing first, then prioritize purchase of surplus or multiple use products, before looking at recyclable or compostable products.
- The University's sustainable purchasing requirements are:
  - 100% compliance with Required Level Green Spend criteria within three fiscal years of the addition of those products and/or product categories to the Guidelines.
  - 25% Green Spend as a total percentage of spend per product category; target to be reached within three fiscal years after a category is added to the Guidelines.
  - 25% Economically and Socially Responsible Spend as a total percentage of addressable spend; target to be reached within five fiscal years of adoption of this section in the Guidelines.
- The University's sustainable purchasing reporting requirements are:
  - Reporting on percent Green Spend beginning at the close of the first full Fiscal Year after a category is added to the Guidelines.
  - Reporting on percent Economically and Socially Responsible Spend beginning at the close of Fiscal Year 2018/19.
  - Reporting on percent Sustainable Spend will be piloted by UCOP beginning at the close of Fiscal Year 2018/19.
- Each University's Procurement department will integrate sustainability into its processes and practices, including competitive solicitations, in order to satisfy the sustainable purchasing goals outlined above for products, as well as for the procurement of services. The University will do so by:
  - Allocating a minimum of 15% of the points utilized in solicitation evaluations to sustainability criteria. Criteria may include, but is not limited to, sustainable product attributes, supplier diversity, supplier practices, contributions to health and wellbeing, and materials safety.
  - Supporting outreach, education and providing equal access to small, diverse, and disadvantaged suppliers for all applicable University procurement opportunities.
  - Comparing the Total Cost of Ownership when evaluating costs for goods and services in the selection of suppliers, whenever feasible.

- Targeting sustainable products and services for volume-discounted pricing to make less competitive or emerging sustainable products and services cost competitive with conventional products and services.
- Leveraging its purchasing power and market presence to develop sustainable product and service options where not already available.
- Requiring packaging for all products procured by the University be designed, produced, and distributed to the end user in a sustainable manner.
- Contracting with suppliers of products (e.g. electronics, furniture, lab consumables) that have established (preferably non-manufacturer specific) end-of-life reuse, recycling, and/or takeback programs at no extra cost to the University, and in compliance with applicable federal, state, and University regulations regarding waste disposal.
- Requiring sustainability related purchasing claims to be supported with UC recognized certifications and/or detailed information on proven benefits, durability, recycled content, and recyclability properties, in accordance with the Federal Trade Commission's Green Guides for the use of environmental marketing claims.
- Working with its suppliers to achieve greater transparency and sustainable outcomes throughout the supply chain. This may include maximizing the procurement of products that optimize use of resources from extraction through manufacturing and distribution.

- All procurement staff will consult the UC Sustainable Procurement Guidelines document for minimum mandatory sustainability requirements to be included in solicitations for a given product or service category.

Sustainable Foodservice Operations

- *Food Procurement*: Each campus and health location foodservice operation shall strive to procure 20% sustainable food products by the year 2020, while maintaining accessibility and affordability for all students and UC Health Location's foodservice patrons.
- *Education*: Each campus and health location shall provide patrons with access to educational materials that will help support their food choices.
- *Engagement with External Stakeholders*: Campus and health location departments, organizations, groups, and individuals shall engage in activities with their surrounding communities that support common goals regarding sustainable food systems.
- *Sustainable Operations*: Campus and health location foodservice operations shall strive to earn third party "green business" certifications for sustainable dining operations.
- Retail foodservice tenants will strive to meet the policies. above. Given the constraints faced by nationally-branded franchises that must purchase food through corporate contracts, location departments managing retail foodservice tenants will have the option of meeting the procuring 20% of all sustainable food products by the year 2020 policy by aggregating the purchases of all retail entities under the jurisdiction of a single operational unit on location.

Sustainable Water Systems

- Locations will reduce growth-adjusted potable water consumption 20% by 2020 and 36% by 2025, when compared to a three-year average baseline of FY2005/06, FY2006/07, and FY2007/08. Locations that achieve this target early are encouraged to set more stringent goals to further reduce potable water consumption. Each Campus shall strive to reduce potable water used for irrigation by converting to recycled water, implementing efficient irrigation systems, drought tolerant planting selections, and/or by removing turf.

- Each location will develop and maintain a Water Action Plan that identifies long term strategies for achieving sustainable water systems. Campuses will include quantification of total square feet of used turf and under-used turf areas on campus as well as a plan for phasing out un-used turf irrigated with potable water.
- Each campus shall identify existing single pass cooling systems and constant flow sterilizers and autoclaves in laboratories and develop a plan for replacement.
- New equipment requiring liquid cooling shall be connected to an existing recirculated building cooling water system, new local chiller vented to building exhaust or outdoors, or to the campus chilled water system through an intervening heat exchange system if available.
  - Once through or single pass cooling systems shall not be allowed for softplumbed systems using flexible tubing and quick connect fittings for short term research settings.
  - If no alternative to single pass cooling exists, water flow must be automated and controlled to avoid water waste.

Sustainability at UC Health

- Health locations will achieve Practice Greenhealth's award "Greenhealth Partner for Change". Locations will use the definitions in Practice Greenhealth to set medical-center-specific goals for waste diversion and reduction as well as water reduction.
- UC San Francisco Health and UCLA Health have the following targets:
  - By 2020, 50% of total solid waste diverted from landfill and incineration.
  - By 2020, 40 lbs of total solid waste per Adjusted Patient Day.
  - In line with campus targets, UCLA and UCSF Medical Centers will reduce growth-adjusted potable water consumption 20% by 2020 and 36% by 2025, when compared to a three-year average baseline of FY2005/06, FY2006/07, and FY2007/08.

UC Carbon Neutrality Initiative

In November 2013, UC President Janet Napolitano announced the UC Carbon Neutrality Initiative, which commits the UC to achieving climate neutrality from Scope 1 and 2 sources by 2025 and progressing toward climate neutrality from specific Scope 3 sources by 2050 or sooner. Scope 1 emission sources include direct emissions from sources owned or controlled by the UC, such as emissions from stationary combustion, process emissions, and fugitive emissions; while Scope 2 sources include indirect emissions from purchased electricity and purchased cogeneration for heating or cooling. Scope 3 sources include emissions from all other sources that occur as a result of university operations but occur from sources not owned or controlled.

UC Strategic Energy Plan

The UC Strategic Energy Plan (SEP) was prepared in 2008 for all UC campuses, to fulfill a goal of UC's *Policy on Sustainable Practices* to implement energy efficiency projects in existing buildings. The UCSF portion of the SEP analyzes energy use and GHG trends, and identifies potential energy efficiency retrofit projects for all buildings over 50,000 square feet at UCSF (primarily lighting, HVAC, commissioning and central plant measures). Energy savings, GHG emissions savings, and financial returns are estimated for hundreds of projects, which are grouped into Tier 1 (high priority) and Tier 2 (longer term planning) projects based on their energy savings and financial payback. The SEP project list is updated every year by each campus to evaluate the feasibility of additional energy-saving measures.

University of California, San Francisco

UCSF has a robust sustainability program covering sustainability activities across the entire campus and medical center. Through its Office of Sustainability, UCSF has created work groups addressing sustainability in the following areas, most of which have direct implications for GHG emissions: Carbon Neutrality, Zero Waste, Water Conservation, Sustainable Food, Toxics Reduction, Green Procurement, Green Buildings, and Sustainable Operations.

UCSF's Sustainability Governance consists of the Academic Senate Sustainability Committee and the University's Advisory Committee on Sustainability (UACS). The Academic Senate Sustainability Committee identifies faculty recommendations on improving sustainability at UCSF. The charge of the UACS is to:

- Annually examine UCSF's effect on the environment from a comprehensive perspective;
- Evaluate existing UCSF policies, procedures, and programs that affect the environment;
- Serve as a coordinating body for groups or individuals concerned with sustainability issues;
- Advise selected work groups in the development and implementation of UCSF's sustainability initiatives and goals; and
- Support reduction of greenhouse gas emissions to 1990 levels by 2020.

UCSF includes a Sustainability Dashboard on its LivingGreen web site that includes performance metrics for multiple issue areas, including GHG emissions. UCSF also publishes an annual sustainability report on its web site.[18]

The Sustainability Annual Report summarizes the entire UCSF Campus' key accomplishments utilizing 10 key categories of the UC *Sustainable Practices Policy*, for a given Fiscal Year, with the most recent report documenting FY18. The FY18 report also includes goals for FY19. Where available, it presents data separately for the UCSF Campus and the UCSF Medical Center. Where data is reported for both, the report refers to the entire UCSF campus.

UCSF Climate Action Plan and GHG Reduction Strategy

As part of implementing the UC *Sustainable Practices Policy*, UCSF developed a Climate Action Plan in 2009, a long-term strategy for voluntarily meeting the State of California's goal for reducing GHG emissions to 1990 levels by 2020, pursuant to AB 32. In addition, as part of the 2014 LRDP, UCSF developed a GHG Reduction Strategy (GHGRS) to provide streamlined

[18] Annual Sustainability Reports are available on the UCSF LivingGreen web site: http://sustainability.ucsf.edu/.

analysis under CEQA for future development projects. Both of these documents were updated in 2017 to create a combined UCSF Climate Action Plan – GHGRS to reflect changes that have occurred since 2014 in both the goals outlined in the UC *Sustainable Practices Policy* and the addition of new campus projects unforeseen at the time of LRDP adoption.

Specifically, the updated GHGRS includes strategies to meet UC goals to achieve climate neutrality from Scope 1 and Scope 2 emissions by 2025. Additionally, the 2017 update recognizes new GHG reduction target in response to the State's Climate Change Scoping Plan to achieve a 40 percent reduction in GHGs compared to 1990 levels by year 2030. The update also:

- Considers the completion of the Five Points Solar Park, a 60-megawatt solar power installation built to supply renewable energy to the University of California;
- Consolidates GHG reduction efforts already underway and planned for UCSF over the life of the LRDP through 2035;
- Quantifies the impact on GHG emissions of projected land use as represented by the LRDP; and
- Helps streamline California Environmental Quality Act (CEQA) review of future campus development projects as consistent with the LRDP growth projections and the GHG reduction policies and programs contained in the GHGRS.

Under CEQA, the effects of GHG emissions are considered a potentially significant environmental impact. In addressing climate change, CEQA provides a useful mechanism for local agencies to evaluate new development on a comprehensive basis rather than on an individual project basis. The 2017 GHGRS has been further updated by UCSF to reflect the proposed amendment of the 2014 LRDP from the incorporation of the proposed CPHP. The revised GHGRS portion of the document has been prepared in accordance with Section 15183.5 of the CEQA Guidelines which addresses how lead agencies can analyze and mitigate GHG impacts at a programmatic level and streamline environmental review of future projects that are consistent with the policies and programs contained in the GHGRS. This updated GHGRS is contained as Appendix GHGRS in this Draft EIR and will be considered as part of the proposed amendment of the LRDP.

The updated GHGRS requires the implementation of Tier 1 emission reduction measures along with a mix of Tier 2 reduction measures identified by UCSF to close the gap necessary to meet emission reduction targets for 2020, 2025, 2035, and 2050 and allow for utilization of the streamlining process provision under CEQA. Consequently, a future development project would be considered consistent with the revised GHGRS if it is consistent with the assumptions within the GHGRS with respect to the amount and type of development and inclusive of GHG reduction measures within the GHGRS. Projects consistent with the revised GHGRS, inclusive of conformance with any applicable performance measures, would not be required to provide additional analysis under CEQA Sections 15064(h) and 15183.5(b)(2). The methodology for screening projects is discussed below under the *Approach to Analysis*.

UCSF Transportation Demand Management

UCSF employs an aggressive Transportation Demand Management (TDM) program that includes an extensive shuttle system, among other alternative transportation opportunities. Based on

UCSF's 2018 employee commute survey, approximately 80 percent of the campus faculty, staff and student population commutes by means other than driving alone. Key features of UCSF's existing TDM program include the following:

- 60 shuttles serving 17 locations, with over 2.3 million passengers per year
- 33 vanpools that travel as far as Sacramento and operate using the Green Road Safety System, which improves fuel consumption and safety
- 62 reserved carpool stalls at various sites
- Marin Commute Club buses with about 55 daily riders who live in Marin and Sonoma Counties to the north of San Francisco
- 18 City CarShare vehicles with dedicated parking spaces, along with 1,500 UCSF members who can use these vehicles by scheduling their use on-line
- 18 electric-vehicle charging stations at Parnassus Heights, Mount Zion, and Mission Bay, with plans for another 20 at Mission Bay in the Owens Street Garage and 10 at other locations
- Over 1,900 UCSF users of the ZimRide online carpool matching program
- 972 bicycle parking spaces with another 100 planned at Mission Bay, as well as bike racks on shuttles, a cyclist shower program that allows bicyclists to use UCSF showers at a discount, and other bicycle-related benefits
- Bay Area Bike Share station at Mission Bay (due to commence operation by the end of 2016), where members will have access to bicycles (and a regional network of stations) provided by the Bay Area Air Quality Management District
- More than 400 off-street motorcycle parking stalls in garages and surface parking lots
- An "emergency ride home" program to encourage use of alternative modes of transportation
- Clipper Card (public transit pass) sales at easily accessible locations, including through UCSF's website
- Close to 1,800 UCSF employees that participate in a pretax transit program, which saved UCSF employees over $700,000 on public transit commute costs in 2013
- As UCSF is subject to the City of San Francisco's parking tax, market rate pricing for parking will be implemented that will further discourage personal vehicle use.

Regional

Bay Area Air Quality Management District

The Bay Area Air Quality Management District (BAAQMD) is the regional government agency that regulates stationary sources of air pollution within the nine San Francisco Bay Area counties. BAAQMD regulates GHG emissions through the following plans, programs, and guidelines.

Clean Air Plan. BAAQMD and other air districts prepare clean air plans in accordance with the state and federal Clean Air Acts. On April 19, 2017, the BAAQMD Board of Directors adopted the 2017 Clean Air Plan Spare the Air, Cool the Climate, an update to the 2010 Clean Air Plan.

The Clean Air Plan is a comprehensive plan that focuses on the closely-related goals of protecting public health and protecting the climate. Consistent with the State's GHG reduction targets, the plan lays the groundwork for a long-term effort to reduce Bay area GHG emissions 40 percent below 1990 levels by 2030 and 80 percent below 1990 levels by 2050.

As part of the Basin-Wide Methane Strategy outlined in the 2017 Clean Air Plan, the BAAQMD is currently developing a new regulation to address significant releases of methane in the Bay Area, called *Regulation 13, Rule 1: Significant Methane Releases*, which would serve as a general backstop rule to address releases of methane from regulated sources.

BAAQMD Climate Protection Program. The BAAQMD established a climate protection program to reduce pollutants that contribute to global climate change and affect air quality in the San Francisco Bay Area Air Basin. The climate protection program includes measures that promote energy efficiency, reduce vehicle miles traveled, and develop alternative sources of energy, all of which assist in reducing emissions of GHG and in reducing air pollutants that affect the health of residents. The BAAQMD also seeks to support current climate protection programs in the region and to stimulate additional efforts through public education and outreach, technical assistance to local governments and other interested parties, and promotion of collaborative efforts among stakeholders.

BAAQMD CEQA Air Quality Guidelines. The BAAQMD CEQA Air Quality Guidelines were prepared to assist in the evaluation of air quality impacts of projects and plans proposed within the Bay Area. The guidelines provide recommended procedures for evaluating potential air impacts during the environmental review process, consistent with CEQA requirements, and include recommended thresholds of significance, mitigation measures, and background air quality information. The guidelines also include recommended assessment methodologies for air toxics, odors, and greenhouse gas emissions. In June 2010, the BAAQMD's Board of Directors adopted CEQA thresholds of significance and an update of the CEQA Guidelines, which included significance thresholds for GHG emissions based on the emission reduction goals for 2020 articulated by the State Legislature in AB 32. The first threshold, 1,100 MT CO_2e per year, is a numeric emissions level below which a project's contribution to global climate change would be less than cumulatively considerable. For larger and mixed-use projects, the Guidelines state that emissions would be less than cumulatively significant if the project as a whole would result in an efficiency of 4.6 MT CO_2e per service population or better (BAAQMD, 2010).

On March 5, 2012, the Alameda County Superior Court issued a judgment finding that the BAAQMD had failed to comply with CEQA when it adopted the thresholds of significance in the BAAQMD CEQA Air Quality Guidelines. That decision was appealed to the Court of Appeal and one of the issues in the case has been decided by the California Supreme Court. The Supreme Court found that CEQA does not require an analysis of how existing environmental conditions will impact future residents or users of a proposed project, and remanded the case down for the lower court to decide remaining issues. Following the Superior Court order, the BAAQMD released revised *CEQA Air Quality Guidelines* in May of 2012 that include guidance on calculating air pollutant emissions, obtaining information regarding the health impacts of air pollutants, and identifying potential mitigation measures, and which set aside the significance thresholds. There was no challenge to BAAQMD's 2010 greenhouse gas emissions thresholds or the substantial evidence supporting those thresholds (BAAQMD, 2012). In May 2017, the Air District published a new version of the Guidelines, which included no changes to the quantitative greenhouse gas thresholds, but presented them as guidance and recommended that lead agencies consider the information to develop their own thresholds of significance.

Under BAAQMD's current *CEQA Air Quality Guidelines*, a local government may prepare and adopt a qualified GHG Reduction Strategy that is consistent with AB 32 goals. If a project is consistent with an adopted qualified GHG Reduction Strategy and General Plan that addresses the project's GHG emissions, it can be presumed that the project will not have significant GHG emissions under CEQA (BAAQMD, 2017a).

Metropolitan Transportation Commission/Association of Bay Area Governments Sustainable Communities Strategy. MTC is the federally recognized MPO for the nine county Bay Area. On July 18, 2013, the *Plan Bay Area* was jointly approved by ABAG's Executive Board and by MTC. The Plan includes the region's Sustainable Communities Strategy, as required under SB 375, and the 2040 Regional Transportation Plan. The Sustainable Communities Strategy lays out how the region will meet GHG reduction targets set by CARB. CARB's current targets call for the region to reduce per capita vehicular GHG emissions 10 percent by 2020 and 19 percent by 2035 from a 2005 baseline (CARB, 2018). A central greenhouse gas reduction strategy of *Plan Bay Area* is the concentration of future growth within Priority Development Areas (PDAs) and Transit Priority Areas (TPAs). To be eligible for PDA designation, an area must be within an existing community, near existing or planned fixed transit or served by comparable bus service, and planned for more housing. To be eligible for PDA designation, an area must be within an existing community, near existing or planned fixed transit or served by comparable bus service, and planned for more housing.[19] A TPA is an area within one-half mile of an existing or planned major transit stop such as a rail transit station, a ferry terminal served by transit, or the intersection of two or more major bus routes (MTC, 2013).

On July 26, 2017, MTC adopted *Plan Bay Area 2040*, a focused update that builds upon the growth pattern and strategies developed in the original *Plan Bay Area* but with updated planning assumptions that incorporate key economic, demographic and financial trends since the original plan was adopted (MTC, 2017). The Parnassus Heights campus site is located within a Transit Priority Area (TPA) with respect to *Plan Bay Area 2040*. As stated above, a TPA is defined as an area within one-half mile of an existing or planned major transit stop (Public Resources Code Section 21099(a)(7)), where "major transit stop" is defined as a site containing any of the following: an existing rail or bus rapid transit station, a ferry terminal served by either a bus or rail transit service, or the intersection of two or more major bus routes with a frequency of service interval of 15 minutes or less during the morning and afternoon peak commute periods.

19 It should be noted that on February 20, 2020, MTC adopted growth geographies for several new PDAs, including a "Central City Neighborhoods PDA" in San Francisco that includes a portion of the Parnassus Heights campus site. This and other new PDAs are not included in the *Plan Bay Area 2040*, but will be studied in the *Draft Plan Bay Area 2050 Blueprint* (MTC, 2020).

Local

City and County of San Francisco

Pursuant to Article 9, Section 9 of the California State Constitution, UCSF is constitutionally exempt from local land use regulations whenever using property under its control in furtherance of its educational purposes. This authority includes University master planning and oversight of land uses and the development, maintenance and use of physical facilities under UCSF control. Thus, the following City plans and policies do not apply to UCSF and are presented for informational purposes only. The following is a general discussion of CCSF policy with respect to GHG emissions.

San Francisco Greenhouse Gas Reduction Ordinance

In May 2008, the CCSF adopted Ordinance No. 81-08 amending the San Francisco Environment Code to establish GHG emissions targets and departmental action plans and to authorize the San Francisco Department of the Environment to coordinate efforts to meet these targets. The City ordinance establishes the following GHG emissions reduction limits and target dates by which to achieve them: determine 1990 Citywide GHG emissions by 2008, the baseline level, with reference to which target reductions are set; reduce GHG emissions by 25 percent below 1990 levels by 2017; reduce GHG emissions by 40 percent below 1990 levels by 2025; and reduce GHG emissions by 80 percent below 1990 levels by 2050. The City's GHG reduction targets are consistent with—in fact, more ambitious than—those set forth in Governor Brown's recent Executive Order B-30-15 by targeting a 40 percent reduction by 2025 rather than by 2030.

San Francisco Greenhouse Gas Reduction Strategy

San Francisco has developed a number of plans and programs to reduce the City’s contribution to global climate change and to meet the goals of the City’s Greenhouse Gas Reduction Ordinance. San Francisco’s Greenhouse Gas Reduction Strategy documents its actions to pursue cleaner energy, energy conservation, and alternative transportation and solid waste policies. For instance, the City has implemented mandatory requirements and incentives that have measurably reduced GHG emissions including, but not limited to, increasing the energy efficiency of new and existing buildings, installation of solar panels on building roofs, implementation of a green building strategy, adoption of a zero waste strategy, a construction and demolition debris recovery ordinance, a solar energy generation subsidy, incorporation of alternative fuel vehicles in the City’s transportation fleet (including buses), and a mandatory recycling and composting ordinance. The strategy also identifies 42 specific regulations for new development that would reduce a project’s GHG emissions.

San Francisco’s policies and programs have resulted in a reduction in GHG emissions to below 1990 levels, exceeding statewide AB 32 GHG reduction goals. San Francisco’s GHG emissions in 2010 were 5.3 MMT CO_2e, which represents a 14.5 percent reduction in GHG emissions compared to 1990 levels (6.2 MMT CO_2e). The reduction is largely a result of reduced GHG emissions from the electricity sector, from 2.0 million metric tons CO_2e (1990) to 1.3 MMT CO_2e (2010), and the waste sector, from 0.5 MMT CO_2e (1990) to 0.2 MMT CO_2e (2010) (SF DOE, 2013).

4.7.3 Impacts and Mitigation Measures

Significance Criteria

Would implementation of the CPHP:

a) Generate greenhouse gas emissions, either directly or indirectly, that may have a significant impact on the environment?

b) Conflict with an applicable plan, policy or regulation adopted for the purpose of reducing the emissions of greenhouse gases?

Approach to Analysis

GHG emissions and global climate change represent cumulative impacts of human activities and development projects locally, regionally, statewide, nationally, and worldwide. GHG emissions from all of these sources cumulatively contribute to the significant adverse environmental impacts of global climate change. No single project could generate enough GHG emissions to noticeably change the global average temperature; instead, the combination of GHG emissions from past, present, and future projects around the world have contributed and will continue to contribute to global climate change and its associated environmental impacts.

BAAQMD has prepared guidelines and methodologies for analyzing the impacts associated with GHG emissions. These guidelines are consistent with CEQA Guidelines sections 15064.4 and 15183.5, which address the analysis and determination of significant impacts from a proposed project's GHG emissions. CEQA Guidelines section 15064.4 allows lead agencies to rely on a qualitative analysis to describe GHG emissions resulting from a project. CEQA Guidelines Section 15183.5 allows for public agencies to analyze and mitigate GHG emissions as part of a larger plan for the reduction of greenhouse gases and describes the required contents of such a plan. Accordingly, UCSF prepared its own combined Climate-Action Plan - GHGRS, updated in 2017 (described under *Regulatory Framework*, above). The updated GHGRS provides a framework for meeting the new (2017) statewide 2030 GHG emissions reduction target of 40 percent below 1990 levels and maintaining its status as a qualified GHG reduction plan per *CEQA Guidelines* section 15183.5, through the year 2035. The intent of the updated GHGRS is to ensure that UCSF can answer "no" to the above stated questions regarding "Greenhouse Gas Emissions" in the Environmental Checklist Form (Appendix G) of the *CEQA Guidelines.*

The GHGRS provides a checklist for determining project consistency with the GHGRS and to provide the opportunity to demonstrate that a project would minimize GHG emissions while ensuring that UCSF will achieve its projected reductions of GHGs. The checklist screens projects for important GHG reduction measures that, when implemented, will provide confidence that the project will not impede UCSF's ability to meet its GHG emissions targets. The checklist is based on the GHGRS year 2020 emissions target and growth assumptions associated with the 2014 LRDP. Future year emission and growth targets for year 2030 to achieve the statewide mandated GHG emissions reduction target of 40 percent below 1990 levels are included in the updated GHGRS in Appendix GHGRS.

In lieu of a GHGRS that is qualified per CEQA Guidelines section 15183.5 through the year 2030 under the pending adoption as part of the LRDP amendment, GHG impact assessment in this EIR with respect to the year 2030 and 2050 reduction targets is based on guidance in the CARB's 2017 Scoping Plan Update regarding implementation of available measures to reduce GHG emissions. The 2017 Scoping Plan Update states that "there are recent examples of land use development projects in California that have demonstrated that it is feasible to design projects that achieve zero net additional GHG emissions." In the 2017 Scoping Plan Update, CARB recognizes that achieving no net increase in GHG emissions compared to existing conditions would demonstrate that a project is not contributing to climate change impacts, and is a recommended objective for land use development projects that are able to feasibly achieve this goal. Accordingly, the CPHP would result in a significant impact on the environment if GHG emissions from construction and operations of the Parnassus Heights campus site would exceed a threshold of zero net additional GHG emissions compared to the existing conditions, currently estimated below to be 125,426 MT CO_2e annually for all Scope 1, Scope 2, and Scope 3 sources, as defined above.

Construction-generated GHGs are considered in this analysis by amortizing over a period of 30 years and then added to annual operational emissions in the emission inventories compiled for this analysis.[20]

Impact Analysis

Impact GHG-1: Implementation of the CPHP would generate GHG emissions, either directly or indirectly, that may have a significant impact on the environment. (Less than Significant with Mitigation)

CPHP

Construction

As discussed in Chapter 3, *Project Description*, the CPHP would provide for development of approximately 2.90 million gross square feet (gsf) of new building space, or approximately 2.04 million gsf of net new building space. CPHP Initial Phase projects, including the Irving Street Arrival, RAB, New Hospital and initial Aldea Housing Densification projects, along with other miscellaneous improvements would be completed by 2030. Over an approximately 10-year period, there would be about 1.43 million gsf of new construction, nearly 287,000 gsf of demolition, and approximately 254,000 cubic yards of excavation on the campus site. The analysis provided below indicates that amortized over 30-years, annual construction emissions would be 375 MT CO_2e/yr.

Proposed CPHP Future Phase development is assumed to be completed between approximately 2030 and the horizon year of the Plan, about year 2050. Over this approximately 20-year period, there would be an additional 1.47 million gsf of new construction, approximately 401,000 gsf of

[20] The GHG operational analysis is consistent with the OPR's *CEQA and Climate Change Advisory Discussion Draft*. As stated therein, "when possible, lead agencies should quantify the project's construction and operational greenhouse gas emissions, using available data and tools, to determine the amount, types, and sources of greenhouse gas emissions resulting from the project." Governor's Office of Planning and Research, CEQA and Climate Change Advisory Discussion Draft, December 2018, p. 8.

demolition, and approximately 139,000 cubic yards of excavation on the campus site. The general types of construction equipment and techniques that would be used for CPHP Future Phase projects would be similar to those for the CPHP Initial Phase projects. As a result, while on balance, the overall amount of construction in the Future Phase would be roughly comparable to that which would occur in the Initial Phase, the Future Phase construction would be generally spread out over a longer duration (20-year period) that the Initial Phase construction (10-year period).

Without details of specific construction schedules, sequencing, and overlap of the CPHP Future Phase projects, it is not possible to directly calculate amortized annual GHG emissions associated with the entirety of the CPHP Future Phase. However, when considering the amount and type of CPHP Future Phase demolition and construction, and timeframe over which these activities would occur, it is expected that amortized construction emissions that would be experienced during the CPHP Future Phase may be generally comparable to those calculated for the CPHP Initial Phase projects inclusive of the New Hospital.

Operations

Area, Energy, and Indirect Sources

Operational GHG emissions associated with the CPHP would result from electrical and natural gas usage, water and wastewater transport (the energy used to pump water and wastewater to and from the campus site) and solid waste generation. However, UCSF has committed to net zero electricity by 2025 and no GHG emissions are predicted from electrical usage under full buildout of the CPHP. GHG emissions from natural gas are direct emissions resulting from on-site combustion for the CUP, heating and other purposes. GHG emissions from water and wastewater transport are also indirect emissions resulting from the energy required to transport water from its source, and the energy required to treat wastewater and transport it to its treated discharge point. Solid waste-related emissions are generated when the increased waste generated by the development under the CPHP is disposed in a landfill where it decomposes, producing methane gas.[21]

UCSF's GHGRS identifies strategies to improve efficiency of existing buildings, while new buildings are required to meet or surpass Title 24 energy efficiency standards and attain a minimum LEED silver certification or equivalent. GHG emissions from mobile transportation, water and wastewater conveyance, and solid waste were estimated using the CalEEMod model, while emissions from natural gas combustion were estimated based on existing UCSF Parnassus Heights campus site GHG inventory for the most recent inventory year (2018) and the overall increase in developed building space that would be served by the CUP.

Estimated emissions for existing conditions (2018) and under full buildout of the CPHP in year 2050 are presented in **Table 4.7-3**. Energy use (natural gas combustion at the CUP) represents approximately 68 percent of estimated campus-wide operational GHG emissions under the CPHP while mobile emissions from vehicles contributes 29 percent of the overall emissions under the CPHP. Construction-related GHG emissions were amortized over an assumed 30-year lifetime of the project and are included in the table as the BAAQMD has not adopted a separate GHG

[21] CH_4 from decomposition of municipal solid waste deposited in landfills is counted as an anthropogenic (human-produced) GHG. (USEPA, 2006).

threshold for construction emissions. As shown in the table, campus-wide GHG emissions with the CPHP would increase by approximately 61,815 MT of CO_2e per year. Although there would be a slight decrease in the emissions per service population in 2050 compared to existing conditions, given that emissions would exceed the net zero goal of the CARB, the impact is identified as significant and mitigation measures are required.

TABLE 4.7-3
ANNUAL OPERATIONAL GHG EMISSIONS AT PARNASSUS HEIGHTS CAMPUS SITE: EXISTING AND WITH CPHP YEAR 2050

Emission Source	Emissions (metric tons year)			
	CO_2	CH_4	N_2O	Total CO_2e
Existing (2018) Conditions at Parnassus Heights Campus Site				
Mobile Sources[a]	43,266	2.32	<1	43,324
Electricity	219	0.97	1.11	221
Natural gas combustion (CUP)	79,510	1.35	3.29	79,515
Natural gas combustion (non-CUP)	668	0.01	0.01	671
Water and wastewater	155	15.9	<1	666
Solid Waste	324	19.2	<1	804
Generators	195	0.03	<1	197
Total (2018)				**125,426**
Service population	UCSF Parnassus Heights faculty, staff and students; and residents on Parnassus Heights campus site			11,287
Emissions per service population				**11.1**
Parnassus Heights Campus Site With CPHP (2050) Conditions				
Mobile Sources[a]	54,991	1.87	<1	55,038
Electricity[b]	0	0	0	0
Natural gas combustion (CUP)	128,011	2.17	5.30	128,019
Natural gas combustion (non-CUP)	1,075	0.02	0.02	1,081
Water and wastewater	239	24.5	<1	1,025
Solid Waste	452	26.7	<1	1,120
Generators	583	<1	<1	583
Amortized Construction[c]	375	<1	<1	375
Total (2050)				**187,241**
Service population	UCSF Parnassus Heights faculty, staff and students; and residents on Parnassus Heights campus site			17,212
Emissions per service population				**10.9**
Net Change from Existing				**61,815**
Significant Impact?				**Yes**

NOTE: Project CO_2 emissions estimates were made using CalEEMod v.2013.2 with updated EMFAC2017 emission factors and existing UCSF GHG inventory data. Emission calculations vary from those presented in proposed revisions to the GHGRS due to the inclusion here of all vehicle trips, and not just those associated with staff and students.

[a] Mobile emissions are calculated based on daily VMT calculated for the transportation analysis and conservatively multiplied by 365 to arrive at an annual VMT.

[b] UCSF has committed to net zero electricity by 2025 and no GHG emissions are predicted from electrical usage under full buildout of the CPHP.

[c] Construction emissions associated with future phase projects have not been included because the timing of the projects and thus the start of their amortization period is unknown but are anticipated to be comparable to those calculated for the CPHP Initial Phase projects inclusive of the New Hospital.

Feasible GHG reduction measures are recommended to be included in the GHGRS update, which build upon the strategies and measures in the UC *Sustainable Practices Policy* and 2017 GHGRS update. **Table 4.7-4** summarizes the recommended reduction measures and lists the corresponding UC *Sustainable Practices Policy* and existing GHGRS measures, where applicable. These recommended reduction measures shall be incorporated into the GHGRS update that would occur as part of the proposed Amendment to the 2014 LRDP under the CPHP. The additional inclusion of water conservation strategies has the potential to reduce indirect emissions associated with outdoor water consumption by reducing that consumption by three percent or more and is, therefore identified as CPHP Mitigation Measure GHG-1a. Additionally, GHG emissions will marginally be further reduced through implementation of CPHP Mitigation Measure AIR-2a: Project-Level Operational Measures, CPHP Mitigation Measure AIR-2b: TDM Program Enhancements, CPHP Mitigation Measure AIR-4b: Design for Diesel Delivery Truck Emissions Minimization, and CPHP Mitigation Measure AIR-5: Implement "cool roof and pavement" design elements. Notwithstanding these additional reductions, CPHP Mitigation Measure GHG-1c is identified to reduce GHG emissions under the CPHP to a net zero increase and a less than significant impact with mitigation. To achieve the net zero increase, CPHP Mitigation Measure GHG-1c sets forth a numerical performance standard based on the existing GHG emissions inventory for the Parnassus Heights campus site and requires any GHG emissions in excess of the existing inventory of 125,426 MT CO_2e per year to be offset.

TABLE 4.7-4
SUMMARY OF RECOMMENDED GREENHOUSE GAS REDUCTION MEASURES AND UC SUSTAINABLE PRACTICES POLICY COMPLIANCE

Reduction Measure	SPP Policies	GHGRS Policies	Implemented as Part of the Project?
Energy Efficiency			
High-Efficiency Lighting: Consistent with GHGRS Strategy EN-1, UCSF would opt to install high-efficiency lighting throughout the Parnassus Heights campus site, including light-emitting diode (LED) streetlights, path lighting, emergency lights, maintenance lighting, and building lighting. High-efficiency medical exam lights and surgery room lighting could use LED or other high-efficiency technology. It would be feasible to avoid usage of fluorescent, incandescent, or high-intensity discharge (HID) light sources.	Section A	Section 5.1; Measure EN-1	Yes; CPHP considered to have net zero electricity by 2025 (see Table 4.7-3).
High-Efficiency Appliances: UCSF could establish energy efficiency criteria for appliances installed on the Parnassus Heights campus site.	Section A and B	Section 5.1; Measure EN-1	Yes; CPHP considered to have net zero electricity by 2025 (see Table 4.7-3).
Energy-Efficient Building Envelopes. Title 24 Standards are scheduled for updates and improvements every 3 years, with the ultimate goal of zero net energy. The 2019 LRDP would take proactive steps toward this advanced energy-efficiency goal by requiring all new buildings within the project area to exceed 2016 Title 24 standards.	Section A	Section 5.1; Measure EN-2	Yes; Considered in the GHG Inventory (see Table 4.7-3).
Renewable Energy			
On-Site Renewable Energy Generation: Campus design principle W6 of the CPHP identifies solar and wind energy capture as design principals to be considered in CPHP development.	Section B: B-2	Section 5.1; Measure EN-3.1	Yes; where feasible to implement.

**TABLE 4.7-4 (CONTINUED)
SUMMARY OF RECOMMENDED GREENHOUSE GAS REDUCTION MEASURES
AND UC SUSTAINABLE PRACTICES POLICY COMPLIANCE**

Reduction Measure	SPP Policies	GHGRS Policies	Implemented as Part of the Project?
Renewable Energy (cont.)			
Off-Site Renewable Energy Generation: Through direct access, UCSF currently purchases approximated 6 percent of the electricity supplied to the Parnassus Heights campus site as renewable power. UCSF has committed to purchasing electricity that is carbon-free electrical usage to meet zero GHG electrical demand.	Section B: B-3	Section 5.1; Measure EN-3.2	Yes; Considered in the GHG Inventory (see Table 4.7-3).
Bio-Methane Fueling the Central Utilities Plant: UCSF would purchase bio-methane to address GHG emissions associated with use of natural gas at the CUP.	Section B: B-4	Section 5.1; Measure EN-3.3	No, UCSF does not currently have sufficient supplies in place and otherwise cost prohibitive at present.
On-Site Steam and Electric Cogeneration: Cogeneration systems can use a variety of fuels to generate electricity or power at the point of use, allowing the heat that would normally be lost in the power generation process to be recovered to provide needed heating	NA	NA	Yes; CUP already on campus site.
Mobile			
Bicycle Infrastructure: The CPHP would include bicycle lockers. Showers and lockers could be made available to employees in order to facilitate and encourage commuting to work on bicycles and other wheeled devices.	NA	NA (in TDM Plan)	Yes; VMT assumes mode split from existing UCSF TDM Measures and CPHP Mitigation Measure AIR-2b: TDM Program Enhancements.
Employee Trip Reduction Program: UCSF would continue to implement an its TDM Program to reduce mobile source emissions from employee commutes.	Section D	Strategy TR-1	Yes; VMT assumes mode split from existing UCSF TDM Measures and CPHP Mitigation Measure AIR-2b: TDM Program Enhancements.
Improved Walkability Design: The CPHP proposes pedestrian pathways connecting the various land uses on campus with crosswalks at major street intersections.	NA	NA	Yes; VMT assumes mode split from existing UCSF TDM Measures and CPHP Mitigation Measure AIR-2b: TDM Program Enhancements.
Neighborhood Electric Vehicles (NEV): Provide an NEV-friendly road network within the campus, including charging stations, and use an NEV fleet to shuttle visitors and employees between the various buildings on campus.	Section D	NA	No; no internal roadway system on campus.
Transit Oriented Design: The existing Parnassus Heights campus site is served by Muni light rail and busses as well as UCSF's fleet of shuttles.	NA	NA	Yes; VMT assumes mode split from existing transit options.

**TABLE 4.7-4 (CONTINUED)
SUMMARY OF RECOMMENDED GREENHOUSE GAS REDUCTION MEASURES
AND UC SUSTAINABLE PRACTICES POLICY COMPLIANCE**

Reduction Measure	SPP Policies	GHGRS Policies	Implemented as Part of the Project?
Solid Waste			
Institute a Recycling and Waste Diversion Program: The existing Parnassus Heights campus site and the CPHP include recycling containers located within public areas, and a waste diversion and recycling program could be implemented within the campus to divert all non-hazardous and non-health care related waste that can be safely recycled or composted.	Section F	NA	Yes; Considered in the GHG Inventory (see Table 4.7-3).
Water Conservation			
Water Conservation Strategies: Campus design principle WC2 of the CPHP identifies storm water capture and treatment to reduce water demand	Section I: I-1 to 5	NA	No: Available as mitigation.

NOTES: SPP = UC Sustainable Practices Policy; GHGRS = Greenhouse Gas Reduction Strategy; NA = not applicable or not included in the document.

SOURCE: ESA 2019.

CPHP Mitigation Measure GHG-1a: Emission Reduction Measures to supplement those currently included in GHGRS update that would occur as part of the proposed amendment to the 2014 LRDP under the CPHP.

The GHGRS update shall include the following measure identified in Table 4.7-4 to address long-term GHG emissions reductions:

- ***Water Conservation Strategies*****:** Campus design principle WC2 of the CPHP identifies storm water capture and treatment to reduce water demand. UCSF shall amend the GHGRS to include a Water Conservation Measure based on storm water capture and the associated reduction in outdoor water demand. A year 2050 target of 3 percent reduction of overall outdoor water use shall be established.

CPHP Mitigation Measure GHG-1b: Implement CPHP Mitigation Measure AIR-2a: Project-Level Operational Measures, CPHP Mitigation Measure AIR-2b: TDM Program Enhancements, CPHP Mitigation Measure AIR-4b: Design for Diesel Delivery Truck Emissions Minimization, and CPHP Mitigation Measure AIR-5: Implement “cool roof and pavement” design elements to further reduce emissions from individual projects and mobile sources.

CPHP Mitigation Measure GHG-1c: Monitor emissions annually and acquire carbon offset credits in conformance with CARB guidance, prioritizing local and in-State offsets to achieve and maintain carbon neutrality for the Parnassus Heights campus site under the CPHP.

As part of this mitigation measure, UCSF is making the following separate, though overlapping, GHG emission reduction commitments: (1) As a CARB-covered entity, UCSF will maintain compliance with CARB’s cap and trade program; (2) Per existing UC Policy, UCSF’s Scope 1 and Scope 2 GHG emissions shall, commencing in 2025, be entirely carbon neutral; (3) Also per existing UC Policy, commencing in 2020, UCSF's Scope 1, Scope 2, and Scope 3 emissions from commuters and air travel shall be voluntarily offset; and (4) UCSF's total GHG operational emissions from all Scope 1, 2, and 3 sources (as defined in this EIR) shall not exceed the Parnassus Heights campus's baseline emissions from these sources in 2018. Each of these commitments is described in more detail below.

Compliance with CARB's Cap and Trade Program: Any carbon offset credits purchased for the purpose of compliance with CARB's cap and trade program shall be purchased from an accredited carbon credit market. Such offset credits (or California Carbon Offsets) shall be registered with, and retired[22] by an Offset Project Registry, as defined in 17 California Code of Regulations § 95802(a), approved by the California Air Resources Board such as, but not limited to, Climate Action Reserve, American Carbon Registry or Verra (formerly Verified Carbon Standard). In order to demonstrate that the carbon offset credits provided are real, permanent, additional, quantifiable, verifiable, and enforceable, as those terms are defined in 17 California Code of Regulations § 95802(a), UCSF shall document in its annual report: (i) the protocol used to develop those credits, and (ii) the third-party verification report concerning those credits. As and when the credits are retired, UCSF shall document in its annual report the unique serial numbers of those credits showing that they have been retired.

Compliance with UC Policy: Compliance with UC's policies for carbon neutrality by 2025 and UC's own policy to reduce Scope 1, 2, and transportation-related Scope 3 emissions below 1990 levels pursuant to AB 32 will be accomplished through reductions in direct emissions, the purchase of renewable electricity and possibly biomethane, and the purchase of carbon offset credits. UCSF will purchase voluntary carbon offset credits as the final action to reach the GHG emission reduction targets. As part of the UC Carbon Neutrality Initiative, internal guidelines have been developed to ensure that any use of offsets for this purpose will result in additional, verified GHG emissions reductions from actions that align, as much as possible, with UC's research, teaching, and public service mission. Specifically, any voluntary carbon offset credits used by UCSF to mitigate GHG emissions will:

1. Prioritize local (within the air district) and in-state offset credits over in-nation offset credits. Offset credits shall be third-party verified by a major registry recognized by CARB such as CAR (Climate Action Reserve). If sufficient local and in-state offset credits are not available, UCSF will purchase CARB conforming national offset credits registered with an approved registry.

2. Be reported publicly and tracked through the Climate Registry (TCR) as required by UC policy. TCR is a non-profit organization governed by U.S. states and Canadian provinces and territories. UCSF's TCR reports will be third-party verified and posted publicly.

Commitment to control Parnassus Heights Annual Emissions to not exceed existing baseline: UCSF shall monitor Parnassus Heights campus-wide GHG operational emissions from all Scope 1, 2 and 3 sources (as defined in this EIR) annually, commencing in 2025 upon the completion and occupancy of the first project under the

[22] When Climate Reserve Tonnes (CRTs) are transferred to a retirement account in the Reserve System, they are considered retired. Retirement accounts are permanent and locked to prevent a retired CRT from being transferred again. CRTs are retired when they have been used to offset an equivalent ton of emissions or have been removed from further transactions on behalf of the environment.

CPHP. The estimated annual emissions shall be compared to the year 2018 baseline of 125,426 MT CO_2e per year to determine whether the emissions have increased above the baseline level. For the identified amount of exceedance of the performance standard, UCSF shall purchase carbon offset credits sufficient to maintain carbon neutrality. These offset credits shall be purchased for the types of Scope 1 and Scope 3 emissions that are already reported to and verified by a third party verification body annually, as well as for Scope 3 emissions from patient and visitor vehicle trips, indirect emissions from water and wastewater demand, and solid waste emissions, all of which are included in the EIR analysis above as required by CEQA.

Carbon offset credits used for this purpose shall originate from a voluntary carbon credit registry that TCR recognizes such as: CAR, ACR, or Verra (other registries are also applicable). Offset credits in this case shall be registered, transferred, and retired at such registries. The protocols of each registry, and UC own internal screens, shall be used to demonstrate that the carbon offset credits provided are real, permanent, additional, and have been independently verified as adhering to its applicable project protocols. For this purpose, local (within the air district) and in-state carbon offset credits shall be prioritized over in-nation offset credits. If sufficient local and in-state offset credits are not available, UCSF will purchase CARB conforming national offset credits registered with an approved registry. As and when the credits are retired, UCSF shall document in its annual report the unique identifier of those credits showing that they have been retired and accepted by TCR.

Significance after Mitigation: Less than Significant.

Irving Street Arrival, Research and Academic Building, and Initial Aldea Housing Densification

The assessment of GHG emissions from Irving Street Arrival, Research and Academic Building, and Initial Aldea Housing Densification projects applies a similar methodology as that applied to the assessment of the CPHP, except that the assessment of these Initial Phase projects uses a 2030 horizon year.

Estimated incremental contributions of GHG emissions from these three Initial Phase projects are presented in **Table 4.7-5**, as are existing (2018) campus site wide emissions, and year 2030 campus-wide emissions with these Initial Phase projects. As can be seen from the table, campus-wide GHG emissions with the Initial Phase projects would increase by approximately 7,666 MT of CO_2e per year. Given that emissions would exceed the net zero goal of the CARB, the impact of the Initial Phase projects is identified as significant and mitigation measures are required.

Consequently, GHG emissions associated with the Irving Street Arrival, Research and Academic Building, and Initial Aldea Housing Densification projects, would result in a significant impact on the environment, which would be reduced to a less than significant level with mitigation.

Mitigation: Implement CPHP Mitigation Measures GHG-1a, GHG-1b, and GHG-1c**.**

TABLE 4.7-5
ANNUAL OPERATIONAL GHG EMISSIONS: EXISTING AND YEAR 2030 WITH IRVING STREET ARRIVAL, RAB, AND INITIAL ALDEA HOUSING DENSIFICATION

Emission Source	Emissions (metric tons year)			
	CO_2	CH_4	N_2O	Total CO_2e
Existing (2018) Conditions for Parnassus Heights Campus Site				
Mobile Sources[a]	43,266	2.32	<1	43,324
Electricity	219	0.97	1.11	221
Natural gas combustion (CUP)	79,510	1.35	3.29	79,515
Natural gas combustion (non-CUP)	668	0.01	0.01	671
Water and wastewater	155	15.9	<1	666
Solid Waste	324	19.2	<1	804
Generators	195	0.03	<1	197
Total (2018)				**125,426**
Year 2030 Contributions from Irving Street Arrival, RAB, and Initial Aldea Housing Densification Projects				
Mobile Sources[a]	5,500	<1	<1	5,504
Electricity[b]	0	0	0	0
Natural gas combustion (CUP)	1,590	0.03	<1	1,590
Natural gas combustion (other)	423	<1	<1	425
Water and wastewater	45.1	4.63	<1	193
Solid Waste	17.4	1.03	<1	43.2
Generators	32.1	<1	<1	32.1
Construction (Amortized 30 years)				128
Total Contribution (2030)		–	–	7,787
Service population Increase	UCSF Parnassus Heights faculty, staff and students; and residents on Parnassus Heights campus site			4,224
Emissions per service population				1.8
Parnassus Height Campus Site Year 2030 Emissions with Irving Street Arrival, RAB, and Initial Aldea Housing Densification				
Mobile Sources[a]	48,766	2.32	<1	48,828
Electricity[b]	0	0	0	0
Natural gas combustion (CUP)	81,100	1.35	3.29	81,105
Natural gas combustion (other)	1,091	0.01	0.01	1,096
Water and wastewater	200	20.5	<1	859
Solid Waste	341	20.2	<1	847
Generators	227	0.03	<1	229
Construction (Amortized 30 years)				128
Total (2030)		–	–	133,092
Net Change from Existing				**7,666**
Achieve Net Zero Increase?				No
Significant Impact?				Yes

NOTE: Project CO_2e emissions estimates were made using CalEEMod v.2013.2.

a Mobile emissions are calculated based on daily VMT calculated for the transportation analysis and conservatively multiplied by 365 to arrive at an annual VMT.

b UCSF has committed to net zero electricity by 2025 and no GHG emissions are predicted from electrical usage under buildout of the Initial Phase Projects.

SOURCE: ESA 2020.

Initial Phase Improvements

As described in Chapter 3, *Project Description*, Initial Phase improvements are also proposed that would include various Initial Phase utility improvements, implementation of the Parnassus Avenue Streetscape Plan, renovation of certain existing buildings, and installation of miscellaneous community investments in the public realm. These Initial Phase improvements would generate incremental construction-related GHG emissions depending on the timing of implementation, but are not expected to substantially contribute to those emissions calculated above for the Initial Phase projects. Furthermore, as applicable, any Initial Phase improvements that would be constructed outside the campus site boundary, such as streetscape, utility or community investments, may involve the cooperation of the City of San Francisco and, as public works projects, would be subject to the City of San Francisco's Clean Construction Ordinance which requires the use of biodiesel (B20) in construction equipment.

Mitigation: None required.

Impact GHG-2: Implementation of the CPHP would not conflict with an applicable plan, policy or regulation adopted for the purpose of reducing the emissions of greenhouse gases. (Less than Significant)

CPHP, including Irving Street Arrival, Research and Academic Building, and Initial Aldea Housing Densification Projects, and Initial Phase Improvements

The 2014 LRDP included a GHGRS to ensure that the LRDP was implemented in alignment with UC *Sustainable Practices Policy*, and to fulfill the GHG reduction requirements of the State of California Assembly Bill 32 (AB 32): the California Global Warming Solutions Act of 2006. Since the adoption of the 2014 LRDP by the Regents, the University of California Office of the President further identified a UC policy goal to reach climate neutrality from Scopes 1 and 2 sources by 2025. As discussed in Chapter 3, *Project Description*, an update to the GHGRS would be prepared as part of a proposed amendment to the LRDP that would incorporate CPHP construction and operations emissions.

In addition, the updated GHGRS would address UCSF's achievement of goals set forth in the adopted Carbon Neutrality Initiative (CNI), which has goals more stringent than the statewide target of achieving 80 percent below 1990 emission levels by 2050. In compliance with the *Sustainable Practices Policy*, as well as the CNI, UCSF currently undergoes annual inventories of GHG emissions for Scope 1, 2, and 3 emissions to monitor GHG reduction progress.

The Parnassus Heights campus site is making substantial efforts to develop pathways to offset carbon emissions that would contribute to achieving the CNI goals by offsetting carbon emissions. To offset the Scope 1 (direct and controlled) and Scope 2 (indirect) emissions, the first strategy is to reduce energy demand through investments in achieving deep energy efficiency of the buildings and facilities on campus. All new buildings constructed under the CPHP would meet or surpass Title 24 energy efficiency standards and attain a minimum LEED silver certification or equivalent.

A second strategy is the UC Regents Direct Access Program and purchase of carbon-free electricity, which contributes to achieving carbon neutrality in Scope 2 (indirect) emissions. As of 2018, UCSF purchases approximated 6 percent of the electricity supplied to the Parnassus Heights campus site as renewable power. UCSF has committed to purchasing electricity that is carbon-free by 2025.

After implementing these strategies (maximizing energy efficiency across campus systems and operations and purchasing carbon-free renewable energy), annual inventories of GHG emissions for Scope 1, 2, and 3 emissions as defined for this EIR would be completed by campus staff and verified by a qualified verification process through TCR. Starting in 2025, the campus would offset any remaining Scope 1 and Scope 2 emissions by purchasing carbon credits on the accredited voluntary carbon credit market in fulfillment of the UC CNI Policy. Additionally, CPHP Mitigation Measure GHG-1c will be implemented which requires, among other things, that the operational emissions be monitored annually and that carbon offsets be acquired to achieve and maintain carbon neutrality for the Parnassus Heights campus site under the CPHP. This will further offset remaining emissions inclusive of emissions from visitor/patient trips and indirect emissions from water and wastewater demand and solid waste emissions to the extent these exceed existing emissions.

After validating the annual inventory, UCSF would purchase carbon credits through the Climate Action Reserve, American Carbon Registry, Verra, or other accredited voluntary markets to offset the remaining Scope 1 emissions. The Parnassus Heights campus site would be actively involved in this effort and contribute to the implementation of the UC system-wide CNI. Compliance with the *Sustainable Practices Policy* and CNI ensures that the campus is implementing the UCSF GHGRS. Therefore, the CPHP would not conflict with any adopted plans, policies, or regulations for the reduction of GHG emissions. The impact would be less than significant.

The CPHP is anticipated to reach buildout in 2050. The GHGRS is currently being updated to reflect 2015 updates to the *Sustainable Practices Policy* which requires each campus to establish a goal of 30 percent of commutes by zero emissions vehicles in efforts to commit toward continued and sustained GHG reductions through 2050, which is the horizon year of State reduction goal. The Parnassus Heights campus site would continue to develop and apply the UCSF GHGRS through buildout of the campus, which would implement long-term GHG reductions through sustainable design, renewable energy generation, electrification of the transportation fleet, sustainable water use, and zero waste (for non-health care uses) programs as described in the GHGRS. In addition, UCSF will continue to report annual inventories of GHG emissions into perpetuity to monitor progress and ensure achievement of the CNI reduction targets Scope 1, 2, and 3 emissions in 2050.

Consistency with Other Plans and Policies

As noted earlier, CARB's 2017 Scoping Plan Update describes how the State plans to achieve the 2030 GHG emission reduction goal for California of 40 percent below 1990 levels by 2030 as mandated by SB 32. By implementing the updated GHGRS and CPHP Mitigation Measures GHG-1a through 1c, thereby achieving consistency with UCSF's CNI, the CPHP would be consistent with CARB's 2017 Scoping Plan Update and with Executive Order S-3-05, which established a goal of reducing California's GHG emissions to 80 percent below the 1990 level by the year 2050.

The CPHP would also be consistent with *Plan Bay Area 2040*, which includes the Regional Transportation Plan, and was adopted as the Bay Area's Sustainable Communities Strategy pursuant to California Senate Bill 375. P*lan Bay Area 2040*'s core strategy is encouraging growth in existing communities along the existing transportation network, focusing new development in Priority Development Areas (PDAs) and Transit Priority Areas (TPAs) within urbanized centers where there is more public transit and other mobility options available to reduce driving by cars and light trucks. In addition to significant transit and roadway performance investments to encourage focused growth, *Plan Bay Area 2040* directs funding to neighborhood active transportation and complete streets projects, climate initiatives, lifeline transportation and access initiatives, pedestrian and bicycle safety programs, and PDA planning. The proposed project is consistent with *Plan Bay Area 2040* by virtue of being located within a TPA, which is defined as an area within one-half mile of an existing or planned major transit stop (Public Resources Code Section 21099(a)(7)), where "major transit stop" is defined as a site containing any of the following: an existing rail or bus rapid transit station, a ferry terminal served by either a bus or rail transit service, or the intersection of two or more major bus routes with a frequency of service interval of 15 minutes or less during the morning and afternoon peak commute periods (Public Resources Code Section 21064.3).

Additionally, UCSF's existing TDM strategies and CPHP Mitigation Measure AIR-2b would be implemented which include programs to encourage more employees, visitors, and patients to shift from driving to other modes of travel. These programs would consist of strategies that encourage telecommuting and telehealth; encourage non-automobile modes, such as discounted transit tickets and preferential carpool parking; and disincentivize travel by automobile by effectively managing parking permits and parking fees.

Therefore, the development of the Parnassus Heights campus site under the CPHP would be consistent with the State's efforts toward achieving 2050 reduction target. This impact would be less than significant.

Mitigation: None required.

Cumulative Impacts

Climate change is the cumulative effect of all natural and anthropogenic sources of GHGs accumulated on a global scale. The GHG emissions from an individual project, even a very large development project, would not individually generate sufficient GHG emissions to measurably influence global climate change, and thus the assessment of GHG emissions impacts is inherently cumulative.

The analysis in Impact GHG-1 uses a net zero increase threshold over existing emissions. Consideration of a project's climate change impact, therefore, is essentially an analysis of a project's contribution to a cumulatively significant global impact through its emission of GHGs. While it is possible to examine the quantity of GHGs that would be emitted from individual project sources, it is not currently possible to link these GHGs emitted from a specific source or location to particular global climate changes.

Both BAAQMD and the California Air Pollution Control Officers Association (CAPCOA) consider GHG impacts to be exclusively cumulative impacts, in that no single project could, by itself, result in a substantial change in climate. (BAAQMD, 2012; CAPCOA, 2008). Therefore, the evaluation of cumulative GHG impacts presented above evaluates whether the proposed CPHP would make a considerable contribution to cumulative climate change effects.

As such, the analysis in Impact GHG-1 considers the potential cumulative impacts of the CPHP related to GHG emissions. Implementation of the CPHP, including the updated GHGRS with additions required by CPHP Mitigation Measure GHG-1a, would result in decreased annual GHG emissions compared to existing conditions. As such, implementation of the CPHP would not be cumulatively considerable.

4.7.4 References

American College & University, 2007. Text of the American College & University Presidents Climate Commitment.

Anderegg, William R. L., J.W. Prall, J. Harold, S.H., Schneider, 2010. Expert Credibility in Climate Change; Proceedings of the National Academy of Sciences of the United States of America. 2010; 107:12107-12109.

Bay Area Air Quality Management District (BAAQMD), 2010. California Environmental Quality Act Air Quality Guidelines, May 2010. Available at: http://www.baaqmd.gov/plans-and-climate/california-environmental-quality-act-ceqa/updated-ceqa-guidelines. Accessed June 8, 2020.

BAAQMD, 2012. California Environmental Quality Act Air Quality Guidelines, May 2012. Available at: http://www.baaqmd.gov/~/media/Files/Planning%20and%20Research/CEQA/BAAQMD%20CEQA%20Guidelines_Final_May%202012.ashx?la=en. Accessed June 8, 2020.

BAAQMD, 2017. California Environmental Quality Act Air Quality Guidelines, May 2017. Available at: http://www.baaqmd.gov/plans-and-climate/california-environmental-quality-act-ceqa/updated-ceqa-guidelines. Accessed June 8, 2020.

California Air Pollution Control Officers Association, (CAPCOA), 2008. CEQA and Climate Change. January. p. 32.

California Air Resources Board (CARB), 2008. Climate Change Scoping Plan, December 2008. Available at: http://www.arb.ca.gov/cc/scopingplan/document/adopted_scoping_plan.pdf. Accessed June 8, 2020.

CARB, 2017. California's 2017 Climate Change Scoping Plan. November 2017.

CARB, 2018. SB 375 Regional Greenhouse Gas Emissions Reduction Targets. Available at: https://www.arb.ca.gov/cc/sb375/finaltargets2018.pdf. Accessed March 11, 2019.

CARB, 2019. California Air Resources Board 2017 Scoping Plan-Identified VMT Reductions and Relationship to State Climate Goals. January 2019. Available at: https://ww2.arb.ca.gov/resources/documents/carb-2017-scoping-plan-identified-vmt-reductions-and-relationship-state-climate. Accessed June 8, 2020.

CARB, 2020. 2019 California Greenhouse Gas Emission Inventory. Available at: http://www.arb.ca.gov/cc/inventory/data/data.htm. Accessed June 8, 2020.

California Building Standards Commission, 2016. 2016 California Green Building Standards Code (Part 11 of Title 24). Available at: https://www.dgs.ca.gov/BSC/Resources/Page-Content/Building-Standards-Commission-Resources-List-Folder/CALGreen. Accessed June 8, 2020.

California Department of Finance, 2018a. E-5 Population and Housing Estimates for Cities, Counties, and the State, January 1, 2011-2018, with 2010 Benchmark. May 1, 2018. Available at: http://www.dof.ca.gov/Forecasting/Demographics/Estimates/. Accessed June 8, 2020.

California Department of Finance, 2018b. Gross State Domestic Product 1963 to 2018. Available at: http://www.dof.ca.gov/Forecasting/Economics/Indicators/Gross_State_Product/. Accessed June 8, 2020.

California Energy Commission (CEC), 2012. California Climate Change Center. *Our Changing Climate 2012*. Available online at: http://www.energy.ca.gov/2012publications/CEC-500-2012-007/CEC-500-2012-007.pdf. Accessed June 8, 2020.

CEC, 2015. 2016 Building Energy Efficiency Standards for Residential and Nonresidential Buildings. June 2015.

California Environmental Protection Agency (CalEPA), 2013. Preparing California for Extreme Heat: Guidance and Recommendations. October 2013.

California Natural Resources Agency (CNRA), 2009. 2009 California Climate Adaptation Strategy: A Report to the Governor of the State of California in Response to Executive Order S-13-2008.

CNRA, 2012. California Adaption Planning Guide: Planning for Adaptive Communities. Available at: http://resources.ca.gov/docs/climate/01APG_Planning_for_Adaptive_ Communities.pdf. Accessed June 8, 2020.

CNRA, 2014. Safeguarding California: Reducing Climate Risk, an Update to the 2009 California Climate Adaptation Strategy. July 2014. Available at: https://www.adaptationclearinghouse.org/resources/safeguarding-california-reducing-climate-risk-2014-update-to-the-2009-ca-climate-adaptation-strategy.html. Accessed June 12, 2020.

CNRA, 2018a. Safeguarding California Plan: 2018 Update. January 2018.

CNRA, 2018b. CEQA Guidelines Amendments, Sections 15064.4, 15183.5, 15364.5. November 2018. Available at: http://resources.ca.gov/ceqa/docs/2018_CEQA_FINAL_TEXT_122818.pdf. Accessed June 8, 2020.

CalRecyle, 2019. Jurisdiction Diversion/Disposal Rate Summary (2007 - Current); Per Capita Disposal Rates Trends; City of Oakland. Available at: https://www.calrecycle.ca.gov/LGCentral/DataTools/Reports/. Accessed: May 10, 2019.

Caltrans, 2016. Sustainable Freight Action Plan. Available: http://dot.ca.gov/hq/tpp/offices/ogm/cs_freight_action_plan/theplan.html. July 2016. Accessed June 8, 2020.

Center for Climate and Energy Solutions. What is Black Carbon? April 2010. Available online at: https://www.c2es.org/site/assets/uploads/2010/04/what-is-black-carbon.pdf. Accessed June 8, 2020.

Climate Central, 2019. 2018 Global Temperature Review: Land & Ocean. Published February 6, 2019.

Intergovernmental Panel on Climate Change (IPCC), 2007. Climate Change 2007 Synthesis Report.

IPCC, 2014. Climate Change 2014 Synthesis Report. Available at: http://ipcc.ch/report/ar5/syr/. Accessed June 8, 2020.

Kenward, Alyson, PhD, Dennis Adams-Smith, Urooj Raja, 2013. Wildfires and Air Pollution: The Hidden Health Hazards of Climate Change. Climate Central. Available at: http://assets.climatecentral.org/pdfs/WildfiresAndAirPollution.pdf. Accessed June 8, 2020.

Metropolitan Transportation Commission (MTC) and Association of Bay Area Governments (ABAG), 2013. Plan Bay Area. Adopted July 18, 2013. Available at: http://files.mtc.ca.gov/pdf/Plan_Bay_Area_FINAL/Plan_Bay_Area.pdf. Accessed June 8, 2020.

MTC and ABAG, 2017. Plan Bay Area 2040, Adopted July 26, 2017. Available at: https://www.planbayarea.org/. Accessed June 8, 2020.

MTC, 2020. *Plan Bay Area 2050: Draft Blueprint Growth Geographies for Study*. Available at: https://mtc.maps.arcgis.com/apps/webappviewer/index.html?id=a077e9adab904055a56aa088ac0c1122. Accessed June 23, 2020.

National Oceanic and Atmospheric Administration (NOAA), 2019. Assessing the U.S. Climate in 2018. Published February 6, 2019. Available at: https://www.ncei.noaa.gov/news/national-climate-201812. Accessed June 8, 2020.

Office of Planning and Research (OPR), 2018a. Discussion Draft: CEQA and Climate Change Advisory. December. Available at: http://opr.ca.gov/docs/20181228-Discussion_Draft_Climate_Change_Adivsory.pdf. Accessed June 8, 2020.

OPR, 2018b. Technical Advisory for Evaluating Transportation Impacts in CEQA. December 2018.

San Francisco Department of the Environment (SF DOE), 2013. San Francisco Climate Action Strategy, 2013 Update. Available at: https://sfenvironment.org/sites/default/files/fliers/files/sfe_cc_climateactionstrategyupdate2013.pdf. Accessed June 8, 2020.

SF DOE, 2020. San Francisco's Carbon Footprint. Available at: https://sfenvironment.org/carbon-footprint. Accessed May 18, 2020.

University of California, San Francisco (UCSF), 2017. UCSF Climate Action Plan – Greenhouse Gas Reduction Strategy. April 2017.

U.S. Environmental Protection Agency (USEPA), 2012. United States Environmental Protection Agency and NHTSA Set Standards to Reduce Greenhouse Gases and Improve Fuel Economy for Model Years 2017-2025 Cars and Light Trucks. EPA-420-F-12-051. August 2012. Available at: https://nepis.epa.gov. Accessed: June 8, 2020.

USEPA, 2019. Inventory of U.S. Greenhouse Gas Emissions and Sinks Fast Facts. Available at: https://www.epa.gov/ghgemissions/inventory-us-greenhouse-gas-emissions-and-sinks-fast-facts. Accessed June 8, 2020.

Westerling, Anthony LeRoy. 2018. Wildfire Simulations for the Fourth California Climate Assessment: Projecting Changes in Extreme Wildfire Events with a Warming Climate. California's Fourth Climate Change Assessment, California Energy Commission. Publication number: CCCA4-CEC-2018-014. August 2018.

This page intentionally left blank

4.8 Hazards and Hazardous Materials

This section describes and evaluates potential for construction and operation of the Comprehensive Parnassus Heights Plan (CPHP or Plan), including the three Initial Phase projects and Initial Phase improvements, to result in significant impacts related to hazards and hazardous materials. The section contains: a description of the existing land uses of the campus site and surrounding areas as they pertain to hazardous materials use; a discussion of handling (including transport and disposal) and storage of hazardous materials, emergency response planning and wildfire management at the campus site; a summary of the University, federal, State, and local regulations governing these activities; an analysis of the potential impacts related to hazards and hazardous materials, emergency response planning and wildfire management associated with the implementation of the CPHP, as well as identification of potentially feasible measures that could mitigate significant impacts.

The analysis of hazardous materials included in this section was developed based on publicly available information from the State Water Resources Control Board (SWRCB), California Department of Toxic Substances Control (DTSC), and California Department of Forestry and Fire Protection (CAL FIRE).

4.8.1 Environmental Setting

The study area for evaluation of hazards and hazardous materials impacts includes the campus site and surrounding areas. The evaluation considers an environmental database search that extends approximately 0.25 miles from the campus site boundary; however, it focuses on the campus site and the immediately adjacent area. Sites beyond the immediately adjacent area would have a remote chance of affecting subsurface materials beneath the campus site since releases of hazardous materials tend to be localized.

In addition, a radius of up to 0.25 miles from the campus site boundary is considered relative to proximity to schools and the radius of up to two miles is similarly considered relative to proximity to airports, both in accordance with the CEQA Guidelines.

Definitions and Background

Hazardous Materials

A hazardous material is defined as any material that, because of 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 (California Health and Safety Code Chapter 6.95, section 25501(o)). The term "hazardous materials" refers to both hazardous substances and hazardous wastes. Under federal and State laws, any material, including wastes, may be considered hazardous if it is specifically listed by statute as such or if it is toxic (causes adverse human health effects), ignitable (has the ability to burn), corrosive (causes severe burns or damage to materials), or reactive (causes explosions or generates toxic gases).

Hazardous wastes are hazardous substances that no longer have practical use, such as materials that have been spent, discarded, discharged, spilled, contaminated, or are being stored until they can be disposed of properly (Title 22 California Code of Regulations [CCR] section 66261.10). Soil that is excavated from a site containing hazardous materials is a hazardous waste if it exceeds specific criteria established in sections 66261.20 through 66261.24 of the CCR Title 22. Hazardous substances are regulated by multiple agencies, as described in the Regulatory Setting below, and cleanup requirements of hazardous releases are determined on a case-by-case basis according to the agency (e.g., DTSC or SWRCB) with lead jurisdiction over a contaminated site.

Potential Receptors/Exposure

The sensitivity of potential receptors in the areas of known or potential hazardous materials contamination is dependent on several factors, the primary factor being the potential pathway for human exposure. Exposure pathways include external exposure, inhalation, and ingestion of contaminated soil, air, water, or food. The magnitude, frequency, and duration of human exposure can cause a variety of health effects, from short-term acute symptoms to long-term chronic effects. Potential health effects from exposure can be evaluated in a health risk assessment. The principal elements of health risk assessments typically include:

- Evaluation of the fate and transport processes for hazardous materials at a given site;
- Identification of potential exposure pathways;
- Identification of potential exposure scenarios;
- Calculation of representative chemical concentrations; and
- Estimation of potential chemical uptake.

Sensitive Receptors

On the Parnassus Heights campus site, existing sensitive receptors include the UCSF hospitals; and UCSF campus housing on Third and Fifth Avenues, on Irving Street, and the Aldea Housing complex located in the southeast portion of the campus site. There are also two child care centers within the Parnassus Heights campus site: the Kirkham Child Development Center at 10 Kirkham Street, and the UCSF Marilyn Reed Lucia Child Development Center at 601 Parnassus Avenue.

Off-campus receptors (residences) abut the western, northern and southern campus site boundaries. There are three public schools operated by the San Francisco Unified School District within a quarter mile of the Parnassus Heights campus site boundary: Independence High School is located at 1350 7th Avenue, approximately 500 feet northwest of the campus site boundary; Grattan Elementary School (which also contains Grattan Nursery and School-Age Children's Center) is located at 165 Grattan Avenue, approximately one quarter mile east of the campus site boundary; and Clarendon Alternative Elementary School is located at 500 Clarendon Avenue, approximately 1,100 feet south of the campus site boundary. There are also a number of private child care centers within one-quarter mile of the campus site: the Stepping Stones Preschool is located at 1329 7th Avenue, approximately 800 feet northwest of the campus site boundary; the Haight Ashbury Community Nursery School is located at 1180 Stanyan Street, approximately

1,000 feet east of the campus site boundary; and the ABC Bay Area Child Care facility is located at 115 Lawton Street, approximately 900 feet west of the campus site boundary.

Hazardous Building Materials Associated with Demolition and Renovation

Parnassus Heights is the oldest campus site within the UCSF campus system, and as a result, the age of some of the existing buildings and structures increases the likelihood for building materials to contain hazardous components [e.g., lead-based paint (LBP), asbestos-containing materials (ACMs), mercury, and polychlorinated biphenyls (PCBs)].

Lead and Lead-Based Paint (LBP)

Among its numerous uses and sources, lead can be found in paint, water pipes, solder in plumbing systems, and in soils around buildings and structures painted with LBP. Old peeling paint can contaminate near surface soil, and exposure to residual lead can have adverse health effects, especially in children. LBP was phased out in the United States beginning with the passage of the Lead-Based Paint Poisoning Prevention Act in 1971. Prior to the US Environmental Protection Agency (US EPA) ban in 1978, LBP was commonly used on interior and exterior surfaces of buildings. Structures built prior to 1978 may have LBP and some paints manufactured after 1978 for industrial uses legally contain more than 0.06 percent lead. Pathways of exposure to lead include inhalation, ingestion, dermal absorption, or absorption from retained/embedded leaded foreign body. Exposure to lead can result in severe health effects; children are particularly susceptible to potential lead-related health problems because it is easily absorbed into developing systems and organs.

Asbestos

Asbestos, a naturally occurring fibrous material, was used as a fireproofing and insulating agent in building construction before such uses were terminated due to liability concerns in the late 1970s. From 1973 through 1990, several laws were passed banning the manufacture and use of ACM (USEPA, 2019a). Some materials are still allowed to contain asbestos. The demolition of structures with ACM can result in airborne fibers. Inhalation of the tiny asbestos fibers can lead to lung disease. Structures that predate 1981 and structural materials installed before 1981 are presumed to potentially contain asbestos. Because it was widely used prior to the discovery of its health effects, asbestos can be found in a variety of building materials and components such as insulation, walls and ceilings, floor tiles, and pipe insulation. Friable (easily crumbled) materials are particularly hazardous because inhalation of airborne fibers is the primary mode of asbestos entry into the body. Non-friable asbestos is generally bound to other materials such that it does not become airborne under normal conditions. Non-friable asbestos and encapsulated friable asbestos do not pose substantial health risks. Asbestos exposure is a human respiratory hazard. Asbestos-related health problems include lung cancer and asbestosis.

Mercury

Spent fluorescent light tubes commonly contain mercury vapors, the exposure to which can have both long-term (e.g., anxiety, loss of appetite, fatigue, changes in vision or hearing) and/or short-term (e.g., sore throat, shortness of breath, chest pain, headache, vision problems) health effects. In February 2004, regulations took effect in California that classified all fluorescent lamps and tubes as hazardous waste. When these lamps or tubes are broken, mercury is released to the environment and can become airborne. When inhaled, mercury vapors can be absorbed through the lungs and into the bloodstream. Released mercury that is not vaporized can also be washed by rain water and into waterways. Mercury switches, which contain small amounts of mercury, may also be present in some buildings.

Polychlorinated Biphenyls (PCBs)

PCBs are organic oils that were formerly used primarily as insulators in many types of electrical equipment such as transformers and capacitors. After PCBs were determined to be carcinogenic in the mid-to-late 1970s, the US EPA banned PCB use in most new equipment and began a program to phase out certain existing PCB-containing equipment (USEPA 2019b). Fluorescent lighting ballasts manufactured after January 1, 1978, do not contain PCBs and are required to have a label clearly stating that PCBs are not present in the unit. PCBs are highly persistent in the environment, and exposure to PCBs has been demonstrated to cause cancer, as well as a variety of other adverse health effects. Occupational exposure to PCBs occurs mainly through inhalation and dermal contact routes.

Soil and Groundwater Contamination

Medical offices, research facilities and hospitals as well as many commercial and light industrial businesses use materials and generate wastes that are considered hazardous by federal and State standards. Such businesses and practices are required to contain, manage, and transport their hazardous materials in conformance with established State regulations to ensure hazardous materials that can become a health hazard are not released to subsurface soils and groundwater or create exposure risks to the public.

Underground storage tanks (USTs), in particular, are a common contamination source in urban areas. Until the mid-1980s, most USTs were made of single-walled bare steel, which can corrode over time and result in leakage. Faulty installation or maintenance procedures can also lead to UST leakage, as well as to potential releases associated with spills. Recently revised UST regulations have substantially reduced the incidents of leakage and consequential soil and groundwater contamination from new UST systems.

Campus Site

The majority of existing development is located within the campus core in the north portion of the campus site. Current campus operations include the storage, use, and disposal of variable quantities of hazardous materials. **Table 4.8-1** presents a list of representative hazardous materials stored and used at the campus site.

TABLE 4.8-1
REPRESENTATIVE HAZARDOUS MATERIALS USED AT PARNASSUS HEIGHTS CAMPUS SITE

Substance	Examples	Uses	Hazards
Solvents	Alcohols, ether, ethers, toluenes, and hexanes	Lab chemicals, paint removers, degreasers, and pesticides	Flammable, some explosive; toxic; damage to skin and respiratory tract; systematic damage to liver, kidneys, and nervous system.
Oxidizers	Hydrogen peroxide, perchloric acid, nitric acid, silver nitrate, potassium dicholorate, and ammonium persulfate	Hazardous medications, lab chemicals	Stimulates combustion of organic materials
Compressed Gases	Carbon dioxide, nitrogen, acetylene, oxygen, compressed air, refrigerants and miscellaneous small quantities and mixtures.	Hazardous medical gases, labs, facility systems, welding, and other campus shops	Flammable, some explosive (with potential for propellant effect, and some toxic)
Corrosives	Hydrochloric, nitric, sulfuric, and acetic acid, sodium hydroxide, and ammonium hydroxide	Hazardous medications, lab chemicals, cleaning agents, paint and paint thinners, Freon refrigerants, pesticides, and herbicides	Damage to skin and respiratory tract; some react to produce fire, explosion, or toxic fumes
Reactives	Alkyl metals (sodium potassium), and hydrides	Lab chemicals	Explosive (with or without detonation); toxic fumes; and explodes with exposure to water
Toxics	Chemotherapy drugs and bulk wastes, RCRA hazardous drugs and wastes, heavy metals, chlorinated hydrocarbons, arsenic, and cyanide compounds	Hazardous medications, lab chemicals, pesticides, photographic chemicals, and paints or dyes	Capable of causing acute or chronic systemic damage or death, cancer, infertility, and birth defects
Biohazards	Waste containing blood, bodily fluids, used sharps, pharmaceutical waste, trace chemotherapy drug waste, and other potentially infectious materials, bacteria and viruses	Regulated medical waste from the hospital and clinics and research laboratories	Capable of producing diseases
Radioactivity	Radionuclides (radioisotopes)	Labs and medical center	Capable of causing acute or chronic systematic damage, cancer, infertility, and birth defects
Fuels	Gasoline, diesel, and waste oil	Campus maintenance (grounds and building) and vehicles	Flammable, some explosive; toxic; damage to skin and respiratory tract; and produces fire/explosions

SOURCE: UCSF, 2019

The Parnassus Heights campus site has five 30,000 gallon single-walled diesel USTs located below Medical Center Way that serve the Central Utility Plant (CUP) generators and boilers in emergency situations when normal electrical services are interrupted. These storage tanks do not meet current code requirements and must be decommissioned by December 31, 2025. The 2014 LRDP authorized updating and improving a number of utilities and infrastructure at the Parnassus Heights campus site, including the replacement of these diesel tanks with new code-compliant tanks.

In a review of available environmental databases, there were two cases for the Parnassus Heights campus site (at the EHS building at 50 Medical Center Way, and 315 Parnassus Avenue) identified either on the Geotracker database maintained by the State Water Resources Control Board (SWRCB), and/or the Envirostor database maintained by Department of Toxic Substances Control (DTSC) (SWRCB, 2019; DTSC, 2019). Both cases predated the 2014 LRDP, and were closed in accordance with applicable regulatory agency oversight, with no further action required.

Surrounding Area

The database searches indicated above were also expanded to include a quarter mile radius from the campus site boundary for release sites that may have had the potential to adversely affect soil and groundwater beneath the campus site. In total, there were seven database listings on the Geotracker database in a northwest to northeast direction from campus site boundary. All but one of these cases were closed, with no further investigation or remediation required. The single open case, for a listing located at 250 Irving Street, pertains to a UST that was removed on May 23, 2018 and a release of petroleum hydrocarbons was identified as requiring further investigation (SFDPH, 2018). Based on topography, this listing is estimated to be in a downgradient direction from the campus site, and consequently, would not likely have the potential to migrate beneath the campus site. There were no Envirostor database listings within 0.25 miles of the campus site boundary (DTSC, 2019).

Naturally Occurring Asbestos

San Francisco is among the identified counties where ultramafic bedrock materials are present and have the potential for naturally occurring asbestos fibers. According to statewide mapping, the campus site appears to be located east of any mapped ultramafic bedrock units for the City of San Francisco (CDMG, 2000) or where reported asbestos occurrences have been mapped (USGS, 2011). According to a previous geotechnical report for the upland slope stability within the Mount Sutro Open Space Reserve (Reserve), the bedrock of the area consists of Franciscan Complex bedrock (chert, greenstone and meta-sandstone and shale) (Rutherford & Chekene, 2006).[1] Naturally occurring asbestos fibers are more associated with the mineral chrysotile commonly found in serpentinite.

Airports

There are no public use airports within two miles of the City of San Francisco. San Francisco International Airport and Oakland International Airport are over 8 and 12 miles from the campus site, respectively.

Wildland Fire

A wildland fire is any non-structure fire that occurs in vegetation or natural fuels. According to CAL FIRE's Fire Hazard Severity Zone Map of San Francisco County, the Mount Sutro Open Space Reserve is designated as Local Responsibility Area (LRA) moderate fire hazard severity zone (CAL FIRE, 2007).

1 Greenstone refers to any compact dark-green altered or low-grade metamorphosed basic igneous rock that owes to its green color. It is distinct from serpentinite which is also green and can contain naturally occurring asbestos fibers.

In September 2018, UCSF began implementing the Mount Sutro Open Space Reserve Vegetation Management Plan, a 20-year phased plan to improve ecosystem health, regenerate the forest, maintain and ensure public access to the Reserve, and minimize fire risk. In accordance with UCSF's established risk-reduction program, the Vegetation Management Plan is intended to protect the safety of Reserve users and adjacent structures with vegetation management to reduce the risk of both tree failure and fire. Under the Vegetation Management Plan, vegetation management is conducted in accordance with guidelines established by the San Francisco Fire Department and Cal Fire to create and maintain defensible space between vegetation and buildings.

In addition, UCSF Facilities Services conducts ongoing, regular maintenance in the Reserve including: removal of storm debris, downed trees or branches, hazardous trees, trash, campsites; managing overgrown vegetation, including near roads, trails, parking areas, walkways, stairs, and buildings; scheduled tree pruning every two years or as necessary to keep buildings, roads and pathways safe.

4.8.2 Regulatory Setting

Federal

The primary federal agencies with responsibility for hazards and hazardous materials management include the US EPA, US Department of Labor Occupational Safety and Health Administration (Fed/OSHA), and the US Department of Transportation (DOT). Federal laws, regulations, and responsible agencies are summarized in **Table 4.8-2**.

State agencies often have either parallel or more stringent rules than federal agencies. In most cases, state law mirrors or overlaps federal law and enforcement of these laws is the responsibility of the state or of a local agency to which enforcement powers are delegated. For these reasons, the requirements of federal law and its enforcement are discussed under either the State or local agency section.

State

California Environmental Protection Agency and Unified Program

California's Secretary for Environmental Protection has established a unified hazardous waste and hazardous materials management regulatory program (Unified Program) as required by Senate Bill 1082 (1993).

The California Environmental Protection Agency (Cal/EPA) oversees the implementation of the Unified Program. The Unified Program consolidates, coordinates, and makes consistent the administrative requirements, permits, inspection and enforcement activities of six environmental and emergency response programs. The state agencies responsible for these programs set the standards for their respective programs while local governments implement the standards.

TABLE 4.8-2
FEDERAL LAWS AND REGULATIONS RELATED TO HAZARDS AND HAZARDOUS MATERIALS MANAGEMENT

Classification	Federal Law or Responsible Federal Agency	Description
Hazardous Waste Handling	Resource Conservation and Recovery Act of 1976 (RCRA)	Under RCRA, the US EPA regulates the generation, transportation, treatment, storage, and disposal of hazardous waste from "cradle to grave."
	Hazardous and Solid Waste Act	Amended RCRA in 1984, affirming and extending the "cradle to grave" system of regulating hazardous wastes. The amendments specifically prohibit the use of certain techniques for the disposal of some hazardous wastes.
	Toxic Substances Control Act (TSCA)	Code of Federal Regulations Title 40 Chapter 1, Subchapter R – Toxic Substances Control Act – Part 761 Polychlorinated Biphenyls (PCBs) – covers the identification and sampling requirements for PCBs for disposal purposes.
Hazardous Materials Management	Community Right-to-Know Act of 1986 (also known as Title III of the Superfund Amendments and Reauthorization Act (SARA) U.S. Department of Health and Human Services	
Hazardous Materials Transportation	US Department of Transportation (DOT)	DOT has the regulatory responsibility for the safe transportation of hazardous materials. The DOT regulations govern all means of transportation except packages shipped by mail (49 CFR).
	US Postal Service (USPS)	USPS regulations govern the transportation of hazardous materials shipped by mail.
Occupational Safety	Occupational Safety and Health Act of 1970	Fed/OSHA sets standards for safe workplaces and work practices, including the reporting of accidents and occupational injuries (29 CFR).
Structural and Building Components (Lead-based paint, polychlorinated biphenyls, and asbestos)	Toxic Substances Control Act	Regulates the use and management of polychlorinated biphenyls in electrical equipment, and sets forth detailed safeguards to be followed during the disposal of such items.
	US EPA	The US EPA monitors and regulates hazardous materials used in structural and building components and their effects on human health.

The Unified Program is implemented at the local level by 86 government agencies certified by the Secretary of Cal/EPA. These Certified Unified Program Agencies (CUPAs) have typically been established as a function of a local environment health or fire agency. Some CUPAs also have contractual agreements with one or more other local agencies called "participating agencies (PAs)," which implement one or more program elements, under the oversight of the CUPA.

The state agency partners involved in the Unified Program have the responsibility of setting program element standards, working with Cal/EPA on ensuring program consistency and providing technical assistance to the CUPAs and PAs. The following state agencies are involved with the Unified Program:

- **California Environmental Protection Agency (Cal/EPA).** The Secretary of the California Environmental Protection Agency is directly responsible for coordinating the administration of the Unified Program. The Secretary certifies Unified Program Agencies. The Secretary has certified 86 CUPAs to date. These 86 CUPAs carry out the responsibilities previously handled by approximately 1,300 state and local agencies.

- **Department of Toxic Substances Control (DTSC).** The Department of Toxic Substances Control provides technical assistance and evaluation for the hazardous waste generator program including onsite treatment (tiered permitting).
- **Governor's Office of Emergency Services (OES).** The Governor's Office of Emergency Services is responsible for providing technical assistance and evaluation of the Hazardous Material Release Response Plan (Business Plan) Program, the California Accidental Release Response Plan (CalARP) Programs, and carrying out FEMA requirements to prepare the State Multi-Hazard Mitigation Plan also known as the State Hazard Mitigation Program.
- **Office of the State Fire Marshal (OSFM).** The Office of the State Fire Marshal is responsible for ensuring the implementation of the Aboveground Petroleum Storage Act (APSA). They are also responsible for oversight of the Hazardous Material Management Plans (HMMPs) and the Hazardous Material Inventory Statement Programs. These programs tie in closely with the Business Plan Program.
- **State Water Resources Control Board (SWRCB).** The State Water Resources Control Board provides technical assistance and evaluation for the underground storage tank program.

Hazardous Waste Control Act

The hazardous waste management program enforced by DTSC was created by the Hazardous Waste Control Act (California Health and Safety Code Section 25100 et seq.), which is implemented by regulations described in CCR Title 22, Social Security, Division 4.5, Environmental Health Standards for the Management of Hazardous Waste. This act implements the RCRA "cradle-to-grave" waste management system in California, but is more stringent in its regulation of non-RCRA wastes, spent lubricating oil, small-quantity generators, transportation and permitting requirements, as well as in its penalties for violations. The act also exceeds federal requirements by mandating the recycling of certain wastes, requiring certain generators to document a hazardous waste source reduction plan, requiring permitting for federally exempt treatment of hazardous wastes by generators, and implementing stricter regulation of hazardous waste facilities.

California Department of Industrial Relations, Division of Occupational Safety and Health

The California Department of Industrial Relations, Division of Occupational Safety and Health (Cal/OSHA), assumes primary responsibility for developing and enforcing workplace safety regulations within the state. Cal/OSHA standards are more stringent than federal OSHA regulations and are presented in CCR Title 8. Standards for workers dealing with hazardous materials include practices for all industries (General Industry Safety Orders); specific practices are described for construction and hazardous waste operations and emergency response. Cal/OSHA conducts on-site evaluations and issues notices of violation to enforce necessary improvements to health and safety practices. CCR Title 8 also includes standards for the identification, abatement, and handling of asbestos containing materials (8 CCR 1529 and 5208) and lead-based paint (8 CCR 1532.1).

California Highway Patrol and Department of Transportation

The California Highway Patrol and California Department of Transportation (Caltrans) are the enforcement agencies responsible for applicable federal (DOT) and State hazardous materials transportation regulations. Hazardous materials and waste transporters are responsible for complying with all applicable packaging, labeling, and shipping regulations. California Vehicle Code, Division 13, Chapter 5, Article 1 Sections 31303 - 31309 regulates the transport of hazardous materials. The provisions of this section apply to the highway transportation of hazardous materials and hazardous waste and include restrictions on labeling/placards, transportation routes, and other measures to ensure safe transport of regulated materials.

State Water Resources Control Board (SWRCB)

The SWRCB has primary responsibility to protect water quality and supply through the respective RWQCBs. As described in Section 4.9, Hydrology and Water Quality, RWQCBs are authorized by the Porter-Cologne Water Quality Control Act of 1969 to protect the waters of the state. The RWQCBs provide oversight for sites where the quality of groundwater or surface waters is threatened. Extraction and disposal of contaminated groundwater due to investigation/remediation activities or due to dewatering during construction require a permit from the RWQCBs if the water were discharged to storm drains, surface water, or land.

California Code of Regulations Title 23, Chapter 15, requires that non-hazardous liquid (greater than 42 gallons) or solid (greater than 10 cubic yards) waste must be reported to the RWQCB. Domestic wastewater and refuse releases are required to be reported under different non-Chapter 15 regulations.

California Fire Code

The 2019 California Fire Code is published by the California Building Standards Commission and incorporates by adoption the 2018 International Fire Code of the International Code Council. The California Fire Code is contained as Part 2 of the California Building Code and includes minimum requirements consistent with nationally recognized good practices to safeguard the public health, safety and general welfare from the hazards of fire, explosion or dangerous conditions in new and existing buildings, structures and premises, and to provide safety and assistance to fire fighters and emergency responders during emergency operations. The California Building Code is updated triennially and the 2019 version was effective on January 1, 2020.

Medical Waste Management Act

Within the regulatory framework of the Medical Waste Management Act, the Medical Waste Management Program of the California Department of Health Services (CDHS) ensures the proper handling and disposal of medical waste by permitting and inspecting medical waste offsite treatment facilities and transfer stations throughout the state. The CDHS also oversees all medical waste transporters. UCSF works with San Francisco Department of Public Health to ensure the Medical Waste Management Program is enforced.

Radioactive Materials

Pursuant to the federal Atomic Energy Act, which requires states to assume responsibility for the use, transportation, and disposal of low-level radioactive material and for the protection of the public from radiation hazards, the Radiologic Health Branch (RHB) of the CDHS administers the state's Radiation Control Law, which governs the storage, use, transportation, and disposal of sources of ionizing radiation (radioactive material and radiation-producing equipment). Radioactive material regulations require registration of sources of ionizing radiation, licensing of radioactive material, and protection against radiation exposure. The RHB also regulates the transportation of radioactive materials and disposal of radioactive waste. Users of radioactive materials must maintain detailed records regarding the receipt, storage, transfer, and disposal of such materials. State regulations concerning radioactive substances are included in 17 CCR. The regulations specify appropriate use and disposal methods for radioactive substances, as well as worker safety precautions and worker health monitoring programs.

California Office of Statewide Health Planning and Development

The Office of Statewide Health Planning and Development (OSHPD) is a department of the California Health and Human Services Agency. OSHPD serves as the regulatory building agency for all hospitals and nursing homes in California. Its primary goal in this regard is to ensure that patients in these facilities are safe in the event of an earthquake or other disaster, and to ensure that the facilities remain functional after such an event in order to meet the needs of the community affected by the disaster.

Aboveground and Underground Storage Tanks

The SWRCB administers the Aboveground Storage Tank (AST) Program. Facilities that store petroleum in a single tank greater than 1,320 gallons or facilities that store petroleum in ASTs or containers with a cumulative storage capacity of greater than 1,320 gallons are subject to SWRCB regulations. The AST Program requires that the owners or operators file a storage statement, pay a facility fee, and prepare and implement a federal Spill Prevention Control and Countermeasure (SPCC) Plan. The SPCC Plan must discuss the procedures, methods, and equipment in place at the facility to prevent discharges of petroleum from reaching navigable waters.

State laws governing underground storage tanks (UST) specify requirements for permitting, construction, installation, leak detection monitoring, repairs, release monitoring, corrective actions, cleanup, and closure. The State laws are codified in the Health and Safety Code Division 20, Chapter 6.7 (supplemented by California Code of Regulations (CCR) Title 23, Chapters 16 and 17). The San Francisco Department of Public Health and the SFFD are the local agencies designated to permit and inspect USTs and ASTs and implement applicable regulations.

University of California

UCOP Sustainable Practices Policy

UCOP's Sustainable Practices Policy establishes goals in several areas of sustainable practices, including, but not limited to, sustainable procurement. Under procedures for Sustainable

Procurement, the Sustainable Practices Policy indicates the University will work to remove harmful chemicals from products brought onto campus by increasing the purchase of products and materials that disclose known hazards (e.g. in compliance with the requirements of LEED BD+C – or updated equivalent) and choosing products with reduced concentrations of chemical contaminants that can damage air quality, human health, productivity, and the environment.

UCSF 2014 LRDP

The UCSF 2014 LRDP included *Community Planning Principles*, which were produced in collaboration with the UCSF Community Advisory Group:

Community Planning Principles

Environmental Planning and Safety

EP1. Community health is of paramount importance to UCSF. UCSF bioscience facilities and research laboratories are designed by UCSF and inspected by outside regulatory agencies for compliance with applicable city, state, and federal regulatory requirements for environmental health and safety; use and collection of hazardous chemicals and of radioactive and bio-hazardous materials; use of animals; and waste collection.

EP2. Plan and locate UCSF's facilities to avoid hazards to the campus community and surrounding neighborhoods.

UCSF Office of Environmental Health and Safety

The UCSF Office of Environment, Health and Safety (EH&S) oversees UCSF's health and safety operations including the management of hazardous materials and wastes. EH&S programs include Environmental Protection, Biosafety, Chemical Safety & Industrial Hygiene, Controlled Substances, Ergonomics, Fire & Life Safety, Injury Illness and Prevention Program, Public Health, and Radiation Safety. EH&S provides key resources in the planning, development and implementation of environmental and health and safety training programs. EH&S also conducts routine surveys of campus laboratories and facilities to ensure compliance with regulatory requirements in the transport, use, storage and disposal of hazardous materials. Hazardous materials tracking and reporting is done through an online chemical inventory database system maintained by authenticated hazardous materials users. EH&S also reviews proposed plans for new campus facilities and remodels to address health, safety, and environmental risks associated with activities conducted in the buildings, in accordance with applicable environmental and health and safety laws, codes, and regulations. Operations are guided by EH&S policies and manuals such as the Standard Operating Procedures, Chemical Safety Policy, Safe Use and Storage of Chemicals, Spill Cleanup Procedure, Medical Waste Management Plan, Radiation Safety Manual, Laboratory Design Guide, Personal Protective Equipment Policy, Disposal of Chemicals.

4.8.3 Impacts and Mitigation Measures

Significance Criteria

Would implementation of the CPHP, including the three Initial Phase projects and Initial Phase improvements:

a) Create a significant hazard to the public or the environment through the routine transport, use, or disposal of hazardous materials;

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;

c) Emit hazardous emissions or handle hazardous or acutely hazardous materials, substances, or waste within one-quarter mile of an existing or proposed school;

d) Be located on a site which is included on a list of hazardous materials sites compiled pursuant to Government Code Section 65962.5 and, as a result, would create a significant hazard to the public or the environment;

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, would the project result in a safety hazard or excessive noise for people residing or working in the project area or create a hazard to navigable airspace and/or operations at a public airport;

f) Impair implementation of or physically interfere with an adopted emergency response plan or emergency evacuation plan; or

g) Expose people or structures, either directly or indirectly, to a significant risk of loss, injury or death involving wildland fires.

Criteria Not Analyzed

As stated in the Initial Study, there would no impact related to the following topics for the reasons described below:

- ***Airport land use plan.*** There are no airports within 2 miles of the campus site boundary and as a result no impact would occur.
- ***Emergency response or evacuation plan.*** All expansion and improvements with the program would adhere to building code requirements and relevant emergency access and egress measures. All designs would be subject to review and approval by State Fire Marshall. In addition, UCSF design criteria and safety measures would ensure that emergency response abilities remain fully functional. Therefore, potential impacts related to emergency response or evacuation would remain less than significant.
- ***Wildland fire.*** UCSF's continued implementation of the Mount Sutro Open Space Reserve Vegetation Management Plan and reduction of fire hazards in the Reserve along with compliance with all California Fire Code requirements for all proposed improvements would ensure potential hazards from wildfires would be less than significant.

Approach to Analysis

The potential for the creation of significant impacts related to hazards and/or hazardous materials through construction and operation of campus development under the proposed CPHP was determined by a review of the existing conditions, with particular attention paid to the known or potential presence of hazardous materials and hazardous wastes as determined through a search of the environmental databases maintained by the DTSC and SWRCB; and information regarding the types and quantities of hazardous materials used in UCSF's clinical and research activities. Also considered are the existing regulatory requirements regarding the transportation, use, storage, and disposal of hazardous materials and wastes.

Approach to Analysis of Initial Phase Projects, including New Hospital, and Initial Phase Improvements

This EIR includes project-level analysis for certain Initial Phase projects anticipated to be completed by about the year 2030; specifically, the Irving Street Arrival, Research and Academic Building (RAB), and initial Aldea Housing Densification; and Initial Phase improvements, as described below. The New Hospital is also an Initial Phase project anticipated to be completed by about the year 2030, but is analyzed at a program level in this EIR within the context of the overall CPHP, and will be analyzed at a project level in a subsequent EIR when more details are available.

Impact Analysis

Impact HAZ-1: Construction and operation of campus development under the proposed CPHP could create a significant hazard to the public or the environment through the routine transport, use, or disposal of hazardous materials. (Less than Significant with Mitigation)

CPHP

Construction

Construction activities that would occur in association with new development or redevelopment under the CPHP would include modification, demolition, and/or removal of a number of existing buildings on the campus site that may contain hazardous building materials. Further, hazardous materials would be used during construction of new buildings, renovation of structures, and other associated elements of the proposed CPHP. The potential for exposure of the public or the environment to hazardous materials during these demolition and construction activities is addressed below.

Exposure to Hazardous Building Materials

The proposed CPHP would include modification or demolition of existing campus structures that are of varying ages. Many structures within the campus site were built before newer regulatory requirements were enacted (1978 for lead-based paint and PCBs, 1981 for ACMs, and 2004 for mercury in fluorescent lighting) and, as a result, could contain hazardous building materials. Exposure to hazardous building materials during demolition, including ACMs, LBP, PCBs, mercury and other hazardous materials in structures would only occur during demolition activities, but could result in adverse health effects if not managed appropriately as required by existing laws and regulations. Once the structures have been removed, there would be no further exposure during operation of the new buildings under the proposed CPHP.

As described under the *Regulatory Setting*, above, existing federal, State, and local regulations require demolition or renovation activities that may disturb or require the removal of materials that consist of, contain, or are coated with ACM, LBP, PCBs, mercury, and other hazardous materials to be inspected and/or tested for the presence of hazardous materials. Further, all hazardous materials must be managed and disposed of in accordance with laws and regulations described in the *Regulatory Setting* and further described below.

The identification, removal, and disposal of ACM is regulated under 8 CCR 1529 and 5208. The identification, removal and disposal of LBP is regulated under 8 CCR 1532.1. For both ACM and LBP, all work must be conducted by a State-certified professional. If ACM and/or LBP is determined to exist onsite, a site-specific hazard control plan must be prepared and submitted to the appropriate agency detailing removal methods and specific instructions for providing protective clothing and equipment for abatement personnel (Bay Area Air Quality Management District for asbestos and Cal/OSHA for lead). If necessary, a State-certified LBP and an asbestos removal contractor would be retained to conduct the appropriate abatement measures as required by the plan. Wastes from abatement and demolition activities would be disposed of at a landfill(s) licensed to accept such waste. Once all abatement measures have been implemented, the contractor would conduct a clearance examination and provide written documentation to UCSF that testing and abatement have been completed in accordance with all federal and State laws and regulations.

In the case of PCBs, the identification, removal, and disposal is regulated by the US EPA under the Toxic Substances Control Act (TSCA) (Title 40 Chapter 1 Subchapter R Part 761) and California regulations (22 CCR 66263.44). Electrical transformers and older fluorescent light ballasts not previously tested and verified to not contain PCBs must be tested. If PCBs are detected above action levels, the materials must be disposed of at a licensed facility permitted to accept the materials. Upon completion of abatement measures, if applicable, the contractor would provide written documentation to EH&S that testing and abatement have been completed in accordance with all federal and State laws and regulations.

In the case of mercury in fluorescent light tubes and switches, the identification, removal, and disposal is regulated under 22 CCR 67426.1 – 67428.1 and 66261.50. Under these regulations, the light tubes must be removed without breakage and disposed of at a licensed facility permitted to accept the materials. Upon completion of abatement measures, if applicable, the contractor would provide written documentation to EH&S that testing and abatement have been completed in accordance with all federal, State, and local laws and regulations.

As discussed above, pursuant to federal and State regulations, the demolition permit process would require appropriate surveying, identification and disposal of any identified hazardous building materials. Therefore, exposure to ACM, LBP and/or other hazardous building materials that would create a potentially significant hazard to the public or the environment through the routine transport, use, or disposal of hazardous materials would not occur and the impact would be less than significant.

Naturally Occurring Asbestos

San Francisco is among the identified counties where ultramafic bedrock materials are present and have the potential for naturally occurring asbestos fibers, which could be encountered during excavation activities. If present, groundbreaking activities could disturb these fibers causing them to be airborne and potentially adversely affect workers and the public. However, implementation of **CPHP Mitigation Measure HAZ-1** would ensure that disturbance of underlying materials during earthwork activities associated with construction of new development under the CPHP would not expose workers or the public to naturally occurring asbestos, if present.

Use of Hazardous Materials during Construction

Construction activities would also likely require the use of limited quantities of hazardous materials such as fuels, oils, and lubricants for construction equipment; as well as paints, thinners, glues, solvents and cleaners. These hazardous materials are typically packaged in consumer quantities and used in accordance with manufacturer recommendations, and would be transported to and from the campus site. The improper handling and transport of hazardous materials could result in adverse health effects to workers or the public.

As discussed in the *Regulatory Setting*, transportation of hazardous materials is regulated by the DOT, CHP and Caltrans. Together, federal and State agencies determine driver-training requirements, load labeling procedures, and container specifications designed to minimize the exposure of hazardous materials.

See also CPHP Impact HAZ-2, below, for a discussion of construction best management practices (BMPs) that would be implemented as part of a Storm Water Pollution Prevention Plan, as required by the NPDES Construction General Permit which would also minimize the potential for an inadvertent release of hazardous materials during construction.

As discussed above, a comprehensive set of federal and State laws and regulations regulate the transportation, management, and disposal of hazardous materials and wastes so as to reduce the potential risks of human exposure. For these reasons, construction associated with the proposed CPHP would not result in a significant hazard due to exposure of the public or the environment to hazardous materials or wastes through the routine transport, use, or disposal of hazardous materials.

Operation

As discussed in the *Environmental Setting*, the use of hazardous materials presently occurs in a variety of campus operations; and their use would be expanded as part of operation of the new or expanded facilities under the proposed CPHP.

The Parnassus Heights campus site residential, classroom, office, and other campus uses (other than clinics, laboratories and research facilities) would typically include familiar hazardous materials such as toners, paints, and household cleaning products. In addition, activities such as building maintenance and landscaping commonly use fuels, oils, paints, lubricants, solvents, and pesticides. These common types of hazardous materials are typically stored and used in small quantities, and used in accordance with manufacturer recommendations. As such, the routine transport, use, storage or disposal of these materials under the CPHP would not be reasonably expected to cause an adverse impact to the public and the environment.

As discussed in the *Environmental Setting*, diesel fuel is currently stored on the campus site for use at the CUP for its generators and boilers in emergency situations. As authorized under the 2014 LRDP, the diesel fuel USTs will be replaced with new code-compliant tanks prior to the end of 2025. As such, under the CPHP, the continued storage and use of diesel fuel at the campus site would be carried out in compliance with all applicable State regulations to ensure any potential exposure risks would remain less than significant.

Clinics, laboratories and research facilities may include transport, handling, storage and disposal of other varied and larger quantities of hazardous materials, including low-level radioactive waste and medical/biological waste. Various chemicals that may be used may pose different levels of hazards in their use from acute to chronic illnesses if not managed appropriately. In general, the properties and health effects of chemical substances are unique to the individual materials, although they often can be grouped by chemical types. Operations would continue to comply with all hazardous materials regulatory requirements and UCSF protocols for the campus as detailed above in the Regulatory Setting section. UCSF's Chemical Safety Policy establishes requirements and responsibilities for the safe use of hazardous chemicals in UCSF laboratories and other facilities. It is based on federal, State, and local regulations, as well as UCSF's commitment to providing a safe environment for the entire UCSF community. The policy covers training requirements, hazard communication, standard operating procedures, safe storage, engineering controls, hazardous waste, security, shipping and transportation, lab close-outs, enforcement, and other aspects of safe and compliant chemical management. A related policy, known as the Workplace Safety and Environmental Protection Policy, addresses various responsibilities for ensuring a safe and compliant workplace, including reporting hazards, inspecting workplaces, and interfacing with regulatory agencies.

To minimize exposure to chemicals in the air, staff would continue to receive required training, take prescribed procedural precautions in accordance with existing regulatory and UCSF handling requirements, such as working under fume hoods and wearing appropriate personal protective equipment, when using chemicals likely to present inhalation exposure hazards. Fume hoods and other engineering controls would be required to meet Cal/OSHA requirements and fume hood ventilation rates are checked annually by EH&S. EH&S also oversees radiation safety in accordance with the Radiation Safety Manual that is consistent with Radiological Health Branch requirements. Campus departments are primarily responsible for ensuring that safe work practices are followed. EH&S supports departments with this responsibility by reviewing proposed laboratory designs for safety concerns and compliance with Cal/OSHA requirements to provide appropriate protection for the workers. Current chemical handling training programs used to educate staff would continue with development of new CPHP facilities.

Laboratories and research facilities developed and operated under the CPHP would also include transport, handling, storage and disposal of medical/biological waste. UCSF has established policies and procedures and implements a comprehensive system for management of hazardous materials at its facilities, including medical/biological wastes as overseen by EH&S. UCSF's EH&S is responsible for ensuring compliance with applicable laws and regulations governing the transport, use, storage and disposal of hazardous materials.

Compliance with hazardous storage and transportation regulations, and continuation of the programs and controls currently in place to manage hazardous materials, as mandated by state and federal laws, would minimize the hazards to workers, the public, and the environment. Therefore, implementation of the CPHP would result in a less than significant impact related to the use and disposal of hazardous materials and wastes.

> **CPHP Mitigation Measure HAZ-1:** An Excavation Management Plan shall be prepared by a qualified consultant to include the California Air Resource Board (CARB) Asbestos Airborne Toxic Control Measure (ATCM) for Construction, Grading, Quarrying and Surface Mining Operations to minimize naturally occurring asbestos through the application of best management practices for fugitive dust from construction, grading and excavation operations. Unless site specific testing by a certified laboratory can demonstrate the absence of naturally occurring asbestos in materials to be excavated, construction specifications shall include implementation of this CARB ATCM.
>
> **Significance after Mitigation:** Implementation of an Excavation Management Plan would ensure that if naturally occurring asbestos is present in areas that would be disturbed, exposure risks would be reduced and this impact would be less than significant.

Irving Street Arrival, Research and Academic Building, and Initial Aldea Housing Densification Projects, and Initial Phase Improvements

Construction

The potential exposure to hazards from the routine transport, use, and disposal of hazardous materials during construction of the Irving Street Arrival, RAB, and initial Aldea Housing Densification projects, and Initial Phase improvements would be similar to that described above for the CPHP. As with all construction under the CPHP, construction activities associated with these Initial Phase projects and Initial Phase improvements would also be required to adhere to the NPDES Construction General Permit and implement appropriate BMPs that would control hazardous materials transport, handling, and disposal. Furthermore, as applicable, any Initial Phase improvements that would be constructed outside the campus site boundary would be subject to construction site runoff requirements in accordance with the City Public Works Code to minimize construction-related water quality impacts. As such, the potential for adverse effects would be reduced to less than significant levels.

Similarly, in regards to the potential for encountering naturally occurring asbestos during construction, the impact would be potentially significant. However, implementation of **CPHP Mitigation Measure HAZ-1** would ensure that disturbance of underlying materials would not expose workers or the public to naturally occurring asbestos, if present, for any proposed earthwork activities during construction of these Initial Phase projects and Initial Phase improvements at the campus site. Furthermore, as applicable, improvements that would be constructed outside the campus site boundary would be subject to the requirements of City Health Code Article 22B, San Francisco's Dust Control Ordinance, including implementation of Dust Control Plan. As such, potential effects related to naturally occurring asbestos during construction would be less than significant.

Operation

The quantities and types of hazardous materials and wastes involved in the operation of the Irving Street Arrival, RAB, and initial Aldea Housing Densification projects, and Initial Phase improvements would vary considerably, from likely insubstantial amounts associated with the Irving Street Arrival and initial Aldea Housing Densification projects, to likely more extensive use of hazardous materials associated with RAB. Initial Phase improvements may also involve use of hazardous materials during operation and/or maintenance. Regardless, the same regulatory environment and/or UCSF policy requirements as described above for the CPHP would apply to these Initial Phase projects and Initial Phase improvements. Therefore, impacts associated with routine transport, use and disposal of hazardous materials during operation of the Initial Phase projects and Initial Phase improvements would be less than significant.

Mitigation: Implement CPHP Mitigation Measure HAZ-1.

Significance after Mitigation: Less than Significant.

Impact HAZ-2: Construction and operation of campus development under the proposed CPHP would not create a significant hazard to the public or the environment through reasonably foreseeable upset and accident conditions involving the release of hazardous materials into the environment. (Less than Significant)

CPHP

Construction

As noted above in Impact HAZ-1, construction activities would require the use of limited quantities of hazardous materials that are typical of the construction process for single- and multi-story structures, including fuels, oils, and lubricants for construction equipment; paints and thinners; and solvents and cleaners. These materials would be transported to and from the campus site for use during construction activities. The improper handling and transport of hazardous materials could result in accidental release of hazardous materials, thereby exposing the public or the environment to hazardous materials.

Construction activities that would disturb more than one acre would be required to comply with the NPDES Construction General Permit. This permit requires implementation of best management practices (BMPs) that would include measures to address the safe handling of hazardous materials, and in the unlikely event of an inadvertent release, also requires spill response measures to contain any release of hazardous materials. The use of construction BMPs implemented as part of a Storm Water Pollution Prevention Plan (discussed further in Section 4.9, *Hydrology and Water Quality*) as required by the NPDES Construction General Permit would minimize the potential adverse effects from accidental release of hazardous materials or wastes. These BMPs could include, but are not necessarily limited to, the following:

- Establishment of a dedicated area for fuel storage and refueling activities that includes secondary containment protection measures and spill control supplies;
- Requirements to follow manufacturer's recommendations on use, storage and disposal of chemical products used in construction;
- Avoidance of overtopping construction equipment fuel gas tanks;
- Proper containment and removal of grease and oils during routine maintenance of construction equipment; or
- Proper disposal of discarded containers of fuels and other chemicals.

In general, aside from refueling needs for heavy equipment, the hazardous materials typically used on a construction site would be brought onto the site by the construction contractor, packaged in consumer quantities, and used in accordance with manufacturer recommendations. The overall quantities of these materials on the site at any one time would not result in large bulk amounts that, if spilled, could cause significant soil or groundwater contamination. If a spill of hazardous materials on the construction sites were to occur, the spilled materials would be localized because of the relatively small quantities involved, and would be cleaned up in a timely manner in accordance with identified BMPs. See Impact HAZ-4 for a discussion of potential impacts related to encountering previously released (i.e., legacy contaminants) hazardous materials or wastes.

As described above, refueling activities of heavy equipment would be conducted in a dedicated and controlled area with secondary containment and protective barriers to minimize any potential hazards that might occur with an inadvertent release. Given the required protective measures (i.e., BMPs) and the quantities of hazardous materials typically needed for construction projects, such as those that would be constructed under the proposed CPHP, the threat of exposure to the public or contamination to soil and/or groundwater from construction-related hazardous materials is considered a less-than-significant impact.

Operation

Operation of the proposed new and expanded facilities associated with the CPHP would involve continued and likely expanded use of hazardous materials as described above in Impact HAZ-1. UCSF would continue to implement existing campus health and safety practices and comply with federal and State regulations related to the use, transport, and disposal of hazardous materials, thus minimizing the potential for a release and providing for prompt and effective cleanup in the unlikely event that an accidental release would occur. Furthermore, UCSF has prepared an Emergency Operations Plan for the campus, which addresses the campus community's planned response to various levels of human-made or natural emergency situations, including the release of hazardous materials. UCSF's HMBP for the campus also addresses spill response procedures that include, but are not limited to, specific emergency response instructions, locations of personnel and equipment resources, specialty hazard instructions, and appropriate training. The existing Emergency Operations Plan and HMBP would be revised to include the expanded operations that would occur under the proposed CPHP. Thus, the proposed CPHP would not create a significant hazard to the public or the environment through reasonably foreseeable upset and accident conditions involving the release of hazardous materials into the environment.

Therefore, because a comprehensive set of enforced laws and regulations as well as existing UCSF policies and procedures govern the transportation and management of hazardous materials to reduce the potential hazards to the public and environment from upset and accident conditions, this impact would be less than significant.

Mitigation: None required.

Irving Street Arrival, Research and Academic Building, and Initial Aldea Housing Densification Project, and Initial Phase Improvements

Construction

The potential for upset and accidental releases of hazardous materials during construction of the Irving Street Arrival, RAB, and initial Aldea Housing Densification projects, and Initial Phase improvements would be similar to that described above for all construction that would occur under the CPHP. Construction activities with these Initial Phase projects and Initial Phase improvements would be required to adhere to the NPDES Construction General Permit and implement appropriate BMPs that would control hazardous materials transport, handling, and disposal such that the potential for upset and accident conditions would be less than significant.

Operation

Just as with the CPHP, the Irving Street Arrival, RAB, and initial Aldea Housing Densification projects, and Initial Phase improvements would adhere to existing regulatory requirements and/or UCSF policies such that the potential for upset and accidental release conditions would be reduced to less than significant levels.

Mitigation: None required.

Impact HAZ-3: Construction and operation of the proposed CPHP would not emit hazardous emissions or handle hazardous or acutely hazardous materials, substances, or waste within one-quarter mile of an existing or proposed school. (Less than Significant)

As noted above in *Environmental Setting*, there are three public schools (Independence High School, Grattan Elementary, and Clarendon Alternative Elementary) located within a quarter mile of the campus site, and a number of child care centers (Stepping Stones Preschool, Haight Ashbury Community Nursery School, and ABC Bay Area Child Care). In addition, two child care centers are located within the Parnassus Heights campus site (Kirkham Child Development Center and the UCSF Marilyn Reed Lucia Child Development Center). Under the CPHP, the Lucia Child Care

Center and Kirkham Child Care Center would be demolished, and likely relocated to a new child care facility at the Proctor building location in the campus site.

CPHP

Construction

The potential for emissions of hazardous materials during construction to adversely affect any of the schools or day care centers would be relatively low for the same reasons described above in Impact HAZ-1. Construction activities would be required to adhere to the NPDES Construction General Permit and implement appropriate BMPs that would control hazardous materials transport, handling, and disposal such that the potential for emissions to adversely affect existing or proposed schools or daycare centers would be reduced to less than significant.

Operation

During the operational phases of facilities developed under the CPHP, the new and expanded facilities would continue to adhere to existing regulatory requirements and UCSF policies. And while these new and expanded facilities would likely increase the total quantities of hazardous materials and also potentially the types of hazardous materials, there would not likely be a substantive change in hazardous emissions since all transportation, use, storage, and disposal of hazardous materials would be conducted in accordance with applicable federal, State, and UCSF requirements which are designed to minimize exposure. Therefore, implementation of the CPHP would not result in any adverse exposure to hazardous emissions to existing or future schools within, or in the vicinity of, the campus site and the impacts would be considered less than significant. Please also refer to a health risk assessment associated with implementation of the CPHP presented in Section 4.2, Air Quality.

Mitigation: None required.

Irving Street Arrival, Research and Academic Building, and Initial Aldea Housing Densification Projects, and Initial Phase Improvements

Construction

The potential for emissions of hazardous materials during construction to adversely affect existing or proposed schools or daycare centers would be similar to that described above for the CPHP. Construction activities with these Initial Phase projects and Initial Phase improvements would be required to adhere to the NPDES Construction General Permit and implement appropriate BMPs that would control hazardous materials transport, handling, and disposal such that the potential for adverse effects associated with emissions would be less than significant.

Operation

Just as with the CPHP, the Initial Phase projects and Initial Phase improvements would adhere to existing regulatory requirements and/or UCSF policies such that the potential exposure of existing or proposed schools or daycare centers to hazardous material emissions would be reduced to less than significant levels.

Mitigation: None required.

Impact HAZ-4: Campus development under the proposed CPHP would not be located on a site which is included on a list of hazardous materials sites compiled pursuant to Government Code Section 65962.5. However, previously unknown contamination could be encountered during construction and could have the potential to create a significant hazard to the public or the environment. (Less than Significant with Mitigation)

CPHP

As described above under *Environmental Setting*, the two cases identified in a review of DTSC and SWRCB environmental databases both predate the 2014 LRDP, were closed in accordance with the applicable regulatory agencies, required no further action, and there is no indication that any known threat to human health or the environment remains.

While there are no database records that would indicate a high probability of legacy contaminants present that could adversely affect construction workers or future occupants of the proposed improvements, the possibility exists for future improvements associated with the CPHP to encounter previously unidentified contamination. If not identified and managed appropriately, future visitors or workers at the campus site could be exposed to legacy contaminants. Construction activities in locations of undocumented contaminated materials could come in contact with contaminated soils, groundwater, or soil vapor that could adversely affect workers, the public or future occupants through soil vapor intrusion.

Preparation and implementation of a Soil Management Plan in accordance with Cal/OSHA standards as required by **CPHP Mitigation Measure HAZ-4** would ensure that workers would have the training to identify suspected contamination, and protocols for notification and isolation of suspected materials until laboratory confirmation can assess the potential exposure risks.

CPHP Mitigation Measure HAZ-4: Prior to development on the Parnassus Heights campus site under the CPHP, a Soil Management Plan shall be prepared by a qualified environmental consulting firm to reflect current regulatory requirements and risk management protocols that are in accordance with Regional Water Quality Control Board oversight. The Plan shall include measures to address protocols for identifying, handling, and characterizing suspect contaminated soils. Notification and sampling requirements for adequate characterization shall be in accordance with the overseeing agency (RWQCB or SFDEH) requirements and any required removal or remediation work shall be completed to the overseeing agency's standards prior to occupancy of the new structure.

Level of Significance after Mitigation: With the implementation of CPHP Mitigation Measure HAZ-4, the CPHP would not create a significant hazard to the public or the environment as a result of exposure to previously unknown contamination or hazardous release sites. Thus, this impact would be considered less than significant.

Irving Street Arrival, Research and Academic Building, and Initial Aldea Housing Densification Projects, and Initial Phase Improvements

Just as with the CPHP, the Initial Phase projects and Initial Phase improvements at the campus site that include ground disturbing activities would have the potential to encounter previously unidentified contamination. Implementation of **CPHP Mitigation Measure HAZ-4** would also ensure that suspected contamination at the campus site is appropriately isolated and characterized to protect workers, the public and the environment. Furthermore, for any potential Initial Phase improvements that would be constructed outside the campus site boundary; would involve moving more than 50 cubic yards of soil; and would be located in an area subject to City Health Code Article 22A. Compliance with City Health Code Article 22A, as overseen by the City Department of Public Health, would ensure potential effects associated with release of hazardous materials in soil or groundwater would be less than significant.

Mitigation: Implement CPHP Mitigation Measure HAZ-4.

Significance after Mitigation: Less than Significant.

Cumulative Impacts

This section presents an analysis of the cumulative effects of the CPHP when considered with other cumulative projects. The geographic scope of potential cumulative hazards and hazardous materials impacts encompasses the campus site and immediate surrounding area. Hazardous materials and hazard impacts are generally localized to specific sites/incidents and do not combine with one another in a way to create a greater or more severe hazard, because of the relative infrequencies, the variances in timing, and the existing response measures that tend to contain the vast majority of incidents and releases to very localized areas. Impacts relative to hazardous materials usually depend on the nature and extent of the hazardous materials release, and existing and future soil and groundwater conditions. For example, hazardous materials incidents tend to be limited to a smaller more localized area surrounding the immediate location and extent of a release, and could only be cumulative if two or more hazardous materials releases overlapped spatially and contemporaneously in a way that could be considered cumulatively considerable.

Impact C-HAZ-1: Construction and operation of campus development under the proposed CPHP, in conjunction with other cumulative development within the City of San Francisco, would not create a significant hazard to the public or the environment through the routine transport, use, or disposal of hazardous materials or from risk of upset and accident conditions. (Less than Significant)

Based on the existing management of hazardous materials and the continued oversight, guidance and compliance monitoring that would be conducted by UCSF’s EH&S, there would not be a substantial change in how hazardous materials are handled on the proposed campus site. Other demolition and construction activities previously authorized under the 2014 LRDP that have not yet been implemented would similarly be carried out in accordance all applicable regulations governing hazardous materials. Land uses throughout the City of San Francisco include various light industrial and commercial land uses which are subject to similar regulations and internal standard operating procedures which control the use, storage, and disposal of hazardous materials such that routine exposure and release risks from upset and accident conditions are minimized. As a result of these existing regulatory requirements, the potential hazardous materials and hazard impacts would not combine to become cumulatively considerable.

Cumulative health and safety impacts could also occur if CPHP -related off-site hazards were to interact or combine with those of existing and/or proposed non-program development. This could only occur through the following mechanisms: air emissions; transport of hazardous materials and waste to or from the campus site; inadvertent release of hazardous materials to the sanitary sewer, storm drain, or non-hazardous waste landfill; and potential accidents that require hazardous materials emergency response capabilities. Air emissions are addressed in Section 4.2, *Air Quality*. The CPHP as well as other past, present, and future projects would be required to adhere to existing regulatory requirements for the appropriate handling, storage, and disposal of hazardous materials that are designed to minimize exposure and protect human health and the environment. These requirements include that all businesses that handle hazardous materials or wastes would be required to submit business information and hazardous materials inventory forms contained in a Hazardous Materials Management Plan and Hazardous Materials Business Plan. Cumulative increases in the transportation of hazardous materials and wastes would cause a less than significant impact because the probability of accidents is relatively low, and the use of legally required packaging minimizes the consequences of potential accidents. In addition, all cumulative projects in the area would be required to comply with the same laws and regulations as the CPHP. This includes federal and state regulatory requirements for transporting (Cal EPA and Caltrans) hazardous materials or cargo (including fuel and other materials used in all motor vehicles) on public roads or disposing of hazardous materials (Cal EPA, DTSC, SF Environmental Department of Health). The cumulative impact related to hazards and hazardous materials would be less than significant.

Mitigation: None required.

4.8.4 References

California Department of Forestry and Fire Protection (CAL FIRE). 2007. *Draft Fire Hazard Severity Zones in LRA – San Francisco County*. October 5.

California Division of Mines and Geology (CDMG), 2000. *A General Location Guide for Ultramafic Rocks in California – Areas More Likely to Contain Naturally Occurring Asbestos*. August, 2000.

Department of Toxic Substances Control (DTSC), 2019. *Envirostor Database Search Results,* https://www.envirostor.dtsc.ca.gov/public/map/?myaddress=505+Parnassus+Ave%2C+San+Francisco+CA. Accessed September 19, 2019.

Rutherford & Chekene, 2006. *Slope Stability Risk Assessment*. August 25, 2006.

San Francisco Department of Public Health (SFDPH), 2018. *Local Oversight Program, Letter Regarding Unauthorized Release at 250 Irving Street, San Francisco, California*. August 28, 2018.

State Water Resources Control Board (SWRCB), 2019. *Geotracker Database Search Results,* http://geotracker.waterboards.ca.gov/map/?CMD=runreport&myaddress=505+Parnassus%2C+San+Francisco+CA. Accessed September 19, 2019.

United States Environmental Protection Agency (USEPA), 2019a. *Federal Bans on Asbestos*. Last updated April 26, 2019.

USEPA, 2019b. *Policy and Guidance for Polychlorinated Biphenyl (PCBs)*. Available: https://www.epa.gov/pcbs/policy-and-guidance-polychlorinated-biphenyl-pcbs. Last Updated April 25, 2017. Accessed September 19, 2019.

United States Geological Survey (USGS), 2011. *Reported Historic Asbestos Mines, Historic Asbestos Prospects, and Other Natural Occurrences of Asbestos in California*, Open File Report 2011-1188, 2011.

4.9 Hydrology and Water Quality

This section describes and evaluates potential for construction and operation of the Comprehensive Parnassus Heights Plan (CPHP or Plan), including the three Initial Phase projects and Initial Phase improvements, to result in significant impacts related to hydrology and water quality. The section contains a description of the existing hydrology and water quality conditions of the campus site and the surrounding areas; describes the regulatory University, federal, State and local regulations related to hydrology and water quality; identifies criteria used to determine impact significance, and provides an analysis of the changes in hydrology and water quality associated with the implementation of the CPHP, as well as the identification of potentially feasible measures that could mitigate significant impacts.

4.9.1 Environmental Setting

Climate

The Bay Area has a Mediterranean climate, with cool, dry summers and mild, wet winters. The mean annual precipitation in San Francisco is approximately 24 inches per year with most of the rainfall occurring between November and March. The average annual temperature in San Francisco is 57.3 degrees Fahrenheit, with the minimum average monthly temperature occurring in December and January (46 degrees Fahrenheit) and maximum average monthly temperature occurring during September (70 degrees Fahrenheit) (U.S. Climate Data, 2019).

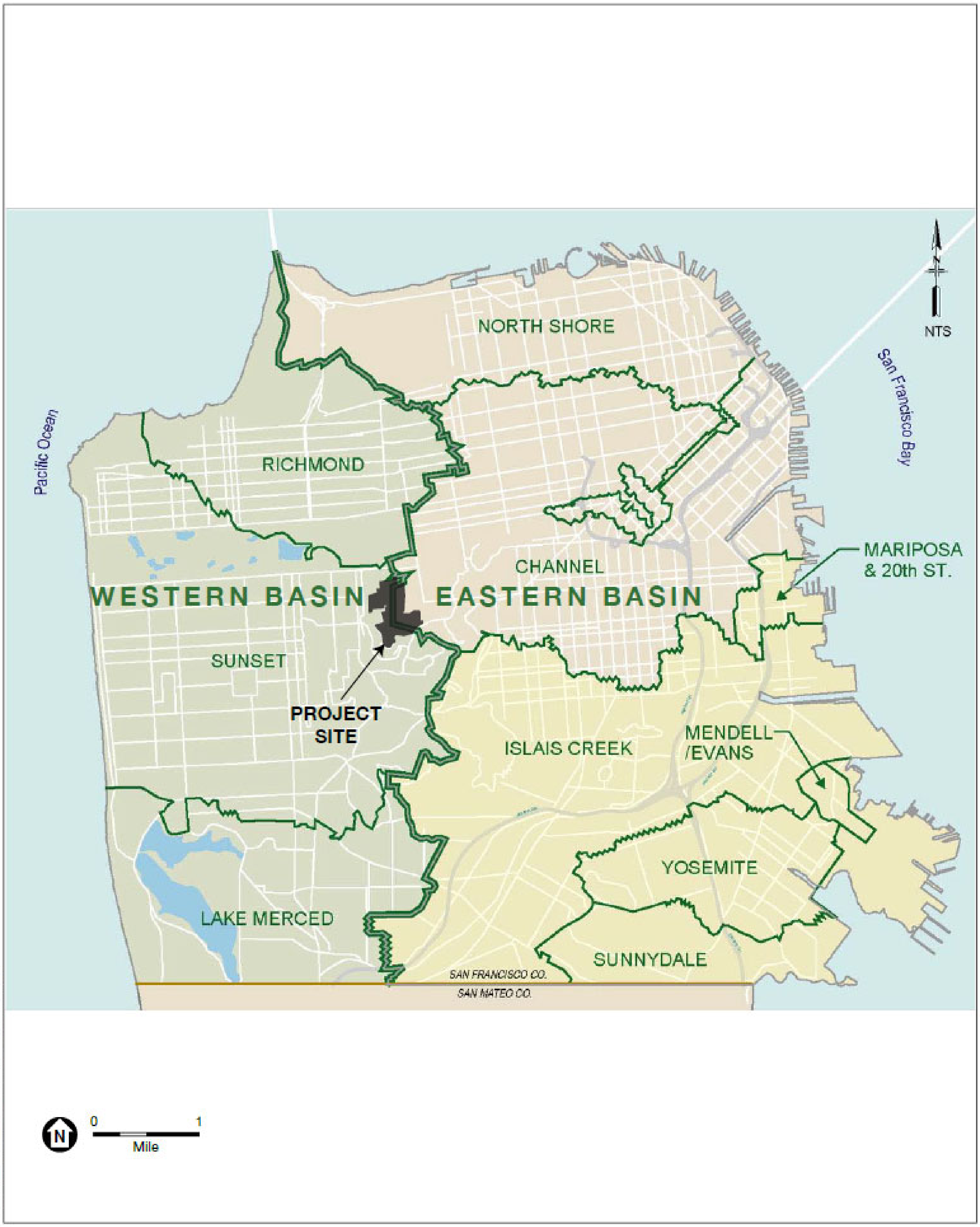
Watershed Drainage Basins

The majority of the City of San Francisco is urbanized and covered in impermeable surfaces with few daylighted surface waters, though topographic drainages in some park and open space areas may have ephemeral surface flows during storms. **Figure 4.9-1** presents existing watershed drainage basins in San Francisco. As shown in Figure 4.9-1, Parnassus Heights campus site straddles two City watershed basins. The west side of the Parnassus Heights campus site is located in the City's Sunset drainage basin within the larger Western Basin; and east side of the campus site is in the City's Channel drainage basin within the larger Eastern Basin.

City of San Francisco Stormwater Collection and Treatment

The City's combined sewer system (CSS) is a network of pipes and tunnels that convey combined stormwater and sanitary sewage flows, referred to as combined sewer discharge, to City wastewater treatment plants. During non-storm conditions, the City's CSS collects and treats up to 80 million gallons per day (mgd) of wastewater, primarily municipal sewage.

The CSS routes flows to two treatment plants: the Southeast Treatment Plant (SEP) in the Bayview/Hunters Point neighborhood, and the Oceanside Treatment Plant (OSP) east of the Great Highway near the San Francisco Zoo. The SEP receives approximately 80 percent of the combined wastewater and stormwater flows from the city and discharges them to San Francisco Bay. On average, the SEP treats approximately 60 mgd of combined flows each day. During a



SFO/D190231.00 - UCSF CPHP EIR/2. Graphics/Illustrator

SOURCE: City of San Francisco, 2011

UCSF Comprehensive Parnassus Heights Plan EIR

Figure 4.9-1
San Francisco Drainage Basins

ESA

rainstorm, the SEP has the capacity to treat up to 250 mgd of combined flows. The OSP treats the remaining 20 percent of flows from the west side of the city, including approximately half the combined flows from the Parnassus Heights campus site. On an average day, the OSP can treat approximately 17 mgd; during rain events, the wet-weather treatment capacity is 65 mgd (SFPUC, 2019a).

These plants normally employ a minimum of secondary treatment to the combined flows, before discharging the effluent. However, depending on individual storm characteristics and timing, the treatment plants can be overwhelmed, which results in discharge of minimally treated flows to the Bay and/or Ocean.

Campus Site Drainage and Stormwater Collection

The majority of rainfall runoff within the developed areas of the campus site, including the campus core in the north portion of the campus site, and the Aldea Housing complex in the southeast area of the campus site, is captured and routed to UCSF's owned- and maintained stormwater infrastructure within the campus site, and then discharged to the City's CSS collection lines in Parnassus Avenue, Kirkham Street, Irving Street, and Clarendon Avenue. See description of City's CSS system. Rainfall that occurs within the campus site (including portions of the Reserve) that is not captured and directed to the CSS either infiltrates into the ground (in landscaped and other pervious areas), or flows overland off-site.

Groundwater

There are seven groundwater basins in San Francisco. The Parnassus Heights campus site is located within the Westside Groundwater Basin which extends beneath the Sunset District from Golden Gate Park to the San Francisco/San Mateo County line, and from the Pacific Ocean to inland bedrock exposures generally associated with Mount Sutro and Mount Davidson. The principal aquifers for water supply in the basin are the Merced and Colma Formations. Several thousand feet in total thickness, the Merced Formation has been developed for water supply in its upper and middle units which are on the order of 500 and 600 feet thick, respectively. The shallower Colma Formation is near the surface, and is not clearly distinguishable from the upper Merced Formation (SFPUC, 2005).

In April, 2017, the San Francisco Public Utilities Commission (SFPUC) began pumping groundwater from the Westside Groundwater Basin aquifer from approximately 270 feet to 460 feet below the surface. The groundwater is treated and blended with regional drinking water supplies before delivery to consumers for potable use. To date, four groundwater wells have been completed, with the remaining two still under construction. The SFPUC plans to continue to add groundwater in order to reach its goal of blending 4 million mgd of treated groundwater with regional water supplies (SFPUC, 2019b).

The Westside Groundwater Basin is routinely monitored for water quality parameters as part of the Groundwater Monitoring Program that provides information summarizing basin-wide groundwater pumping, groundwater levels and quality in the different aquifer systems within the basin, and surface water conditions, most notably in Lake Merced.

Flooding

The Federal Emergency Management Agency (FEMA) administers the National Flood Insurance Program (NFIP) that delineates areas subject to flood hazards on Flood Insurance Rate Maps (FIRMs) for each community participating in the NFIP. The FIRMs show the areas subject to inundation by a flood that has a one percent chance or greater of being equaled or exceeded in any given year. This type of flood is commonly referred to as the 100-year or base flood. Areas on FIRMs are divided into geographic areas, or zones, that FEMA has defined according to varying levels of flood risk. The entire campus site is located in an area that is above the one percent annual chance (100-year) and the 0.2 percent chance (500-year) flood level (FEMA, 2015).

The City, in coordination with the SFPUC, has also developed a 100-Year Storm Flood Risk Map that shows areas of San Francisco where significant flooding from storm runoff is highly likely to occur during a 100-year storm.[1] This flood map also shows the Parnassus Heights campus site is outside of the 100-year flood zone (SF, 2019).

4.9.2 Regulatory Setting

Federal

Clean Water Act

Water quality objectives for all waters of the United States are established under applicable provisions of section 303 of the federal Clean Water Act (CWA). The CWA prohibits the discharge of pollutants to navigable waters from a point source unless authorized by a National Pollutant Discharge Elimination System (NPDES) permit. Point sources are defined as any discernible, confined, and discrete conveyance including but not limited to any pipe, ditch, channel, tunnel, well, or vessel from which pollutants are discharged. Nonpoint sources come from many diffuse sources including land runoff, precipitation, drainage, seepage, or hydrologic modification. Because implementation of these regulations has been delegated to the State, additional information regarding this permit is discussed under the “State” subheading, below.

National Pollutant Discharge Elimination System Permits

The NPDES permit system was established in the CWA to regulate municipal and industrial point discharges to surface waters of the US. Each NPDES permit for point discharges contains limits on allowable concentrations of pollutants contained in discharges. CWA sections 401 and 402 contain general requirements regarding NPDES permits. CWA section 307 describes the factors that the EPA must consider in setting effluent limits for priority pollutants.

The regulations initially focused on municipal and industrial wastewater discharges in 1972, followed by stormwater discharge regulations, which became effective in November 1990. NPDES permits for wastewater and industrial discharges specify discharge prohibitions and effluent limitations and also include other provisions (such as monitoring and reporting programs) deemed

[1] In contrast to the preliminary FEMA flood hazards map for San Francisco which show inland flood hazards associated with San Francisco Bay and the Pacific Ocean, SFPUC’s Flood Risk Map focuses on flooding that would be attributed to peak storm flows during a 100-year storm event.

necessary to protect water quality. In California, the State Water Resources Control Board (SWRCB) and the Regional Water Quality Control Boards (RWQCB) implement and enforce the NPDES program. Stormwater sources are diffuse and originate over a wide area rather than from a definable point. The goal of NPDES stormwater regulations is to improve the quality of stormwater discharged to receiving waters to the "maximum extent practicable" through the use of structural and non-structural BMPs. BMPs can include the development and implementation of various practices, including educational measures (e.g., workshops informing public of what impacts results when household chemicals are dumped into storm drains), regulatory measures (e.g., local authority of drainage facility design), public policy measures, and structural measures (e.g., filter strips, grass swales and detention ponds). For the campus site, all stormwater runoff that is not infiltrated onsite is collected in the existing City infrastructure which directs all runoff to one of two combined flow treatment plants described above. These plants discharge effluent to either the San Francisco Bay or Pacific Ocean in accordance with an individual NPDES permit.

Executive Order 11988 and National Flood Insurance Program

Under Executive Order 11988, FEMA is responsible for management of floodplain areas, which are defined as the lowland and relatively flat areas adjoining inland and coastal waters subject to a one percent or greater chance of flooding in any given year. Also, FEMA administers the National Flood Insurance Program, which requires that local governments covered by federal flood insurance pass and enforce a floodplain management ordinance that specifies minimum requirements for any construction within the one percent annual chance flood zone. FEMA prepares FIRMs that are used to identify areas prone to flooding.

State

Porter-Cologne Water Quality Control Act

The Porter-Cologne Water Quality Control Act (Division 7 of the California Water Code) provides for protection of the quality of all waters of the State of California for use and enjoyment by the people of California. The act also establishes provisions for a statewide program for the control of water quality, recognizing that waters of the State are increasingly influenced by inter-basin water development projects and other statewide considerations, and that factors such as precipitation, topography, population, recreation, agriculture, industry, and economic development vary regionally within the State. The statewide program for water quality control is therefore administered most effectively on a local level with statewide oversight. Within this framework, the act authorizes the SWRCB and RWQCBs to oversee the coordination and control of water quality within California.

General Construction Activity Stormwater Permit

In accordance with NPDES regulations, to minimize the potential effects of construction runoff on receiving water quality, the State requires that any construction activity affecting one acre or more obtain coverage under a General Construction Activity Stormwater Permit (Construction General Permit). The current Construction General Permit is the modified 2017 NPDES Construction General Permit (CGP) for Storm Water Discharges from Construction Activities, effective June 27, 2019. CGP applicants are required to prepare and implement a SWPPP which includes implementing BMPs to reduce construction effects on receiving water quality by implementing erosion and sediment control measures and reducing or eliminating non-stormwater discharges. Examples of typical construction BMPs in SWPPPs include, but are not limited to: using temporary mulching, seeding, or other suitable stabilization measures to protect uncovered soils; storing materials and equipment so as to ensure that spills or leaks cannot enter the storm drain system or surface water; developing and implementing a spill prevention and cleanup plan; and installing sediment control devices such as gravel bags, inlet filters, fiber rolls, or silt fences to reduce or eliminate sediment and other pollutants from discharging to the City drainage system or receiving waters.

The CGP includes what are known as Construction and Development rule requirements which have non-numeric effluent limitations that apply to all permitted discharges from construction sites (40 CFR 450.21). The effluent limitations are structured to require construction operators to first prevent the discharge of sediment and other pollutants through the use of effective planning and erosion control measures; and second, to control discharges that do occur through the use of effective sediment control measures. Operators must implement a range of pollution control and prevention measures to limit or prevent discharges of pollutants, including those from dry weather discharges as well as wet weather (i.e., stormwater).

Phase II General Stormwater Permit (SWRCB Order Nos. 2003-0005-DWQ and 2013-0001-DWQ)

In 2003, the SWRCB adopted the General Permit for the Discharge of Storm Water from Small Municipal Separate Storm Sewer System (MS4s), SWRCB Order No. 2003-0005-DWQ (Phase II General Stormwater Permit), which applies to small municipal separate storm water systems, including systems owned and operated by the University of California. A revised permit applying to the MS4 at UCSF was approved in 2013 (Order No. 2013-0001-DWQ). The revised Phase II General Permit required UCSF to develop, implement and enforce a Storm Water Management Program designed to minimize the discharge of pollutants into receiving waters; identify appropriate stormwater treatment practices with measurable performance criteria; and ensure that the program includes provisions to address six minimum measures to promote pollutant load reduction. These measures are: public education, public participation and involvement, illicit discharge detection and elimination, construction site runoff control, post-construction runoff control and pollution prevention and good housekeeping.

The revised Phase II permit also required that plans for UCSF projects that create and/or replace (including projects with no net increase in impervious footprint) more than 5,000 square feet of impervious surface include the following:

- Site design measures such as porous pavement, setbacks, and impervious area disconnections to reduce project site runoff
- Low-Impact Design (LID) standards to effectively reduce runoff and pollutants from the project site, including:
- Source control measures such as permanent and/or operational source control measures at loading docks, fuel dispensing areas, pools, and other areas;

- Numeric sizing criteria for stormwater retention and treatment; and
- Stormwater treatment measures and baseline hydromodification management measures

Regional

San Francisco Regional Water Quality Control Plan (Basin Plan)

San Francisco Bay waters are under the jurisdiction of the San Francisco Bay RWQCB which established regulatory standards and objectives for water quality in the Bay in the *Water Quality Control Plan for the San Francisco Bay Basin*, commonly referred to as the Basin Plan. The Basin Plan is reviewed on a triennial basis and the current plan includes amendments that have been adopted up through May 4, 2017. The Basin Plan identifies existing and potential beneficial uses for surface waters and provides numerical and narrative water quality objectives designed to protect those uses. The preparation and adoption of water quality control plans is required by the California Water Code (Section 13240) and supported by the federal CWA. Because beneficial uses, together with their corresponding water quality objectives, can be defined per federal regulations as water quality standards, the Basin Plan is a regulatory reference for meeting the State and federal requirements for water quality control. Adoption or revision of surface water standards is subject to the approval of the U.S. Environmental Protection Agency (USEPA).

NPDES Separate Storm Sewer System Permit

The City and County of San Francisco operates the OSP and SEP and their related transport and outfall facilities under the regulatory provisions in NPDES Permits No. CA0037681 and CA0037664, and the Waste Discharge Requirements (WDRs) cited in Orders No. R2-2019-0028 (adopted September 11, 2019, expiring October 31, 2024) and R2-2013-0029 (adopted on August 14, 2013, expired September 30, 2018 but currently in revision), respectively. These Orders stipulate protocols for the monitoring of dry and wet weather influent and effluent and limitations on sampled constituents of concern. The SEP also maintains a pretreatment program for Combined Sewer System flows.

University of California

UCOP Sustainable Practices Policy

UCOP’s Sustainable Practices Policy establishes goals in several areas of sustainable practices, including, but not limited to, green building, climate protection, sustainable operations, and sustainable water systems. Under procedures for Sustainable Water Systems, the Sustainable Practices Policy indicates that each campus will develop and maintain a Water Action Plan that identifies long term strategies for achieving sustainable water systems. Each Water Action Plan includes a section on Stormwater Management developed in conjunction with the location stormwater regulatory specialist that:

a. Addresses stormwater management from a watershed perspective in a location-wide, comprehensive way that recognizes stormwater as a resource and aims to protect and restore the integrity of the local watershed(s);

b. References the location's best management practices for preventing stormwater pollution from activities that have the potential to pollute the watershed (e.g., construction; trenching; storage of outdoor equipment, materials, and waste; landscaping maintenance; outdoor cleaning practices; vehicle parking);

c. Encourages stormwater quality elements such as appropriate source control, site design (low impact development), and stormwater treatment measures to be considered during the planning stages of projects in order to most efficiently incorporate measures to protect stormwater quality;

d. If feasible, cites relevant and current location stormwater-related plans and permits;

e. Includes, to the extent feasible, full cost evaluation of stormwater management initiatives.

UCSF 2014 LRDP

The UCSF 2014 LRDP identified campus-wide objectives and objectives specific to the Parnassus Heights campus site. The following UCSF 2014 LRDP campus-wide objective relates to the Sustainable Practices Policy:

Campus-Wide Objectives

4. Promote Environmental Sustainability

F. Facilitate growth in an environmentally responsible manner while reducing UCSF greenhouse gas emissions in compliance with UC *Sustainable Practices Policy.*

The UCSF 2014 LRDP also included *Community Planning Principles*, which were produced in collaboration with the UCSF Community Advisory Group:

Community Planning Principles

Sustainability

S1. Meet or exceed guidelines and standards in the University of California's Sustainable Practices Policy when planning and developing projects. Policy goals are categorized as follows: Green Building; Clean Energy; Climate Protection Practices (including greenhouse gas reduction); Sustainable Transportation; Sustainable Building Operations; Recycling and Waste Management; Environmentally Preferable Purchasing Practices; Sustainable Foodservices Practices.

4.9.3 Impacts and Mitigation Measures

Significance Criteria

Would implementation of the CPHP, including the three Initial Phase projects and Initial Phase improvements:

a. Violate any water quality standards or waste discharge requirements or otherwise substantially degrade surface or ground water quality;

b. Substantially decrease groundwater supplies or interfere substantially with groundwater recharge such that the project may impede sustainable groundwater management of the basin;

c. Substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river or through the addition of impervious surfaces, in a manner which would:

   i. Result in substantial erosion or siltation on or off site;

   ii. Substantially increase the rate or amount of surface runoff in a manner which would result in flooding on or off site;

   iii. Create or contribute runoff water which would exceed the capacity of existing or planned stormwater drainage systems or provide substantial additional sources of polluted runoff; or

   iv. Impede or redirect flow.

d. In flood hazard, tsunami, or seiche zones, risk release of pollutants due to project inundation; or

e. Conflict with or obstruct implementation of a water quality control plan or sustainable groundwater management plan.

Criteria Not Analyzed

As stated in the Initial Study, there would no impact related to the following topics for the reasons described below:

- ***Decrease groundwater supplies or interfere with groundwater recharge.*** Development under the proposed CPHP could increase impervious surfaces but not enough to interfere with groundwater recharge and the CPHP would not require use of groundwater for construction or operation. Therefore, the proposed CPHP would not substantially deplete groundwater supplies or interfere substantially with recharge.
- ***Risk of release of pollutants due to inundation.*** Based on the location of the campus outside of a 100-year flood zone, and its elevation and distance to the nearest major body of water, there would be no impact related to risk of release of pollutants due inundation from a flood, tsunami or seiche.

It should be noted that the Initial Study inadvertently checked two significance boxes for the Hydrology and Water Quality topic e) "Conflict with or obstruct implementation of a water quality control plan or sustainable groundwater management plan." Development of the proposed CPHP would alter drainage patterns and the potential to affect water quality is analyzed below in Impact HYD-1, but development would not otherwise conflict with or obstruct the RWQCB Basin Plan for the San Francisco Bay. The campus site is located within the Westside groundwater basin which is not a medium- or high-priority groundwater basin and which does not require preparation or implementation of a Groundwater Sustainability Plan. Given these factors, and the additional analyses for other topics in this EIR section, the proposed CPHP would not conflict with or obstruct implementation of a water quality control plan or a sustainable groundwater management plan, and no impact would occur.

Approach to Analysis

Impacts on water quality were evaluated qualitatively by considering the type of pollutants the CPHP would generate during construction and operational phases and whether meeting the requirements of applicable regulations would reduce potential impacts to a less-than-significant level. On-site drainage impacts were also evaluated qualitatively for full buildout of the CPHP. Development under the CPHP would comply with applicable State and federal laws, regulations, design standards, and plans.

Approach to Analysis of Initial Phase Projects, including New Hospital, and Initial Phase Improvements

This EIR includes project-level analysis for certain Initial Phase projects anticipated to be completed by about the year 2030; specifically, the Irving Street Arrival, Research and Academic Building (RAB), and initial Aldea Housing Densification; and Initial Phase improvements, as described below. The New Hospital is also an Initial Phase project anticipated to be completed by about the year 2030, but is analyzed at a program level in this EIR within the context of the overall CPHP, and will be analyzed at a project level in a subsequent EIR when more details are available.

Impact Analysis

Impact HYD-1: Construction and operation of campus development under the CPHP would not have the potential to violate water quality standards or waste discharge requirements, or otherwise substantially degrade surface or groundwater quality. (Less than Significant)

CPHP

Construction

Over the course of construction of development identified under the CPHP, the use of construction equipment and other vehicles could result in spills of oil, grease, gasoline, brake fluid, antifreeze, or other vehicle-related fluids and pollutants. Improper handling, storage, or disposal of fuels and materials or improper cleaning of machinery could result in accidental spills or discharges that could degrade water quality. In addition, the use of equipment and ground disturbing activities could increase erosion, in turn potentially increasing sediment discharged into storm water that could degrade water quality. As discussed in the *Regulatory Setting*, above, development associated with the CPHP would be required to comply with existing regulations designed to reduce or eliminate construction-related water quality effects, including the NPDES CGP and the UCSF Storm Water Program for construction projects on UCSF-owned property.

Before any construction activities commence for any individual project, an application for coverage under the NPDES CGP would be submitted to the San Francisco RWQCB. Before construction could begin, a Stormwater Pollution Prevention Plan (SWPPP) would be developed and a Notice of Intent (NOI) filed with the RWQCB. After the RWQCB confirms the applicability of the CGP, and approves the SWPPP, construction could commence. In accordance with the CGP Permit, UCSF would be required to prepare and implement a SWPPP for proposed development activities to minimize water quality impacts during construction and demolition. The SWPPP will identify pollutant sources within the construction area and recommend site-specific BMPs regarding control of sediments in runoff and storage and use of hazardous materials to prevent discharge of pollutants into stormwater. Likely BMPs include, but are not limited to:

- Erosion control practices
- Sediment control practices
- Practices to reduce the tracking of sediment onto public and private roads
- Practices to prevent or minimize wind erosion
- Practices to minimize contact with stormwater
- Construction material loading and unloading
- Waste management and disposal
- Stormwater run-on and run-off controls
- Non-stormwater discharges and management
- Maintenance, inspection, and repair of structural controls
- Spill prevention and control
- Post-construction stormwater management
- Development of a Rain Event Action Plan (REAP)
- Construction site monitoring and reporting
- Water quality sampling and analysis

In addition, proposed development activities will need to obtain a water quality certification from the RWQCB for construction activities, which would also require implementation of BMPs and specific measures for the protection of water quality during construction. Projects that create and/or replace more than 2,500 square feet of impervious surfaces would be required to submit an Erosion Control Plan seven days prior to the start of work and submit it to UCSF Project Management and Environmental Health and Safety (EH&S).

Compliance with the NPDES CGP permit regulations and the UCSF Storm Water Program as outlined above would prevent the substantial degradation of water quality during construction of any development associated with the CPHP. These regulatory requirements are designed to ensure that construction projects result in water quality discharges that are not in violation of SWRCB objectives, and as such would be effective in ensuring that construction activities result in less than significant impacts related to water quality.

Operation

The campus core, where the majority of development and redevelopment under the CPHP is proposed, is largely developed and covered in impervious surfaces (estimated at approximately 86 percent impervious). Preliminary estimates indicate additional building development under the CPHP could incrementally increase the amount of impervious surfaces across the campus core by an additional 4 percent (about one acre) over existing conditions. Elsewhere on the campus site, the CPHP is not expected to notably increase impervious surfaces, as the proposed new housing buildings in the Aldea Housing complex would be sited largely within existing housing building footprints.

As under existing conditions, stormwater runoff from the new development under the CPHP would potentially contain pollutants common in urban runoff, including metals, oils and grease, pesticides, herbicides, nutrients, pet waste, and garbage/litter with no substantive change in the type of pollutants associated with the proposed development. Stormwater runoff would be collected by existing and new on-site stormwater collection infrastructure, depending on location, that would direct the runoff to the existing off-site City CSS infrastructure in adjacent streets, and depending on point of discharge, treated at the City's OSP or SEP.

Development associated with the CPHP would not substantively change how runoff is directed or routed through the campus site to the City's CSS and the respective combined flow treatment plant. Furthermore, consistent with post-development BMP requirements, including LID measures, contained within the NPDES Phase II MS4 permit which are incorporated into UCSF's Storm Water Program, development associated with the CPHP would include operational stormwater features that minimize discharge of pollutants and eliminate prohibited non-stormwater discharges as part of the final drainage design. Implementation of LID site design measures such as green roofs, permeable paving, or other infiltration-based stormwater features (e.g., flow-through planters) would be required in project designs and would effectively reduce the amount of increase in impervious surfaces. Incorporation of these design features would be effective in minimizing the offsite discharge of stormwater pollutants.

Therefore, due to the characteristics of the proposed changes and inclusion of post-development BMPs and NPDES drainage control requirements, the operational impacts related to water quality and waste discharge requirements would be less than significant.

Mitigation: None required.

Irving Street Arrival, Research and Academic Building (RAB), and initial Aldea Housing Densification Projects, and Initial Phase Improvements

Development associated with the Irving Street Arrival, RAB, and initial Aldea Housing Densification projects, and Initial Phase improvements would be subject to the same or similar regulatory requirements as those described above during construction and operation. Furthermore, as applicable, any Initial Phase improvements that would be constructed outside the campus site boundary would be subject to construction site runoff requirements and post-construction stormwater controls in accordance with the City Public Works Code and in compliance with the City's Stormwater Management Ordinance. As such, the potential to violate water quality standards or waste discharge requirements, or otherwise substantially degrade surface or groundwater quality would be less than significant.

Mitigation: None required.

Impact HYD-2: Construction and operation of the campus development under the CPHP would not substantially alter the existing drainage patterns of the site or area, in a manner that has the potential to result in substantial erosion or siltation on- or off- site; substantially increase the rate or amount of surface runoff in a manner that would result in flooding on or off site; create or contribute runoff water that would exceed the capacity of existing or planned stormwater drainage systems or provide substantial additional sources of polluted runoff; or impede or redirect flow. (Less than Significant)

CPHP

Erosion or Siltation

Construction

Ground disturbing activities associated with construction of new development under the CPHP, including excavation and grading (as described in Chapter 3, *Project Description*), would temporarily expose underlying soils and has the potential to result in erosion or siltation on- or off-site. There are no natural water or drainage features on the campus site in the vicinity of where additional development would occur under the CPHP, and current flow of stormwater runoff within the campus core and Aldea Housing complex is largely directed to existing on-site storm drain facilities and discharged to the City's CSS for treatment at the City's OSP and SEP.

As described above under Impact HYD-1, construction activities associated with the CPHP would be required to comply with the NPDES CGP and UCSF's Storm Water Program. The contractor would be required to prepare and implement a SWPPP that includes erosion and sediment control BMPs to minimize the potential for erosion and sedimentation. BMPs would include, but would not necessarily be limited to, filtering runoff during construction, avoiding heavy grading and earthwork operations during the rainy season, and incorporating landscaping as early as possible. Therefore, with implementation of erosion and sedimentation control BMPs as required by the NPDES CGP, the potential changes to drainage patterns during construction would have a less than significant impact.

Operation

As indicated under Impact HYD-1, additional building development under the CPHP could incrementally increase the amount of impervious surfaces over existing conditions, primarily in the campus core, which could result in localized alteration of existing drainage patterns within the campus site, and create additional sources of erosion or siltation. UCSF, as a non-traditional municipal discharger, is required to adhere to the NPDES Phase II MS4 permit which include LID stormwater requirements. The LID stormwater features that could be used to meet these requirements could include green roofs, permeable paving and flow-through planters which can effectively limit the amount and rate of stormwater runoff such that it also reduces the potential for erosion or sedimentation. Incorporating these design measures into the final project designs would not only reduce peak storm flows but would also ensure that the potential for erosion or sedimentation is minimized. Therefore, with adherence to the design measures and LID stormwater requirements of the NPDES Phase II MS4 permit, the potential impacts related to erosion and sedimentation would be less than significant.

Flooding and Stormwater Drainage Capacity

As indicated above, the additional development under the CPHP could incrementally increase the amount of impervious surfaces over existing conditions, primarily in the campus core, and could result in localized alteration of existing drainage patterns within the campus site However, the implementation of the LID requirements would minimize any increase in the rate or amount of peak storm runoff making flooding on- or off-site unlikely. As discussed in the Environmental Setting, the campus site is not considered susceptible to flooding from 100-year storm events. As under existing conditions, under buildout of the CPHP, stormwater runoff within developed areas of the campus site would continue to be collected by on-site stormwater collection facilities and routed off-site to the City's CSS. Due to the relatively small change in impervious surfaces and the flow reductions that would be achieved with the implementation of LID stormwater features, storm water flows from the campus site would not adversely affect stormwater drainage capacity. In fact, the CPHP includes upgrades to the existing CSS within the campus core as discussed further in Section 4.16, Utilities. Therefore, considering the minor change in impervious surfaces, incorporation of LID stormwater features, and proposed improvements to the existing CSS that would occur with the program, the potential impacts related to flooding on- or off-site, stormwater drainage capacity, or additional sources of polluted runoff would be less than significant.

Impede or Redirect Flow

As noted above, the campus site is not located in a 100-year flood hazard area nor is it identified by SFPUC as an area subject to flooding from 100-year peak storm events. The campus core and Aldea Housing area are already developed with stormwater collection facilities, and proposed new development in these areas under the CPHP would not impede or redirect flood flows. The potential impact would be less than significant.

Mitigation: None required.

Irving Street Arrival, RAB, and Initial Aldea Housing Densification Projects, and Initial Phase Improvements

Construction

As with all development proposed under the CPHP, the Irving Street Arrival, RAB, and initial Aldea Housing Densification projects, and Initial Phase improvements at the campus site would require adherence to the NPDES CGP and UCSF's Storm Water Program, as applicable. On its own, the Irving Street Arrival project would not disturb more than one acre, and would not involve disturbance of any substantive quantities of subsurface soils, making the potential for erosion or siltation negligible. The RAB and initial Aldea Housing Densification projects would individually disturb more than one acre. As part of the CPHP, the contractor would be required to adhere to the CGP for any subsurface soils that are disturbed. Furthermore, as applicable, any Initial Phase improvements that would be constructed outside the campus site boundary would be subject to construction erosion and sediment control requirements in accordance with the City Public Works Code. Implementation of these requirements, therefore, would reduce the potential for erosion or siltation to less than significant levels.

Operation

Development associated with the Irving Street Arrival, RAB, and initial Aldea Housing Densification projects, and Initial Phase improvements at the campus site would be subject to the same regulatory requirements during operation as described for all development under the CPHP. The Irving Street Arrival project, as essentially a building modification, would have negligible changes in stormwater runoff and thus the potential for erosion or siltation would be less than significant. For the RAB and initial Aldea Housing Densification projects, implementation of required LID measures such as permeable paving, green roofs, flow-through planters, or others, in accordance with UCSF's Storm Water Program and the NPDES Phase II MS4 would be effective in minimizing the potential for erosion or siltation. Furthermore, as applicable, any Initial Phase improvements that would be constructed outside the campus site boundary would be subject to post-construction stormwater controls in accordance with the City Public Works Code and in compliance with the City's Stormwater Management Ordinance. Therefore, the potential impact for all three projects would be less than significant.

Flooding and Stormwater Drainage Capacity

The proposed Irving Street Arrival project would have no associated increase in stormwater runoff because of no net change to impervious surfaces. As a result, there would be no impact related to flooding or stormwater drainage capacity. As indicated above, the RAB and initial Aldea Housing Densification projects, and as needed, Initial Phase improvements, would be required to implement stormwater drainage control features consistent with the NPDES Phase II MS4 permit, which would ensure that changes to drainage patterns, if any, do not increase stormwater flow volumes such that there would be no increased potential for flooding or adverse effects related to stormwater drainage capacity. Furthermore, as applicable, any Initial Phase improvements that would be constructed outside the campus site boundary would be subject to stormwater management and design guidelines in accordance with the City Public Works Code. The potential impact would be less than significant.

Impede or Redirect Flow

The campus site and surrounding areas are not located in a 100-year flood hazard area or identified by SFPUC as an area subject to flooding from 100-year peak storm events. The campus core and Aldea Housing complex are already developed and would not impede or redirect flood flows. The potential impact on flood flows from implementation of the Irving Street Arrival, RAB, and initial Aldea Housing Densification projects, and Initial Phase improvement would be less than significant.

Mitigation: None required.

Cumulative Impacts

The geographic scope of analysis for cumulative impacts related to hydrology and water quality is the areas of the City of San Francisco that are served by the City's CSS. Potential cumulative impacts would be associated with the off-site discharge of pollutants, including sediment, during construction and operational activities, which could further degrade water quality of the receiving waters within the hydrologic unit.

Impact C-HYD-1: Construction and operation of campus development under the CPHP, in conjunction with other cumulative development within the City of San Francisco, would not cumulatively violate water quality standards or waste discharge requirements, or otherwise substantially degrade water quality. (Less than Significant)

Cumulative projects have the potential to discharge pollutants, including sediment, off-site during construction and operational activities, which could further degrade runoff directed into the CSS. However, similar to the CPHP, cumulative projects would be required to implement project-specific BMPs and comply with federal, State, as well as local regulations related to stormwater water quality. These regulations include, but are not limited to, the NPDES CGP and also the City's Stormwater Management Ordinance. All cumulative projects that disturb more than one acre would include preparation and implementation of a SWPPP to reduce pollutants in stormwater and other non-point source runoff during construction. Projects that create or replace 5,000 square feet or more of impervious surfaces and have existing impervious surfaces greater than 50 percent must decrease the stormwater runoff rate and volume by 25 percent from 2-year 24-hour design storm. These regulatory requirements also include LID design measures which must be implemented into project designs and are created to minimize off-site discharges and reduce pollutant loading. Therefore, with adherence to these existing regulatory requirements the potential cumulative impact related to water quality standards or waste discharge requirements would be less than significant.

Mitigation: None required.

Impact C-HYD-2: Construction and operation of campus development under the CPHP, in conjunction with other cumulative development in the City of San Francisco's CSS, would not have the potential to cumulatively alter the drainage pattern of the site or area, through the addition of impervious surfaces, in a manner which would result in substantial erosion or siltation on or off site; substantially increase the rate or amount of surface runoff in a manner which would result in flooding on or off site; create or contribute runoff water which would exceed the capacity of existing or planned stormwater drainage systems or provide substantial additional sources of polluted runoff; or impede or redirect flow. (Less than Significant)

Erosion or Siltation

Cumulative projects would likely have ground disturbing activities that would alter drainage patterns, which, in turn, could result in erosion or siltation in runoff collected by the City's CSS. However, similar to the CPHP, construction and operation of cumulative projects would be required to implement project-specific BMPs and comply with federal, state, and local regulations related to water quality of stormwater runoff. These regulations include, but are not necessarily limited to, the NPDES CGP and the City's Stormwater Management Ordinance which require that BMPs during construction and operation minimize the potential for erosion or siltation.

Therefore, with adherence to these existing regulatory requirements, the potential cumulative impact related to erosion or siltation would be less than significant.

Flooding and Stormwater Drainage Capacity

As stated above, cumulative projects would involve redevelopment and development within what is already a densely developed area with a relatively high percentage of impervious surfaces. However, these cumulative projects could result in increases in impervious surfaces providing additional stormwater runoff that could create or exacerbate flooding and/or exceed the capacity of existing stormwater infrastructure.

As previously discussed, cumulative projects would be required to comply with applicable stormwater runoff regulations, including the City's Stormwater Management Ordinance. The ordinance includes drainage control requirements that address management of peak stormwater flows and even reducing stormwater flows from existing conditions, in many cases, such that there could be potential reductions in stormwater volumes compared to existing conditions. In addition, like the CPHP, other redevelopment projects could include updates to outdated or undersized stormwater infrastructure that no longer meets current demands or City requirements. Older infrastructure would be replaced with newer infrastructure that could provide increased capacity to accommodate higher volume flows during peak storm events.

Therefore, since the CPHP would include upgrades to existing infrastructure, address any increases in impervious surfaces with implementation of LID stormwater features similar to what would be required for other current and future cumulative projects, the potential for flooding or exceedances of stormwater infrastructure capacity would be less than significant.

Impede or Redirect Flow

As noted above, the campus site is located in an upland portion of the City that is not within a 100-year flood hazard area, and is not identified by SFPUC as an area subject to flooding from 100-year peak storm events. As a result, there is no means for the proposed improvements associated with the CPHP to combine with other cumulative projects and create adverse effects related to impeding or redirecting flood flows. Accordingly, the project would have an inconsiderable contribution to cumulative effects on impedance or redirection of flood flows. There would be no cumulative impact.

Mitigation: None required.

4.9.4 References

Federal Emergency Management Agency (FEMA), 2015. *San Francisco Interim Floodplain Map, NW San Francisco*. November 12, 2015.

San Francisco Water Power and Water (SF), 2019. 100-Year Storm Flood Risk Map. Available at: https://sfplanninggis.org/floodmap/. Accessed September 26, 2019.

San Francisco Public Utilities Commission (SFPUC), 2005. *North Westside Groundwater Basin Management Plan*. April 2005.

SFPUC 2019a, Treatment Plant Factsheet*: San Francisco's Wastewater Treatment Facilities*. July 2019.

SFPUC, 2019b. San Francisco Groundwater Supply Project. Available at: https://www.sfwater.org/index.aspx?page=1136. Accessed September 26, 2019.

U.S. Climate Data, 2019, *http://www.usclimatedata.com/climate/san-francisco/california/united-states/usca0987.* Accessed November 15, 2009.

4.10 Land Use and Planning

This section assesses the potential for construction and operation of campus development under the Comprehensive Parnassus Heights Plan (CPHP or Plan), including the three Initial Phase projects and Initial Phase improvements, to result in significant land use and planning impacts. The section includes a description of the existing environmental setting as it relates to land use and planning, and also provides a regulatory framework that discusses applicable University and local plans and policies. The section presents the significance criteria used to evaluate impacts on land use and planning, and the results of the impact assessment, including any significant impacts and associated mitigation measures.

4.10.1 Environmental Setting

Regional Setting

The regional setting for the proposed CPHP is the City and County of San Francisco, a relatively densely developed urban environment that is built out in most areas. Few large tracts of vacant or underused land are available for new development. San Francisco consists of a number of neighborhoods, each with its own unique physical characteristics and mix of land uses.

Local Setting

The Parnassus Heights campus site occupies about 107 acres of land on and at the base of Mount Sutro in the Inner Sunset mixed-use neighborhood. As illustrated in Figures 3-1 through 3-4 in Chapter 3, *Project Description*, the campus site is bounded by Carl and Irving Streets to the north, Third Avenue and Fifth Avenue to the west, the Cole Valley/Ashbury Heights neighborhoods and the City's Interior Greenbelt to the east, and Clarendon Avenue, Christopher Drive and Crestmont Drive in the City's Forest Knolls neighborhood to the south.

UCSF's facilities are concentrated in the northern portion of the campus site on both sides of Parnassus Avenue where Moffitt and Long Hospitals, the four schools (dentistry, medicine, nursing, and pharmacy), clinics, research, auxiliary services, housing, parking and other support uses are located. The 61-acre Mount Sutro Open Space Reserve (Reserve) occupies the central and southern portion of the campus site, rising up to 400 feet in elevation above Parnassus Avenue. The Aldea Housing complex is located in the southeastern portion of the campus site off Clarendon Avenue and is surrounded by the Reserve.

Moderate- and medium-density residential areas, predominantly with two to three dwelling units per lot, are located immediately north and west of the campus site. A neighborhood commercial district is located to the west along Irving and Judah Streets and 9th Avenue. Primarily single-family dwellings in the Cole Valley/Ashbury Heights neighborhoods are adjacent to the east, and neighborhood commercial uses are located on Cole and Carl Streets. There is also some moderate-high density residential to the southwest, on Fifth and Sixth Avenues. Single-family housing is located to the south of the Aldea Housing complex across Christopher Drive in the Forest Knolls neighborhood. Finally, the Sutro Tower, a 977-foot-tall TV and radio antenna tower, is located approximately 900 feet to the south of the campus site across Clarendon Avenue.

Several parks and open space areas of varying scales are located near the campus site. Golden Gate Park, an approximate 1,000-acre facility housing a variety of local and regional attractions, is located approximately 400 feet north of the campus site's north boundary while the Interior Greenbelt, a 21-acre urban forest, is located immediately adjacent to the eastern boundary of the Reserve. The 1.5-acre Grattan Playground is located approximately 1,000 feet east of the campus site's east boundary while the 0.6-acre Richard Gamble Memorial Park is located about 2,000 feet northeast of the campus site. Please see Section 4.14, *Recreation*, for additional detail on recreational facilities in the project vicinity.

4.10.2 Regulatory Framework

UCSF

UCSF 2014 LRDP

Each campus within the University of California system is required periodically to prepare a Long Range Development Plan (LRDP), which sets forth concepts, principles, and plans intended to guide future physical growth and change of the campus. Current development at UCSF is guided by the 2014 LRDP, which includes specific policies related to future program development and space needs at all UCSF campus sites, including the Parnassus Heights campus site.

The 2014 LRDP identified campus-wide objectives and objectives specific to the Parnassus Heights campus site. The following 2014 LRDP objectives relate to land use:

Campus Wide Objectives

1. **Respond to the City and Community Context**
   - A. Acknowledge and respond to local zoning and height and bulk limitations to the extent possible.
   - C. Design new buildings to be sensitive to the surrounding neighborhood and landscape, taking into account use, scale, potential noise generation, and density.
   - D. Incorporate pedestrian-friendly urban design principles to relate campus buildings to surrounding streetscape and neighborhoods.
2. **Accommodate UCSF's Growth Through 2035**
   - A. Meet physical needs for growth in research, clinical, and instructional programs at appropriate locations.
   - B. Address the need for campus housing for students, postdoctoral scholars, house staff and junior and incoming faculty at main campus sites by constructing an adequate number of new units while taking into account financial feasibility and physical site constraints.

C. Provide additional amenities such as retail, permanent child care facilities, recreation and fitness facilities, improved outdoor areas, and other support services to the extent feasible, to enhance the quality of campus life and the public realm.

D. Locate programs and activities at campus sites where they are suitable and compatible with UCSF's missions, and best foster collaboration, accommodate interdependent programs and reinforce academic and operational relationships.

E. Locate buildings in accordance with campus site-specific objectives, functional zones, and other LRDP elements related to open space, transportation, and utilities.

F. Site and design buildings and develop open space in accordance with the universal planning and design principles contained in UCSF's *Physical Design Framework.*

Site Specific Objectives

1. Parnassus Heights

A. Continue to promote excellence and leadership in health science education, maintaining the Parnassus Heights campus site as the central location for classroom instruction.

B. Ensure that adequate space is provided to foster collaboration and to facilitate the inter-dependence and connectivity for operational efficiency and effectiveness of instruction, clinical, research and support uses in close physical proximity to each other.

C. Ensure that Long Hospital and the New Hospital Addition have adequate clinical and administrative support and are aligned with education, research and specialized care programs and support that remain at the campus site.

D. Provide additional campus housing and improve campus life amenities including outdoor space.

F. Preserve the Mount Sutro Open Space Reserve as permanent open space, and serve as the steward of the Reserve by maintaining and expanding the trail system and by ensuring the safety of visitors and neighboring structures.

While not objectives or regulations, the UCSF 2014 LRDP also included *Community Planning Principles*, which were produced in collaboration with the UCSF Community Advisory Group:

Community Planning Principles

Land Use

LU1. Plan for growth and renovations that are substantially consistent with use limitations and height and bulk limitations in City planning and zoning codes that exist at the time UCSF initiates the site selection process for such growth and renovation projects. The University should consider City planning proposals that are underway. UCSF will endeavor to be consistent with applicable land use plans and mitigation approaches where consistent with UC policy, while respecting specific neighborhood plans and concerns.

With respect to other provisions of the planning and zoning codes, such as off-street parking, UCSF will comply with such provisions or, if unable to comply strictly, will attempt to address impacts of its development with alternative measures, whether physical or operational.

LU3. Ensure that future UCSF development is compatible with physical surroundings in use, scale, and density, and that do not negatively affect surrounding land uses.

LU9. Preserve the Mount Sutro Open Space Reserve as permanent open space.

LU10. Work toward compliance with the Parnassus Heights space ceiling and adhere to boundaries for the Parnassus Heights campus site.

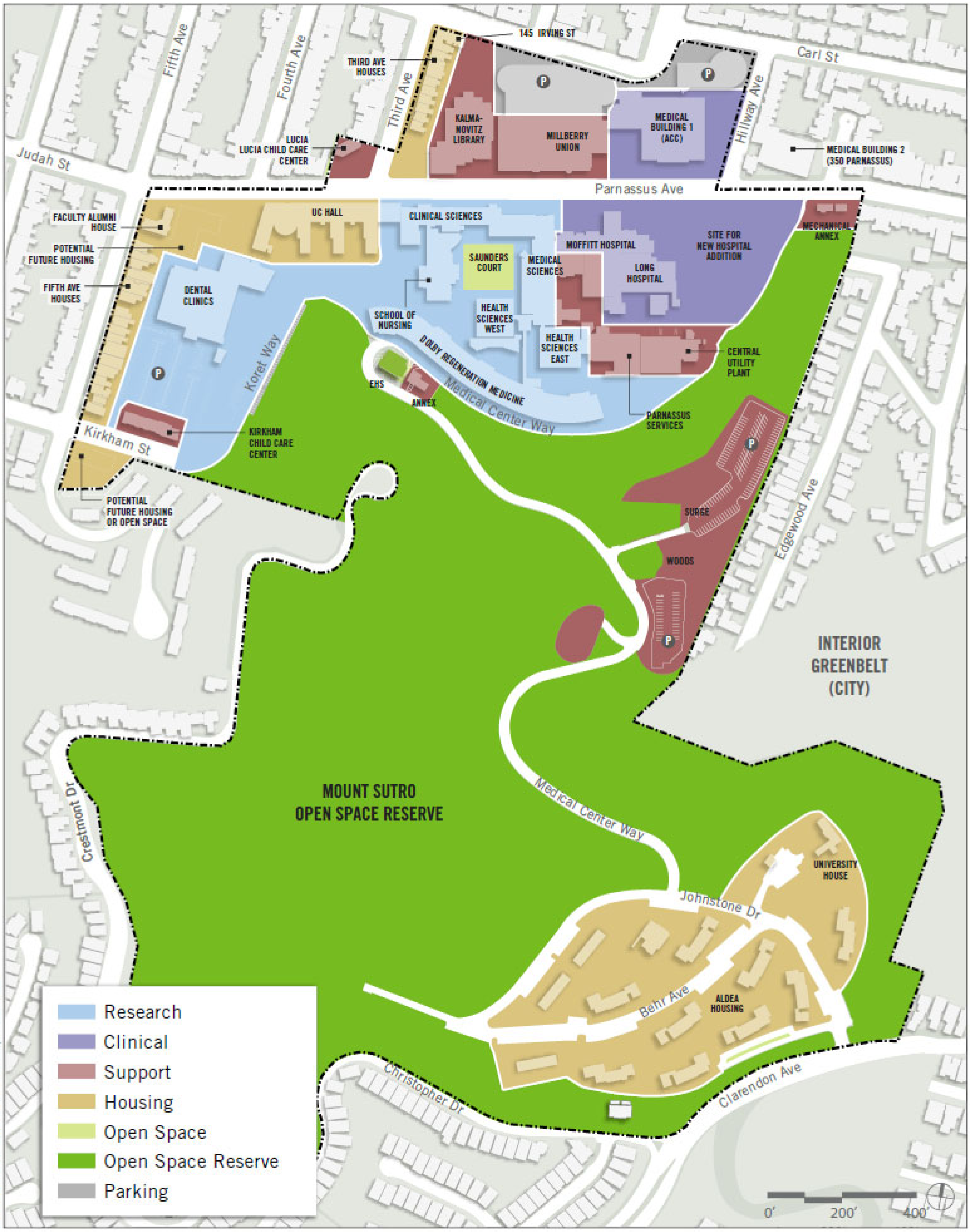
UCSF Functional Zones

The Land Use element of the UCSF 2014 LRDP included functional zone maps for all UCSF campus sites, including the Parnassus Heights campus site, to provide guidance for where certain types of uses are best located based on desired land use adjacencies and other geographic considerations. **Figure 4.10-1** presents the existing functional zones at the Parnassus Heights campus site. The UCSF 2014 LRDP included six categories of functional zones for the Parnassus Heights campus site: Research, Clinical, Support, Housing, Open Space, and Parking. As shown in Figure 4.10-1, the Research, Clinical and Support zones are located at the core of the campus site, primarily along Parnassus Avenue. The Housing zone is located along the western third of Parnassus Avenue, and Third and Fifth Avenues; as well as in the Aldea Housing complex in the southeast portion of the campus site, off Clarendon Avenue.

1976 Regents' Resolution

As discussed in Section 3.7.2 of the *Project Description*, the 1976 Regents' Resolution adopted a limit on the amount of built space at the Parnassus Heights campus site (with some housing excluded), commonly referred to as the "space ceiling," within the newly designated campus site boundaries. The resolution set the space ceiling at 3.55 million gsf. The 2014 LRDP amended the Regents' Resolution to exclude other residential square footage within the campus site from the space ceiling. Currently, Parnassus Heights contains approximately 3.68 million gross square feet (gsf) of space (excluding housing), approximately 128,600 gsf or 3.6 percent above the space ceiling.

The 1976 Regents' Resolution also recognized the principle of limiting the average daily population at the Parnassus Heights campus site to be substantially in accordance with the level projected in the 1976 LRDP (13,400 persons). The 2014 LRDP amended the Regents' Resolution to tie the average daily population goal for the Parnassus Heights campus site to population projections contained in the most recent LRDP EIR. At the time of adoption of the 2014 LRDP, the average daily population at Parnassus Heights was estimated at approximately 17,950 persons. As of 2019, the average daily population at the Parnassus Heights campus site is estimated at 17,440 persons.



SOURCE: UCSF, 2014

UCSF Comprehensive Parnassus Heights Plan EIR

Figure 4.10-1
Existing Functional Zones at Parnassus Heights Campus Site

ESA

City of San Francisco

Pursuant to the University of California's constitutional autonomy, development and uses on property under the control of the University that are in furtherance of the University's educational purposes are not subject to local land use regulation. However, UCSF reviews local land use policies as planning guidelines and has included those policies that are germane to the analysis of land use impacts in this Draft EIR.

In 1987, the City and UCSF entered into a *Memorandum of Understanding* (MOU) to foster harmonious relations between the City and UCSF regarding the growth and development of UCSF facilities within the City's boundaries. The MOU describes the responsibilities of the City and UCSF for the oversight of their respective land uses and the development, maintenance and use of physical facilities, including methods of communication and consultation regarding UCSF's proposed development.

UCSF consults with the City when planning new development, and obtains approvals, such as encroachment permits, if improvements are proposed within City rights-of-way adjacent to campus sites. In addition, it is UCSF's intent to adhere to the extent practicable, to City zoning codes related to building use, height, and bulk limitations; floor area ratios; and parking requirements or restrictions for the purpose of ensuring compatibility with the surrounding areas.

The major land use planning documents of the City are briefly described below.

San Francisco General Plan

The *San Francisco General Plan* provides general policies and objectives to guide land use decisions and includes policies that relate to environmental issues. Although the University is constitutionally exempt from local land use regulation whenever using properties under its control in furtherance of its educational mission, the University strives to be substantially consistent with local policies where feasible. The General Plan contains 10 elements (Commerce and Industry, Recreation and Open Space, Housing, Community Facilities, Urban Design, Environmental Protection, Transportation, Air Quality, Community Safety and Arts) that set forth goals, policies and objectives for the physical development of the City. Two General Plan elements that are particularly applicable to the proposed CPHP are the Urban Design and Transportation elements.

The Urban Design Element seeks to protect and enhance the aesthetic character of San Francisco. Objectives and policies that are relevant to the proposed street improvements along Parnassus Avenue include the following:

> **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 1.5***: 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 1.9**:** Increase the clarity of routes for travelers.

The Transportation Element of the General Plan provides policies and objectives related to transportation, congestion management, circulation, transit, alternative modes of transit (bicycles and walking), parking, and movement of goods. Objectives and policies that are relevant to the proposed street improvements along Parnassus Avenue that are included as part of the proposed CPHP include the following:

Objective 23: Improve the City's pedestrian circulation system to provide for efficient, pleasant, and safe movement.

Policy 23.1**:** Provide sufficient pedestrian movement space with a minimum of pedestrian congestion in accordance with a pedestrian street classification system.

Policy 23.2**:** Widen sidewalks where intensive commercial, recreational, or institutional activity is present, sidewalks are congested, where sidewalks are less than adequately wide to provide appropriate pedestrian amenities, or where residential densities are high.

Policy 23.5**:** Establish and enforce a set of sidewalk zones that provides guidance for the location of all pedestrian and streetscape elements, maintains sufficient unobstructed width for passage of people, strollers and wheelchairs, consolidates raised elements in distinct areas to activate the pedestrian environment, and allows sufficient access to buildings, vehicles, and streetscape amenities.

Policy 23.6**:** Ensure convenient and safe pedestrian crossings by minimizing the distance pedestrians must walk to cross a street.

Objective 27: Ensure that bicycles can be used safely and conveniently as a primary means of transportation, as well as for recreational purposes.

Policy 27.1**:** Expand and improve access for bicycles on city streets and develop a well-marked, comprehensive system of bike routes in San Francisco.

Objective 28: Provide secure and convenient parking facilities for bicycles.

Policy 28.3**:** Provide parking facilities which are safe, secure, and convenient.

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 designations and policies in the *San Francisco General Plan*. The San Francisco Zoning Map defines the locations and boundaries of zoning use, building height and bulk limit districts. Zoning in San Francisco generally consists of multiple layers of districts. Use Districts are the base zoning districts that prescribe permitted land uses and most development standards (except height and bulk). Height and Bulk Districts are mapped separately from Use Districts and prescribe the permitted heights and bulk of buildings.

The Parnassus Heights campus site is primarily located in the City's P (Public) Zoning District. P districts refer to land owned by a governmental agency that is in public use, including open space. Housing located along Third and Fifth Avenues is designated by the City as Residential House District, Two-Family (RH-2). Residential house districts are intended to recognize, protect, conserve and enhance residential areas characterized by limited scale in terms of building width and height. Structures in the RH-2 District usually do not exceed 25 feet in width or 40 feet in height.

The developed areas of the campus site are located within the following City Height and Bulk Districts: 25-X, 40-X, 65-D, 80-D, 130-D, and 220-F. The locations with an “X” designation permit all floors of structures to cover the entire building footprint. The “D” designation limits floor plans above 40 feet to a maximum plan length of 110 feet and a maximum diagonal plan dimension of 140 feet. The “F” designation limits floor plans above 80 feet to a maximum plan length of 110 feet and a maximum diagonal plan dimension of 140 feet. The Reserve is located within the City’s Open Space Height and Bulk District, where the height and bulk of buildings and structures are determined in accordance with the objectives, principles and policies of the General Plan, and where no building or structure or addition thereto is permitted unless it is in conformity with the General Plan.

San Francisco Better Streets Plan

The Better Streets Plan focuses on creating a positive pedestrian environment through measures such as careful streetscape design and traffic calming measures to increase pedestrian safety. The Better Streets Plan includes guidelines for the pedestrian environment, which it defines as the areas of the street where people walk, sit, shop, play, or interact. Generally speaking, the guidelines are for design of sidewalks and crosswalks; however, in some cases, the Better Streets Plan includes guidelines for certain areas of the roadway, particularly at intersections.

4.10.3 Impacts and Mitigation Measures

Significance Criteria

Would implementation of the CPHP, including the three Initial Phase projects and Initial Phase improvements:

a) Physically divide an established community?

b) Cause a significant environmental impact due to a conflict with any land use plan, policy, or regulation adopted for the purpose of avoiding or mitigating an environmental effect?

c) Exceed an LRDP EIR standard of significance by conflicting with local land use regulations such that a significant incompatibility is created with adjacent land uses?

Criteria Not Analyzed

As stated in the Initial Study, there would no impact related to the following topic for the reasons described below:

- ***Physically divide an established community.*** No development outside of the established campus boundary is proposed, and no intrusion into, or division of, surrounding residential communities would occur under the proposed CPHP, including the three Initial Phase projects and the Initial Phase improvements. The Parnassus Heights campus site would continue to remain as a distinct entity, consisting of educational and medical land uses that are woven into the fabric of the surrounding neighborhood, and the boundary of the campus site would not change as a result of the proposed CPHP. While the extension of 4th Avenue under the proposed CPHP would add a new roadway on the Parnassus Heights campus site, this extension would occur entirely within the campus site boundaries and would not intrude into the surrounding neighborhood. As the proposed CPHP would not physically divide an established community, this topic will not be evaluated further in this section.

Approach to Analysis

The examination of land use impacts is based on information obtained from the proposed CPHP; review of published environmental documentation and land use studies of the Parnassus Heights campus site; and review of documents pertaining to land use published by the City of San Francisco, including applicable elements of the General Plan. The analysis discusses whether the proposed CPHP would be consistent with applicable land use plans and policies that were adopted for the purpose of avoiding or mitigating an environmental effect. Land use policies are policies that pertain to the type, location and physical form of new development. For this analysis, policies "adopted for the purpose of avoiding or mitigating an environmental effect" are considered those that, if implemented and adhered to, would avoid or mitigate physical impacts on the environment. For each potential impact, the analysis compares the impact to the standards of significance listed above and determines the impact's level of significance under CEQA.

Approach to Analysis of Initial Phase Projects, including New Hospital, and Initial Phase Improvements

This EIR includes project-level analysis for certain Initial Phase projects anticipated to be completed by about the year 2030; specifically, the Irving Street Arrival, Research and Academic Building (RAB), and initial Aldea Housing Densification; and Initial Phase improvements, as described below. The New Hospital is also an Initial Phase project anticipated to be completed by about the year 2030, but is analyzed at a program level in this EIR within the context of the overall CPHP, and will be analyzed at a project level in a subsequent EIR when more details are available.

Impact Analysis

Impact LU-1: Implementation of the CPHP would not cause a significant environmental impact due to a conflict with land use plans, policies and regulations adopted for the purpose of avoiding or mitigating an environmental effect. (Less than Significant)

As noted above, pursuant to the University of California's constitutional autonomy, development and uses on property under the control of the University that are in furtherance of the University's educational purposes are not subject to local land use regulation. The University is the only agency with land use jurisdiction over programs and projects proposed on the Parnassus Heights campus site, and the 2014 LRDP is the applicable land use plan adopted by the University for guiding the development of the campus site while avoiding or mitigating its environmental impacts. The proposed CPHP, including the three Initial Phase projects and Initial Phase improvements, is evaluated below for its potential to conflict with the 2014 LRDP. The proposed CPHP is also evaluated for potential conflict with the 1976 Regents' Resolution, as amended. The proposed CPHP includes certain off-campus street improvements along Parnassus Avenue. An evaluation of the potential for those street improvements to conflict with City policies that pertain to streets is also provided below.

Consistency with UC Plans and Policies

CPHP

Consistency with the 2014 LRDP

As stated in Chapter 3, *Project Description*, since the adoption of the 2014 LRDP and certification of the 2014 LRDP FEIR, UCSF undertook a planning process to re-envision and revitalize the Parnassus Heights campus site as a whole, to integrate UCSF's clinical, educational, and research missions in ways that promote collaboration and synergies in the UCSF Parnassus Heights campus community. The planning process resulted in the development of the CPHP, which proposes a long-term development framework for the revitalization of the Parnassus Heights physical environment and is intended to ensure that a modernized Parnassus Heights enhances UCSF's status as an anchor institution in San Francisco and a leading academic medical center in the region, state and nation.

The proposed CPHP is a comprehensive land use plan intended to guide growth and other physical changes at the Parnassus Heights campus site through 2050. The proposed CPHP sets forth general types of campus development and land uses to support projected population, clinical and research growth at the Parnassus Heights campus site. It also sets forth objectives to guide decisions for future facilities to meet needs over the next 30 years and it projects the quantities and uses of new and/or renovated building space needed during this time frame. The proposed CPHP includes an updated land use or "functional zone" map for the Parnassus Heights campus site (see Figure 3-15 in Chapter 3*)*, which would guide the location of future capital construction and infrastructure development. The proposed CPHP also references community planning principles that formalize UCSF's commitment to communicate with neighbors regarding its space needs and potential future development, in order to identify potential community concerns that may arise from UCSF's physical development prior to the time that individual projects are brought forward for approval.

As described in Chapter 3, the CPHP does not substantially depart from the planning principles and concepts set forth in the 2014 LRDP. The Plan generally would continue to focus future development in the same areas of the core campus as previously envisioned under the 2014 LRDP. The CPHP identifies opportunity sites for new buildings and major renovations of existing buildings; candidate buildings for demolition; opportunities for development of open space, and opportunities for improvements to on-campus mobility and circulation. The functional zones proposed under the CPHP (see Figure 3-17 in Chapter 3) are generally consistent with the existing functional zones established for the Parnassus Heights campus site under the 2014 LRDP, but modified where appropriate to reflect proposed changes in land use that would occur under the CPHP. Under the proposed CPHP, the functional zone of the area occupied by UC Hall, which is the site of the RAB project, would be changed from Housing to Research, while the functional zone of the site of the proposed West Side Housing project would be reclassified from Research to Housing. In addition, the CPHP would reclassify the portion of the Reserve that could be occupied by the proposed New Hospital from Open Space Reserve to Clinical.

The functional zone changes proposed under the CPHP are all internal to the campus site and do not involve a functional zone change that would place a new use adjacent to existing developed land uses outside of the campus site boundaries in such a way to create a land use conflict (the aforementioned potential zone change to accommodate the New Hospital would involve an extension of the existing Clinical zone in an easterly direction such that the clinical uses would be closer to existing off-site residential uses than at the present time. The potential effect of this change is addressed under Impact LU-2 below). Further, the zone changes would not result in land use conflicts with adjacent existing land uses on the campus site, because compatibility between adjacent existing and proposed functional zones was taken into consideration in developing the proposed zones in the CPHP. Existing land use patterns reflect campus development guided by the planning principles embodied in the previous LRDPs. The CPHP remains consistent with the same planning principles. Therefore, implementation of the CPHP would have a less-than-significant impact regarding conflict with land use plans and policies adopted for the purpose of avoiding or mitigating an environmental effect.

However, because the University intends to use the CPHP as the primary planning document for the Parnassus Heights campus site, and because the CPHP proposes some revisions to the 2014 functional zones, revisions to the building space program, an update to the projected daily population that would be on the campus site as well as revisions to the proposed amount of space at Parnassus Heights identified in the 2014 LRDP, an amendment of the 2014 LRDP would be required. The proposed amendment to the 2014 LRDP includes the substantial revision of Chapter 4, *Parnassus Heights*, to incorporate concepts and proposals of the CPHP, as well as a text change in Chapter 3, LRDP Framework, to clarify that certain campus-wide objectives are not applicable to the New Hospital. In addition, the proposed amendment to the 2014 LRDP includes an update to Appendix E, *UCSF Greenhouse Gas Reduction Strategy*. Following public review, the CPHP Final EIR and proposed LRDP amendment would be submitted to the Regents for their approval.

Mitigation: None required.

Consistency with Space Ceiling

In conjunction with the proposed CPHP, UCSF is proposing that the Regents amend the 2014 LRDP by reaffirming certain continuing commitments and increasing the space ceiling limit set forth in the 1976 Regent's Resolution, as amended. The proposed CPHP would not conflict with the space ceiling, as amended, and it reaffirms the University's continuing commitments in the Resolution by 1) maintaining the designation of the Mount Sutro Open Space Reserve as permanent open space; 2) continuing to respect the Parnassus Heights campus site boundary established in 1976; and 3) continuing to adhere to the expansion restriction area within which UCSF would not acquire property or lease residential property. While, as discussed above, the CPHP could require the re-designation of an area of the Reserve of about 0.15 acre[1] adjacent to Medical Center Way from Open Space Reserve to Clinical, the University also proposes to re-

1 Excluding the widening of Medical Center Way adjacent to the proposed New Hospital, which would be necessary for fire safety purposes. The amount of acreage for the widening of Medical Center Way is to be determined.

designate an equivalent or greater acreage of other land within the campus site to Open Space Reserve so that there would be no decrease in the size of the Reserve.

However, in order for UCSF to retain its leadership position in patient care, research, and education and provide an adequate amount of program space at the Parnassus Heights campus site, the proposed CPHP requires that both the space ceiling limit and the population projections in the resolution be revised. To accommodate the planned CPHP programs, the space ceiling would need to be revised from the current limit of 3.55 million gsf to a proposed 5.05 million gsf, excluding housing (an increase of approximately 1.5 million gsf above the current space ceiling limit), and the population commitment revised from approximately 18,500 to nearly 25,000. The environmental impacts that could result from the expanded space program and increased on-campus population are analyzed and disclosed in this Draft EIR, in the various impact category sections, and for those impacts that are determined to be significant, mitigation measures are set forth to avoid or reduce the impacts to the maximum extent feasible. Based on the information in this Draft EIR and other relevant information, the Regents would determine whether or not to amend the 2014 LRDP to increase the space ceiling and the population projections. Upon approval by the Regents of the proposed LRDP amendment, the proposed CPHP would be consistent with the space and population commitments for the Parnassus Heights campus site and the impact would be less than significant.

Mitigation: None required.

Irving Street Arrival

The Irving Street Arrival project would mainly involve modifications to the existing Medical Building 1 in order to develop a new and/or reconfigured multistory vertical circulation space between Medical Building 1 and Millberry Union. The new/modified structure would be about 25,000 gsf and would include two additional stories on the Irving Street side, and one additional story on the Parnassus Avenue side. The area occupied by Medical Building 1 is within the Clinical functional zone while the area occupied by the Millberry Union is classified as a Support functional zone. No changes to the functional zones would be needed for the Irving Street Arrival project. Further, the Irving Street Arrival project in and of itself would not substantially increase the amount of building space on the campus site to require a change to the space ceiling. The Irving Street Arrival project would also not require an amendment of the 2014 LRDP. Based on the above, the Irving Street Arrival project would have a less than significant impact on land use and planning.

Mitigation: None required.

Research and Academic Building

The proposed Research and Academic building (RAB) is an approximately 270,000 gsf building that would occupy the site currently occupied by the 7-story UC Hall. The building site is classified as Housing under the existing functional zone in the 2014 LRDP, and this designation would need to be revised to Research under the CPHP to allow for the construction of the RAB project. For reasons set forth above for the CPHP, the proposed LRDP amendment to change the functional zones, including the site of the RAB, would not represent a conflict with a land use plan or policies adopted for the purpose of avoiding or mitigating an environmental effect. Although by itself, the RAB project would contribute to the need for the revisions to the space ceiling, the impact related to the Regents' Resolution set forth above for the CPHP as a whole, including the RAB project, would be less than significant.

Mitigation: None required.

Initial Aldea Housing Densification

During the initial phase of housing densification on the Aldea Housing complex, three existing 3-story housing structures would be replaced with three 8-story housing structures and one 5-story building. The entire Aldea Housing complex, is classified as Housing under the existing functional zones in the 2014 LRDP, and no change in land use zone would be required for the initial phase of the proposed Aldea Housing Densification project. Further, housing on the campus site is not subject to the space ceiling. Therefore, the proposed initial Aldea Housing Densification project would not contribute to the need for the proposed LRDP amendment or revisions to the space ceiling. Based on the above, the initial phase of the proposed Aldea Housing Densification project would have a less than significant impact on land use and planning.

Mitigation: None required.

Initial Phase Improvements

As described in Chapter 3, the Initial Phase improvements would include various Initial Phase utility improvements, implementation of the Parnassus Avenue Streetscape Plan, renovation of certain existing buildings, and installation of miscellaneous community investments in the public realm. Those Initial Phase improvements that would occur within the campus site boundary are located within a number of proposed functional zones, and no further changes to these functional zones would be needed for each improvement. Further, the improvements would not, by themselves, substantially increase the amount of building space or the population on the campus site to require a change to the space ceiling. Finally, none of the improvements would require an amendment of the 2014 LRDP. Based on the above, the Initial Phase improvements would have a less than significant impact on land use and planning.

Mitigation: None required.

Consistency with San Francisco Plans and Policies

CPHP

The 2014 LRDP included the Parnassus Streetscape Plan, which included improvements (e.g., new paving, street furniture, lighting, and street trees, as well as sidewalk and crosswalk widening) along Parnassus Avenue generally between Fifth Avenue and Medical Center Way. Under the proposed CPHP, slight modifications to the Parnassus Avenue Streetscape Plan would be made to bring the plan into conformance with new development proposals that would front Parnassus Avenue. Those modifications would be specified as adjacent new buildings under the CPHP are designed. From an urban design perspective, the proposed improvements would strengthen the presence of the campus along Parnassus Avenue, thus further establishing the corridor as a distinct medical services district (General Plan Urban Design Element Policy 1.5). In addition, the creation of more useable outdoor pedestrian space would further establish the corridor as a center of activity (General Plan Urban Design Element Policy 1.6) and enhanced wayfinding improvements would increase the clarity of routes for travelers using all modes of transportation (General Plan Urban Design Element Policy 1.9).

With regard to pedestrian circulation, sidewalks along Parnassus Avenue would be improved to provide a minimum width of eight feet, thus providing sufficient space for pedestrian travel (General Plan Transportation Element Policy 23.1) and providing adequate sidewalk width where intensive institutional activity is present (General Plan Transportation Element Policy 23.2). In addition, this minimum sidewalk width would also provide sufficient unobstructed passage for people, strollers and wheelchairs and allow for sufficient access to buildings, vehicles, and streetscape amenities (General Plan Transportation Element Policy 23.6).

With respect to bicycle circulation, the proposed improvements would include "sharrow" lane markings for mixed traffic throughout the entire corridor, thus establishing a marked route for bicycles (General Plan Transportation Element Policy 27.1). In addition, the proposed improvements would include safe, secure, and varied bicycle parking options both on and off the street throughout the corridor (General Plan Policy Transportation Element 28.3).

The proposed improvements would also not conflict with the recommendations listed in the City's Better Streets Plan. For example, hardscape bulb-outs would be located at every location where pedestrians are required to cross a street along Parnassus Avenue (Policies 2.1 and 2.3). Other proposed improvements that align with recommendations listed in the plan include pedestrian-friendly crossings (Policies 2.3 and 6.1), pedestrian-scale lighting (Policies 6.3, 6.7. and 10.5), and special paving and street furnishings Policy 10.4).

Finally, the City's Better Streets Plan favors safe, convenient crossings on surface streets wherever possible instead of using pedestrian bridges and tunnels; pedestrian connections such as pedestrian bridges should only be installed where at-grade crossings are not feasible, such as freeways or rail lines (Policy 7.2). The proposed CPHP would include a pedestrian bridge crossing over Parnassus Avenue and the proposed pedestrian tunnel crossing underneath Parnassus Avenue. These facilities would conform to applicable City standards. In addition, the pedestrian bridge would provide enough clearance so that the overhead catenary wires for the electric bus system have enough clearance to allow for safe operation. As discussed above, the Parnassus Streetscape Plan includes crosswalk widening, which would the facilitate safe, convenient crossing of Parnassus Avenue. The pedestrian bridge and tunnel are required to safely transfer patients that are admitted in Medical Building 1 north of Parnassus Avenue to Moffitt Hospital south of Parnassus Avenue. Currently, patients admitted in the Medical Building 1 have to be transported across Parnassus Avenue by ambulance to Moffitt Hospital, thus increasing traffic and congestion along the roadway. Given this unique circumstance and that UCSF plans on improving pedestrian access across Parnassus Avenue, the proposed pedestrian bridge and tunnel do not substantially conflict with this policy.

In summary, the planned off-campus improvements along Parnassus Avenue would not conflict with City of San Francisco policies for streets found in the General Plan and the Better Streets Plan. The impact would be less than significant.

Mitigation: None required.

Irving Street Arrival

The Irving Street Arrival project would not involve any modifications to city streets. There would be no effect related to conflict with the City plans and policies.

Mitigation: None required.

Research and Academic Building

The proposed RAB project would involve modifications to Parnassus Avenue sidewalk and streetscape adjacent to the project site. These improvements would be designed to conform to City plans and policies discussed above. There would be no conflict and the impact would be less than significant.

Mitigation: None required.

Initial Aldea Housing Densification

The proposed initial Aldea Housing Densification project would not require any modifications to city streets. There would be no effect related to conflict with City plans and policies.

Mitigation: None required.

Initial Phase Improvements

Some of the Initial Phase improvements, such as implementation of the Parnassus Avenue Streetscape Plan and installation of miscellaneous neighborhood investment improvements in the public realm, would require modifications to city streets. These improvements would be designed to conform to City plans and policies discussed above. There would be no conflict and the impact would be less than significant.

Mitigation: None required.

Impact LU-2: Development under the proposed CPHP would not conflict with local land use regulations such that a significant incompatibility with adjacent land uses is created. (Less than Significant)

CPHP

Although new buildings proposed under the CPHP have not yet been designed, conceptual drawings indicate that most of the proposed buildings would be largely consistent with City's Height and Bulk districts for the building sites, if applicable. However, certain planned CPHP development, including the proposed New Hospital, proposed improvements at the Millberry Union, certain proposed West Side development, and the Aldea Housing Densification project, as currently conceptualized, would not be consistent with City Planning Code height and/or bulk regulations for their respective building sites. However, as explained below, the conflict with the City's height and bulk regulations would not result in a significant incompatibility with adjacent land uses.

New Hospital

The CPHP's proposed New Hospital would primarily occupy the area currently occupied by the seven-story LPPI building, but could also require a modification to the adjacent Reserve boundary. The site for the New Hospital is located within three height and bulk districts. A large portion of the building site is located within the City's 65-D Height and Bulk District, which restricts building heights to 65 feet and limits floor plans above 40 feet to a maximum plan length of 110 feet and a maximum diagonal plan dimension of 140 feet. A portion of the New Hospital building site would extend within the City's 220-F Height and Bulk District to the west, which restricts building heights to 220 feet and limits floor plans above 80 feet to a maximum plan length of 110 feet and a maximum diagonal plan dimension of 140 feet; and the eastern most portion extends within the City's Open Space Height and Bulk District to the east, where the height and bulk of buildings and structures are determined in accordance with the objectives, principles and policies of the General Plan, and where no building or structure or addition thereto is permitted unless it is in conformity with the General Plan.

As currently envisioned, the proposed New Hospital would be 16 stories and up to 294 feet in height.[2] Although the building has not yet been designed, the 16-story building would exceed the City's height limits for the portions of the project site within the 65-D and 220-F Height and Bulk Districts. As for any portion of the New Hospital that would be located within the Open Space Height and Bulk District, although General Plan policies discourage the placement of buildings or additions within this district, the University plans to replace any area of the Reserve that is lost due to new development by designating new Reserve area elsewhere on the campus site in an amount equal to or greater than that area lost. This would serve to offset the reduction in open space at this location and ensure there would be no net reduction in open space. However, the proposed New Hospital would be located closer to nearby off-site residences on Edgewood Avenue to the east (located within a 40-X Height and Bulk District) than the existing LPPI building.

As noted above in Impact LU-1, the University is exempt from local zoning whenever using property under its control in furtherance of its educational mission. However, UCSF strives to adhere to City zoning codes to the extent possible in accordance with 2014 LRDP Objective 1: Respond to the City and Community Context. The 2014 LRDP also includes an objective (Objective 3) to ensure that its facilities are seismically safe. In order to meet the SB 1953 mandate at the Parnassus Heights campus site, inpatient uses currently at Moffitt Hospital must

2 Including potential rooftop observation deck and elevator vestibule that would occupy a portion of the roof. As currently conceived, the majority of mechanical equipment would be contained within various levels of the New Hospital to minimize the amount of equipment located on the roof; components of mechanical equipment located on the roof may slightly exceed the 294 feet in height.

be relocated prior to 2030, necessitating the construction of the New Hospital. To the extent feasible, UCSF would design the New Hospital to avoid or minimize the effects of the conflict with the City's Planning Code, however, it would not be possible to replace clinical uses currently in Moffitt Hospital with a new hospital that complies with the City's height and bulk district regulations that pertain to the site. As discussed in greater detail in the Space Needs Assessment, it is neither possible, given current code requirements, modern clinical space needs, and physical limitations of the existing Moffitt Hospital, nor cost effective to retrofit Moffitt Hospital to provide the number of beds that it could provide once retrofitted. Further, based on observed shortages in the availability of beds, especially intensive care unit (ICU) and acute care beds; an analysis of demographic trends that indicate that Parnassus Heights will need to serve not only a larger population but also a population that includes more elderly patients; an analysis of the demand/need for private rooms (versus shared rooms/wards); and an analysis of trends in health care which show an increased need for tertiary and quaternary health care, UCSF has determined that a larger hospital is needed that not only replaces the 150 beds that are currently in Moffitt Hospital and the beds that would be reduced in Long Hospital once it is upgraded to current standards, but also provides an additional 200 beds, along with other necessary facilities that include additional operating rooms, additional emergency room bays and spaces, additional interventional labs, and ambulance bays. The New Hospital is planned to be located at the LPPI site so that it is adjacent to Long Hospital which would continue to provide 291 beds, and Moffitt Hospital which would be seismically retrofitted and used for clinical operations in support of both Long Hospital and the New Hospital. This co-location of clinical uses would allow UCSF to operate more efficiently, allow the hospitals to share resources, and also minimize travel for patients and staff. In addition, the New Hospital would replace an existing building on the campus site, and in an area already built out with other similar UCSF facilities, such as Moffitt Hospital and Long Hospital. For these reasons, on balance, the proposed New Hospital would be compatible with adjacent land uses and would not create a significant land use impact.

However, the introduction of the New Hospital would result in certain aesthetic, wind and noise effects at nearby residential land uses, as addressed in Sections 4.1 and 4.11 in this EIR. As described in Section 4.1, Impact AES-2 finds that the New Hospital would be the most noticeable visual change under the CPHP program, and would contrast sharply both in height and scale with the nearby residential development; however, with the proposed amendments to the 2014 LRDP, the CPHP would not conflict with applicable zoning and other regulations governing scenic quality. Impact AES-3 finds that with implementation of appropriate design standards and exterior materials for the new buildings, potential light and glare impacts of the CPHP, including from the New Hospital, would be reduced to a less-than-significant level. Section 4.1, Impact AES-4 determines winds generated around New Hospital's northeast corner could exceed the wind hazard criterion; this significant impact would be addressed through wind tunnel testing once a preliminary design is available, and implementation of design changes to eliminate or reduce wind hazards to the extent feasible. Increases in operational noise levels from new building development, including the New Hospital, would be mitigated to a less-than-significant level through implementation of proper noise reduction design measures to ensure compliance with the applicable noise code.

Other CPHP Development

The westernmost portion of existing Medical Building 1 and adjacent Millberry Union are located within the City's 80-D Height and Bulk District. This height and bulk district restricts building heights to 80 feet and limits floor plans above 40 feet to a maximum plan length of 110 feet and a maximum diagonal plan dimension of 140 feet. Under the CPHP, proposed buildings heights for these improvements as measured along Parnassus Street (up to 64 feet) would be within the heights allowed by this City zoning district. However, building heights as measured along Irving Street for the proposed Irving Street Arrival project (up to 86 feet) under the Initial Phase, and for improvements at the adjacent Millberry Union (up to 90 to 95 feet) under the Future Phase, would exceed the City's 80-foot height limit. The exceedance of height restrictions on Irving Street by 6 to 15 feet would represent a nominal increase above the height limit of about 8 to 19 percent. In addition, the Irving Street Arrival project would enhance the entrance to campus, thus better linking the campus site with the surrounding neighborhood. As a result, the proposed improvement would be compatible with adjacent land uses and the impact would be less than significant.

The compatibility of the proposed RAB project with existing City height and bulk zoning is described under RAB, below.

The CPHP's proposed West Side development would occupy the general area currently occupied by the Dental Clinics, West Side parking lot, and the Kirkham Child Care Center. The northern portion of this site is mostly located in the City's 130-D Height and Bulk District, which restricts building heights to 130 feet and limits floor plans above 40 feet to a maximum plan length of 110 feet and a maximum diagonal plan dimension of 140 feet. The southern portion of the proposed West Side development is mostly located within the City's 40-X Height and Bulk District, which restricts building heights to 40 feet and permits all the floors of the structures to cover the entire building footprint. A small portion of the proposed West Side development would be located within an OS Height and Bulk District. The proposed West Side development would consist of structures bisected by the proposed 4th Avenue extension. The structures to the east of the 4th Avenue extension would be up to 130 feet in height while the three structures to the west of the 4th Avenue extension would be up to 79 feet in height. The heights of the structures on the northern portion of this site would meet the height requirement of the 130-D Height and Bulk District while the heights of certain structures on the southern portion of this site would exceed the height requirement of the 40-X Height and Bulk District. The proposed West Side development would be designed to minimize the effects of its conflict with the City's 40-X Height and Bulk District, and OS Height and Bulk District. The closest off-site land uses are residences located along the west side of 5th Avenue, approximately 150 feet west of the West Side Housing development. The off-site residences would be buffered by existing residences within the campus site boundary along the east side of 5th Avenue, which are approximately 35 feet in height. In addition, as indicated above, the heights of the proposed West Side development would be stepped back from 5th Avenue so the heights of the structures on the campus site would get progressively taller to the east. For these reasons, the proposed West Side development would be compatible with adjacent land uses, and the impact would be less than significant.

The Aldea Housing complex is located within a 40-X Height and Bulk District. Under the CPHP's proposed Aldea Housing Densification project (occurring in the Initial and Future Phases), the 12 existing 3-story housing buildings would be replaced with three 5-story housing buildings (up to 60 feet in height) and nine 8-story housing buildings (up to 96 feet in height). As a result, the height of the proposed buildings would exceed the City's height limit for this site. However, the Aldea Housing Densification project would not result in a change of land use; the land use would remain residential. In addition, the new structures would generally be located on the building footprints of the structures to be demolished. As a result, the new structures would remain at least approximately 170 feet from the nearest off-site land uses, which are single-family residential uses located along the south side of Christopher Drive. Furthermore, given that the new residential structures are proposed in generally the same location as the buildings being removed, the proposed densification of the Aldea Housing complex would not require substantial removal of, or alteration to, existing trees and other vegetation located between the Aldea Housing complex and off-site residences. The vegetation would continue to act as a visual buffer between the uses. Finally, the proposed new Aldea Housing development would adhere to a number of best practices in sustainable design, including establishing discrete façade treatments and a design language that embraces context, and prioritizing the use of natural materials for building design. For these reasons, the Aldea Housing Densification project would be compatible with adjacent land uses and the impact would be less than significant.

Separate from the buildings that would be demolished or added to the campus site, the CPHP identifies existing buildings on the campus site that would be renovated under the Plan. These include the Health Sciences Instruction and Research (HSIR) Towers and the Medical Sciences Building. As the renovations to these buildings would not change the height and bulk of these buildings, there would be no impact with respect to conflicts with City regulations due to these renovations.

Mitigation: None required.

Irving Street Arrival

As described above, the building heights as measured along Irving Street for the proposed Irving Street Arrival project (up to 86 feet) would exceed the City's 80-foot height limit, although proposed building height for this project as measured along Parnassus Street (up to 64 feet) would be within the heights allowed in this City zoning district. For the reasons described above, the proposed improvement would be compatible with adjacent land uses and the impact would be less than significant.

Mitigation: None required.

Research and Academic Building

The proposed RAB project would occupy the area currently occupied by the 7-story UC Hall and nearby School of Nursing. The site for the RAB project is located within the City's 130-D Height and Bulk District. This district restricts building heights to 130 feet and limits floor plans above 40 feet to a maximum plan length of 110 feet and a maximum diagonal plan dimension of 140 feet. The proposed RAB would be eight stories and up to 130 feet in height. As a result, the height of the proposed RAB would not exceed the City's height limit for this site. With respect to the bulk limitations for the site, the proposed RAB will adhere the City's floor plan limits for the "D" Bulk district. The RAB would be somewhat taller in height than the adjacent Clinical Sciences building, which is 7 stories or approximately 100 feet in height; although the RAB project would be shorter than certain other existing campus site buildings along Parnassus Avenue (e.g., Medical Sciences Building and Moffitt Hospital). Given these considerations, the proposed building would be generally compatible with adjacent land uses and the impact would be less than significant.

Mitigation: None required.

Initial Aldea Housing Densification

The initial Aldea Housing Densification project is a subset of the overall Aldea Housing Densification project: three existing 3-story housing structures would be replaced with three 8-story housing structures (up to 96 feet in height) and one 5-story housing structure (approximately 60 feet in height). As discussed above, this would exceed the City's height limit of 40 feet for this site. For the reasons described under CPHP for the overall Aldea Housing densification, the initial Aldea Housing Densification project would be compatible with adjacent land uses, and the impact would be less than significant.

Mitigation: None required.

Initial Phase Improvements

The Initial Phase improvements do not involve the construction of new buildings or structures. Therefore, the height and bulk district requirements for the site of each improvement do not apply, and there would be no conflict with local land use regulations such that a significant incompatibility with adjacent land uses would occur.

Mitigation: None required.

Cumulative Impacts

Impact C-LU-1: The proposed CPHP, in combination with past, present, and reasonably foreseeable future projects, would not result in a conflict with land use plans, policies, and regulations adopted for the purpose of avoiding or mitigating an environmental effect or a conflict with local land use regulations such that a significant incompatibility with adjacent land uses is created. (Less than Significant)

The Parnassus Heights campus site is situated in a built-out urban area surrounded by a mix of land uses. Generally, opportunities for new development are limited, and future campus growth would require building replacement rather than new construction on undeveloped tracts of land. Potential growth in the vicinity of the campus site would also be limited to the intensification of existing uses rather than a substantial change from established land uses. Future development on the campus site would comply with the CPHP and amended LRDP, and anticipated development in the campus vicinity would generally conform with objectives and policies found in the San Francisco General Plan and permitted uses and height and bulk requirements found in the San Francisco Planning Code. Therefore, cumulative development would not result in a conflict with land use plans and policies adopted by the University and the City for the purposed of avoiding or mitigating environmental impacts. The cumulative impact would be less than significant.

As discussed above under Impact LU-2, the clinical, research and residential uses planned under the proposed CPHP would not conflict with the campus site's P (Public) zoning designation as these uses are principally permitted. While under the CPHP, the proposed New Hospital, West Side Housing, Irving Street Arrival, Millberry Union improvements, and Initial and Future Aldea Housing Densification projects would not conform to the City's height and bulk standards for these sites, UCSF would design the projects to avoid or minimize the effects of this conflict with the City's Planning Code. With regard to other future development in the campus site vicinity, it would be subject to City review and approval, and would be expected to comply with local land use regulations such that a significant incompatibility is not created. For these reasons, the cumulative impact of the proposed CPHP and future development with regard to land use compatibility would be less than significant.

Mitigation: None required.

This page intentionally left blank

4.11 Noise and Vibration

This section describes and evaluates the potential for the construction and operation of the Comprehensive Parnassus Heights Plan (CPHP or Plan), including the three Initial Phase projects and Initial Phase improvements, to result in significant noise and vibration impacts. The section contains a description of the existing local conditions of the campus site and the surrounding areas; includes a summary of the applicable regulations related to noise and vibration; identifies criteria used to determine impact significance, and provides an analysis of the potential noise and vibration impacts associated with the implementation of the CPHP as well as identifies feasible mitigation measures that could mitigate any potentially significant impacts.

4.11.1 Environmental Setting

Noise Background

Sound is characterized by various parameters that describe the rate of oscillation (frequency) of sound waves, the distance between successive troughs or crests in the wave, the speed that the sound wave travels, and the pressure level or energy content of a given sound. The sound pressure level has become the most common descriptor used to characterize the loudness of an ambient sound, and the decibel (dB) scale is used to quantify sound intensity. Because sound can vary in intensity by over one million times within the range of human hearing, a logarithmic loudness scale is used to keep sound intensity numbers at a convenient and manageable level. Since the human ear is not equally sensitive to all sound frequencies within the entire spectrum, human response is factored into sound descriptions in a process called “A-weighting,” expressed as “dBA.” The dBA, or A-weighted decibel, refers to a scale of noise measurement that approximates the range of sensitivity of the human ear to sounds of different frequencies. On this scale, the normal range of human hearing extends from about 0 dBA to about 140 dBA. An increase of 10 dBA in the level of a continuous noise represents a perceived doubling of loudness. The noise levels presented herein are expressed in terms of dBA, unless otherwise indicated. **Table 4.11-1** shows some representative noise sources and their corresponding noise levels in dBA (HUD, 1985).

Planning for acceptable noise exposure must take into account the types of activities and corresponding noise sensitivity in a specified location for a generalized land use type. Some general guidelines are as follows: sleep disturbance can occur at noise levels above 35 dBA; interference with human speech begins at about 60 dBA; and hearing damage can result from prolonged exposure to noise levels in excess of 85 to 90 dBA (US EPA, 1974).

Attenuation of Noise

Noise from line sources, such as roadway traffic, attenuates (lessens) at a rate of 3.0 to 4.5 dBA per doubling of distance from the source, based on the inverse square law and the equation for cylindrical spreading of noise waves over hard and soft surfaces.

TABLE 4.11-1
TYPICAL SOUND LEVELS MEASURED IN THE ENVIRONMENT

Examples of Common, Easily Recognized Sounds	Decibels (dBA) at 50 feet	Subjective Evaluations
Near Jet Engine	140	Deafening
Threshold of Pain (Discomfort)	130	
Threshold of Feeling – Hard Rock Band	120	
Accelerating Motorcycle (at a few feet away)	110	
Loud Horn (at 10 feet away)	100	Very Loud
Noisy Urban Street	90	
Noisy Factory	85	
School Cafeteria with Untreated Surfaces	80	Loud
Near Freeway Auto Traffic	60	Moderate
Average Office	50	
Soft Radio Music in Apartment	40	Faint
Average Residence Without Stereo Playing	30	
Average Whisper	20	Very Faint
Rustle of Leaves in Wind	10	
Human Breathing	5	
Threshold of Audibility	0	

NOTE: Continuous exposure above 85 dBA is likely to degrade the hearing of most people. Range of speech is 50 to 70 dBA.
SOURCE: United States Department of Housing and Urban Development, *The Noise Guidebook*, 1985.

Noise from point sources, including stationary mobile sources such as idling vehicles or onsite construction equipment, attenuates at a rate of 6.0 to 7.5 dBA per doubling of distance from the source, based on the inverse square law and the equations for spherical spreading of noise waves over hard and soft surfaces. For the purposes of this analysis, it is assumed that noise from line and point sources to a distance of 200 feet attenuates at rates of between 3.0 and 6.0 dBA per doubling of distance, and the noise from line and point sources at a distance greater than 200 feet attenuates at a rate of 4.5 to 7.5 dBA per doubling of distance, to account for the absorption of noise waves due to ground surfaces such as soft dirt, grass, bushes, and intervening structures (Caltrans, 2009).

Noise Descriptors

Time variations in noise exposure are typically expressed in terms of a steady-state energy level (L_{eq}) that represents the acoustical energy of a given measurement. L_{eq} is used to describe noise over a specified period of time, in terms of a single numerical value. The L_{eq} is the constant sound level that would contain the same acoustic energy as the varying sound level, during the same time period (i.e., the average noise exposure level for the given time period). The L_{90} (the noise level exceeded 90 percent of the time) is also a noise metric that can be used to describe existing ambient noise levels. The maximum noise level (L_{max}) is the maximum instantaneous noise level measured during the measurement period of interest. Because community receptors are more sensitive to unwanted noise intrusion during the evening and at night, state law requires that, for planning purposes, an artificial dBA increment be added to "quiet time" noise levels to form a 24-hour noise descriptor called the day-night noise level (L_{dn}). The L_{dn} adds a 10-dBA penalty during the night hours (10:00 p.m. to 7:00 a.m.).

Health Effects of Environmental Noise

The World Health Organization (WHO) is perhaps the best source of current knowledge regarding the health effects of noise impacts because European nations have continued to study noise and its health effects, while the United States Environmental Protection Agency (USEPA) all but eliminated its noise investigation and control program in the 1970s.[1] 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 suggest that 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 of people to initially fall asleep (WHO, 1999).

Other potential health effects of high noise levels identified by WHO include decreased performance for complex cognitive tasks, such as reading, attention span, problem solving, and memorization; physiological effects such as hypertension and heart disease (after many years of constant exposure, often by workers, to high noise 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, can also damage hearing). 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.

Vehicle traffic and continuous sources of machinery and mechanical noise contribute to ambient noise levels. Short-term noise sources, such as truck backup beepers, the crashing of material being loaded or unloaded, and car doors slamming contribute very little to 24-hour noise levels but are capable of causing sleep disturbance and annoyance. The importance of noise to receptors depends on both time and context. For example, long-term high noise levels from large traffic volumes can make conversation at a normal voice level difficult or impossible, while short-term peak noise levels, if they occur at night, can disturb sleep.

Vibration Descriptors

Vibration is an oscillatory motion through a solid medium in which the motion's amplitude can be described in terms of displacement, velocity, or acceleration. Several different methods are used to quantify vibration. The peak particle velocity (PPV) is defined as the maximum instantaneous peak of the vibration signal. The PPV is most frequently used to describe physical vibration impacts on buildings. Another useful vibration descriptor is known as vibration decibels or VdBs. VdBs are generally used when evaluating human response to vibration, as opposed to

[1] The *San Francisco General Plan* Land Use Compatibility Guidelines for Community Noise, presented below in Figure 4.6-2, were created during the same era.

structural damage (for which PPV is the more commonly used descriptor). Vibration decibels are established relative to a reference quantity, typically 1 x 10^{-6} inches per second (FTA, 2018).

Typically, groundborne vibration generated by human activities attenuates rapidly with distance from the source of the vibration. Sensitive receptors to vibration include people (especially residents, the elderly, and sick people), structures (especially older masonry structures), and vibration-sensitive equipment.

The background vibration velocity level in residential areas is typically 50 VdB or lower, and the threshold of perception for humans is approximately 65 VdB. A vibration level of 85 VdB in a residence can result in strong annoyance (FTA, 2018).

Existing Noise and Vibration Environment

Long-term environmental noise in urbanized areas is primarily dependent on vehicle traffic volumes and the mix of vehicle types. The existing ambient noise environment at the Parnassus Heights campus site is dominated by vehicular traffic on adjacent public streets, including Parnassus Avenue, Irving Avenue and Clarendon Avenue, internal private roadways and parking and loading areas within the campus site. Ambient noise levels on the campus site are also affected by noise generated by stationary equipment noise sources, particularly in the east portion of the campus core where principal campus support functions exist [e.g., Central Utility Plant (CUP)].

Ambient Noise Measurements

Ambient long-term (24-hour) and short-term (15-minute) noise measurement data were collected in 2014 in conjunction with the preparation of the 2014 LRDP Final EIR, and updated in October 2019 to characterize noise conditions on the campus site and its environs. Additionally, long- and short-term noise measurements were collected in 2017 as part of the Mount Sutro Vegetation Management Plan Final EIR. Noise measurement locations are shown in **Figure 4.11-1**. To characterize ambient noise in the campus site area, short-term measurement data were compiled for three locations in 2019 where existing off-site residential land uses are present near proposed CPHP development on the campus site, (see short-term measurements ST-1, ST-2 and ST-3 presented in **Table 4.11-2**. In addition, long-term noise data was collected in 2019 in the Aldea Housing complex in the southeast portion of the campus site (see LT-3 in **Table 4.11-3**).

Long-term monitoring location LT-1 is located at the top of the ridge at the eastern property line of the campus site. The noise environment at this location is dominated by noise generated by mechanical equipment at the CUP and delivery trucks at the loading docks behind Long Hospital at the campus site. Noise data indicate that these noise sources are consistent throughout the daytime and nighttime hours. Noise levels recorded at monitoring location LT-1 in 2017 reflect a reduced noise level (4 to 5 dBA less) from those recorded at the same location in 2014. Long-term monitoring location LT-2 is located at UC Hall. The noise environment at this location is dominated by Parnassus Avenue vehicle traffic, which is relatively high during daytime hours, but is largely reduced after 10:00 p.m.

SOURCE: Google Earth, 2019; ESA, 2019

UCSF Comprehensive Parnassus Heights Plan EIR

Figure 4.11-1
Noise Monitoring Locations

ESA

TABLE 4.11-2
SHORT-TERM AMBIENT NOISE LEVEL DATA IN THE PARNASSUS HEIGHTS CAMPUS SITE VICINITY

Measurement Location		Time	Noise Levels in dBA	
			Hourly L_{eq}	L_{max}
ST-1	Parnassus Avenue at 5th Avenue (2019): Existing off-site residential receptors near the proposed CPHP Research and Academic Building	11:00 am	63	80
ST-2	Kirkham Street at 5th Avenue (2019): Existing off-site residential receptors near the proposed CPHP West Side Housing	11:33 am	58	72
ST-3	Irving Street at Arguello Boulevard (2019): Existing off-site residential receptors near the proposed CPHP Irving Street Arrival	10:34 am	69	83
ST-4	Johnstone Drive at Behr Avenue (2017):	11:20 am	52	64
ST-5	Edgewood Trailhead at terminus of Edgewood Avenue (2017):	11:00 am	52	64
ST-6	Crestmont Drive at Devonshire Way (2017):	11:20 am	46	56

NOTE: See Figure 4.11-1 for noise measurement locations. L_{eq} represents the constant sound level; L_{max} is the maximum noise level.
SOURCE: Environmental Science Associates, 2019; Illingworth and Rodkin, 2018.

TABLE 4.11-3
LONG-TERM AMBIENT NOISE LEVEL DATA IN THE PARNASSUS HEIGHTS CAMPUS SITE VICINITY

Measurement Location		Day-Night Noise level (DNL)	Noise Levels in dBA	
			Daytime hourly average, L_{eq}	Nighttime hourly average, L_{eq}
LT-1	Campus Site east property line (2014): Along rear of adjacent existing Edgewood Avenue residences, near the proposed CPHP New Hospital	64	58	58
LT-1	Campus Site east property line (2017)	60	54	53
LT-2	UC Hall Balcony on Parnassus Avenue (2014).	61	58	53
LT-3	Behr Avenue (2019): Within existing Aldea Housing complex and the site of proposed Aldea Housing Densification	52	48	45
LT-4	Terminus of Crestmont Drive (2017):	53	50	43
LT-5	Christopher Drive 400 feet north of Crestmont Drive (2017)	55	53	41

NOTE: See Figure 4.11-1 for noise measurement locations.
SOURCE: Environmental Science Associates, 2014 and 2019; Illingworth and Rodkin, 2018.

Noise levels at the LT-1 and LT-2 monitoring locations were marginally in excess of 60. Noise levels at the LT-3, LT-4, and LT-5 monitoring locations (Aldea Housing complex, and south and west campus site perimeters) were recorded to be below 60 DNL.

Sources of Vibration

The primary vibration source in the campus site vicinity is SF Muni light rail operations on Irving Street along the northern campus site boundary. The FTA has published generalized ground-surface vibration levels for light-rail passenger trains which are presented in **Table 4.11-4**; the table presents only those vibration levels that correspond to light rail speeds that are representative of those occurring along Irving Street.

TABLE 4.11-4
GENERALIZED VIBRATION LEVELS (IN VdB) FROM LIGHT RAIL ACTIVITY

Train Speed	Distance from Tracks		
	30 Feet	50 Feet	100 Feet
10 Miles per Hour	62 VdB	59 VdB	53 VdB
20 Miles per Hour	68 VdB	65 VdB	59 VdB
30 Miles per Hour	72 VdB	69 VdB	63 VdB

SOURCE: FTA, 2018

Sensitive Receptors

Sensitive receptors for noise are generally considered to include nursing homes, senior citizen centers, hospitals with overnight accommodations, schools, churches, libraries, and residences. Land uses in the campus site vicinity are described in detail in Section 4.10, *Land Use and Planning*.

Sensitive land uses within the Parnassus Heights campus site includes its hospitals, the Aldea Housing complex, and housing along Third and Fifth Avenues, and Irving Street. There are also two child care centers within the Parnassus Heights campus site: the Kirkham Child Development Center at 10 Kirkham Street, and the UCSF Marilyn Reed Lucia Child Development Center at 601 Parnassus Avenue.

The off-site sensitive receptors nearest to the Parnassus Heights campus site are residential dwellings on Edgewood Avenue adjacent to the east campus site boundary, across Hillway Avenue from the east campus site boundary, on Irving and Carl Streets north of the campus site boundary, across Third Avenue, Fifth Avenue and Kirkham Street west of the campus site boundary, on Christopher Drive and Forest Knolls Drive adjacent to the south campus site boundary. Within a quarter mile of the campus site boundary, there are three public schools (Independence High School, Grattan Elementary School and Clarendon Alternative Elementary School) and several private child care centers.

Vibration sensitive receptors can include not only residences and other places where people would be expected to sleep, such as a hotel, nursing home, or hospital, but also locations where vibration-sensitive equipment may be in use such as microscopes and magnetic resonance imagery (MRI) equipment and recording studios. Vibration-sensitive receptors in the campus site vicinity consist of the noise-sensitive receptors identified above, existing MRI and microscopy uses at Moffitt Hospital and Long Hospital, as well as any research facilities that use vibration-sensitive equipment.

4.11.2 Regulatory Framework

Federal Regulations

Federal Aviation Administration

The Federal Aviation Administration (FAA) develops noise exposure maps that use average annual DNL noise contours around the airport as the primary noise descriptor. The FAA states that all land uses are considered compatible when aircraft noise effects are less than 65 decibels (dB) DNL. San Francisco International Airport and Oakland International Airport are over eight and 12 miles from the campus site, respectively. The campus site is outside the 55 dB CNEL noise contour of both airports (ACCDA, 2010 and SFO, 2015).

State Regulations

State regulations include requirements for the construction of new hotels, motels, apartment houses, and dwellings other than detached single-family dwellings that are intended to limit the extent of noise transmitted into habitable spaces. These requirements are collectively known as the California Noise Insulation Standards and are found in Title 24 of the California Code of Regulations.

The 2016 California Building Code (CBC, Title 24, Part 2 of the California Code of Regulations) requires that walls and floor/ceiling assemblies separating dwelling units from each other, or from public or service areas, have a *Sound Transmission Class* (STC) of at least 50, meaning they can reduce noise by a minimum of 50 dB.[2] The CBC (section 1207.4, Allowable Interior Noise Levels) also specifies a maximum interior noise limit of 45 dBA (L_{dn} or CNEL) in habitable rooms, and requires that common interior walls and floor/ceiling assemblies meet a minimum STC rating of 50 for airborne noise.

UCSF

The UCSF 2014 LRDP identified campus-wide objectives and objectives specific to the Parnassus Heights campus site. The following UCSF 2014 LRDP campus-wide objective relates to noise:

Campus-Wide Objectives

1. **Respond to City and Community Context**
   - C. Design new buildings to be sensitive to the surrounding neighborhood and landscape, taking into account use, scale, potential noise generation, and density.
   - F. Consider neighborhood and city-wide impacts related to UCSF's physical growth.

2 State Building Code section 1207.2.

The UCSF 2014 LRDP also included *Community Planning Principles*, which were produced in collaboration with the UCSF Community Advisory Group:

Community Planning Principles

Environmental Planning and Safety

EP3. Meet or exceed city, state, and federal standards with respect to health and safety, noise and construction-related environmental impacts.

UCSF is not subject to local plans, policies, or ordinances whenever using land under its control in furtherance of its educational mission. However, it is UCSF policy to be consistent with such plans, policies, or ordinances to the extent feasible.

City of San Francisco

San Francisco General Plan

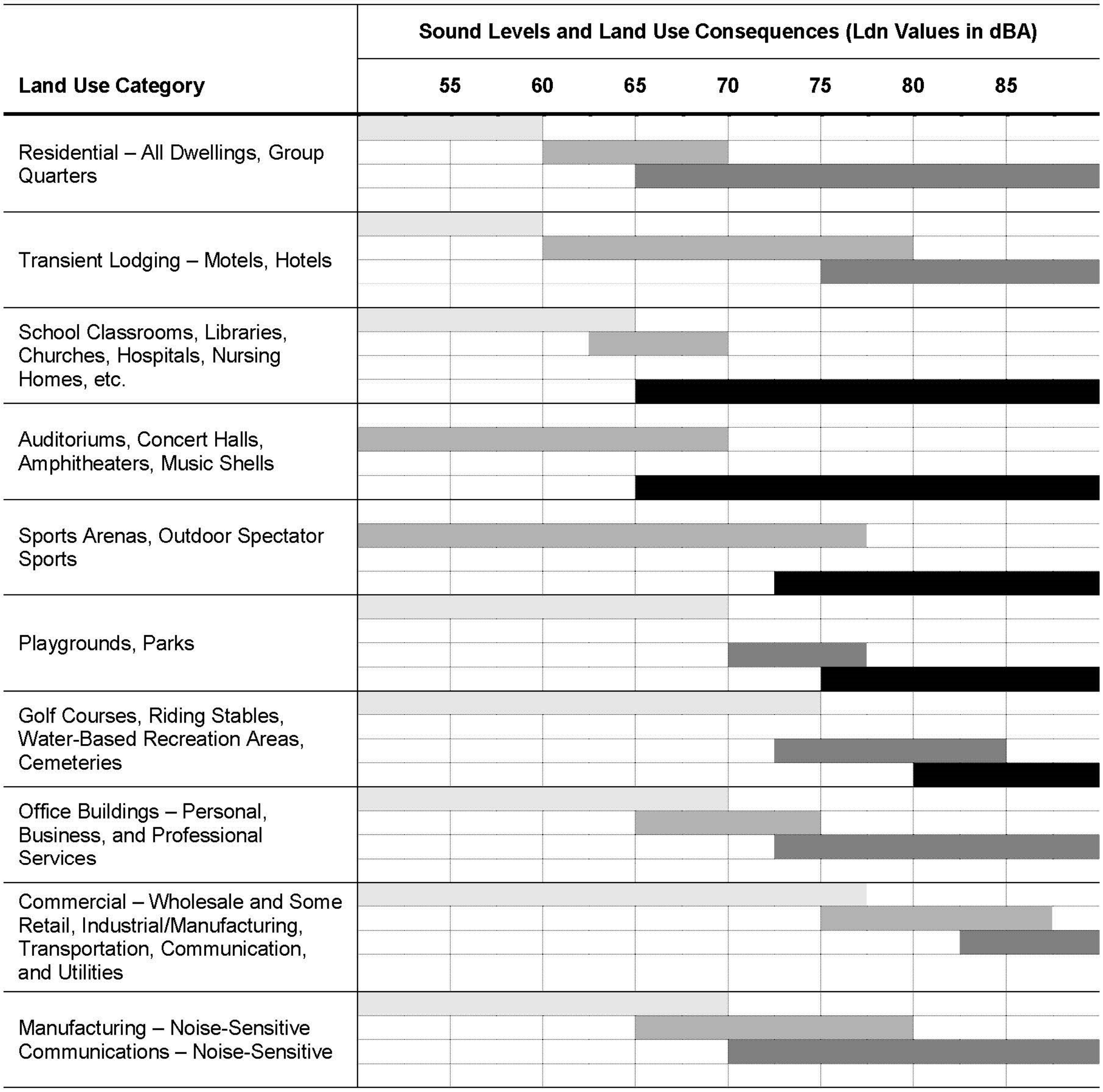
Land Use Compatibility Guidelines for Community Noise

The Environmental Protection Element of the *San Francisco General Plan* contains Land Use Compatibility Guidelines for Community Noise (CCSF, 1996). These guidelines, which are similar to but differ somewhat from state guidelines promulgated by the Governor's Office of Planning and Research, indicate maximum acceptable exterior noise levels for various newly developed land uses. The City's guidelines, which are presented in **Figure 4.11-2**, indicate exterior noise levels that might be inappropriate for sensitive land uses and would therefore require additional noise insulation considerations beyond standard practices. Though this figure presents a range of noise levels that are considered compatible or incompatible with various land uses, the maximum "satisfactory" noise level is 60 dBA (DNL) for residential and hotel uses; 65 dBA (DNL) for school classrooms, libraries, churches, and hospitals; 70 dBA (DNL) for playgrounds, parks, office buildings, retail commercial uses, and noise-sensitive manufacturing/communications uses; and 77 dBA for other commercial uses such as wholesale, some retail, industrial/manufacturing, transportation, communications, and utilities. If these uses are proposed to be located in areas with noise levels that exceed these guidelines, a detailed analysis of noise reduction requirements will normally be necessary prior to final review and approval.

Noise-Related Policies

The following policies of the *San Francisco General Plan* Environmental Protection Element relate to noise:

***Policy 10.1*:** Promote site planning, building orientation and design and interior layout that will lessen noise intrusion. Because sound levels drop as distance from the source increases, building setbacks can play an important role in reducing noise for the building occupants. Buildings sited with their narrower dimensions facing the noise source and sited to shield or be shielded by other buildings also help reduce noise intrusion. Although walls with no windows or small windows cut down on noise from exterior sources, in most cases it would not be feasible or desirable to eliminate wall openings. However, interior layout can achieve similar results by locating rooms whose use require more quiet, such as bedrooms, away from the street noise.



SOURCE: San Francisco Planning Department, *San Francisco General Plan*, Environmental Protection Element, adopted on June 27, 1996, http://www.sf-planning.org/ftp/General_Plan/I6_Environmental_Protection.htm#ENV_TRA_11, accessed December, 2019.

Satisfactory, with no special noise insulation requirements. Noise levels in this range are considered "Acceptable."

New construction or development should be undertaken only after a detailed analysis of the noise reduction requirements is made and needed noise insulation features included in the design. Noise levels in this range are considered "Conditionally Acceptable."

New construction or development should generally be discouraged. If new construction or development does proceed, a detailed analysis of the noise reduction requirements must be made and needed noise insulation features included in the design. Noise levels in this range are considered "Conditionally Unacceptable."

New construction or development should generally not be undertaken. Noise levels in this range are considered "Unacceptable."

Figure 4.11-2
San Francisco Land Use Compatibility Chart for Community Noise

> ***Policy 10.2*: **Promote the incorporation of noise insulation materials in new construction. State-imposed noise insulation standards apply to all new residential structures except detached single-family dwellings. Protection against exterior noise and noise within a building is also important in many nonresidential structures. Builders should be encouraged to take into account prevailing noise levels and to include noise insulation materials as needed to provide adequate insulation.
>
> ***Policy 11.1*: **Discourage new uses in areas in which the noise level exceeds the noise compatibility guidelines for that use. New development should be examined to determine whether background and/or thoroughfare noise level of the site is consistent with the guidelines for the proposed use. If the noise levels for the development site….exceed the sound level guidelines established for that use, as shown in the accompanying land use compatibility chart, then either needed noise insulation features should be incorporated in the design or else the construction or development should not be undertaken.
>
> ***Policy 11.3*: **Locate new noise-generating development so that the noise impact is reduced. Developments which will bring appreciable traffic into or through noise-sensitive areas should be discouraged, if there are appropriate alternative locations where the noise impact would be less. For those activities—such as a hospital—that need a quiet environment, yet themselves generate considerable traffic, the proper location presents a dilemma. In those cases, the new development should locate where this traffic will not present a problem and, if necessary, incorporate the proper noise insulation.

San Francisco Noise Ordinance

In San Francisco, regulation of noise is stipulated in Article 29 of the Police Code (Regulation of Noise), which states that the City's policy is to prohibit unnecessary, excessive, and offensive noises from all sources subject to police power. Sections 2907 and 2908 of Article 29 regulate construction equipment and construction work at night, while Section 2909 provides for limits on stationary-source noise from machinery and equipment. Sections 2907 and 2908 are enforced by the Department of Building Inspection, and Section 2909 is enforced by the Department of Public Health. Summaries of these and other relevant sections are presented below.

Sections Regulating Construction Noise

Sections 2907(a) and (b) of the Police Code state that it shall be unlawful for any person, including the City and County of San Francisco, to operate any powered construction equipment, regardless of age or date of acquisition, if the operation of such equipment emits noise at a level in excess of 80 dBA when measured at a distance of 100 feet from such equipment, or an equivalent sound level at some other convenient distance. Exemptions from this requirement include:

- Impact tools and equipment with intake and exhaust mufflers recommended by the manufacturers and approved by the Director of Public Works as best accomplishing maximum noise attenuation; and
- Pavement breakers and jackhammers equipped with acoustically attenuating shields or shrouds recommended by the manufacturers and approved by the Director of Public Works as best accomplishing maximum noise attenuation.

Section 2908 prohibits any person, between the hours of 8:00 p.m. of any day and 7:00 a.m. of the following day, from erecting, constructing, demolishing, excavating for, altering, or repairing any building or structure if the noise level created is in excess of the ambient noise level by 5 dBA at the nearest property line unless a special permit has been applied for and granted by the Director of Public Works.

Sections Regulating Operational Noise

Section 2909 establishes a not-to-exceed noise standard for fixed sources of noise, such as building mechanical equipment and industrial or commercial processing machinery. Unlike the state building code (Title 24) standard, which is applicable to interior living space only, the standards in Section 2909(a), (b), and (c) are applicable outdoors, at the property line of the affected use, and vary based on the residential or commercial nature of the noise generator's use. For example, the noise limits for commercial and industrial properties (Section 2909(b)) provide that no person shall produce or allow to be produced a noise level more than 8 dBA above the local ambient level at the property plane. If the noise generated from commercial and industrial properties is generated from a licensed place of entertainment or other location subject to regulation by the Entertainment Commission, such use shall not produce or allow to be produced a noise level more than 8 dBC[3] above the local ambient level at the property plane in addition to the 8 dBA standard.

For noise generated by residential properties, the noise limits are 5 dBA above the ambient level at any point outside of the property plane of a residential use. The noise limits for public property provide that no person shall produce a noise level more than 10 dBA above the local ambient level at a distance of 25 feet or more on public property.

As is common for noise standards, the permitted noise level for fixed residential interior noise limits identified in Section 2909(d) is lower at night than during the day. For example, maximum noise levels at any sleeping or living room in any dwelling unit located on residential property must not exceed 45 dBA between 10:00 p.m. and 7:00 a.m., and 50 dBA between 7:00 a.m. and 10:00 p.m. None of the noise limits set forth in this section apply to activity for which the City and County of San Francisco has issued a permit that contains noise limit provisions that are different from those set forth in this article. Additionally, the Directors of Public Health, Public Works, or Building Inspection, or the Entertainment Commission, or the Chief of Police may grant variances to noise regulations, over which they have jurisdiction pursuant to Section 2916.

4.11.3 Impacts and Mitigation Measures

Significance Criteria

Would implementation of the CPHP, including the Irving Street Arrival, RAB and initial Aldea Housing Densification projects and the Initial Phase improvements, result in:

a) Generation of a substantial temporary or permanent increase in ambient noise levels in the vicinity of the project in excess of standards established in the local general plan or noise ordinance, or applicable standards of other agencies?

b) Generation of excessive groundborne vibration or groundborne noise levels?

[3] C-weighted decibels include low-frequency sounds that are more common to amplified sound/concerts.

c) For a project located within the vicinity of a private airstrip or 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, would the project expose people residing or working in the project area to excessive noise levels?

d) Exceed an LRDP EIR operational standard of significance by contributing to an increase in average daily noise levels (L_{dn}) of 3 dB(A) or more at property lines, if ambient noise levels in areas adjacent to proposed development already exceed local noise levels set forth in local general plans or ordinances for such areas based on their use?

With respect to criterion a) above, this analysis applies the restrictions of the City of San Francisco Police Code Sections 2907 and 2908 and the 90 dBA daytime construction noise criteria of the FTA for residential uses. Additionally, an increase of 10 dBA representing a doubling of perceived loudness is also considered, although not a regulatory threshold. With respect to criterion b) above, this analysis applies the thresholds published by Caltrans for vibration impacts that may result in building damage or human annoyance. See Approach to Analysis, below, for additional detail.

Criteria Not Analyzed

As stated in the Initial Study, there would no impact related to the following topic for the reasons described below:

- ***For a project located within the vicinity of a private airstrip or 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, would the project expose people residing or working in the project area to excessive noise levels.*** The proposed CPHP would not include development of land uses near an airport influence area. The FAA states that all land uses are considered compatible when aircraft noise effects are less than 65 decibels (dB) CNEL. As discussed above, San Francisco International Airport and Oakland International Airport are over eight and 12 miles from the campus site, respectively. The project site is outside the 55 dB CNEL noise contour of both airports (ACCDA, 2010 and SFO, 2015). No impact would occur, and this impact is not discussed further in this EIR.

Approach to Analysis

Construction Noise Assessment for CPHP

According to Section 2907 of the City's noise ordinance, it is prohibited to operate any powered construction equipment (non-impact), regardless of age or date of acquisition, if the operation of such equipment emits noise at a level in excess of 80 dBA when measured at a distance of 100 feet from such equipment. Impact equipment such as pile driving and hoe rams are exempt from this requirement. To assess consistency with his Code requirement, published reference noise levels for standard construction equipment are compared to this Code requirement to determine whether CPHP projects would generate construction noise levels in excess of published standards.

Approach to Analysis of Initial Phase Projects, and Initial Phase Improvements

This section includes project-level analysis for certain Initial Phase projects anticipated to be completed by about the year 2030; specifically, the Irving Street Arrival, Research and Academic Building (RAB), and initial Aldea Housing Densification; and Initial Phase improvements, as described below. The New Hospital is also an Initial Phase project anticipated to be completed by about the year 2030, and except where noted below (e.g., construction noise assessment), is analyzed at a program level in this EIR within the context of the overall CPHP and will be analyzed at a project level in a subsequent EIR when more details are available.

Construction Noise Assessment for CPHP and Irving Street Arrival, Research and Academic Building, New Hospital, and Initial Aldea Housing Densification, and Initial Phase Improvements

Given the anticipated concurrent construction of New Hospital with other Initial Phase projects, the combined construction noise effects of all four Initial Phase projects are considered in this noise analysis.

All construction under the CPHP, including the Initial Phase projects and Initial Phase Improvements, would comply with the restrictions established by Sections 2907 and 2908 of the San Francisco Police Code. As discussed in the *Regulatory Setting*, UCSF voluntarily strives to meet the City's Police Code, which sets limits on the hours during which construction activities can occur (between the hours of 7:00 AM and 8:00 PM) and requires that construction noise not exceed 80 dB(A) Maximum Noise Level (L_{max}) at a distance of 100 feet, although an exception to the City's Police Code allows the use of impact tools with appropriate controls and approval by the Director of Public Works or the Director of Building Inspection.

Additionally, for assessment of project-level construction noise impacts associated with the Initial Phase projects and Initial Phase Improvements, the quantitative evaluation of daytime construction noise effects is based on the general assessment methodology and criteria set forth in the Federal Transit Administration (FTA) guidelines for residential land uses which is an hourly 90 dBA L_{eq} (FTA, 2018) during daytime hours.

The FTA methodology for general assessment of construction noise entails a process for calculating the hourly dBA, L_{eq} for each stage of construction considering (1) the reference noise emission level at 50 feet for equipment to be used for each stage of construction, (2) the usage factor for each piece of equipment, and (3) the distance between construction centerline and receptors[4]. This methodology entails determining the resultant noise levels for the two noisiest pieces of equipment expected to be used in each stage of construction.

The FTA does not publish a software noise model; as such, the Federal Highway Administration (FHWA) Roadway Construction Noise Model (RCNM) was used. The RCNM is used as the FHWA's national standard for predicting construction noise. The RCNM analysis includes the calculation of noise levels (L_{max} and L_{eq}) at incremental distances for a variety of construction equipment. The model inputs include acoustical use factors, L_{eq} values at various distances

[4] In an urban area such as downtown San Francisco that have acoustically non-absorptive ground conditions, the ground factor is taken to be zero.

depending on the receptor location analyzed. Construction noise levels were calculated for both the demolition and the construction phases of each Initial Phase project.

In addition to the assessment of construction noise relative to Sections 2907 and 2908 of the San Francisco Police Code and the FTA's 90 dBA L_{eq} daytime standard at residential uses, this analysis applies an increase of 10 dBA or more over existing noise levels at sensitive receptor locations to warrant the implementation of construction noise control measures. Such as increase is a perceived doubling of loudness (Caltrans, 2013a).

Operational Stationary Source Noise Assessment for CPHP and the Irving Street Arrival, Research and Academic Building, and Initial Aldea Housing Densification and Initial Phase Improvements

Operational stationary sources include mechanical equipment such as heating, ventilation, and air conditioning (HVAC) equipment and backup generators. Because specific locations and specifications of these equipment are unknown at this point for both the CPHP and Initial Phase projects and Initial Phase Improvements, the analysis is generally a qualitative analysis that identifies existing code requirements that would serve to restrict noise from these sources and UCSF's intent to meet code requirements to the degree feasible. UCSF voluntarily strives to meet the City's Police Code, according to which stationary mechanical equipment noise for commercial and industrial uses is limited to 8 dB(A) in excess of the ambient noise environment. The Code also provides an interior noise limit, stating that noise levels from mechanical sources may not exceed 45 dB(A) between the hours of 10:00 PM and 7:00 AM or 55 dB(A) between the hours of 7:00 AM and 10:00 PM with windows open except where building ventilation is achieved through mechanical systems that allow windows to remain closed.

Construction Vibration Assessment for CPHP and Irving Street Arrival, Research and Academic Building, and Initial Aldea Housing Densification and Initial Phase Improvements

The study area for evaluation of vibration impacts from construction encompasses the construction site and the nearest potentially affected sensitive receptors to that site. Construction vibration impacts are analyzed in terms of the potential of project-related vibrations to result in damage to nearby structures or buildings as established by Caltrans (Caltrans, 2013b). The Caltrans thresholds for potential architectural damage due to groundborne vibrations is 0.5 in/sec PPV for new residential structures and modern commercial buildings and 0.25 in/sec PPV for historic and older buildings. With respect to human annoyance, Caltrans considers vibrations of 0.04 in/sec PPV to be strongly perceptible and this is the criterion applied in this analysis.

Construction vibration impacts are analyzed in terms of the potential of project-related vibrations to result in human annoyance or interfere with the operation of vibration-sensitive equipment or uses (FTA, 2018). Vibration levels are predicted at various distances for equipment reasonably expected to be involved with project demolition and construction activities and impacts to receptors assessed based on the criteria established by Caltrans and FTA. The criterion for vibration-sensitive equipment is 65 VdB, as published by FTA.

Traffic Noise Assessment for CPHP and Irving Street Arrival, Research and Academic Building, and Initial Aldea Housing Densification and Initial Phase Improvements

Traffic noise modeling to address the effects of the traffic generated by the CPHP, including the proposed Irving Street Arrival, RAB, and initial Aldea Housing Densification projects and Initial Phase Improvements, was completed using a spreadsheet based on the FHWA Traffic Noise Model. Traffic noise level significance was determined by comparing the increase in noise levels (traffic contribution only) to increments recognized by UCSF of a permanent increase in noise levels of 3 dBA or more if noise levels without the project already exceed those identified as appropriate for a given land use within the San Francisco General Plan, as presented in Figure 4.11-2.

Impact Analysis

Impact NOI-1: Construction activities under the CPHP would generate a substantial temporary increase in ambient noise levels in the vicinity of the construction project in excess of standards established in the local general plan or noise ordinance, or applicable standards of other agencies. (Significant and Unavoidable with Mitigation)

CPHP

Construction activities under the CPHP would include, but not be limited to, demolition or renovation of certain existing campus site buildings; site clearing, excavation, and grading activities; new building foundation and vertical construction; new street, sidewalk and service corridor construction; installation of utilities; building interior finishing; and exterior hardscaping and landscaping improvements. As discussed in Chapter 3 *Project Description*, equipment involved with large-scale demolition, excavation, grading and construction at the campus site would include excavators, backhoes, dozers, loaders, cranes, and trucks for delivering materials and for off-hauling demolition debris. Additionally, a hoe-ram (a back-hoe fitted with a ramming bit) may be used to break up large concrete structures (e.g., for the demolition of the School of Nursing and UC Hall). No pile driving or blasting activities are proposed during construction of projects proposed under the CPHP. Rather, foundations would be installed using drilled piers; and excavation of soft rock would be conducted using hydraulic heavy excavators.

Table 4.11-5 shows typical noise levels produced by various types of construction equipment typically involved with large-scale construction projects that would occur at a reference distance of 50 feet from the source. Noise levels at and near demolition and construction sites would fluctuate depending on the particular type, number and duration of uses of various pieces of construction equipment at any given time. As shown in Table 4.11-5, the estimated noise levels generated by typical equipment that would be used at the campus site under the CPHP would meet the City of San Francisco Police Code 2909 standard of 80 dbA at 100 feet, with the exception of those equipment that would be exempt.

Under the CPHP, renovations of certain existing buildings would also occur, such as the HSIR Towers and the Medical Sciences Building. These renovations are assumed to be predominantly within the interior of existing buildings, and would not involve substantial operation of off-road construction equipment, other than use of a small crane. Since these activities would be largely conducted within the interior of building they would not result in significant construction noise impacts at nearby receptors. This would also be true for interior construction in new buildings that would be developed under the CPHP.

TABLE 4.11-5
TYPICAL NOISE LEVELS FROM CONSTRUCTION EQUIPMENT

Construction Equipment	Noise Level (dBA, Lmax at 50 Feet)	Noise Level (dBA, Leq at 100 Feet)	Exceed 80 dBA at 100 feet standard?
Dump truck	77	71	No
Portable air compressor	78	72	No
Concrete mixer (truck)	79	73	No
Crane	81	75	No
Excavator	81	75	No
Dozer	82	76	No
Paver	77	71	No
Generator	81	75	No
Backhoe	78	72	No
Auger Drill Rig	84	78	No
Hoe-ram	90	84	Exempt (impact) per City Noise Ordinance

SOURCE: FHWA, 2006.

As discussed in Chapter 3, *Project Description*, the CPHP would provide for development of approximately 2.90 million gross square feet (gsf) of new building space, or approximately 2.04 million gsf of net new building space. The CPHP Initial Phase projects, including the Irving Street Arrival, RAB, New Hospital and initial Aldea Housing Densification projects and the Initial Phase improvements, would be completed by 2030. Over an approximately 10-year period, there would be about 1.43 million gsf of new construction, nearly 287,000 gsf of demolition, and approximately 254,000 cubic yards of excavation on the campus site. Analysis provided below for the Initial Phase projects and the Initial Phase improvements indicates that noise levels from proposed peak demolition and construction activities at the closest receptors could exceed existing noise levels by as much as 27 dBA at receptors approximately 70 feet away. Noise levels exceeding the 10 dBA over existing levels threshold of the 2014 LRDP FEIR (a perceived doubling of loudness) would be a temporary significant impact. Receptors near these construction sites could also experience noise levels approaching or exceeding a speech-interference threshold of 70 dBA and result in a temporary but significant noise impact from construction and demolition activities.

All proposed CPHP Future Phase development is assumed to be completed between approximately 2030 and the horizon year of the Plan, about year 2050. Over this approximately 20-year period, there would be an additional 1.47 million gsf of new construction, approximately 401,000 gsf of demolition, and approximately 139,000 cubic yards of excavation on the campus site. The general types of construction equipment and techniques that would be used for Future Phase projects would be similar to those for the Initial Phase. As a result, while on balance, the overall amount of construction in the Future Phase would be roughly comparable to that which would occur in the Initial Phase, the Future Phase construction would be generally spread out over a longer duration (20-year period) that the Initial Phase construction (10-year period).

The specific sequencing of the individual CPHP Future Phase projects is not known at this time. However, when considering the amount and type of Future Phase demolition and construction, and the location of Future Phase development sites with respect to nearby receptors, it is expected that overall and peak construction noise impacts that would be experienced during the Future Phase would be generally comparable to those discussed for the Initial Phase projects, and would similarly result in a temporary but significant impact. Implementation of **CPHP Mitigation Measures NOI- 1a** through **1c** would reduce noise levels associated with demolition and construction activities under the proposed CPHP. Furthermore, as discussed in **CPHP Mitigation Measure TRANS-5: Construction Coordination and Monitoring Measures**, a traffic control plan would be implemented to reduce temporary construction related conflicts. The traffic control plan shall specify that truck routes for haul trucks and vendor trucks shall be designated and signed to be circular loops to the degree feasible. This would reduce the need for back-up alarms in proximity to noise-sensitive receptors.

CPHP Mitigation Measure NOI-1a: Construction Noise Control Measures

UCSF contractors shall employ site-specific noise attenuation measures during construction of projects under the CPHP to reduce the generation of construction noise. These measures shall be included in a Noise Control Plan that shall be submitted for review and approval by UCSF to ensure that construction noise is consistent with the standards set forth in the City's Noise Ordinance. Measures specified in the Noise Control Plan and implemented during project construction shall include, at a minimum, the following noise control strategies:

- Equipment and trucks used for construction shall use the best available noise control techniques (e.g., improved mufflers, equipment redesign, use of intake silencers, ducts, engine enclosures, and acoustically attenuating shields or shrouds.
- Impact tools (e.g., jack hammers, pavement breakers, and rock drills) used for construction shall be hydraulically or electrically powered wherever possible to avoid noise associated with compressed air exhaust from pneumatically powered tools. Where use of pneumatic tools is unavoidable, an exhaust muffler on the compressed air exhaust shall be used; this muffler can lower noise levels from the exhaust by up to about 10 dBA. External jackets on the tools themselves shall be used where feasible; this could achieve a reduction of 5 dBA. Quieter procedures, such as use of drills rather than impact tools, shall be used where feasible.
- Stationary noise sources shall be located as far from adjacent receptors as possible, and they shall be muffled and enclosed within temporary sheds, incorporate insulation barriers, or include other measures.
- Shield staging areas where adjacent sensitive receptors have direct line-of-sight with loading and delivery activities. Shielding may consist of plywood fencing with no gaps or acoustical paneling erected in K-rails.

CPHP Mitigation Measure NOI-1b: Construction Hours

Construction hours shall be restricted to the hours listed in the table below. In rare circumstances, work may need to occur outside of these work hour limits. In such cases, UCSF Community and Government Relations will receive advance notice from the project manager, at least one week in advance as feasible, and will engage the community to identify measures to minimize potential impacts. These measures may include, but not be limited to, restricting work to smaller time windows, condensing the overall duration of nighttime work to the degree feasible, and erecting temporary barriers to shield the short-term nighttime activity.

Construction Hours

	"Not Noisy" Work[1]		Noisy Work	
	Regular hours	Extended hours[2]	Regular hours	Extended hours[1]
Monday - Friday	7:00 a.m. to 5:00 p.m.	5:00 p.m. to 8:00 p.m.	8:00 a.m. to 5:00 p.m.	
Saturday		8:00 a.m. to 5:00 p.m.		9:00 a.m. to 4:00 p.m.
Sunday		8:00 a.m. to 5:00 p.m.		

1 "Not Noisy" work = 80 decibels or less at 100 feet; "Noisy" work = more than 80 decibels at 100 feet.
2 Extended hours to be considered by UCSF Community and Government Relations with advance notice from the project manager.

CPHP Mitigation Measure NOI-1c: Pile-Installation Noise-Reducing Techniques

Noise-reducing pile-installation techniques shall be employed during project construction. These techniques shall include:

- Installing cast-in-place concrete piles. Noise from auger drilling is 17 dBA less than an impact pile driver.
- Vibrating piles into place, and installing shrouds around the pile-driving hammer where feasible.
- Implement "quiet" pile-installation technology (such as pre-drilling of piles and the use of more than one pile driver to shorten the total pile installation duration).

Mitigation: Implement CPHP Mitigation Measure TRANS-5: Construction Coordination and Monitoring Measures– Construction Traffic Control Plan.

Significance After Mitigation: CPHP Mitigation Measures NOI-1a, NOI-1b and NOI-1c would reduce the severity of noise generated by demolition and construction activities and reduce the potential annoyance to nearby residents and others who could be disturbed by these activities to the extent feasible. Implementation of CPHP Mitigation Measure NOI- 1a and 1b is projected to reduce noise levels associated with demolition and construction activities for CPHP construction by 5 to 10 dBA, while CPHP Mitigation Measure NOI-1c would reduce noise levels associated with pile installation activities by 17 dBA. However, because it would still be likely that during peak construction activities, noise levels in excess of 10 dBA over ambient may still occur at some sensitive receptors on or near the Parnassus Heights campus site after mitigation, the CPHP's construction noise impact would be significant and unavoidable with mitigation.

Irving Street Arrival, Research and Academic Building and Initial Aldea Housing Densification and Initial Phase Improvements

Construction Noise

As discussed in Chapter 3, *Project Description*, this EIR addresses three Initial Phase projects (Irving Street Arrival, RAB, and initial Aldea Housing Densification) at a project-level. While proposed New Hospital is also an Initial Phase and considered programmatically in this EIR, given the anticipated concurrent construction of New Hospital with other Initial Phase projects, the combined construction noise effects of all four projects are considered in this noise analysis.

As described in Chapter 3, *Project Description*, Initial Phase improvements are also proposed that would include various Initial Phase utility improvements, implementation of the Parnassus Avenue Streetscape Plan, renovation of certain existing buildings, and installation of miscellaneous community investments in the public realm. These Initial Phase improvements would generate incremental construction-related noise depending on the timing of implementation, but are not expected to substantially generate noise levels beyond those conservatively estimated below for the Initial Phase projects. Furthermore, as applicable, any Initial Phase improvements that would be constructed outside the campus site boundary, such as streetscape, utility or community investments, may involve the cooperation of the City of San Francisco and, as public works projects, would be subject to the City of San Francisco's Noise Ordinance.

As indicated above, construction under the CPHP would occur consistent with Section 2908 of the City Police Code (San Francisco Noise Ordinance). Although UCSF is not subject to the noise ordinance, it strives to be consistent with it to the extent feasible.[5]

Based on the construction schedule presented in Chapter 3, *Project Description*, the construction of the proposed Irving Street Arrival and Research and Academic Building (RAB) projects would overlap by approximately 2 years (between early 2022 and the end of 2023). Additionally, construction of the proposed New Hospital would also overlap in part with the finishing work for the proposed Irving Street Arrival (6 months; mid-2023 to end of 2023), RAB (1½ years; mid-2023 to end of 2025) and the initial Aldea Housing Densification (3 years; from 2028 to end of 2030). Given the substantial distance of the initial Aldea Housing Densification project from the other Initial Phase projects (greater than 1,500 feet and shielded topographically by Mount Sutro), the initial Aldea Housing Densification project would not contribute to cumulative concurrent noise effects from the other Initial Phase projects at receptor locations. However, there would potentially be occasions when construction activities of the New Hospital and the RAB could occur simultaneously, together affecting receptors on Parnassus Avenue. This could also be true of the construction of the Irving Street Arrival with the New Hospital, although the overlapping period would be at the end of the Irving Street Arrival work which would likely be mostly interior work by that time.

5 Section 2908 prohibits erecting, constructing, demolishing, excavating for, altering, or repairing any building or structures between the hours of 8:00 p.m. of any day and 7:00 a.m. of the following day if the noise level created is in excess of the ambient noise level by 5 dBA at the nearest property line.

The FHWA RCNM was used to estimate noise generated by construction activities. Construction noise levels were calculated for each stage of construction based on the equipment list provided by UCSF.

Table 4.11-6 presents the results of the RCNM modelling effort showing the predicted noise levels at the nearest sensitive land use. The nearest sensitive receptor to the Irving Street Arrival are residential uses on the north side of Irving Street, approximately 70 feet from the northern façade. Predicted noise values in Table 4.11-6 represent a worst case analysis when equipment is in operation at the point of the construction site closest to the nearest receptor, as this would occur only occur a short percentage of the overall construction period. As can be seen in Table 4.11-6, noise levels generated from the Irving Street Arrival project at the closest receptor would be below the FTA daytime criteria of 90 dBA for residential uses.

As shown in Table 4.11-6, noise levels from proposed demolition and construction activities at the closest receptors could exceed existing noise levels by as much as 27 dBA at demolition of the existing Aldea housing and up to 16 dBA from demolition activities associated with the RAB and mitigation measures are warranted.

Similarly, for demolition and construction of the RAB and initial Aldea Housing Densification, construction noise levels at the closest receptor would be below the FTA daytime criteria of 90 dBA at the nearest residential uses (nearest receptors along the 600 block of Parnassus Avenue for the RAB project; and at the Aldea Housing complex, the nearest receptor would be existing Aldea residences at 90 Behr Avenue which would remain occupied during construction of the initial Aldea Housing Densification project). However, the increase over existing noise levels at the nearest receptors for these two Initial Phase projects, as presented in Table 4.11-6 would be 16 dBA and 27 dBA, respectively. Impacts at other more distant receptors such as the existing Lucia Child Care center would less than those indicated in Table 4.11-6. Predicted noise values in the table represent a worst case analysis when equipment is in operation at the point of the project area closest to the receptor, which would only occur a short percentage of the overall construction period. However, such an increase would be a temporary significant impact that warrants implementation of mitigation measures.

Implementation of **CPHP Mitigation Measures NOI-1a** and **1b** would reduce noise levels associated with demolition and construction activities for Initial phase demolition and construction. However, because it would still be likely that during peak construction activities, noise levels in excess of 10 dBA over ambient may still occur at some sensitive receptors on or near the Parnassus Heights campus site after mitigation, the Initial Phase construction noise impact would be significant and unavoidable with mitigation.

Haul Truck Noise and Staging Areas

Excavation and demolition debris volumes associated with the Irving Street Arrival project would be modest, resulting in approximately three haul truck trips per peak hour. This temporary increase in haul truck trips would not substantially increase noise level along Irving Street where, as discussed in the *Environmental Setting*, existing noise levels were monitored to be 69 dBA due to frequent Muni light rail operations on this street.

TABLE 4.11-6
DAYTIME NOISE LEVELS FROM DEMOLITION AND CONSTRUCTION FOR PROPOSED IRVING STREET ARRIVAL, RAB, AND INITIAL ALDEA HOUSING DENSIFICATION PROJECTS

Representative Receptor	Existing Daytime Noise Level (dBA, Leq)[a]	Loudest Two Noise Sources	Reference Noise Level (dBA)[a]	Distance to Receptor[b] (feet)	Usage Factor	Adjusted L_{eq} Level (dBA)[c]	Exceed 90 dBA daytime standard?	Existing + Construction Noise Resultant Noise Level (dBA)[d]
Initial Phase Project: Irving Street Arrival Demolition								
30 Irving Street		Backhoe	78	70	40%	71	No	NA
30 Irving Street		Excavator	81	70	40%	74	No	NA
30 Irving Street	69	Combined Total	NA	70	NA	76	No	77
Initial Phase Project: Irving Street Arrival Building Construction								
30 Irving Street		Crane	83	70	16%	70	No	NA
30 Irving Street		Gradall Forklift	81	70	40%	77	No	NA
30 Irving Street	69	Combined Total	NA	70	NA	77	No	77
Initial Phase Project: RAB Demolition								
650 Parnassus Avenue		Backhoe	78	75	40%	70	No	NA
650 Parnassus Avenue		Hoe Ram	90	75	20%	80	No	NA
650 Parnassus Avenue	64	Combined Total	NA	75	NA	80	No	80
Initial Phase Project: RAB Building Construction								
650 Parnassus Avenue		Crane	83	75	16%	69	No	NA
650 Parnassus Avenue		Gradall Forklift	81	75	40%	76	No	NA
650 Parnassus Avenue	64	Combined Total	NA	75	NA	77	No	77

TABLE 4.11-6 (CONTINUED)
DAYTIME NOISE LEVELS FROM DEMOLITION AND CONSTRUCTION FOR PROPOSED IRVING STREET ARRIVAL, RAB, AND INITIAL ALDEA HOUSING DENSIFICATION PROJECTS

Representative Receptor	Existing Daytime Noise Level (dBA, Leq)[a]	Loudest Two Noise Sources	Reference Noise Level (dBA)[a]	Distance to Receptor[b] (feet)	Usage Factor	Adjusted L_{eq} Level (dBA)[c]	Exceed 90 dBA daytime standard?	Existing + Construction Noise Resultant Noise Level (dBA)[d]
Initial Phase Project: Initial Aldea Housing Densification Demolition								
90 Behr Avenue		Backhoe	78	70	40%	71	No	NA
90 Behr Avenue		Excavator	81	70	40%	74	No	NA
90 Behr Avenue	49	Combined Total	NA	70	NA	76	No	76
Initial Phase Project: Initial Aldea Housing Densification Building Construction								
90 Behr Avenue		Excavator	81	70	40%	74	No	NA
90 Behr Avenue		Crane	81	70	40%	70	No	NA
90 Behr Avenue	49	Combined Total	NA	70	NA	75	No	75

NOTES:
[a] L_{max} at 50-feet
[b] Distance between approximate location of equipment and property line of receptor.
[c] The L_{eq} level is adjusted for distance and percentage of usage.
[d] Logarithmic sum of existing noise level and construction equipment contribution is the resultant noise level.

Haul trucks to remove demolition debris and excavated materials at the site of the RAB project would use Parnassus Avenue. Grading and site preparation activity at the RAB site would generate approximately three peak haul trucks per hour over several months. These trips would contribute 52 dBA to hourly average noise levels, where, as discussed in the *Environmental Setting*, existing daytime noise levels were monitored to be 58 dBA on Parnassus Avenue. These haul truck trips would result in a temporary 1 dBA increase to the existing hourly average noise levels along Parnassus Avenue, which would be a less than significant roadway noise increase for receptors along this street.

Haul trucks to remove demolition and grading materials from the Aldea Housing complex would temporarily increase noise levels along Clarendon Avenue, which would be used as a haul route for this Initial Phase project. Grading and site preparation activity at Aldea Housing complex would generate approximately nine peak haul trucks per hour over a two-week period. While each truck pass-by event would be noticeable to existing sensitive receptors along the truck haul route, these trips would contribute 58 dBA to hourly average noise levels, where existing daytime noise levels were monitored to be 60 dBA. Addition of this contribution of truck noise to existing levels would be less than a 3 dBA increase to existing levels and would be less than significant. As explained under the CPHP analysis, CPHP Mitigation Measure TRANS-5: Construction Coordination and Monitoring Measures would implement a Construction Traffic Control Plan that would serve to reduce truck noise from back-up alarms, including for the Initial Phase projects.

Given the relatively short duration of demolition and grading activity for the Irving Street Arrival, RAB and initial Aldea Housing Densification, and the modest contribution to existing roadway noise, and with implementation of CPHP Mitigation Measure TRANS-5: Construction Coordination and Monitoring Measures, noise from haul and construction truck operations would be less than significant.

As described in Chapter 3, Project Description, potential on-site CPHP construction materials/construction worker staging areas would include: 1) the existing parking lot area located south of UC Hall; 2) the Surge parking lot, and/or 3) the top level of the Medical Building 1 parking lot. Staging areas would primarily generate noise at the beginning and end of work shifts, when equipment is activated or shut down for a given workday, and by trucks delivering and removing materials. Operation of loaders and forklifts may also occur in staging areas. The existing parking lot area located south of UC Hall is located over 250 feet from the nearest receptors across Parnassus Avenue and the lot is substantially shielded by existing structures. Given this shielding, and that demolition of UC Hall and construction of the RAB would be occurring adjacently, operations at this potential staging area are not expected to generate a substantial noise contribution.

The potential staging at the Surge parking lot would be located as close as 20 feet from the nearest off-site receptors (on Edgewood Avenue) and potential staging at the Medical Building 1 parking lot would be within 100 feet from the nearest off-site receptors (e.g., on Irving Street, Arguello Boulevard, Cole Street and Hillway Avenue). Staging operations at the Medical Building 1 parking lot are not expected to generate a substantial noise contribution given that demolition and construction of the new Irving Street Arrival would be occurring adjacently. However, the Surge parking lot would likely be used for staging for the Aldea Housing Densification project and the New Hospital. Equipment operations and delivery trucks at this staging area and along Medical Center Way would be a new source of noise to the residences on Edgewood Avenue, which would be a potentially significant impact. **CPHP Mitigation Measure NOI- 1a: Construction Noise Control Measures** would require shielding of the staging area where adjacent sensitive receptors have direct line-of-sight with loading and delivery activities. Depending on the materials used, such shielding can provide anywhere from 5 to 15 dBA of noise reduction.

Irving Street Arrival

Mitigation: Implement Mitigation Measure NOI-1b.

Significance after Mitigation: Less than Significant with Mitigation. Construction equipment would be consistent with San Francisco Police Code 2909 standard, would be below the 90 dBA criteria of the FTA and, as demonstrated in Table 4.11-6, would result in an increase in noise level of less than 10 dBA over existing levels. Implementation of CPHP Mitigation Measure NOI-1b would ensure that nighttime noise impacts from construction activities would be avoided.

Research and Academic Building

Mitigation: Implement CPHP Mitigation Measures NOI-1a, NOI-1b, NOI-1c and CPHP Mitigation Measure TRANS-5: Construction Coordination and Monitoring Measures.

Significance after Mitigation: Significant and Unavoidable. Implementation of CPHP Mitigation Measure NOI-1a-c would reduce the severity of noise generated by demolition and construction activities and reduce the potential annoyance to nearby sensitive receptors to the extent feasible. Implementation of CPHP Mitigation Measures NOI-1a through -1b would reduce noise levels associated with demolition and construction activities by 5 to 10 dBA, and implementation of CPHP Mitigation Measure NOI-1c would reduce noise levels by 17 dBA. However, because it would still be likely that during peak demolition activities, noise levels in excess of 10 dBA over ambient may still occur at some sensitive receptors on or near the Parnassus Heights campus site after mitigation, the RAB construction noise impact would be significant and unavoidable with mitigation.

Initial Aldea Housing Densification Project

Mitigation: Implement CPHP Mitigation Measures NOI-1a, NOI-1b, NOI-1c and CPHP Mitigation Measure TRANS-5: Construction Coordination and Monitoring Measures.

Significance after Mitigation: Significant and Unavoidable. Implementation of CPHP Mitigation Measure NOI-1a-c would reduce the severity of noise generated by demolition and construction activities and reduce the potential annoyance to nearby sensitive receptors to the extent feasible. Implementation of CPHP Mitigation Measure NOI-1a through -1b would reduce noise levels associated with demolition and construction activities by 5 to 10 dBA, and implementation of CPHP Mitigation Measure NOI-1c would reduce noise levels by 17 dBA. Shielding of staging areas adjacent to receptors can provide 5 to 15 dBA of noise reduction. However, because it would still be likely that during peak demolition and construction activities, noise levels in excess of 10 dBA over ambient may still occur at sensitive receptors on or near the Aldea housing complex after mitigation, the construction noise impact associated with the Initial Aldea Housing Densification project would be significant and unavoidable with mitigation.

Initial Phase Improvements

Mitigation: Implement Mitigation Measure NOI-1b.

Significance after Mitigation: Less than Significant with Mitigation. Construction equipment would be consistent with San Francisco Police Code 2909 standard and would be below the 90 dBA criteria of the FTA. Implementation of CPHP Mitigation Measure NOI-1b would ensure that nighttime noise impacts from construction activities would be avoided.

Potential Health Effects of Significant CPHP Construction Noise Impacts

As discussed above, daytime construction noise levels from simultaneous operation of multiple pieces of equipment could result in occasional noise levels of up to 76 dBA, L_{eq} at the nearby receptors over several months of activity. Because construction would be restricted by CPHP Mitigation Measure NOI-1b to only occur during daytime hours, health effects associated with the potential for nighttime awakenings would be avoided.

Short-term noise levels constituting the threshold of pain and hearing damage are 120 dB and 140 dB, respectively (Kinsler, 1982). Table 4.11-5 shows average daytime construction noise levels at each of the studied receptors. The Occupational Safety and Health Administration require hearing conservation plans when noise levels continuously exceed 85 dBA over an 8-hour period, which is also above the predicted noise levels at the nearest receptors. Construction equipment would comply with the City's Noise Ordinance restriction (noise level of 80 dBA or less at a distance of 100 feet), and the resultant predicted noise levels at the nearest receptors would be below this level. Therefore, project construction noise would not result in adverse health effects related to pain, the onset of hearing loss or other significant health effects.

Impact NOI-2: Implementation of the CPHP would generate substantial permanent increases in ambient noise levels in the vicinity of the project in excess of standards established in the local general plan or noise ordinance, or applicable standards of other agencies. (Less than Significant with Mitigation)

CPHP

Stationary Noise Sources

Operation of Parnassus Heights campus site development under the CPHP would increase ambient noise levels in the immediate campus site vicinity primarily through the operation of new building stationary equipment, such as HVAC systems, and emergency generators that would be required by building code for high rise buildings in excess of 75 feet in height. The specific locations of such noise-generating equipment is not known for CPHP Future Phase projects given that the proposed new buildings have not yet been designed. Preliminary stacking diagrams for the New Hospital indicate that its mechanical rooms could be within two sub-grade basement levels, as well as on the 7th and 11th floors. Because equipment could be located within the building interior, noise emanation could be limited to the locations of exhaust and intake portals. Fixed mechanical equipment would be installed and operated to conform to the extent feasible with the requirements of the City of San Francisco noise ordinance. Additionally, new mechanical equipment installed at the campus site under the CPHP would effectively replace older and potentially noisier HVAC equipment currently existing at buildings that would be demolished and/or renovated.

Regular maintenance operation of emergency standby diesel generators would occur for approximately four hours per month (50 hours annually) for testing and such a short noise event would not substantially alter ambient noise levels. It should also be noted that operation of proposed generators during a power failure or other emergency would be exempt from the restrictions of the City's noise ordinance.

Without specific detail on the location and noise generating specifications and orientation of building stationary sources that would be developed under the CPHP, a potential significant impact may occur resulting in generation of noise levels exceeding the thresholds of the City of San Francisco noise ordinance, with which UCSF strives to be compliant. Therefore, impacts from increased permanent noise levels from stationary sources are conservatively identified as potentially significant and **CPHP Mitigation Measure NOI-2** is identified to reduce this impact to less than significant with mitigation.

Traffic Noise Increases on Medical Center Way, including from Trucks

As discussed in Chapter 3, *Project Description*, the CPHP proposes a service corridor that would extend from Medical Center Way to Koret Way and hence, to a proposed extension of Fourth Avenue on the west side of the campus site. The proposed service corridor would facilitate transport of goods and materials by freight vehicles for back-of-house functions that would otherwise take a longer route.

Notwithstanding the partial shielding provided by existing and proposed buildings at the campus site, and improvement in truck circulation provided by the proposed service corridor, there would be the potential for residences along Edgewood Avenue to be exposed to increased noise generation from increases in vehicle travel, including trucks, along the Medical Center Way.

Noise levels from traffic on Medical Center Way were calculated for the existing and with CPHP conditions. Noise levels were calculated using the DNL calculator developed by the federal Department of Housing and Urban Development. This model takes into account the increases in vehicle trips, including truck, and effect of roadway grade on the noise emissions from heavy trucks. Based on the estimated increase in traffic volumes on Medical Center Way as estimated by the transportation consultant, noise levels would increase from 58 DNL to 59 DNL at the nearest residential structures on Edgewood Avenue, approximately 180 feet away from the roadway. These predicted noise levels do not take into account any shielding that would be provided by local topography or on-campus buildings, and are therefore conservative. With the CPHP, traffic noise level increases along Medical Center Way would increase by 1 dBA, which would not be perceptible to the human ear. The increase would also be substantially less than the 8 dBA over existing ambient noise levels standard established by Section 2909 of the City's Police Code, and consequently, the noise increase from the increase in vehicle travel on Medical Center Way would be less than significant.

Ambulance Related Noise

Emergency vehicles currently access the Moffitt Hospital emergency room at the driveway at 505 Parnassus Avenue. Emergency vehicle sirens (associated with ambulances) are characteristic in the general vicinity of hospitals and can produce short-term noise up to 106 dB (CPMC, 2010), but normal practice is for ambulance drivers to turn off their sirens within a few blocks of the hospital emergency access. The proposed New Hospital would also contain emergency room facilities and accommodate emergency ambulance vehicles. The specific ambulance drop-off location and parking lot configuration is not yet known, however, it could be located along Medical Center Way. Similar to existing ambulance drop-off at Moffitt Hospital, it is expected that ambulances dropping off patients at the New Hospital would turn off the sirens within the vicinity of the hospital which would minimize noise effects on surrounding land uses.

With the exception of siren use, patient drop-off events associated with ambulances are assumed to generate noise levels similar to those that would occur from typical parking lot activities. Like typical parking lot activities, patient drop-off events are expected to generate noise from vehicle arrival, idling, occupants exiting the vehicle, door closures, conversations among passengers, occupants entering the vehicle, startup, and departure of the vehicle. Given that existing campus operations already involve ambulance drop-offs, and that the New Hospital would be assumed to only marginally increase the potential frequency of emergency vehicle visits, the operational impact of additional ambulance activities at the campus site associated with the New Hospital would be less than significant.

CPHP Mitigation Measure NOI-2: Operational Noise Control

For all development projects under the CPHP, mechanical equipment shall be selected and designed to meet the City's Police Code requirements of 8 dBA over existing ambient noise levels without the equipment operating as well as an interior noise standard at any sleeping or living room in any dwelling unit located on residential property of 45 dBA between 10:00 p.m. and 7:00 a.m., and 50 dBA between 7:00 a.m. and 10:00 p.m.

A qualified acoustical consultant shall be retained to review mechanical noise as these systems are selected to determine specific noise reduction measures necessary to reduce noise to comply with the City's Police Code. Noise reduction measures could include, but are not limited to, selection of equipment that emits low noise levels; installation of noise barriers such as enclosures and parapet walls to block the line of sight between the noise source and the nearest receptors; and siting the mechanical equipment, including intake and exhaust portals for fixed mechanical equipment, as far as possible from the nearby existing sensitive receptors (i.e., west side of building).

Irving Street Arrival, Research and Academic Building and Initial Aldea Housing Densification, and Initial Phase Improvements

The proposed Irving Street Arrival project includes modification of the portion of the existing Medical Building 1 that functions as a pedestrian entrance extending from Irving Street to Parnassus Avenue. There would be no stationary noise sources associated with the Irving Street Arrival project, and consequently, there would be no impact associated with permanent noise increases from stationary sources for this project.

The proposed RAB is conceptually designed and would be up to approximately 130 feet in height and would primarily contain research and education space. It would likely have both HVAC and fume hood air handling equipment, and a back-up diesel generator. Generator exhaust port would be located on the southeast corner of the RAB, approximately 260 feet from the nearest off-site receptors, across Parnassus Avenue. As indicated above, maintenance operation of building emergency standby diesel generators, including for the proposed RAB, would occur for approximately four hours per month for testing and such a short noise event would not substantially alter ambient noise levels. HVAC equipment would likely be mounted on the RAB rooftop and would be shielded from nearby receptors, across Parnassus Avenue with a barrier that extends 10 feet above the roofline. However, as discussed above, similar to other projects under the CPHP, without specific detail on the location and noise generating specifications and orientation of stationary sources, a potential significant impact may occur resulting in generation of noise levels exceeding the thresholds of the City of San Francisco noise Police Code, which UCSF strives to be compliant with. Therefore, impacts from increased permanent noise levels from stationary sources associated with the RAB are conservatively identified as potentially significant, and **CPHP Mitigation Measure NOI-2** is identified to reduce this impact to less than significant with mitigation for the RAB project.

For the initial Aldea Housing Densification, three existing 3-story 1960s-era housing structures would be replaced with three 8-story housing structures and one 5-story housing structure, each of which would include HVAC equipment. HVAC equipment for the new Aldea housing would likely be mounted on the rooftop, and would be shielded from surrounding receptors by a parapet and/or rooftop mechanical penthouses. Similar to other projects under the CPHP, in the absence of specific detail on the location and noise generating specifications and orientation of stationary sources, a potential significant impact may occur resulting in generation of noise levels exceeding the thresholds of the City of San Francisco noise ordinance, which UCSF strives to be compliant with. Therefore, impacts from increased permanent noise levels from stationary sources are conservatively identified as potentially significant and **CPHP Mitigation Measure NOI-2** is identified to reduce this impact to less than significant with mitigation for the initial Aldea Housing Densification project.

As described in Chapter 3, *Project Description*, Initial Phase improvements are also proposed that would also include various Initial Phase utility improvements, implementation of the Parnassus Avenue Streetscape Plan, renovation of certain existing buildings, and installation of miscellaneous community investments in the public realm. Once constructed, none of these Initial Phase improvements are expected to result in any notable permanent increases in operational noise.

Irving Street Arrival

Mitigation: None required.

Research and Academic Building

Mitigation: Implement CPHP Mitigation Measure NOI-2.

Significance after Mitigation: Less than Significant. Implementation of CPHP Mitigation Measure NOI-2 would ensure that stationary source equipment would operate within the restrictions of the City of San Francisco Police Code by establishing performance standards consistent with these Code requirements. Therefore, the operational noise impact of the RAB project would be less than significant.

Initial Aldea Housing Densification

Mitigation: Implement CPHP Mitigation Measure NOI-2.

Significance after Mitigation: Less than Significant. Implementation of CPHP Mitigation Measure NOI-2 would ensure that stationary source equipment would operate within the restrictions of the City of San Francisco Police Code by establishing performance standards consistent with these Code requirements. Therefore, the operational noise impact of the initial Aldea Housing Densification project would be less than significant.

Initial Phase Improvements

Mitigation: None required.

Impact NOI-3: Construction activities under the CPHP could result in generation of excessive groundborne vibration or groundborne noise levels. (Less than Significant with Mitigation)

CPHP

The types of construction and demolition-related activities associated with propagation of ground-borne vibration would primarily include the use of hoe-rams for demolishing large concrete structures and foundations, the use of vibratory rollers for compacting, and drilling for pile installation. As discussed above, no pile driving or blasting activities are proposed during construction of development under the CPHP. Rather, foundations would be installed using drilled piers; and excavation of soft rock would be conducted using hydraulic heavy excavators.

The Caltrans thresholds for potential architectural damage due to groundborne vibrations is 0.5 in/sec PPV for new residential structures and modern commercial buildings and 0.25 in/sec PPV for historic and older buildings.

The generalized development scheme of CPHP Future Phase projects does not lend itself to a direct assessment of specific activity and locations (e.g., piles insertion at specific insertion locations) for determining specific construction-generated vibration at sensitive land uses. However, a matrix of vibration from construction activities with distance is presented in **Table 4.11-7**. Shaded areas indicate distances where vibration levels would approach the criterion for historic and older structures. As can be seen from Table 4.11-7, use of a vibratory roller closer than 25 feet from a historic building could result in cosmetic damage. This would be a potential significant impact warranting the identification of mitigation measures.

TABLE 4.11-7
VIBRATION LEVELS FOR CONSTRUCTION ACTIVITY

Equipment	Estimated PPV (inches per second)				
	At 25 Feet (reference)	At 50 Feet	At 75 Feet	At 100 Feet	At 170 Feet
Jack Hammer	0.035	0.016	0.010	0.008	0.004
Loaded Trucks	0.076	0.035	0.023	0.017	0.009
Caisson Drilling	0.089	0.041	0.027	0.019	0.011
Large Bulldozer	0.089	0.041	0.027	0.019	0.011
Vibratory Roller	0.20	0.100	0.063	0.046	0.025

SOURCE: Federal Transit Administration, *Transit Noise and Vibration Impact Assessment*, 2018 and Caltrans, 2013b

The potential for human annoyance and sleep disturbance vibration effects are primarily a concern when substantial construction activities are proposed during the nighttime hours, which would not occur with implementation of CPHP Mitigation Measure NOI-1b: Construction Hours, above. Therefore, with mitigation, human annoyance impacts from vibration would be less than significant.

UCSF also operates vibration sensitive equipment in some of its existing buildings, such as MRI machines and electron microscopes. Demolition and construction activities in close proximity to such equipment could generate vibration levels of 65 VdB or greater that could affect these operations, depending on the degree of vibration isolation designed into their systems. Therefore, there is a potential for a significant impact to vibration-sensitive equipment and mitigation measure is identified to reduce such impacts to a less than significant level.

CPHP Mitigation Measure NOI-3a: Limited Use of Vibratory Rollers

UCSF shall require that contractors use (non- vibratory) excavator mounted compaction wheels mounted on an excavator or back-hoe and/or small, smooth drum rollers for final compaction of any asphalt base and asphalt concrete within 25 feet of a historic or older structure. If needed to meet compaction requirements, smaller, non-seated vibratory rollers shall be used to minimize vibration levels during repaving activities where needed to meet a vibration standard of 0.25 PPV at adjacent historic or older structures.

CPHP Mitigation Measure NOI-3b: Assessment and Relocation/Retrofitting of Vibration-Sensitive Equipment

UCSF shall evaluate the presence of vibration-sensitive equipment within 150 feet of construction and demolition areas. Any sensitive equipment shall be evaluated for the existing extent of vibration isolation and relocated or further embellish isolation, as warranted.

Significance after Mitigation: Less than Significant. CPHP Mitigation Measure NOI-3a would reduce vibration levels by replacing vibration intensive equipment when compaction is required adjacent to historic or older structures. CPHP Mitigation Measure NOI-3b would require identification and assessment of vibration-sensitive equipment so that it can be relocated or further isolated so as to eliminate the potential for significant vibration impacts. Consequently, potential vibration-related impacts for CPHP development projects would be less than significant.

Irving Street Arrival, RAB, and Initial Aldea Housing Densification Projects, and Initial Phase Improvements

The proposal for the Irving Street Arrival includes modification of the portion of the existing Medical Building 1 which would be modified or demolished in order to develop a new and/or reconfigured multi-story vertical circulation space. The Irving Street Arrival project would also include replacing the facades or reskinning of the Millberry Union and Medical Building 1 garage structures. The Milberry Union building is a historic structure, as identified in Section 4.4, *Cultural Resources and Tribal Cultural Resources*, however, the adjacent Millberry Union parking structure is not currently historic. All other adjacent structures are of modern construction and would not be exposed to vibration levels exceeding 0.5 PPV. Therefore, vibration impacts of the Irving Street Arrival project from construction activities would be less than significant.

Construction of the RAB project would necessitate demolition of UC Hall and School of Nursing building. The Clinical Sciences building, which is located adjacent to UC Hall and the School of Nursing building, is a historic structure as identified in Section 4.4. Use of a vibratory roller within 25 feet of this structure could result in building damage. Therefore, CPHP Mitigation Measure NOI-3a identified above should be implemented during construction of the RAB project. In addition, CPHP Mitigation Measure NOI-3b would ensure protection of any vibration-sensitive equipment within 150 feet of construction and demolition areas. With implementation of this mitigation, potential impacts of the RAB project from construction vibration would be less than significant.

The initial Aldea Housing Densification project would require demolition of historic structures at 165 and 175 Johnstone Avenue, and 105 Behr Avenue. The other remaining nearby Aldea housing structures have not been evaluated for historic significance, but are sufficiently distant (60 feet or more) from Initial Phase demolition and construction as to be beyond the potential for vibration impacts. Therefore, impacts of the Initial Aldea Housing Densification project from construction vibration would be less than significant.

Proposed Initial Phase improvements would also generate incremental construction-related vibration depending on the timing of implementation, but are not expected to substantially generate vibration levels beyond those conservatively estimated above for the Initial Phase projects.

The potential for human annoyance and sleep disturbance vibration effects are primarily a concern when substantial construction activities are proposed during the nighttime hours, which would not occur with implementation of CPHP Mitigation Measure NOI-1b: Construction Hours, above. Therefore, with mitigation, human annoyance impacts from vibration would be less than significant.

Irving Street Arrival

Mitigation: None required.

Research and Academic Building

Mitigation: Implement CPHP Mitigation Measure NOI-3a and NOI-3b. CPHP Mitigation Measure NOI-3a would reduce vibration levels by replacing vibration intensive equipment when compaction is required adjacent to the Clinical Sciences building. CPHP Mitigation Measure NOI-3b would ensure protection of any vibration-sensitive equipment within 150 feet of construction and demolition areas.

Significance after Mitigation: Less than Significant.

Initial Aldea Housing Densification

Mitigation: None required.

Initial Phase Improvements

Mitigation: None required.

Impact NOI-4: Implementation of the CPHP would not exceed an LRDP EIR operational standard of significance by contributing to an increase in average daily noise levels (L_{dn}) of 3 dB(A) or more at property lines, where ambient noise levels already exceed local noise levels set forth in local general plans or ordinances for such areas based on their use. (Less than Significant)

Operation of development proposed under the CPHP would be considered to generate a significant impact if it resulted in a permanent increase in ambient noise levels greater than 3 dBA above levels existing without the project for areas already impacted by noise. Noise levels were determined for this analysis using the FHWA Traffic Noise Prediction Model and the turning movements provided in the CPHP traffic study for the Existing, Existing plus CPHP, and Cumulative plus CPHP conditions. Peak hour intersection turning data from the traffic study were analyzed to evaluate traffic increases and resulting traffic-generated noise increases on roadway segments most affected by CPHP-related traffic. The roadway segments analyzed and the modeled noise levels are presented in **Table 4.11-8**.

As shown in Table 4.11-8, the increase in peak hour traffic noise in the vicinity of the Parnassus Heights campus site from the Existing Plus CPHP traffic scenario compared to the Existing traffic scenario would be less than 3 dBA on all roadway segments. This is also true when the Cumulative plus CPHP condition is compared to existing conditions. Overall, traffic noise increases associated with the CPHP along all analyzed roadway segments in the vicinity of the Parnassus Heights campus site would be less than 3 dBA and the impact related to traffic noise would be less than significant.

Mitigation: None required.

TABLE 4.11-8
PEAK-HOUR TRAFFIC NOISE LEVELS IN THE VICINITY OF THE PARNASSUS HEIGHTS CAMPUS SITE (dBA)

Roadway Segment[a,b]	(A) Existing	(B) Existing Plus CPHP	(B-A) Difference between Existing Plus CPHP and Existing[c]	(D) Cumulative Plus CPHP (2050)	(D-A) Difference between Cumulative Plus CPHP and Existing
Kirkham Street between 5th Avenue and 7th Avenue	58.8	60.5	1.7	61.5	2.7
5th Avenue between Kirkham and Judah Streets	58.1	58.7	0.6	59.3	1.2
7th Avenue between Kirkham and Judah Streets	63.5	64.9	1.4	65.1	1.6
Judah Avenue between 5th Avenue and 7th Avenue	63.3	65.2	1.9	65.5	2.2
Parnassus Avenue between 3rd Avenue and 5th Avenue	64.6	66.3	1.7	66.6	2.0
Parnassus Avenue between 3rd Avenue and Hillway Avenue	64.4	66.6	2.2	66.8	2.4
Parnassus Avenue between Hillway Avenue and Stanyan Street	63.1	64.8	1.7	65.2	2.1
Stanyan Street between Parnassus Avenue and Frederick Street	63.5	64.9	1.4	65.0	1.5
Carl Street between Arguello Boulevard and Stanyan Street	60.1	61.1	1.0	61.7	1.6
Irving Street between Arguello Boulevard and 4th Avenue	60.9	62.7	1.8	63.3	2.4
Lincoln Way between Arguello Boulevard and 4th Avenue	73.3	73.7	0.4	73.9	0.6
Clarendon Avenue between Johnstone Drive and Laguna Honda Boulevard	64.7	65.1	0.4	65.3	0.6

NOTES:
[a] Road center to receptor distance is 15 meters (approximately 50 feet) for all roadway segments. Noise levels were determined using algorithms of the FHWA Traffic Noise Prediction Model.
[b] The analysis considered the vehicle mix based on – cars 95 percent, medium trucks three percent, and heavy trucks two percent on Parnassus Avenue, Irving Avenue, and Lincoln Way based on observed city and para-transit bus activity. Traffic speeds for all vehicle classes were set at 25 mph for all vehicle classes, except for Lincoln Way and Clarendon Avenue which are 35 mph.

SOURCE: ESA, 2019.

Irving Street Arrival, RAB, and Initial Aldea Housing Densification Projects, and Initial Phase Improvements

Operational traffic generated individually by the Irving Street Arrival, RAB, and Initial Aldea Housing Densification projects, and Initial Phase improvements would be a subset of that traffic generated by the CPHP. As a result, traffic-associated noise for each of these projects would be a subset of the traffic-generated noise of the CPHP as analyzed above, and would similarly be less than significant.

Mitigation: None required.

Cumulative Impacts

Impact C-NOI-1: Implementation of the CPHP, combined with cumulative construction noise in the project area, would generate a substantial temporary increase in ambient noise levels from construction activity in the vicinity of the project in excess of standards established in the local general plan or noise ordinance, or applicable standards of other agencies. (Significant and Unavoidable with Mitigation)

The geographic scope of analysis for cumulative construction noise and vibration impacts encompasses sensitive receptors within approximately 600 feet of the construction project site.[6] Beyond 600 feet, the contributions of noise from other projects would be greatly attenuated through both distance and intervening structures and their contribution would be expected to be minimal. Section 4.0 *Introduction to Environmental Analysis*, presents the list of reasonably foreseeable future projects in the vicinity that could contribute to cumulative construction noise impacts.

There is one reasonably foreseeable off-site cumulative construction project in the campus site vicinity: the seismic retrofit of 350 Parnassus Avenue which would occur at approximately the same time as the Irving Street Arrival construction in 2022. Additionally, cumulative construction noise would be associated with the proposed Initial Phase projects and other UCSF projects within the campus site that were previously approved under the 2014 LRDP. Most notably, the demolition of the LPPI building, which would be necessary to accommodate development of the New Hospital, would occur in 2022. The only notable contemporaneous CPHP construction project during 2022 would be the proposed Irving Street Arrival which would undergo construction work during the same year. As discussed above in Impact NOI-1, individually, the demolition and construction of the Irving Street Arrival would result in a less than significant impact. Demolition activities of the LPPI and the Irving Street Arrival would occur within approximately 200 feet of each other on either side of Parnassus Avenue. Receptors potentially affected by both projects' demolition and construction activities would be the existing residences on Irving Street between Arguello Boulevard and 2nd Avenue, as well as patients of Long and Moffitt Hospitals. Irving Street receptors would be 450 feet away and shielded from demolition activities of the LPPI by the intervening Medical Building 1, an 8-story structure, which would provide sufficient attenuation to reduce the cumulative contribution of LPPI demolition noise to a less than significant level. However, Moffitt Hospital is adjacent to the LPPI and approximately 160 feet from the Irving Street Arrival where noise levels of 78 dBA would be expected at a distance of 100 feet from the LPPI demolition alone. As stated in the analysis of Impact NOI-1, construction noise associated with the Irving Street Arrival would be approximately 8 dBA over the existing noise levels at the nearest sensitive receptor which would be a less than significant construction noise impact for the construction year of 2022. However, the addition of demolition activities of the LPPI as well as the potential simultaneous seismic retrofit work at 350 Parnassus

6 This screening threshold distance was developed based on stationary source noise attenuation equations (Caltrans, 2013a) and the combined noise level generated by typical construction phases for a given project (assuming multiple pieces of equipment) at a distance of 50 feet. Using the attenuation equations, the maximum noise level of 89 A-weighted decibels (dBA) for both excavation and finishing would diminish to below 70 dBA (speech interference) at 600 feet.

A receptor experiencing noise levels of 89 dBA from two adjacent construction sites would experience a cumulative noise level of 91 dBA (the acoustical sum of 89 dBA plus 89 dBA), which would still be below 70 dBA at 600 feet which, hence, is used as the geographic scope for approaching a significant impact.

Avenue would likely result in times when the combination of demolition and construction noise would exceed 10 dBA over existing ambient levels even after implementation of identified Mitigation Measures. Therefore, implementation of **CPHP Mitigation Measure NOI-1a** and **1b** would be required to reduce noise levels associated with demolition and construction activities. Implementation of **CPHP Mitigation Measure TRANS-5** would further serve to reduce cumulative construction traffic noise.

Mitigation: Implement CPHP Mitigation Measures NOI-1a, NOI-1b and CPHP Mitigation Measure TRANS-5: Construction Coordination and Monitoring Measures.

Significance after Mitigation: Significant and Unavoidable with Mitigation. CPHP mitigation measures would reduce the severity of noise generated by demolition and construction activities and reduce the potential annoyance to nearby sensitive receptors to the extent feasible. Implementation of CPHP Mitigation Measures NOI-1a and 1b would reduce noise levels associated with demolition and construction activities by 5 to 10 dBA. However, because it would still be likely that during peak demolition activities, noise levels in excess of 10 dBA over ambient may still occur at some sensitive receptors on or near the Parnassus Heights campus site after mitigation, the cumulative construction noise impact would be significant and unavoidable with mitigation.

Impact C-NOI-2: Implementation of the CPHP, combined with cumulative development in the project area, would generate substantial permanent increases in ambient noise levels in the vicinity of the project in excess of standards established in the local general plan or noise ordinance, or applicable standards of other agencies. (Less than Significant with Mitigation)

As discussed above, there are no reasonably foreseeable off-site cumulative projects within the geographic scope of the CPHP projects, including CPHP Initial Phase projects, and consequently, cumulative operational noise would be limited to other UCSF projects within the campus site that were previously approved under the 2014 LRDP. However, these on-campus cumulative projects are generally demolition projects addressed above in Impact C-NOI-1 or renovation projects that would not result in new stationary noise sources. Consequently, cumulative stationary source operational impacts of the CPHP would be the same as those analyzed above in CPHP Impact NOI-2, and would be less than significant with implementation of **CPHP Mitigation Measure NOI-2**.

Mitigation: Implement CPHP Mitigation Measure NOI-2.

Significance after Mitigation: Less than Significant.

Impact C-NOI-3: Implementation of the CPHP, combined with cumulative construction in the project area, would result in generation of excessive groundborne vibration or groundborne noise levels. (Less than Significant with Mitigation)

As indicated above, cumulative construction vibration would be limited to other UCSF construction projects within the campus site that were previously approved under the 2014 LRDP. Demolition projects authorized under the 2014 LRDP with the potential to generate vibration include the LPPI, Koret Vision Center, Proctor Building, and the EHS and Annex buildings. As with demolition that would occur under the CPHP, none of the demolition of projects authorized under the 2014 LRDP would be conducted during nighttime hours and would, therefore, not result in human annoyance impacts from vibration or sleep disturbance.

Structural impacts to buildings adjacent to the proposed demolition sites, which may be a concern individually, are not a concern in the cumulative scenario because the LRDP demolition projects are of sufficient distant from one another to cumulatively combine to result in structural damage impacts not already considered above in CPHP Impact NOI-3 or in the 2014 LRDP FEIR.

Consequently, cumulative vibration impacts of the CPHP would be the similar to those analyzed above in CPHP Impact NOI-3, and would be less than significant with implementation of **CPHP Mitigation Measure NOI-3a**.

> **Mitigation:** Implement CPHP Mitigation Measure NOI-3a.
>
> **Significance after Mitigation:** Less than Significant.

Impact C-NOI-4: Implementation of the CPHP combined with cumulative development in the project area could exceed an LRDP EIR operational standard of significance by contributing to an increase in average daily noise levels (L_{dn}) of 3 dB(A) or more at property lines, if ambient noise levels in areas adjacent to proposed development already exceed local noise levels set forth in local general plans or ordinances for such areas based on their use. (Less than Significant)

As shown in Table 4.11-8, the increase in peak hour traffic noise in the vicinity of the Parnassus Heights campus site from the Existing Plus Cumulative CPHP traffic scenario compared to the Existing traffic scenario would be less than 3 dBA on all roadway segments. Overall, traffic noise increases associated with the CPHP and cumulative development along all analyzed roadway segments in the vicinity of the Parnassus Heights campus site would be less than 3 dBA and the cumulative impact related to traffic noise would be less than significant.

> **Mitigation:** None required.

4.11.4 References

Alameda County Community Development Agency (ACCDA), 2010. *Oakland International Airport, Airport Land Use Compatibility Plan*, December, 2010.

California Department of Transportation (Caltrans), 2009. *Technical Noise Supplement*, November 2009. Available at: http://www.dot.ca.gov/hq/env/noise/pub/tens_complete2009RedlineScreenProcess.pdf. November. Accessed December, 2019.

Caltrans. 2013. Transportation and Construction Vibration Guidance Manual. September.

Caltrans, 2013a. *Technical Noise Supplement to the Traffic Noise Analysis Protocol*, September 2013.

California Pacific Medical Center (CPMC), 2010. *Draft Environmental Impact Report for the CPMC Long Range Development Plan*, Vol.3 p. 4.6-70. July 2010.

City and County of San Francisco (CCSF), 1996 The of the *San Francisco General Plan* Environmental Protection Element Land Use Compatibility Guidelines for Community Noise.

Federal Highway Administration (FHWA), 2006. *Roadway Construction Noise Model User Guide*, 2006.

Federal Transit Administration, 2018. Transit Noise and Vibration Impact Assessment.

Illingworth & Rodkin, 2018, Community Noise Survey for *UCSF Mount Sutro Open Space Reserve Vegetation Management Plan, Final EIR*, March 2018.

Kinsler, Lawrence E., Frey, A.R., Coppens, A.B., and Sanders, J.V., 1982. *Fundamentals of Acoustics*, Third Edition.

U.S. Environmental Protection Agency (U.S. EPA), 1974. Information on Levels of Environmental Noise Requisite to Protect Public Health and Welfare with an Adequate Margin of Safety, March 1974, Available at: https://nepis.epa.gov/Exe/ZyPDF.cgi/2000L3LN.PDF?Dockey=2000L3LN.PDF. Accessed December, 2019.

World Health Organization, 1999. Guidelines for Community Noise, Geneva. Available at: http://www.euro.who.int/en/health-topics/environment-and-health/noise/environmental-noise-guidelines-for-the-european-region. Accessed December, 2019.

San Francisco International Airport (SFO), 2015. *2019 Noise Exposure Map*, August 13, 2015, https://media.flysfo.com/media/sfo/noise-abatement/sfo_p150_2019-nem-36x24-plot-signed_ada.pdf, accessed December, 2019.

United States Department of Housing and Urban Development (HUD), 1985. *The Noise Guidebook.*

4.12 Population and Housing

This section assesses the potential for construction and operation of campus development under the Comprehensive Parnassus Heights Plan (CPHP or Plan), including the three Initial Phase projects and Initial Phase improvements, to result in significant impacts on population and housing. The section includes a description of the existing environmental setting as it relates to population and housing, and also provides a regulatory framework that discusses applicable state and local regulations. The section presents the significance criteria used to evaluate impacts on population and housing, and the results of the impact assessment, including any significant impacts and associated mitigation measures.

4.12.1 Environmental Setting

The City and County of San Francisco is the primary study area that would be affected directly by CPHP-related population and housing effects as well as by employment effects that could in turn result in demand for additional housing. However, effects may extend beyond San Francisco to neighboring counties in the Bay Area. The 2018 UCSF Transportation Commute Survey indicated that approximately 60 percent of UCSF students and employees commute from places within San Francisco, and therefore likely reside in San Francisco. Besides San Francisco, employee commuters largely travel from four other counties to UCSF campus sites: Alameda, Contra Costa, Marin, and San Mateo. Therefore, the study area for population and housing impacts includes San Francisco and the four surrounding counties. Population, housing and employment information on San Francisco and the four counties is presented below.

Study Area Population

In 2018, there were about 881,000 people living in San Francisco, an increase of approximately 9.4 percent, or about approximately 75,700 residents, since 2010. In addition, there were also approximately 363,100 households in San Francisco in 2018, an increase of approximately 5.1 percent, or about 17,290 households, since 2010. This rate of population and household growth is slightly higher than the rate of population and household growth in the five-county study area over the same period of time. In 2018, the population in the five-county study area was approximately 4.72 million, an increase of approximately 8.9 percent, or about 385,500 residents, since 2010. In addition, in 2018 there were also approximately 1.69 million households in the five-county study area, an increase of approximately 3.8 percent, or about 61,800 households, since 2010. However, the average household size in San Francisco in 2018 was slightly lower than the five-county study area with the average household size in San Francisco at 2.36 persons per household and the average household size in the five-county study area at 2.69 persons per household (DOF, 2019).

Study Area Housing

In 2018, there were approximately 397,100 housing units in San Francisco, an increase of approximately 5.5 percent, or 20,900 units, since 2010 (DOF, 2019). During the period from 2013 to 2017, San Francisco had an estimated homeowner vacancy rate of 0.8 percent and rental vacancy rate of 2.7 percent (U.S. Census, 2017). In comparison, the five-county study area contained approximately 1.80 million housing units in 2018, an increase of approximately 3.6 percent, or 63,300 units, since 2010. The average vacancy rate across the study area in 2018 was noticeably higher at 6.4 percent (DOF, 2019).

Study Area Employment

In 2018, approximately 718,700 people worked in San Francisco, an increase of 22 percent, or about 185,400 jobs, since 2010 (EDD, 2019a).[1] This estimate measures workers by place of work and includes full-time and part-time wage and salary employment; it does not include self-employed people, unpaid family workers, or private household employees (EDD, 2019b). In comparison the rate of job growth in the five-county study area was lower. In 2018, approximately 2.1 million people were employed in the study area, an increase of 15 percent, or about 307,700 jobs, since 2010.

Regional Projections

The Association of Bay Area Governments (ABAG) is the regional planning agency for the nine Bay Area counties and provides projections of future Bay Area population, housing, and employment. **Table 4.12-1** shows ABAG's current forecast for San Francisco and the four other counties that a majority of UCSF employees live in, which was prepared in 2017 for *Plan Bay Area*. The forecasts show that of the five counties, San Francisco will have the highest growth in population, households and jobs over the 2010–2040 planning period. The City's population is expected to increase by approximately 360,300 new residents between 2010 and 2040, which would represent a 45 percent increase over the City's 2010 population levels. Over the same 30-year period, the five-county region's population is expected to increase by 34 percent, or by nearly 1.50 million new residents. Household growth is expected to be slightly below population growth, with the number of households in San Francisco increasing by 40 percent between 2010 and 2040 and households in the five-county region increasing by 30 percent.

The rate of future job growth in San Francisco is expected to be similar to the rate of population growth. Between 2010 and 2040, San Francisco is expected to add about 294,700 new jobs, which would represent a 51 percent increase over its 2010 employment levels. Over the same 30-year period, the five-county region's employment is expected to increase by 39 percent, or by about 822,300 new jobs.

1 These estimates of employment by place of work count part-time and full-time jobs equally. People who hold more than one job may be counted more than once.

TABLE 4.12-1
PLAN BAY AREA FORECAST OF POPULATION, HOUSEHOLDS, AND EMPLOYMENT FOR SAN FRANCISCO AND THE FIVE COUNTY STUDY AREA (2010-2040)

Factor	2010	2040	2010 to 2040	
			Increase	Percent
Population				
San Francisco	809,145	1,169,485	360,340	45%
Alameda	1,515,230	2,092,370	577,140	38%
Contra Costa	1,051,830	1,387,295	335,465	32%
Marin	252,920	282,670	29,750	12%
San Mateo	721,195	916,590	195,395	27%
Five-County Region	4,350,320	5,848,410	1,498,090	34%
Households				
San Francisco	345,810	483,695	137,885	40%
Alameda	545,140	734,210	189,070	35%
Contra Costa	375,365	475,390	100,025	27%
Marin	103,210	111,585	8,375	8%
San Mateo	257,835	317,965	60,130	23%
Five-County Region	1,627,360	2,093,965	466,605	29%
Employment				
San Francisco	576,850	872,510	295,660	51%
Alameda	705,865	953,190	247,325	35%
Contra Costa	360,080	498,165	138,085	38%
Marin	121,730	134,915	13,185	11%
San Mateo	343,380	472,340	128,960	38%
Five-County Region	2,108,565	2,930,840	822,275	39%

NOTE: Numbers may not sum due to rounding

SOURCE: MTC and ABAG, Plan Bay Area: Projections 2040, November 2018.

4.12.2 Regulatory Framework

This section discusses University, State, and regional regulations pertaining to population, housing and employment. There are no federal laws and regulations related to population, housing or employment that are relevant to the proposed CPHP. One State law, SB 375, related to housing is relevant and is summarized below, along with University plans and policies that relate to population and housing. *Plan Bay Area 2040* which was prepared in response to SB 375 is also summarized below, as well as the Bay Area's Regional Housing Needs Allocation.

University of California

UCSF 2014 LRDP

The UCSF 2014 LRDP identified campus-wide objectives and objectives specific to the Parnassus Heights campus site. The following UCSF 2014 LRDP campus-wide and Parnassus Heights campus site objectives relate to population and housing:

Campus-Wide Objectives

2. Accommodate UCSF's Growth Through 2035

A. Meet physical needs for growth in research, clinical, and instructional programs at appropriate locations.

B. Address the need for campus housing for students, postdoctoral scholars, house staff and junior and incoming faculty at main campus sites by constructing an adequate number of new units while taking into account financial feasibility and physical site constraints.

C. Provide additional amenities such as retail, permanent child care facilities, recreation and fitness facilities, improved outdoor areas, and other support services to the extent feasible, to enhance the quality of campus life and the public realm.

Campus Site-Specific Objectives

1. Parnassus Heights

D. Provide additional campus housing and improve campus life amenities including outdoor space.

E. Strive to better achieve the remaining unfulfilled components of the 1976 Regents' Resolution by reducing space, minimizing population growth, and improving transportation-related programs.

The UCSF 2014 LRDP also included *Community Planning Principles*, which were produced in collaboration with the UCSF Community Advisory Group:

Community Planning Principles

Housing

H1. Make a positive contribution to San Francisco's affordable housing stock by directly providing housing and by using financial and technical resources to assist with the development of increased housing opportunities for UCSF students, staff, and faculty in order to relieve housing demand in the local community.

H2. Ensure that UCSF development will seek to avoid adversely affecting the availability and affordability of housing. Address the need for student and junior faculty housing by making additions to the existing housing stock, while respecting existing neighborhood character.

H3. Avoid displacement of existing residential units or individuals who could be displaced by converting housing to other uses. Continue the UCSF practice of not acquiring existing residential property for nonresidential use.

H4. Should UCSF lease or purchase existing residential property for residential use and displacement occurs, assist in securing suitable and equivalent replacement housing for existing residents or tenants prior to displacement – in the same neighborhood, if possible.

State

Senate Bill 375

Senate Bill 375 was enacted to encourage regions like the Bay Area to develop solutions to the challenge of growing congestion, which has disproportionately affected lower-income residents and burdened them with hours-long commutes on crowded roads, buses or trains. This bill requires regions to prepare a Sustainable Communities Strategy (or Alternative Planning Strategy) to reduce greenhouse gas emissions by linking growth to transit, resulting in a different distribution of jobs and housing growth than under pre-strategy projections.

Regional

Plan Bay Area 2040

Plan Bay Area 2040 was developed to comply with Senate Bill 375. This plan serves as the Bay Area's Sustainable Communities Strategy and was prepared by ABAG and the Metropolitan Transportation Commission (MTC). The *Draft Plan Bay Area 2040* was published in 2013, and the final was published in July 2017. *Plan Bay Area 2040* provides an update to the region's long-range transportation plan and sustainable communities strategy; it projects household and employment growth in the Bay Area through 2040, provides a roadmap for accommodating expected growth, and connects it all to a transportation investment strategy that strives to move the Bay Area toward key regional goals for the environment, economy, and social equity. *Plan Bay Area 2040* is advisory; adherence by each jurisdiction is not compulsory.

ABAG and MTC are currently preparing Plan Bay Area 2050, focusing on the economy, environment, housing and transportation. It is expected that Plan Bay Area 2050 will be completed in mid-2021 (MTC, 2019).

Regional Housing Need Planning for the San Francisco Bay Area: 2014-2022

The Regional Housing Need Allocation (RHNA) is the state-mandated process under the State Housing Law to identify the total number of housing units (by affordability level) that each jurisdiction must accommodate. As part of this process, the California Department of Housing and Community Development (HCD) identifies the total housing need for the San Francisco Bay Area for an eight-year period (in the current cycle, from 2015 to 2023). ABAG must then develop a methodology to distribute this need to local governments in a manner that is consistent with the development pattern included in the Sustainable Communities Strategy (SCS).[2] Once a local government has received its final allocation, it must revise its general plan housing element to accommodate its portion of the region's housing need.

The housing allocation is expressed not only as an overall housing production target to alleviate tight housing market conditions and reduce long-distance commuting, but also, as separate targets for production of housing affordable to various household income categories. Based on this two-fold expression, San Francisco's share of the regional housing need for 2014 through 2022

2 The SCS is a newly required element of the Regional Transportation Plan (RTP), integrating land use and transportation strategies to achieve California Air Resources Board (CARB) emissions reduction targets.

is approximately 28,900 new units, with approximately 57 percent of the target to provide affordable housing to households making what is considered *above moderate*, or more than 120 percent of the area median income or less (CCSF, 2015).[3] This represents a little over 15 percent of the regional total from 2014 to 2022 and amounts to a total citywide housing production goal of affordable and market rate units of about 3,600 units per year. San Francisco's share of the RHNA is incorporated into the City's 2014 Housing Element of its General Plan (adopted in April 2015). As required by State law, the City's Housing Element discusses the City's fair share allocation of regional housing needs by income as projected by the ABAG. Cities in the four study area counties have also prepared updated General Plan Housing Elements in response to the latest RHNA for the Bay Area.

4.12.3 Impacts and Mitigation Measures

Significance Criteria

Would implementation of the CPHP, including the three Initial Phase projects and Initial Phase improvements:

a) Induce substantial unplanned 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)?

b) Displace substantial numbers of existing people or housing, necessitating the construction of replacement housing elsewhere?

c) Exceed the LRDP EIR standard of significance by creating a demand for housing outside the market area where the facilities or site are located?

Criteria a) and c) are addressed in Impact POP-1 as they address overlapping issues, and criteria b) is addressed in Impact POP-2, in the Impact Analysis, below.

Approach to Analysis

The analysis estimates the increase in campus population and related housing needs that would result from implementation of the CPHP. To evaluate the relative magnitude of the increases in population and housing needs resulting from implementation of the Plan, the analysis compares these estimates with growth estimates developed for both the City and the entire five-county study area. "Substantial unplanned population growth" resulting from implementation of the CPHP is defined as an increase in population or employment that is inconsistent with growth anticipated in adopted planning documents.

[3] Income levels are broken into four categories: very low income is 50 percent or less of area median income, low income is 51 to 80 percent of area median income, moderate income is 81 to 120 percent of area median income, and above moderate is more than 120 percent of area median income.

Approach to Analysis of Initial Phase Projects, including New Hospital, and Initial Phase Improvements

This EIR includes project-level analysis for certain Initial Phase projects anticipated to be completed by about the year 2030; specifically, the Irving Street Arrival, Research and Academic Building (RAB), and initial Aldea Housing Densification; and Initial Phase improvements, as described below. The New Hospital is also an Initial Phase project anticipated to be completed by about the year 2030, but is analyzed at a program level in this EIR within the context of the overall CPHP, and will be analyzed at a project level in a subsequent EIR when more details are available.

Impact Analysis

Impact POP-1: Implementation of the CPHP would induce population growth in the San Francisco Bay area, which could create demand for housing outside the market area. (Less than Significant)

CPHP

The proposed CPHP would result in population growth on the Parnassus Heights campus site through increased employment, patients, and visitors. The proposed CPHP would accommodate an increase in the campus site's average daily (daytime) population from approximately 17,440 under existing conditions to about 23,230 by the year 2030 and roughly 25,290 by the year 2050 (see **Table 4.12-2**).

TABLE 4.12-2
PARNASSUS HEIGHTS CAMPUS SITE: EXISTING AND PROJECTED AVERAGE DAILY POPULATION (DAYTIME)

	Existing (2018) Population	Projected Population at 2030	Projected Population at 2050	Growth between Existing (2018) and 2030	Growth between Existing (2018) and 2050
Students	3,683	4,187	4,187	504	504
Faculty and Staff	7,395	10,992	12,075	3,597	4,680
Subtotal	*11,078*	*15,179*	*16,262*	*4,101*	*5,184*
Patients	2,984	3,275	3,810	291	826
Visitors	3,375	4,771	5,221	1,396	1,846
Subtotal	*6,359*	*8,046*	*9,031*	*1,687*	*2,672*
Total	**17,437**	**23,225**	**25,293**	**5,788**	**7,856**

SOURCE: UCSF, 2019

Because patients and visitors would use the campus site for short periods and would already be living in the area, they are not considered in the population increase that would result from CPHP implementation. Therefore, when focusing on increases in students, faculty and staff, the CPHP would result in a population increase of approximately 4,100 by 2030 and about 5,180 by 2050. In addition, while the proposed CPHP has a horizon year of 2050, growth projections provided by ABAG are only available to 2040, so as a conservative approach, this analysis assumes the full CPHP population increase expected by 2050 would occur in 2040.

As indicated in the *Environmental Setting*, according to the *Plan Bay Area 2040*, approximately 576,850 people worked in San Francisco in 2010. Between 2010 and 2040, San Francisco is expected to add about 295,700 new jobs, which would represent a 51 percent increase over its 2010 employment levels or an annual job growth rate of about 1.7 percent. Employment growth at the Parnassus Heights campus site was included in the 2014 LRDP and is potentially accounted for in the employment projections for San Francisco included in the *Plan Bay Area 2040*. However, if conservatively it is assumed that all new jobs under the CPHP are not included in the projections and would be incremental, the addition of about 5,180 jobs over a period of 30 years or about 173 new jobs per year would not substantially increase the employment levels in San Francisco above those projected by ABAG. The amount of employment growth at the Parnassus Heights campus site under the proposed CPHP would not add significantly to the amount of employment forecast for San Francisco during this period.

Conservatively assuming that all new students and employees at the Parnassus Heights campus site under the proposed CPHP would be new to San Francisco and the region, the increase in students and employment would result in an increase in the residential population of San Francisco and other communities in the four study area counties. Assuming that future students and employees would make the same residential location decisions as current UCSF students and employees, approximately 60 percent of new students and employees would live in San Francisco. There would also be additional population living in those UCSF employee and student households. Assuming only one UCSF employee/student per household and based on 2.36 persons per household for San Francisco, the total population in San Francisco associated with UCSF growth under the proposed CPHP would be approximately 5,800 by 2030 and about 7,330 by 2050. Between 2010 and 2040, San Francisco is expected to add about 360,340 new residents, which would represent a 45 percent increase over its 2010 population levels. The share of the City's 2040 population growth associated with the population growth under the proposed CPHP by 2030 would be approximately 1.6 percent and by 2050 about two percent.

Alternatively, conservatively assuming that all future students and employees would live in San Francisco, the total population in the City associated with UCSF growth under the proposed CPHP would be approximately 9,680 by 2030 and about 12,220 by 2050. The share of the City's 2040 population growth associated with the population growth under the proposed CPHP by 2030 would be approximately 2.7 percent and by 2050 about 3.4 percent.

The market area for housing for UCSF employees is the five-county study area discussed in the *Environmental Setting* (i.e., San Francisco, Alameda, Contra Costa, Marin, and San Mateo Counties). Generally, the housing demand associated with employment growth under the proposed CPHP would be satisfied by the housing that could be added in San Francisco and in other parts of the region. Between 2010 and 2040, San Francisco is expected to add about 137,900 new households, which would represent a 40 percent increase over its 2010 household levels. Assuming the current pattern of residential location preferences, the housing demand in San Francisco associated with UCSF student and employment growth under the CPHP by 2030 would represent approximately 1.8 percent of the projected household growth, and by 2050 would represent about 2.3 percent of the projected household growth — shares that would not be anticipated to trigger shifts of demand to other parts of the study area or beyond the regional housing market area.

Further, again conservatively assuming that all future students and employees would live in San Francisco, housing demand in the City associated with UCSF student and employment growth under the CPHP by 2030 would represent approximately three percent of the projected household growth, and by 2050 would represent about 3.8 percent of the projected household growth.

UCSF currently has 222 housing units on the Parnassus Heights campus site (see **Table 4.12-3**). Under the CPHP, housing on the campus site would increase to a total of 364 housing units by 2030, and to a total of 984 units by 2050. Development of additional residential units on the Parnassus Heights campus sites would allow UCSF to provide more on-campus housing to students, postdoctoral scholars, clinical residents, and faculty near their classrooms and workplaces, thereby reducing demand for off-campus housing in San Francisco and the Bay Area. It would also promote sustainability objectives of the 2014 LRDP by reducing the amount of private vehicle and UCSF shuttle traffic between these and other campus sites. Additional UCSF housing would also serve to improve the University's jobs-housing balance and support the City's housing goals.

TABLE 4.12-3
PARNASSUS HEIGHTS CAMPUS SITE: EXISTING AND PROJECTED HOUSING UNDER CPHP

	Existing (2018) Units	(2030) Total Housing Units after CPHP Initial Phase	(2050) Total Housing Units after CPHP Future Phase
Aldea	172	314	504
Avenue Houses	32	32	32
Irving Street Housing	18	18	18
West Side Housing	--	--	430
Total	**222**	**364**	**984**

SOURCE: UCSF, 2020

Implementation of the proposed CPHP would induce population growth in the Bay Area, but the population growth would not be substantial in comparison to the growth that is projected and planned for San Francisco and the four study area counties in *Plan Bay Area 2040* and the local General Plans for the study area communities. Further, the population growth would not result in a demand for new housing that would exceed the capacity of the five-county market area. The CPHP's impact related to population and housing would be less than significant.

Mitigation: None required.

Irving Street Arrival

The Irving Street Arrival project is intended to better facilitate entry onto the campus from Irving Street. The Irving Street Arrival project would support the movement of the new population associated with the proposed CPHP through campus, however, no population is directly associated with this project. As a result, the Irving Street Arrival project would not induce population growth in the San Francisco Bay area, and no population and housing impact would occur.

Mitigation: None required.

Research and Academic Building

As discussed above, while implementation of the proposed CPHP would induce population growth in the Bay Area, it would not induce population growth that is substantial compared to the study area growth projections and to the extent that demand for new housing would exceed the capacity of the market area. The Research and Academic Building (RAB) would provide academic and research space for approximately 939 faculty and staff. As this population sub-set is accounted for in the total population growth that would occur under the proposed CPHP, the RAB also would not induce population growth to the extent that demand for new housing would exceed the capacity of the market area, and this impact is considered less than significant.

Mitigation: None required.

Initial Aldea Housing Densification

The initial densification of the Aldea Housing complex would remove three existing 3-story housing structures containing 42 units, and construct three 8-story housing structures and one 5-story housing structure that would contain 184 units, increasing the number of dwelling units by 142 units. These units would be reserved for existing and future students, faculty and staff on the campus site and would not be available to the public. As a result, unlike a residential project open to the public that could attract population from outside the City or five-county study area, the initial Aldea Housing Densification project would serve some of the increase in campus population associated with the proposed CPHP described above. For this reason, the initial densification project would not induce population growth in and of itself, and this impact is considered less than significant.

Mitigation: None required.

Initial Phase Improvements

As described in Chapter 3, *Project Description*, the Initial Phase improvements would include various Initial Phase utility improvements, implementation of the Parnassus Avenue Streetscape Plan, renovation of certain existing buildings, and installation of miscellaneous community investments in the public realm. The Initial Phase improvements would serve in part to help accommodate the population growth anticipated under the CPHP, however, no population is directly associated with these improvements. As a result, the Initial Phase improvements would not induce population growth in the San Francisco Bay area, and no population and housing impact would occur.

Mitigation: None required.

Impact POP-2: Implementation of the CPHP would not displace substantial numbers of existing people or housing, necessitating the construction of replacement housing elsewhere. (Less than Significant)

CPHP

Implementation of the proposed CPHP would result in the addition of 762 new on-campus housing units: 332 net new housing units as part of Aldea Housing complex reconstruction and 430 new housing units as part of the West Side Housing project. In order to construct the new units in the Aldea Housing complex, all 12 existing Aldea Housing buildings containing 172 units, would be demolished in order to make way for the new 12 buildings that would provide for a total of 504 units. The new Aldea Housing development would be phased over time to minimize displacement of on-campus housing residents and the amount of disruption caused by construction activities. Specifically, the Initial Phase would remove three 3-story housing structures, which provide 42 units, and replace them with three 8-story housing structures and one 5-story housing structure, which would provide 184 units (a net increase of 142 units). The Future Phase would remove the remaining nine 3-story structures, which provide 130 units, and replace them with eight 5-story structures, which would provide 320 units (a net increase of 190 units). The West Side Housing project would not require the demolition of any existing residential units.

Only the residents of the first three buildings demolished during the initial Aldea Housing Densification project would be temporarily displaced. In total, approximately 42 households, or about 100 residents, would be temporarily displaced. UCSF recently opened the Tidelands residential complex (595 units) south of the Mission Bay campus site in the City's Dogpatch Neighborhood. In addition, UCSF may lease housing units owned by UC Hastings College of the Law. Residents temporarily displaced during the initial phase of the Aldea Housing Densification project could be housed in these units or other available campus housing. Prior to implementing the project, UCSF would develop a plan to ensure that displaced residents receive housing accommodations. Furthermore, in addition to 42 households temporarily displaced, the four structures constructed during the initial Aldea Housing Densification would also provide enough units to accommodate the residents that would be temporarily displaced due to the demolition of the remaining nine structures within the Aldea Housing complex that would occur under the Future Phase of the Aldea Housing Densification project. Residents in the remaining structures could be transitioned to the four structures constructed during the initial Aldea Housing Densification phase, or to other available campus housing, prior to the construction of the Future Phase Aldea Housing Densification phase. As a result, the Future Phase Aldea Housing Densification would not result in a temporary displacement of residents off the campus site.

Given the size of the population to be displaced during the initial Aldea Housing Densification project, that the displacement would be temporary, and that other housing provided by UCSF exists, implementation of the CPHP would not displace substantial numbers of existing people or housing, necessitating the construction of replacement housing elsewhere, and this impact is considered less than significant.

Mitigation: None required.

Irving Street Arrival

No existing housing units would be affected by the proposed Irving Street Arrival project. As a result, implementation of the Irving Street Arrival project would not displace substantial numbers of existing residents or housing, necessitating the construction of replacement housing elsewhere. No displacement impact would occur.

Mitigation: None required.

Research and Academic Building

The RAB project would be constructed on the site of the existing UC Hall building; no housing units are located within the structure. As a result, implementation of the RAB project would not displace substantial numbers of existing residents or housing, necessitating the construction of replacement housing elsewhere. No displacement impact would occur.

Mitigation: None required.

Initial Aldea Housing Densification

As discussed above, the initial phase of the Aldea Housing Densification project would result in the temporary displacement of 42 households, or about 100 residents. These residents would have the option to move back to the Aldea Housing complex when the initial phase is complete. Given the size of the population to be displaced and that the displacement would be temporary, implementation of the initial phase of the Aldea Housing Densification project would not displace substantial numbers of existing people or housing, necessitating the construction of replacement housing elsewhere, and this impact is considered less than significant.

Mitigation: None required.

Initial Phase Improvements

The Initial Phase improvements would not displace existing people or housing, necessitating the construction of replacement housing elsewhere. Accordingly, there would be no impact.

Mitigation: None required.

Cumulative Impacts

Impact C-POP-1: The CPHP, in combination with past, present, and reasonably foreseeable future projects, would not result in a cumulatively considerable contribution to significant cumulative population and housing impacts. (Less than Significant)

Development of cumulative projects in the City and the remaining four counties could result in substantial unplanned population growth in San Francisco and the Bay Area, thus resulting in a potentially significant cumulative impact with respect to population and housing. The proposed CPHP would accommodate an increase in students and employees at the Parnassus Heights campus site from approximately 11,100 in 2018 to about 16,300 by 2050, an increase of approximately 5,200 students and employees. Population and housing estimates discussed above in Table 4.12-1 were based on *Plan Bay Area* forecasts through the year 2040, which includes all planned and approved cumulative development and associated population and housing information. As stated above under Impact POP-1, development under the proposed CPHP would contribute approximately 2.3 to 3.8 percent to projected citywide household growth by 2040, and about two percent to projected citywide employment growth by 2040. In addition, some of the additional population associated with the proposed CPHP would be housed in the approximately 762 new units planned under the proposed CPHP on the Parnassus Heights campus site, thereby reducing demand for off-campus housing in San Francisco and the Bay Area. Although implementation of the proposed CPHP would induce population growth in the Bay Area, the contribution made by the proposed CPHP would not be cumulatively considerable and the impact would be less than significant.

Mitigation: None required.

4.12.4 References

California Department of Finance (DOF), 2019. Report E-5: Population and Housing Estimates for Cities, Counties, and the State, January 1, 2011-2019, with 2010 Benchmark. May 1, 2019.

California Employment Development Department (EDD), 2019a. Employment by Industry Data. Available at: https://www.labormarketinfo.edd.ca.gov/data/employment-by-industry.html. Accessed November 15, 2019.

EDD, 2019b. LMI Frequently Asked Questions. Accessed at: *http://www.labormarketinfo.edd.ca.gov/FAQs/FAQs_DD.html*. Accessed on October 18, 2019.

City and County of San Francisco (CCSF), 2015. General Plan Housing Element. Adopted April 27, 2015.

Metropolitan Transportation Commission (MTC) and Association of Bay Area Governments (ABAG), 2018. *Plan Bay Area: Projections 2040*. November 2018.

MTC and ABAG, 2019. *What is Plan Bay Area 2050?* Available at: https://www.planbayarea.org/2050-plan/plan-bay-area-2050.

U.S. Census Bureau, 2018. 2013-2017 American Community Survey 5-Year Estimates: Selected Housing Characteristics, San Francisco County, California. December 6, 2018.

This page intentionally left blank

4.13 Public Services

This section assesses the potential for construction and operation of campus development under the Comprehensive Parnassus Heights Plan (CPHP or Plan), including the three Initial Phase projects and Initial Phase improvements, to result in significant impacts on public services, including police protection, fire protection, and public schools. The section includes a description of the existing environmental setting as it relates to public services, provides a regulatory framework that discusses applicable state and local regulations, identifies criteria used to determine impact significance, and discusses potential impacts, and regulatory mechanisms and/or feasible mitigation measures, as necessary, to reduce significant impacts. Please refer to Section 4.14, *Recreation*, for a discussion of CPHP effects on local and regional parks.

4.13.1 Environmental Setting

Fire Services

UCSF does not have its own fire department. The San Francisco Fire Department (SFFD), headquartered at 698 Second Street, provides fire protection and emergency services to the City of San Francisco, as well as to all UCSF facilities within the City. SFFD serves an estimated 1.5 million people within the 49 square miles of the city. Emergency medical transportation to San Francisco hospitals is provided by a dynamically deployed fleet of both public and private ambulance services.

Fire suppression companies are organized into two divisions, which are further divided into nine battalions, located throughout the City. As of 2019, the SFFD consists of 1,780 firefighting and emergency medical field personnel and resources, including 43 Engine companies, 19 Truck companies, a dynamically deployed fleet of Ambulances, two Heavy Rescue Squad units, two Fireboats, and multiple special purpose units. (SFFD, 2019a; SFFD, 2019b).

The San Francisco Public Utilities Commission (SFPUC)-City Distribution Division operates and maintains an Auxiliary Water Supply System (AWSS) used for fire protection use only. This high pressure water supply system is distinct and separate from the City's domestic water and fire hydrant system. The AWSS consists of 135-mile pipeline network, a high elevation reservoir, two large capacity tanks, and two seawater pumping stations (SFPUC, 2019).

The nearest fire station to the Parnassus Heights campus site is Station No. 12, located at 1145 Stanyan Street, about 0.5 mile east of the campus core. Station No. 12 responds to all calls for fire protection service on the campus site. Other fire stations in proximity to the Parnassus Heights campus site include Station 20 at 285 Olympia Way (0.4 miles south of the Aldea Housing complex, and 1.5 miles south of the campus core); Station 22 at 1290 16th Avenue (1.0 mile west of the campus core); and Station 24 at 100 Hoffman Avenue (2.0 miles from the campus site).

Table 4.13-1 provides a summary of the staffing and equipment at each of the stations near the Parnassus Heights campus site.

TABLE 4.13-1
SUMMARY OF EXISTING SFFD STAFFING AND EQUIPMENT IN CAMPUS SITE AREA

SFFD Fire Station	Staffing per Shift	Fire Engines/ Trucks
No. 12: Stanyan St./Grattan St.	9	E12 T12
No. 20: Olympia Way/Clarendon Ave.	5	E20 Mobile Air 1
No. 22: 16th Ave./Irving St.	4	E22
No. 24: Hoffman Ave./Alvarado St.	4	E24

NOTE: E = Engine Company; T = Truck Company

SOURCE: San Francisco Fire Department, 2019a

Table 4.13-2 summarizes SFFD total responses at the four designated response stations in the year from August 2017 to August 2018.

TABLE 4.13-2
SUMMARY OF SFFD RESPONSES FOR FIRE STATIONS IN CAMPUS SITE AREA (AUGUST 2017 TO AUGUST 2018)

SFFD Fire Station No.	Fire Responses	Medical Responses	Total Responses
12	1,493	1,286	2,779
20	206	309	515
22	476	1,018	1,494
24	387	383	770

SOURCE: San Francisco Fire Department, 2019a.

Fire Support Standards

Emergency calls for fire and medical services at UCSF campus sites are routed to the SFFD for dispatching. Response times generally reflect the seriousness of the call. As of 2019, the SFFD has a response time goal for the first arriving unit of 5:00 minutes, while actual response times averaged 3:20 minutes (SFFD, 2019a).

Police Services

University of California, San Francisco Police Department

The University of California, San Francisco Police Department (UCPD) provides police protection services for University of California properties and facilities that comprise UCSF, including the Parnassus Heights campus site. The UCPD is responsible for approximately 60,000 patients, visitors, students, faculty, staff and affiliates. Headquartered at 654 Minnesota Street, the UCPD employs approximately 130 authorized staff. The UCPD also operates a patrol station at the Parnassus Heights campus site. The UCPD is comprised of the Field Services

Division, which provides police and investigative services; the Security Services Division; the Professional Standards Division; and the Homeland Security Emergency Management Division (UCPD, 2019).

As of 2016, the service ratio of police personnel to UCSF population is 1.93 sworn police officers per 1,000 persons (UCPD, 2019). Police officers patrol by car, bicycle and on foot to maintain high-profile, proactive and preventive public safety services (UCPD, 2016). In 2016, UCSF police responded to over 45,000 calls for service and processed 410 arrests. In addition, uniformed officers conducted 930 Community Orientated Policing and Problem Solving (COPPS) activities, along with approximately 4,500 directed foot patrols on campus properties (UCPD, 2016).

San Francisco Police Department

The San Francisco Police Department (SFPD) is responsible for police protection services in the City. The UCPD has a mutual-aid agreement with the SFPD to provide cooperative assistance within a 1-mile radius of each UCSF campus site. A memorandum of understanding between the UCPD and the SFPD establishes that UCPD has exclusive jurisdiction over police service on UCSF properties. Depending on the nature of the emergency, the UCPD may request assistance from the SFPD.

SFPD is comprised of six bureaus, including Field Operations, which includes Investigations and Patrol Divisions; Special Operations; Airport; Professional Standards and Principled Policing; Administration; and Chief of Staff. The Patrol Division is divided into the Metro Division and the Golden Gate Division, which oversee 10 separate districts. The Parnassus Heights campus site is located within the Park District of the Golden Gate Division, which is headquartered at 1899 Waller Street.

The SFPD is mandated by the City Charter to maintain a sworn staff of 1,971, excluding officers assigned to the San Francisco International Airport and officers not available for field duty (e.g., due to on-duty injuries, temporary modified duty, medical leave, and administrative leave). During 2017, the Department averaged 1,873 total full-duty sworn officers (SFPD, 2018).

Public Schools

San Francisco Unified School District

The San Francisco Unified School District (SFUSD) operates San Francisco’s public schools. During the 2018–2019 academic year, the SFUSD managed 115 schools (73 elementary schools, 16 middle schools, 18 high schools, six alternative schools, and two continuation schools), with a total enrollment of approximately 60,390 students (CDE, 2019) and a capacity to accommodate about 63,400 students (SFUSD, 2020a).

In general, student enrollment within the SFUSD has steadily decreased since the late 1990s. However, enrollment has begun to increase since reaching a low of approximately 55,100 during the 2007–2008 academic year (CDE, 2019). The SFUSD anticipates that elementary school, middle school and high school enrollment is anticipated to increase throughout its projection horizon of 2030; much of the increase is expected to result from new housing development in the City (SFUSD, 2020b).

Currently, any student in the City can choose to apply to any SFUSD school. However, the Aldea Housing complex and the site of the future West Side Housing complex are located within the attendance boundaries of Clarendon Alternative Elementary School (K-5), located at 500 Clarendon Avenue, which feeds into Presidio Middle School (6-8), located at 450 30th Avenue. All high schools within the SFUSD are open to any student, and thus do not have attendance boundaries. Finally, two of the Citywide elementary schools with specialized instruction are located near the Parnassus Heights campus site: (1) Alice Fong Yu Alternative School (grades K-8), located at 1541 12th Avenue, which is a Chinese immersion school; and (2) Rooftop Alternative School, located at 443 Burnett Avenue (grades PreK-4) and at 500 Corbett Avenue (grades 5-8), which is a school that emphasizes the arts.

The SFUSD will not enroll students beyond the capacity of each school. However, demand patterns for each school, which are different than capacity, do vary. For example, in March 2019, the Clarendon School received 1,324 enrollment requests for 42 available seats (SFUSD, 2020c).

4.13.2 Regulatory Framework

State

California Master Mutual Aid Agreement

The California Master Mutual Aid Agreement is a framework agreement between the State of California and local governments for aid and assistance by the interchange of services and facilities, including but not limited to fire, police, medical and health, communication, and transportation services and facilities to cope with the problems of rescue, relief, evacuation, rehabilitation, and reconstruction.

Fire Regulations

All projects undertaken at UCSF are subject to the approval of the State Fire Marshal and compliance with California Health and Safety Code Sections 13000 et seq. which sets forth State fire regulations concerning building standards (as set forth in Title 24 of the California Building Code), fire protection and notification systems, fire protection devices (such as fire extinguishers and smoke alarms), high-rise building and child care facility standards, and fire suppression training. California Fire Code Section 403.2 addresses public safety for both indoor and outdoor gatherings, including emergency vehicle ingress and egress, fire protection, emergency medical services, public assembly areas and the directing of both attendees and vehicles (including the parking of vehicles), vendor and food concession distribution, and the need for the presence of law enforcement and fire and emergency medical services personnel at the event. The Fire Marshal’s office has review and approval authority over all development proposals on the Parnassus Heights campus site.

Police Regulations

As noted above, the UCPD has a mutual-aid agreement with the SFPD to provide cooperative assistance within a 1-mile radius of each UCSF campus site. A memorandum of understanding between the UCPD and the SFPD establishes that UCPD has exclusive jurisdiction over police service on UCSF properties.

Projects implemented under the proposed CPHP would be required to comply with applicable rules of the California Office of Statewide Health Planning & Development (OSHPD) with respect to the incorporation of security features in standard building design plans.

Schools

The University is not subject to fee requirements such as those paid by developers pursuant to California Government Code Sections 53080, 65995, and 66001.

University of California

UCSF 2014 LRDP

The UCSF 2014 LRDP identified campus-wide objectives and objectives specific to the Parnassus Heights campus site. The following UCSF 2014 LRDP campus-wide objective relates to public services:

Campus-Wide Objectives

1. **Respond to City and Community Context**
   - A. Coordinate with City agencies in areas of mutual interest.
   - F. Consider neighborhood and city-wide impacts related to UCSF’s physical growth.

The UCSF 2014 LRDP also included *Community Planning Principles*, which were produced in collaboration with the UCSF Community Advisory Group:

Community Planning Principles

Amenities and Services/Public Safety

- A2. Support local efforts to increase fire and police protection, especially in neighborhoods with a high incidence of crime, and ensure that the campus safety officers are sensitive to the surrounding community.
- A3. Provide adequate security measures, including lighting, particularly in parking garages and exterior parking areas, to enhance a safe environment on all campus sites. These security methods should be designed in a manner that is sensitive to the surrounding community.

4.13.3 Impacts and Mitigation Measures

Significance Criteria

Would implementation of the CPHP, including the three Initial Phase projects and Initial Phase improvements:

a) Would the project result in substantial adverse physical impacts associated with the provision of new or physically altered governmental facilities, need for new or physically altered governmental facilities, the construction of which could cause significant environmental impacts, in order to maintain acceptable service ratios, response times or other performance objectives for any of the following public services:

   i. Fire protection?

   ii. Police protection?

   iii. Schools?

   iv. Parks?

   v. Other public facilities?

Criteria Not Analyzed

As stated in the Initial Study, there would no impact related to the following topic for the reasons described below:

- ***Physical impacts associated with the provision of new or physically altered police facilities, or other public facilities.*** The increase in daily population at the Parnassus Heights campus site under the CPHP will increase demand on UCPD services. It is UCPD's practice to review staffing levels and to provide necessary staffing to meet standard response times (less than 3 minutes for emergency/in-progress calls and less than 5 minutes for normal service calls). New staffing required to serve the increase in daily population as a result of the proposed CPHP would either be accommodated by existing facilities or within new facilities that are covered under the building space envelope being analyzed in the CPHP EIR. The UCPD also has a mutual-aid agreement with the SFPD to provide cooperative assistance within a 1-mile radius of the Parnassus Heights campus site. However, the SFPD is generally only called where an unusual need for assistance is identified. As a result, daily campus population growth under the proposed CPHP is not anticipated to substantially increase demand for SFPD services, such that new or altered police facilities could be required. For these reasons, impacts to police services would be less than significant, and this topic will not be evaluated further in this section. Similarly, campus development under the proposed CPHP would not affect any other public facilities (besides fire service and public schools, which are addressed below), and therefore, will not be evaluated further in this section.

Approach to Analysis

Implementation of the proposed CPHP, including the three Initial Phase projects and Initial Phase improvements, could have a significant impact if (1) it would require the construction of new or physically altered governmental facilities in order to maintain acceptable levels of public services, and (2) the construction or alteration of such facilities would result in one or more substantial adverse impacts on the environment.

In general, development that would occur on Parnassus Heights campus site under the proposed CPHP would increase demand for public services. While some impacts would result from on-campus activities, such as new buildings requiring additional fire coverage, other impacts would occur with the increase in population on the campus site and in surrounding communities.

Public service providers that would be affected by the changes in the proposed CPHP were consulted to determine if new facilities would need to be built, or existing facilities would need to be expanded, in order to maintain current levels of service, including response times, service ratios and other performance objectives. If new or altered public service facilities are determined to be required to serve new development on the Parnassus Heights campus site, then the analysis evaluates whether construction of such facilities would have a substantial adverse physical impact on the environment. For example, if the SFFD determined that a new fire station would be required to be constructed to maintain adequate service levels for fire protection, the impact analysis would evaluate whether construction or operation of the new fire station would have significant impacts on the physical environment.

For purposes of the impact analysis, it is assumed that all temporary and permanent improvements under the CPHP would be designed and constructed in compliance with all applicable building and fire codes, which include requirements for fire alarms, security systems, smoke detectors, sprinkler systems, fire extinguishers, and the number and location of exits.

Approach to Analysis of Initial Phase Projects, including New Hospital, and Initial Phase Improvements

This EIR includes project-level analysis for certain Initial Phase projects anticipated to be completed by about the year 2030; specifically, the Irving Street Arrival, Research and Academic Building (RAB), and initial Aldea Housing Densification; and Initial Phase improvements, as described below. The New Hospital is also an Initial Phase project anticipated to be completed by about the year 2030, but is analyzed at a program level in this EIR within the context of the overall CPHP, and will be analyzed at a project level in a subsequent EIR when more details are available.

Impact Analysis

Impact PUB-1: Implementation of the CPHP would not result in substantial adverse physical impacts associated with the provision of new or physically altered fire protection facilities, need for new or physically altered fire protection facilities, the construction of which could cause significant environmental impacts, in order to maintain acceptable service ratios, response times or other performance objectives. (Less than Significant)

CPHP

In 2018, the estimated population on the Parnassus Heights campus site, including faculty, staff, patients and visitors, was approximately 17,400. By 2050, the total population at the Parnassus Heights campus site is projected to reach approximately 24,900, an increase of nearly 7,500. The population growth that would occur under the proposed CPHP would result in an incremental increase in demand for fire protection services at the Parnassus Heights campus site.

The population increase associated with the proposed CPHP would be minimal in comparison to the population served by the existing fire stations near the Parnassus Heights campus site. The increase in calls for fire protection and medical emergency response would not be substantial in light of the existing demand and capacity for fire protection and emergency medical services in the City. The Parnassus Heights campus site is located in an urban area and would not extend demand of the SFFD beyond the current limits of its service area. The anticipated population increase associated with implementation of the proposed CPHP would neither adversely affect SFFD service standards nor require an increase in SFFD staff and/or equipment that would require the construction of new fire protection facilities (SFFD, 2019b).

Furthermore, development under the proposed CPHP would be designed to comply with building and fire codes and include appropriate fire safety measures and equipment, including but not limited to, use of fire retardant building materials, inclusion of emergency water infrastructure (e.g., fire hydrants and sprinkler systems), installation of smoke detectors and fire extinguishers, emergency response notification systems and provision of adequate emergency access ways for emergency vehicles.

As such, with implementation of the proposed CPHP, the existing fire stations in the vicinity of the Parnassus Heights campus site would be adequate to meet the increases in demand for fire protection and emergency medical response services associated with campus development under the proposed CPHP, and no additional new or physically altered facilities would be necessary. Therefore, implementation of the proposed CPHP would have a less than significant impact regarding the construction of new or physically altered fire protection facilities.

Mitigation: None required.

Irving Street Arrival

The Irving Street Arrival project would not substantially increase the amount of building space or increase population on the campus site. Regardless, this project would be designed and constructed to comply with building and fire codes and include appropriate fire safety measures and equipment. The project would not increase the demand for fire service such that new or altered fire protection facilities would be required. The effect would be less than significant.

Mitigation: None required.

Research and Academic Building

The proposed Research and Academic building (RAB) would be designed and constructed to comply with building and fire codes and include appropriate fire safety measures and equipment, including but not limited to, use of fire retardant building materials, inclusion of emergency water infrastructure (fire hydrants and sprinkler systems), installation of smoke detectors and fire extinguishers, emergency response notification systems and provision of adequate emergency access ways for emergency vehicles. While the project would increase the amount of building space and population on the campus site, for the same reasons set forth above for the CPHP as a whole, this project would not substantially increase the demand for fire services such that such that new or altered fire protection facilities would be required. The effect would be less than significant.

Mitigation: None required.

Initial Aldea Housing Densification

During the initial phase of Aldea Housing Densification project, three existing 3-story housing structures would be replaced with three 8-story housing structures, and one 5-story housing structure. This initial housing densification project would increase the residential population at the campus site. The project would be designed and constructed to comply with building and fire codes and include appropriate fire safety measures and equipment, including but not limited to, use of fire retardant building materials, inclusion of emergency water infrastructure (fire hydrants and sprinkler systems), installation of smoke detectors and fire extinguishers, emergency response notification systems and provision of adequate emergency access ways for emergency vehicles. While this project would increase the amount of building space and population on the campus site, for the same reasons set forth above for the CPHP as a whole, it would not substantially increase the demand for fire services such that such that new or altered fire protection facilities would be required. The effect would be less than significant.

Mitigation: None required.

Initial Phase Improvements

As described in Chapter 3, *Project Description*, the Initial Phase improvements would include various Initial Phase utility improvements, implementation of the Parnassus Avenue Streetscape Plan, renovation of certain existing buildings, and installation of miscellaneous community investments in the public realm. These improvements would be designed and constructed to comply with all applicable building and fire codes and include appropriate fire safety measures and equipment. These improvements would not increase the demand for fire services such that such that new or altered fire protection facilities would be required. The effect would be less than significant.

Mitigation: None required.

Impact PUB-2: Implementation of the CPHP would not result in substantial adverse physical impacts associated with the provision of new or physically altered public school facilities, need for new or physically altered public school facilities, the construction of which could cause significant environmental impacts, in order to maintain acceptable service ratios, response times or other performance objectives. (Less than Significant)

CPHP

The University sets an occupancy policy for all campus housing that serves as a restriction on the number of potential school age children that could live in UCSF facilities. There are currently 114 children living in student housing at the Parnassus Heights campus site. UCSF estimates that an additional approximately 67 children could potentially reside in housing on the Parnassus Heights campus site by 2030, and an additional 55 children by 2050, for a total estimated increase of 122 children living on the campus site under the CPHP. It is conservatively assumed for purposes of this analysis that this increase in children would all attend SFUSD schools.[1]

As discussed above, capacity does exist district wide to accommodate additional students with a surplus of approximately 3,010 seats. However, the district expects an increase of 5,000 students by 2030 (SFUSD, 2020b), which would exceed available capacity. The SFUSD has a number of options available to accommodate new students, including new school-age students generated by on-campus housing that is proposed under the CPHP. These options include building new schools (using 2016 Bond allocated funding for new construction in the Mission Bay and Bayview neighborhoods), increasing capacity at existing schools, and/or re-opening former school sites (SFUSD, 2020a). The construction of each new school would be addressed by project-specific CEQA review. Although the site of each new school is not known, it is expected that each school would be constructed on underutilized parcels of land given the City's urban environment. As a result, potential impacts associated with each new school are expected to be less than significant or if potentially significant, capable of being reduced to a less than significant level with mitigation. With regard to increasing capacity at existing schools and/or re-opening previously closed schools, these activities are not expected to result in significant environmental impacts as these school sites have been previously disturbed and are located in urban environments, and the construction activities of individual projects would be of limited duration. For these reasons, implementation of the CPHP would not result in substantial adverse physical impacts associated with the provision of new or physically altered public school facilities, and this impact is less than significant.

Mitigation: None required.

Irving Street Arrival

The Irving Street Arrival project mainly involves modifications to the existing Medical Building 1 in order to develop a new and/or reconfigured multi-story vertical circulation space between Medical Building 1 and Milberry Union. The project would not increase the residential population on the campus site, and therefore not result in new school-age children requiring school services. There would be no effect on schools.

Mitigation: None required.

1 As a comparison, if the increase in school age children was estimated using statewide student yield factors based on increases in housing (i.e., 0.5 students per dwelling unit for grades K through 6, and 0.2 students per dwelling unit for grades 7 through 12), then the increase in 742 housing units under the CPHP would yield a student increase of approximately 534 new students. However, the application of these student yield factors to the CPHP is not realistic as the potential residents in campus housing would be overwhelmingly graduate students with fewer children than the general population, and furthermore, a notable portion of the proposed dwelling units would be single-occupancy units.

Research and Academic Building

The proposed RAB would not increase the residential population on the campus site, and therefore not result in new school-age children requiring school services. There would be no effect on schools.

Mitigation: None required.

Initial Aldea Housing Densification

During the initial phase of housing densification on the Aldea Housing complex, three existing 3-story housing structures would be replaced with three 8-story housing structures and one 5-story housing structure. The increase in children associated with this initial phase (67) that would potentially reside in housing on the Parnassus Heights campus site are a subset of the overall increase in children living on the campus site under the CPHP. For the same reasons discussed above for the CPHP as a whole, the initial densification of Aldea housing would not result in substantial adverse physical impacts associated with the provision of new or physically altered public school facilities, and this impact is less than significant.

Mitigation: None required.

Initial Phase Improvements

The Initial Phase improvements would not increase the population on the campus site, and therefore not result in new school-age children requiring school services. There would be no effect on schools.

Mitigation: None required.

Cumulative Impacts

Impact C-PUB-1: The CPHP, in combination with past, present, and reasonably foreseeable future projects, would not result in substantial adverse physical impacts associated with the provision of new or physically altered public facilities, need for new or physically altered public facilities, the construction of which could cause significant environmental impacts, in order to maintain acceptable service ratios, response times or other performance objectives. (Less than Significant)

Development under the proposed CPHP, when combined with foreseeable growth in the vicinity of the Parnassus Heights campus site, would increase the demand for fire services, including personnel, equipment, and facilities, and schools. Any necessary fire facilities and/or school expansion would be addressed by project-specific CEQA review that would ensure impacts would be minimized to the extent feasible. As discussed above, the anticipated population increase associated with implementation of the proposed CPHP would neither adversely affect SFFD service standards nor require an increase in SFFD staff and/or equipment that would require the construction of new fire protection facilities. With respect to schools, as described above, the anticipated increase in students in the City, including the anticipated increase in students associated with implementation of the proposed CPHP, could result in the construction of new schools, and activities required to increase capacity at existing schools and/or re-open closed schools. However, the construction of new schools, and construction activities to increase capacity at existing schools and/or re-open old schools are not expected to result in significant environmental impacts as new school sites are likely to consist of underutilized parcels and existing school sites have been previously disturbed and are located in urban environments, and the construction activities would be of limited duration. For these reasons, the contribution of the proposed CPHP to impacts associated with the increase in demand for public services would not be cumulatively considerable and the impact would be less than significant.

Mitigation: None required.

4.13.4 References

California Department of Education (CDE), 2019. Educational Demographics Office. Available online at http://dq.cde.ca.gov/dataquest/. Accessed August 29, 2019.

San Francisco Fire Department (SFFD), 2019a. San Francisco Fire Department. Available at: http://www.sf-fire.org/index.aspx?page=164. Accessed on September 4, 2019a.

SFFD, 2019b. Personal communication with Lt. Jonathan Baxter, Community Affairs and Media Relations Officer, September 6.

San Francisco Police Department (SFPD), 2018. San Francisco Police Department Strategy 1.0, February 8, 2018.

San Francisco Public Utilities Commission, 2018/ *Emergency Firefighting Water System,* Available at: https://sfwater.org/index.aspx?page=467. Accessed November 26, 2019.

San Francisco Unified School District (SFUSD). 2020a, Personal communication with Karissa Yee Findley, Director of School Portfolio Planning, February 25, 2020a.

SFUSD, 2020b. *Demographic Analyses and Enrollment Forecasts San Francisco Unified School District,* prepared by Lapkoff & Gobalet Demographic Research, Inc. for SFUSD, January 2020.

SFUSD, 2020c. SFUSD's March 2019 Enrollment Highlights. Available at: https://public.tableau.com/profile/henry.o.connell7367#!/vizhome/SFUSDsMarch2019EnrollmentHighlights/SFUSDsMarch2019EnrollmentHighlights. Accessed March 20, 2020.

University of California, San Francisco, Police Department (UCPD), 2016. UC Police Department Reports Dashboard, Annual Report 2016.

UCPD, 2019. Police Department Annual Report and Crime Statistics, Program Highlights Available at: Accessed August 29, 2019.

4.14 Recreation

This section assesses the potential for construction and operation of campus development under the Comprehensive Parnassus Heights Plan (CPHP or Plan), including the three Initial Phase projects and Initial Phase improvements, to result in significant impacts on recreation. The section includes a description of the existing environmental setting as it relates to recreation and provides a regulatory framework that discusses applicable state and local regulations. This section presents the significance criteria used to evaluate recreation impacts, and the results of the impact assessment, including any significant impacts and associated mitigation measures.

4.14.1 Environmental Setting

Recreational facilities pertinent to this analysis include those owned by UCSF within the campus site, and other public recreational facilities in the vicinity of the Parnassus Heights campus site.

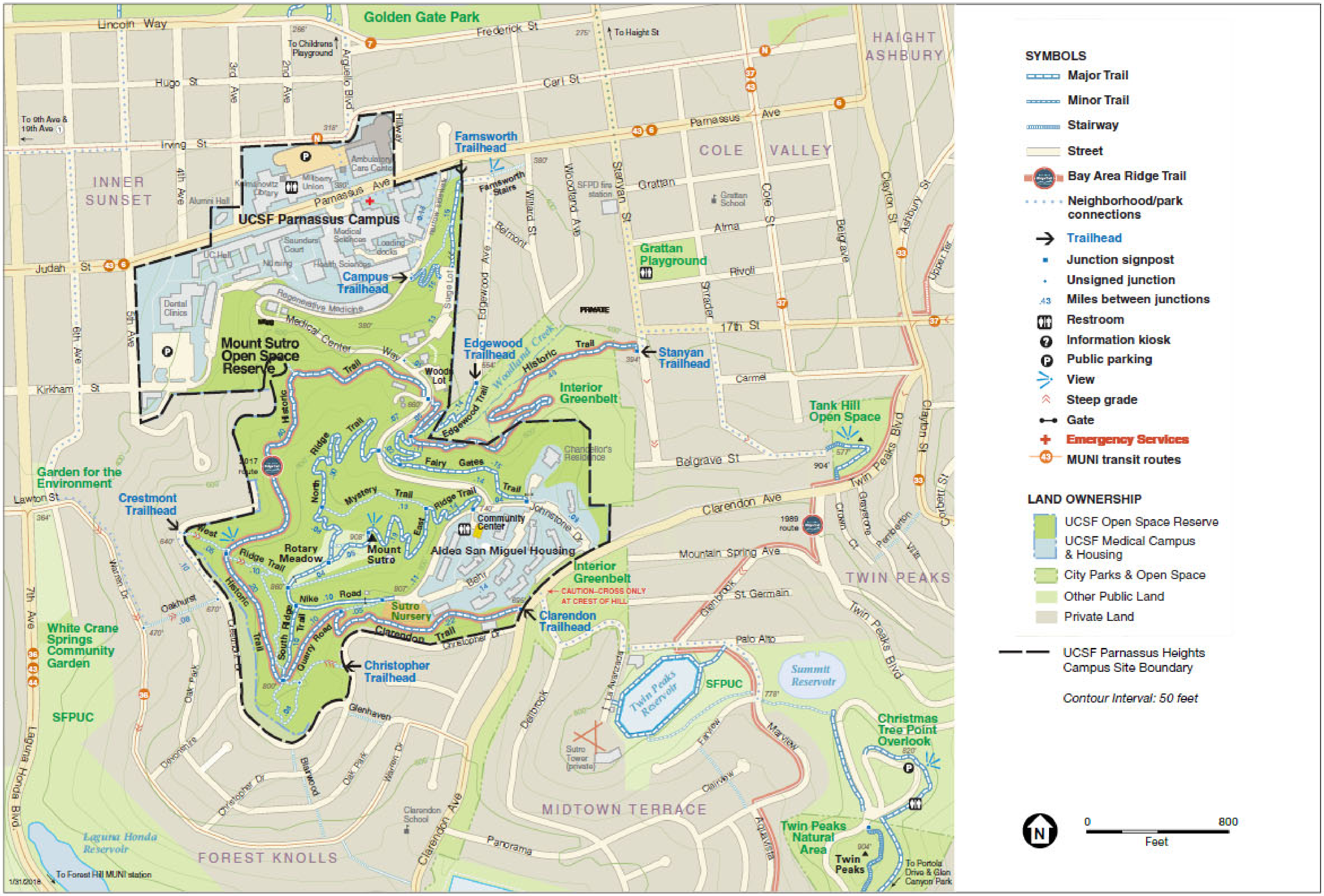
UCSF Recreational Facilities

The Parnassus Heights campus site features three primary areas with open space and recreation opportunities – a number of plazas, Millberry Fitness and Recreation Center, and Mount Sutro Open Space Reserve. The campus has several plazas of various sizes, including Saunders Court, which is considered the primary designed open space on the campus. In addition, the Millberry Fitness and Recreation Center is the primary recreational facility for students, staff, and neighbors of the Parnassus Heights campus site. The Center offers a full gym, indoor pool, spinning studio, and fitness classes.

Mount Sutro Open Space Reserve

The University-owned Mount Sutro Open Space Reserve (Reserve) consists of 61 acres of largely undeveloped forest located within the Parnassus Heights campus site. Within the campus site, the Reserve is generally bound by the UCSF core campus to the north and northwest, and by Aldea Housing complex to the southeast. Several campus site buildings and parking areas are also located along Medical Center Way adjacent to the Reserve. Off-site, urban residential neighborhoods are located to the south, east and west of the Reserve. In addition, the Interior Greenbelt natural area, owned by the City and County of San Francisco, is adjacent to the east side of Reserve. The Reserve is open to the general public.

As illustrated in **Figure 4.14-1**, the Reserve includes a 5-mile network of public, multi-use trails that serve hikers, runners, cyclists, and dogs on leash year-round. Trails in the Reserve include the Historic Trail; the Quarry Road Trail; the Clarendon Trail; the North, South, East and West Ridge Trails; the Fairy Gates Trail; and the Mystery Trail. These trails connect to developed areas of the campus site, including the campus core and the Aldea Housing complex, as well as to the adjacent Interior Greenbelt and street network. Within the Reserve, the Historic Trail coincides with a segment of the Bay Area Ridge Trail. The 2014 LRDP envisioned the development of new trails: the Clarendon Trail (now complete) and the Sunset Trail on the northwest portion of the Reserve, which is in the design phase. Once constructed, the Sunset trail will provide access to the Reserve to west-side residents via Koret Way.



SOURCE: UCSF, Pease Press, 2018; ESA 2019

UCSF Comprehensive Parnassus Heights Plan EIR

Figure 4.14-1
Recreational Facilities in Project Vicinity

Several trailheads provide access to and within trails in the Reserve. The Campus Trailhead provides trail access into the Reserve from Medical Center Way, near the UCSF Central Utilities Plant. There are three trailheads along the perimeter of campus site: Clarendon Trailhead, Christopher Trailhead, and Crestmont Trailhead. In addition, the nearby Farnsworth Trailhead connects to the Reserve via Farnworth Lane, and the Edgewood and Stanyan Trailhead connects to the Reserve by way of the Edgewood Trail and Historic Trail, respectively, in the Interior Greenbelt.

Citywide Recreational Facilities

The San Francisco Recreation and Park Department (SFRPD) maintains more than 200 parks, playgrounds, and open spaces throughout the City. The City's park system also includes 15 recreation centers, nine swimming pools, and five golf courses, as well as tennis courts, ball diamonds, athletic fields and basketball courts. In total, the SFRPD currently owns and manages roughly 3,400 acres of parkland and open space within the City limits. Together with other City properties [e.g., San Francisco Public Utilities Commission (SFPUC) lands, Port of San Francisco parks], State-owned open space (e.g., UCSF's Reserve, and the Candlestick Point State Recreation Area), and federal open space (e.g., Ocean Beach, Fort Mason, Fort Funston) within the city, approximately 5,900 acres of recreational resources serve San Francisco (CCSF, 2014; SFRPD, 2019).

The City categorizes publicly accessible open spaces and recreational facilities according to their size and particular amenities as serving the City, district, neighborhood, or sub-neighborhood (a smaller area within an established neighborhood). Several larger open space areas, including Golden Gate Park (see description below), the Lake Merced complex and John McLaren Park, comprise about one half of the total City-owned acreage in recreational use. Unlike neighborhood facilities, these larger facilities provide programs, activities and recreational opportunities that serve the City as a whole.

In addition to the larger open spaces, SFRPD land comprises more than 100 parks and recreational facilities (both outdoor and indoor), which function mainly for neighborhood use. These smaller facilities are primarily used by residents in the immediate surrounding area and are categorized by size and intended service area. District-serving parks are generally larger than 10 acres and have a service area consisting of a three-eighths-mile radius around the park, while neighborhood-serving parks are generally one to 10 acres and have a service area of one-quarter mile. Sub-neighborhood-serving open spaces, often referred to as mini parks, are too small to accommodate athletic facilities and have a service area of one-eighth of a mile.

Recreation Facilities in Campus Site Vicinity

Figure 4.14-1 illustrates recreational facilities in the campus site vicinity. The SFRPD operates and maintains the Interior Greenbelt natural area adjacent to the east side of the Reserve. As indicated above, the Greenbelt park can be accessed via the Edgewood and Stanyan Trailheads; and from Medical Center Way from the Reserve by way of the Edgewood and Historic Trails.

Golden Gate Park, administered by SFRPD, is the City's largest park, comprised of 1,017 acres, and over three miles in length and one-half mile wide. Golden Gate is the third most-visited city park in the United States with up 13 million people annually. Golden Gate Park is home to the De Young Museum, the California Academy of Sciences, the San Francisco Botanical Garden, and Japanese Tea Garden. Historic attractions of the park include the Beach Chalet, Conservatory of Flowers, and the Dutch and Murphy Windmills. Sports and recreational facilities in the park include Kezar Stadium, the Polo Field, and several soccer and baseball fields, tennis courts and other facilities. The park also contains several lakes, including the prominent Stow and Spreckels Lakes.

The SFRPD also operates the 1.5-acre Grattan Playground, located approximately 1,000 feet east of the campus site, and includes a renovated soccer field, two tennis courts and basketball court, a children's play structure, picnic area and clubhouse. The SFRPD also maintains the approximate 3-acre Tank Hill natural area, located approximately one-quarter mile east of the campus site, and known for its panoramic views. In addition, SFRPD operates the 64-acre Twin Peaks natural area located approximately one-half mile southeast of the campus site. Twin Peaks rises to 922 feet in elevation and provides scenic views of the Bay Area.

Approximately 600 feet southwest of the campus site, the SFPUC operates Laguna Honda Park, which includes the Laguna Honda reservoir and forest. The SFPUC also owns land approximately 800 feet southeast of the campus site that is occupied by Twin Peaks Reservoir and Summit Reservoir, and contains walking trails; and further south east, including Christmas Tree Point Overlook.

4.14.2 Regulatory Framework

UCSF

UCSF 2014 LRDP

The UCSF 2014 LRDP identified campus-wide objectives and objectives specific to the Parnassus Heights campus site. The following UCSF 2014 LRDP objectives relate to recreation:

Campus-Wide Objectives

2. **Accommodate UCSF's Growth Through 2035**
   C. Provide additional amenities such as retail, permanent child care facilities, recreation and fitness facilities, improved outdoor areas, and other support services to the extent feasible, to enhance the quality of campus life and the public realm.

Campus Site-Specific Objectives

1. **Parnassus Heights**
   D. Provide additional campus housing and improve campus life amenities including outdoor space.

F. Preserve the Mount Sutro Open Space Reserve as permanent open space, and serve as the steward of the Reserve by maintaining and expanding the trail system and by ensuring the safety of visitors and neighboring structures.

UCSF Physical Design Framework

The UCSF *Physical Design Framework* describes the vision for the physical development of UCSF campus sites, serving as the foundation for the planning and designing of future projects. The *Physical Design Framework* includes a goal to expand the open space network at the Parnassus Heights campus site by renovating Saunders Court, creating new open spaces and accommodating a wider variety of activities (UCSF, 2016).

City of San Francisco

UCSF is not subject to local land use regulation whenever using land under its control in furtherance of its educational mission. However, it is UCSF policy to be generally consistent with applicable local plans, policies and regulations to the extent feasible. City plans and regulations that are relevant to the recreation are summarized below.

San Francisco General Plan

The San Francisco General Plan Recreation and Open Space Element contains a number of objectives, including, but not limited to, the following:

Objective 1: Ensure a well-maintained, highly utilized, and integrated open space system.

Objective 2: Increase recreation and open space to meet the long-term needs of the City and Bay Region.

Objective 3: Improve Access and Connectivity to open space.

4.14.3 Impacts and Mitigation Measures

Significance Criteria

Would implementation of the CPHP, including the three Initial Phase projects and Initial Phase improvements:

a) Increase the use of existing neighborhood and regional parks or other recreational facilities such that substantial physical deterioration of the facility would occur or be accelerated?

b) Include recreational facilities or require the construction or expansion of recreational facilities, which might have an adverse physical effect on the environment?

Approach to Analysis

This analysis focuses on (1) how the implementation of the proposed CPHP, including the three Initial Phase projects and Initial Phase improvements, would affect the demand for both on-campus and off-campus City parks and recreational facilities in the vicinity of the Parnassus

Heights campus site, and (2) the impacts from the construction of recreational facilities under the proposed CPHP. Consideration is given to whether the proposed CPHP includes features that would reduce the demand for off-site recreation and park services (e.g., on-site recreation facilities or land dedication).

Assessment of Impacts to Existing On- and Off-Campus Recreation Facilities

Population growth on the Parnassus Heights campus site would have the potential to directly affect the on-campus recreational facilities by increasing the use of existing facilities. The analyses of impacts to on-campus recreational facilities are based on a programmatic, qualitative analysis of whether the proposed CPHP would address maintenance and expansion of such resources. The severity of impacts to recreational facilities is addressed using measurements such as population increase and condition.

Growth in campus population, especially residential population, would have the potential to result in impacts on nearby off-campus recreation facilities. Analysis of off-campus recreation effects primarily considers such factors as park accessibility, location, maintenance, capacity, and usability.

Assessment of Impacts of Proposed Recreational Facilities

The analysis considers the environmental impacts from the construction of the recreational facilities planned under the CPHP. Impacts of constructing these facilities and, as needed, mitigation measures and other regulatory requirements, are discussed below as well as in other chapters of this Draft EIR.

Approach to Analysis of Initial Phase Projects, including New Hospital, and Initial Phase Improvements

This EIR includes project-level analysis for certain Initial Phase projects anticipated to be completed by about the year 2030; specifically, the Irving Street Arrival, Research and Academic Building (RAB), and initial Aldea Housing Densification; and Initial Phase improvements, as described below. The New Hospital is also an Initial Phase project anticipated to be completed by about the year 2030, but is analyzed at a program level in this EIR within the context of the overall CPHP, and will be analyzed at a project level in a subsequent EIR when more details are available.

Impact Analysis

Impact REC-1: Implementation of the CPHP would not increase the use of existing neighborhood and regional parks or other existing on- and off-campus recreational facilities such that substantial physical deterioration of the facility would occur or be accelerated. (Less than Significant)

CPHP

Implementation of the CPHP would result in an increase in the on-campus daytime population at Parnassus Heights, including students, faculty and staff who commute to the campus site from various other parts of San Francisco and the greater Bay Area, as well as patients and visitors.

These persons are expected to primarily use recreation facilities near their homes, and any use of recreational facilities by this population on or near the Parnassus Heights campus site is expected to be passive in nature and result in minimal increases in demand for these recreation facilities.

Implementation of the CPHP would also result in an increase in the number of UCSF-affiliated persons who would live on the campus site. The development of up to 332 net new units on the Aldea Housing site and 430 new units as part of the West Side Housing project by 2050 would result in an increased demand for recreational facilities by these new residents. These new residents would be likely to use existing recreational facilities on or near the campus site, including the Millberry Recreation Center and the trails within the Reserve. Furthermore, under the CPHP, UCSF would provide a net increase of 3.9 acres of publically accessible open space within the campus core over existing conditions. New outdoor recreational and open space enhancements would include the proposed Millberry Terrace, expanded Saunders Court, an open space connection from 5th Avenue to the Reserve, and a proposed Promenade to the south of the current UC Hall. In addition, under the CPHP, additional indoor recreational opportunities would be created, such as a proposed new wellness center (including a fitness studio and pool). Although some increase in the use of nearby City recreational facilities (e.g., Golden Gate Park, and the Interior Greenbelt) would also likely occur due to the increase in the residential population at the campus site, the increase in usage is unlikely to be so large as to result in significant physical deterioration of the facilities.

As discussed in Chapter 3, *Project Description,* there is the potential for the proposed New Hospital and widened Medical Center Way under the CPHP to result in encroachment on the Reserve. UCSF proposes to replace any loss of Reserve acreage resulting from new development under the CPHP by creating new Reserve acreage elsewhere within the campus site in an amount equal to or greater than that land lost. Furthermore, under the CPHP, UCSF would maintain Reserve trail access to and from the Farnsworth Lane trailhead.

For these reasons, implementation of the proposed CPHP would not increase the use of existing on-campus recreational facilities and off-campus neighborhood and regional parks or other recreational facilities such that substantial physical deterioration of any of the facilities would occur or be accelerated, and this impact is considered less than significant.

Mitigation: None required.

Irving Street Arrival

The Irving Street Arrival project mainly involves modifications to the existing Medical Building 1 to improve circulation space, and would not substantially increase the amount of building space or the population on the campus site. The project would not increase the demand for recreational facilities such that substantial physical deterioration of any of the facilities would occur or be accelerated. There would be no effect.

Mitigation: None required.

Research and Academic Building

The proposed Research and Academic building (RAB) would increase the campus's daytime population. As noted for the CPHP as a whole, the increased daytime population associated with the RAB is unlikely to result in a substantial demand for recreational facilities. Furthermore, the demand would be served by existing and expanded on-campus facilities, and the use of off-campus recreational facilities would increase minimally due to the project. The project would not increase the demand for recreational facilities such that substantial physical deterioration of any of the facilities would occur or be accelerated. The impact would be less than significant.

Mitigation: None required.

Initial Aldea Housing Densification

During the initial phase of housing densification at the Aldea Housing complex, three existing 3-story housing structures would be replaced with three 8-story housing structures, and one 5-story housing structure. The housing densification project would increase the campus's residential population. As discussed above, there are substantial existing on-campus recreational facilities, along with new and expanded on-campus recreational opportunities that would occur under the CPHP. As noted for the CPHP as a whole, although some increase in the use of nearby City recreational facilities would be associated with new residents, including from the initial Aldea Housing Densification project, the demand for recreational facilities would not increase to a level such that substantial physical deterioration of any of the facilities would occur or be accelerated. The impact would be less than significant.

Mitigation: None required.

Initial Phase Improvements

As described in Chapter 3, *Project Description*, the Initial Phase improvements would include various Initial Phase utility improvements, implementation of the Parnassus Avenue Streetscape Plan, renovation of certain existing buildings, and installation of miscellaneous community investments in the public realm. The Initial Phase improvements would not increase population, and consequently, would not increase the demand for recreational facilities such that substantial physical deterioration of any of the facilities would occur or be accelerated. There would be no effect.

Mitigation: None required.

Impact REC-2: The CPHP includes new recreational facilities, the construction of which would not have an adverse impact on the environment with mitigation. (Less than Significant)

CPHP

As discussed above, the CPHP would result in construction of various new recreational facilities at the campus site, including a new wellness center to be constructed in the Millberry Union, and expansion of open space areas within the campus core, including an expanded Saunders Court, an east-west promenade from Saunders Court to 4th Avenue, an open space connection from 5th Avenue to the Reserve, and a terrace on the roof of the new Millberry Union. Compliance with mitigation measures and other construction-related regulatory requirements discussed in other sections of this Draft EIR, including Section 4.2, *Air Quality*; Section 4.3, *Biological Resources*; Section 4.6, *Geology and Soils,*; Section 4.8, *Hazards and Hazardous Materials*; Section 4.9, *Hydrology and Water Quality*; Section 4.11, *Noise and Vibration*; and Section 4.15, *Transportation,* would reduce construction-related effects of new recreational facilities to less than significant levels.

Mitigation: None required.

Irving Street Arrival

The Irving Street Arrival project would not involve construction of any recreational facilities. There would be no effect related to construction of recreational facilities.

Mitigation: None required.

Research and Academic Building

The RAB project would not involve construction of any recreational facilities. There would be no effect related to construction of recreational facilities.

Mitigation: None required.

Initial Aldea Housing Densification

The Aldea Housing Densification project would not involve construction of any recreational facilities. There would be no effect related to construction of recreational facilities.

Mitigation: None required.

Initial Phase Improvements

As described in Chapter 3, *Project Description*, the Initial Phase improvements would include, among other improvements, installation of miscellaneous community investments in the public realm, which are not yet defined. To the extent any Initial Phase improvements included recreational-related features, compliance with mitigation measures and other construction-related regulatory requirements discussed in other sections of this Draft EIR, including Section 4.2, *Air Quality*; Section 4.3, *Biological Resources*; Section 4.6, *Geology and Soils,*; Section 4.8, *Hazards and Hazardous Materials*; Section 4.9, *Hydrology and Water Quality*; Section 4.11, *Noise and Vibration*; and Section 4.15, *Transportation,* would reduce construction-related effects of new recreational facilities to less than significant levels.

Mitigation: None required.

Cumulative Impacts

Impact C-REC-1: The CPHP, in combination with past, present, and reasonably foreseeable future projects, would not increase the use of existing neighborhood and regional parks or other recreational facilities such that substantial physical deterioration of the facility would occur or be accelerated. (Less than Significant)

Development under the proposed CPHP, when combined with cumulative growth in the vicinity of the Parnassus Heights campus site, could increase the demand for recreation facilities. However, this increased demand would not cumulatively result in the substantial physical deterioration of such facilities. As discussed above, there are substantial existing recreational opportunities on the campus site; and recreational improvements being implemented as part of the 2014 LRDP (e.g., the Sunset Trail). Under the CPHP, recreational facilities within the campus core would be expanded. Many of these existing and expanded recreational facilities would be publically accessible and used not only by the CPHP population, but by cumulative increases in population from the neighboring community. The CPHP would not eliminate any access to existing campus site recreational facilities, or eliminate connection to adjacent recreational space. Furthermore, the neighborhoods surrounding the campus site are largely fully built out under existing zoning, and as a result, development increasing demand on parks and recreational facilities is expected to be minimal. It is expected that continued long-range planning by City agencies, including, but not limited to, SFRPD, would ensure City-owned recreational facilities in the campus site vicinity would continue to be maintained and improved as needed to accommodate anticipated cumulative increases in the citywide population.

Therefore, development under the proposed CPHP, when combined with cumulative growth in the vicinity of the Parnassus Heights campus site, would not result in a significant cumulative impact to recreation.

Mitigation: None required.

4.14.4 References

City and County of San Francisco (CCSF), San Francisco General Plan, Recreation & Open Space Element, April 2014.

San Francisco Recreation and Park Department (SFRPD), 2019. Who We Are. Available at: . Accessed December 1, 2019.

University of California, San Francisco (UCSF), 2016. *UCSF Physical Design Framework*. Updated July 2016.

4.15 Transportation

This section describes and evaluates the potential for campus development under the Comprehensive Parnassus Heights Plan (CPHP or Plan), including the three Initial Phase projects and Initial Phase improvements, to result in significant transportation impacts. The section presents the regional and local transportation setting, provides the transportation regulatory framework, identifies criteria used to determine impact significance, and provides an analysis of the potential transportation impacts associated with the implementation of the CPHP as well as identifies feasible mitigation measures that could mitigate any potentially significant impacts.

4.15.1 Environmental Setting

This section describes the existing transportation and circulation setting: the existing regional roadway network, regional transit service, the local roadway network, local transit service, the UCSF shuttle system, existing UCSF transportation demand management programs, pedestrian conditions, bicycle conditions, loading conditions, emergency vehicle access, vehicle miles traveled, and parking conditions. **Figure 4.15-1** shows the study area and campus site.

Regional Setting

Regional Roadway Network

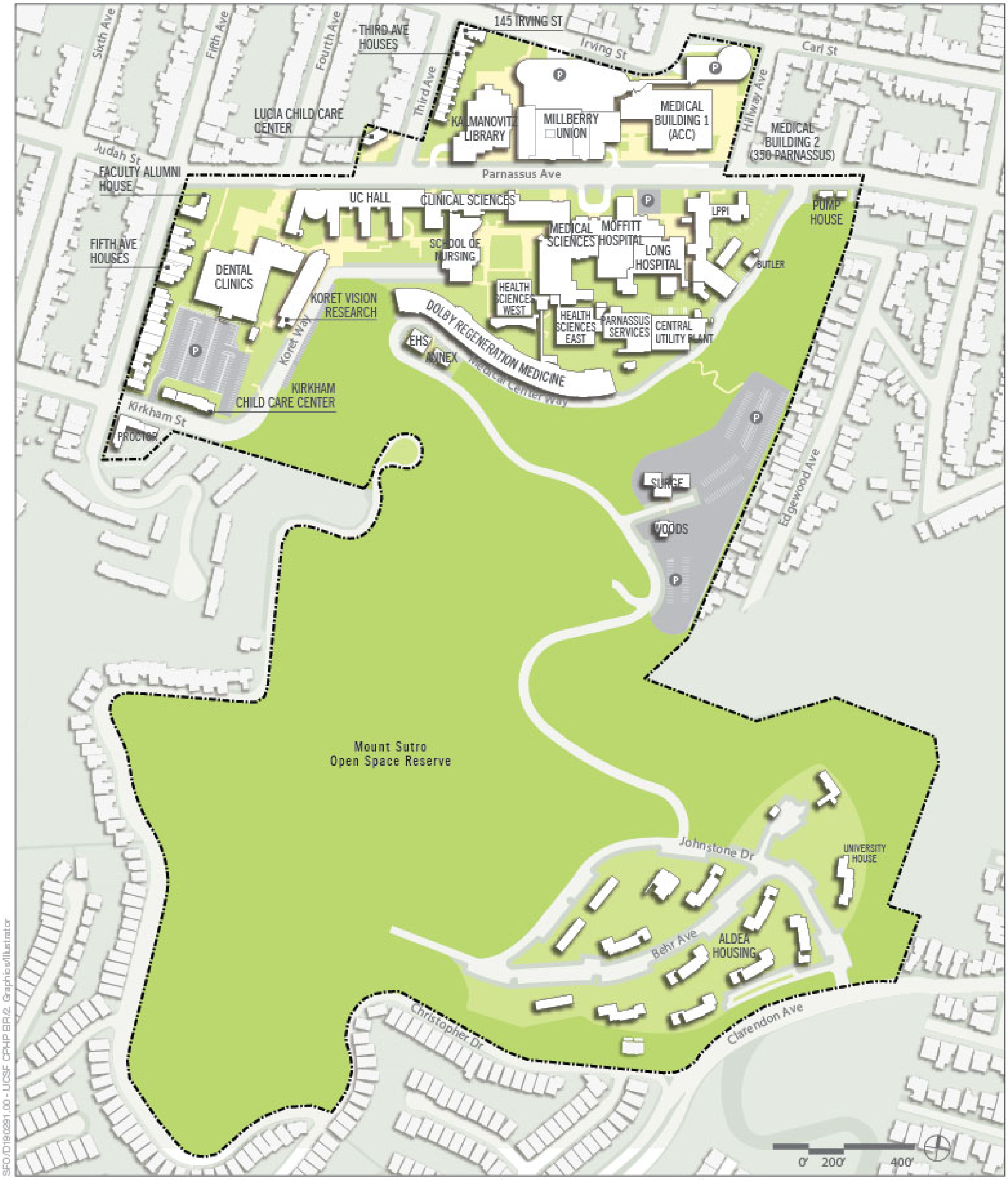
Regional roadway access to the UCSF Parnassus Heights campus site is provided by several major regional freeways and roadways, as discussed below.

Interstate 80 (I-80) is located approximately three miles east of the campus site. I-80 connects San Francisco to the East Bay and other points to the east of the City via the San Francisco-Oakland Bay Bridge.

U.S. Highway 101 (U.S. 101) is located approximately two miles east of the campus site. U.S. 101 connects San Francisco with the Peninsula and the South Bay to the south, and with the North Bay to the north via the Golden Gate Bridge. U.S. 101 connects to I-80 in the South of Market (SoMa) neighborhood of San Francisco. Within the northern part of San Francisco, U.S. 101 operates on surface streets (i.e., Van Ness Avenue and Lombard Street).

State Highway 1 (19th Avenue) is located approximately one mile west of the campus site. 19th Avenue connects San Francisco to the North Bay via the Golden Gate Bridge and to the South Bay via a connection to Interstate 280 (I-280) south of the campus site. Within the study area, 19th Avenue has six lanes, with left turns prohibited at most intersections.

Interstate 280 (I-280) is located approximately two miles east of the campus site. I-280 connects San Francisco to the South Bay with connections to 19th Avenue, the Mission Bay district and SoMa. I-280 connects to U.S. 101 south of Mission Bay.



SOURCE: Fehr & Peers, 2020

UCSF Comprehensive Parnassus Heights Plan EIR

Figure 4.15-1
Parnassus Heights Campus Site

Regional Transit Service

Golden Gate Transit. The Golden Gate Bridge, Highway, and Transportation District operates Golden Gate Transit (GGT), which provides bus and ferry service between the North Bay (Marin and Sonoma Counties) and San Francisco. GGT operates 22 commuter bus routes, nine basic bus routes, and 16 ferry feeder bus routes in San Francisco. Bus routes operate at headways of 15 to 90 minutes depending on time and day of week and bus type. GGT also operates ferry service between the North Bay and San Francisco, connecting Larkspur and Sausalito with the Ferry Building during the morning and evening commute periods. GGT riders need to transfer to San Francisco Municipal Railway (Muni) to access the campus site.

Alameda-Contra Costa County Transit District (AC Transit). AC Transit operates bus service in western Alameda and Contra Costa Counties, as well as routes to the City of San Francisco and San Mateo County. AC Transit operates 33 "Transbay" bus routes between the East Bay and the Salesforce Transit Center, located on Beale Street between Mission Street and Howard Street. The Salesforce Transit Center is accessible from the campus site via Muni. The majority of Transbay service is provided only during commute periods in the peak direction of travel, with headways of 15 to 20 minutes. The peak direction of service is into San Francisco during the AM peak period and out of San Francisco during the PM peak period. All-day service is provided on a few lines, with headways of approximately 30 minutes. AC Transit riders need to transfer to Muni to access the campus site.

San Mateo County Transit District (SamTrans). SamTrans operates bus and rail service in San Mateo County. A few SamTrans routes also serve the Salesforce Transit Center in downtown San Francisco, including Routes 292, 397, and 398. Route 292 makes San Francisco stops along Potrero Avenue and Mission Street throughout the day. AM peak hour headways are between 10 and 15 minutes, and PM peak hour headways are 20 minutes. Routes 397 and 398 run along Mission Street in San Francisco but stop only at the Salesforce Transit Center. Route 397 is a late-night service route with headways of one hour. Route 398 operates during peak periods with one-hour headways. SamTrans riders need to transfer to Muni or UCSF shuttle to access the campus site.

Bay Area Rapid Transit (BART). BART provides regional commuter rail service between San Francisco and the East Bay (Pittsburg/Bay Point, Richmond, Dublin/Pleasanton and Fremont), as well as between San Francisco and San Mateo County (SFO Airport and Millbrae). Weekday hours of operation are currently between 5:00 AM and midnight. During the weekday PM peak period, headways are 5 to 15 minutes along each line. Within San Francisco, BART operates underground along Market Street to Civic Center Station where it turns south through the Mission District towards Daly City. The closest BART station to the campus site is the Civic Center BART station, which is accessible from the campus site via Muni.

Caltrain. Caltrain provides passenger rail service on the Peninsula between San Francisco and Downtown San Jose with several stops in San Mateo County and Santa Clara County. Limited service is available south of San Jose. Caltrain service headways during the AM and PM peak periods are 10 to 60 minutes, depending on the type of train. The peak direction of service is southbound during the AM peak period and northbound during the PM peak period. Caltrain service terminates at the San Francisco Station at Fourth and King Streets (Fourth/King station). The Fourth/King station is served by local, limited, and express “Baby Bullet” trains that are accessible from the campus site via Muni.

Caltrain is in the process of implementing a Modernization Program that will electrify the railway. The electrification project is scheduled to be complete by 2022 and will upgrade rail performance, improve operational efficiency, and result in higher capacity. For example, whereas today Caltrain operates 10 trains per hour during peak periods, electrification will support an increase to 12 trains per hour. Additionally, Caltrain is anticipating a “blended system,” with California High Speed Rail trains running alongside Caltrain on the same tracks by 2040. Electrification of Caltrain (and the associated improved travel times and frequencies), as well as the introduction of High Speed Rail, may improve UCSF’s regional transit access.

Local Setting

Local Roadway Network

With Golden Gate Park to the north and Mount Sutro to the south, the roadways used to access the campus site are primarily via east-west corridors – Parnassus Avenue, Judah Street, Irving Street-Carl Street, Lincoln Way, and Kirkham Street. Primary north-south routes to the campus site include Stanyan Street, Arguello Boulevard, Seventh Avenue, and Second Avenue through Fifth Avenue. The primary vehicular entrances to parking and loading areas for the campus site are located at the intersections of Second Avenue/Irving Street, Arguello Boulevard/Carl Street-Irving Street, along Parnassus Avenue, and at Fifth Avenue/Kirkham Street. Local access to the campus site is provided by an urban street grid network. Key local roadways through the campus site are discussed below.

The local road network serving the campus site consists primarily of two-lane roadways with on-street parking provided on both sides of the streets in most areas, as follows:

- **Kirkham Street** runs between the campus site to La Playa Street in the west. East of Fifth Avenue, Kirkham Street becomes Koret Way (a campus street) and provides access to the School of Dentistry and School of Nursing buildings. West of Sixth Avenue, Kirkham Street has Class II bicycle lanes in both directions.

- **Carl Street/Irving Street** extends from Clayton Street to 48th Avenue. The City classifies this roadway as a Primary Transit Street (transit-oriented) east of Ninth Avenue. In the vicinity of the campus site, the N – Judah light rail line operates along the roadway between Cole Street and Ninth Avenue. The street provides exclusive turn pockets for vehicles to enter the UCSF parking garage at the Second Avenue/Irving Street intersection.

- **Hugo Street** runs between Arguello Boulevard and Seventh Avenue. Between Seventh Avenue and Third Avenue, Hugo Street is designated as a Class III bicycle route.

- **Willard Street** runs from Fredrick Street to Woodland Avenue.

- **Medical Center Way**, a campus street, runs from Parnassus Avenue to Johnstone Drive through the Mount Sutro Open Space Reserve.
- **Hillway Avenue** runs between Parnassus Avenue and Carl Street.
- **Arguello Boulevard** runs from Kezar Drive to Carl Street.
- **Second Avenue** runs from Lincoln Way to Irving Street, with the southern end of the street providing direct access to a large UCSF public parking garage with a long-term bicycle parking facility.
- **Third Avenue** runs between Lincoln Way and Parnassus Avenue. Between Hugo Street and Lincoln Way, Third Avenue is a designated Class III bicycle route. All northbound traffic on Third Avenue must turn right at Lincoln Way.
- **Fourth Avenue** runs between Lincoln Way and Parnassus Avenue. All northbound traffic on Fourth Avenue must turn right at Lincoln Way.
- **Fifth Avenue** runs between Lincoln Way and its terminus south of Kirkham Street. Fifth Avenue provides full access (i.e., northbound traffic can turn left and right) at Lincoln Way.
- **Sixth Avenue** runs between Lincoln Way and its terminus south of Kirkham Street. Sixth Avenue is designated as a bicycle route between Hugo Street and Kirkham Street and has a southbound Class II bicycle lane and a northbound Class III bicycle route (with shared-lane markings [“sharrows”]).
- **Eighth Avenue** runs between Lincoln Way and its southern terminus at Pacheco Street. The 66 Quintara bus line operates along Eighth Avenue between Judah Street and Lawton Street in the northbound direction only.

The roadway exceptions to the two-lane cross section are as follows:

- **Parnassus Avenue/Judah Street** is a two- to three-lane roadway that extends from Clayton Street to 48th Avenue. The City classifies this roadway as a Secondary Transit Street east of Ninth Avenue (in the vicinity of the campus site) and a Primary Transit Street (Transit-Oriented) west of Ninth Avenue. The 6 Parnassus and 43 Masonic bus lines operate on this street. A two-way left-turn lane extends from Stanyan Street to the Moffitt-Long Hospital. Access to the Millberry Union Garage is across from the Moffitt/Long Hospital Drop-off/Pick-up area; two signalized crosswalks facilitate heavy pedestrian volumes across the street in the same location. Parnassus Avenue/Judah Street is also designated as a Class III bicycle route east of Sixth Avenue. Class III bicycle routes employ “sharrows.”
- **Lincoln Way/Frederick Street** is a two- to four-lane Secondary Transit Street that forms the southern boundary of Golden Gate Park. At Third Avenue, Lincoln Way merges with Kezar Drive and is a main thoroughfare between the Sunset District and downtown. The 7 Haight-Noriega bus line uses the entirety of Lincoln Way and Frederick Street to travel to Stanyan Street, while the 7X Noriega Express uses Lincoln Way to merge onto Kezar Drive in order to get to the Fell-Oak Street one-way couplet.

- **Kezar Drive** is a two- to four-lane east-west Major Arterial Street north of Parnassus Avenue that provides the major connection from the campus site to the Fell-Oak Street one-way couplet. Kezar Drive has a Class I bicycle path facility. The 7X Noriega Express uses Kezar Drive to travel from Lincoln Way to Oak Street.

- **Stanyan Street** is a Secondary Transit Street from Geary Boulevard to Belgrave Avenue. It forms the eastern boundary of Golden Gate Park (excluding the Panhandle section of the park). In the vicinity of the campus site (north of Frederick Street), it is a four-lane roadway; south of Fredrick Street, it is a two-lane street. The 7 Haight-Noriega bus line operates along Stanyan Street north of Frederick Street.

- **Seventh Avenue** is a Secondary Transit Street, which provides access to Golden Gate Park and becomes Laguna Honda Boulevard to the south of the campus site. It has one northbound and two southbound lanes in the vicinity of the campus site. Seventh Avenue is designated as a Class III bicycle facility between Lincoln Way and Judah Street and as a Class II bicycle lane south of Judah Street. The 36 Teresita, 43 Masonic, and 44 O'Shaughnessy bus lines operate on Seventh Avenue south of Lawton Street.

- **Ninth Avenue** is a Secondary Transit Street, which provides access to Golden Gate Park and the Sunset District. It has one northbound and two southbound lanes in the vicinity of the campus site. The N-Judah light rail line operates on Ninth Avenue between Irving and Judah Streets. The 43 Masonic and 66 Quintara bus lines operate along Ninth Avenue between Judah Street and Lawton Street, while the 44-O'Shaughnessy line runs between Golden Gate Park and Lawton Street.

Parnassus Avenue Traffic Volumes

UCSF committed to monitoring the number and classification (vehicle type, e.g., private passenger vehicle, taxi, parcel/mail delivery, etc.) of vehicles at key gateways of the campus site every two years as part of the Measurement and Accountability section (4.7) of the 2014 Long Range Development Plan (LRDP). Specifically, monitoring takes the form of collecting two days of vehicle turning movement and classification observations at three "gateway" intersections (Fifth Avenue and Kirkham Street, Fifth Avenue and Parnassus Avenue, and Medical Center Way and Parnassus Avenue), first in 2013 and subsequently every two years beginning in 2016. These traffic volumes also account for through traffic (i.e. vehicles that are passing through the campus site on Parnassus Avenue without stopping at the Parnassus campus site). These gateway intersection counts show that total vehicle volumes increased by approximately four percent between 2013 and 2018, and seven percent between 2016 and 2018 (due to a slight decrease observed between 2013 and 2016). The large majority of vehicles observed at the gateways are private passenger vehicles. Non-passenger vehicles are mainly UCSF shuttles and Muni buses at the Parnassus Avenue intersections.

Local Transit Service

The campus site is well-served by public transit; both local and regional. Local service is provided by the Muni bus and light rail lines, which provide transit service to the campus site and throughout San Francisco and can be used to access regional transit operators. As described previously in Regional Transit Service, 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 GGT buses and ferries; service to and from the Peninsula and South Bay is provided by SamTrans, BART, and Caltrain. As described below in UCSF Shuttle System, UCSF supplements Muni transit service with its own shuttle system that provides direct connections to UCSF-operated or affiliated facilities throughout San Francisco. In many cases, these shuttles provide a direct transit alternative between two campus sites that would otherwise require a transfer between two or more Muni routes. Based on the 2018 UCSF Employee Commute Survey, approximately 32 percent of employees travel to or from the campus site use public transit, while another 10 percent rely on UCSF shuttles.

Muni routes in the study area and their characteristics as of August 2019 are summarized in **Table 4.15-1** and presented in **Figure 4.15-2**. This transportation analysis uses a 0.25-mile radius as the walking distance for transit access.

The San Francisco Municipal Transportation Agency (SFMTA) "Muni Forward" program aims to improve reliability, reduce travel times, provide more frequent service, and update Muni bus routes and rail lines to better match current travel patterns. Informed by the Transit Effectiveness Project, Muni Forward proposals include new routes and route realignments, more service on busy routes, and elimination or consolidation of certain routes or route segments with low ridership. There are several Muni Forward service changes to routes in the campus site area that, as of August 2019, have been implemented or approved by the SFMTA Board of Directors.[1] Note that the Muni Forward program does not include any changes to the 36 – Teresita bus route.

- **6 – Haight/Parnassus:** AM and PM peak frequencies will be reduced from 10 minutes to 12 minutes.[2] These changes have not yet been implemented and are therefore not reflected in Table 4.15-1.

- **7 – Haight/Noriega (f/k/a 71 Haight/Noriega):** The 71 Haight/Noriega route was renamed 7 Haight/Noriega line. Additionally, AM and PM peak frequencies will be increased from 10 minutes to 7.5 minutes, and midday frequencies will be increased from 12 minutes to 8 minutes.[2] The peak frequency changes have not yet been implemented and are therefore not reflected in Table 4.15-1.

- **43 – Masonic:** AM peak frequency was increased from 10 minutes to eight minutes, and PM peak frequency was increased from 12 minutes to 10 minutes.[3] These changes have been partially implemented (frequencies have increased to nine and 11 minutes, respectively) and are therefore not fully reflected in Table 4.15-1.

[1] San Francisco Municipal Transportation Agency (SFMTA), Muni Forward, 2019, https://www.sfmta.com/projects/muni-forward, accessed August 2019.

[2] San Francisco Municipal Transportation Agency (SFMTA), 7 Haight Noriega Rapid Project, 2019, https://www.sfmta.com/projects/7-haight-noriega-rapid-project, accessed August 2019.

[3] San Francisco Municipal Transportation Agency (SFMTA), Muni Forward, 2019, https://www.sfmta.com/projects/muni-forward, accessed August 2019.

- **N – Judah:** An increase in frequencies during the AM peak from 7 minutes to 5.5 minutes and during the PM peak from 8 minutes to 6 minutes has been approved. However, these changes have not yet been implemented and are therefore not reflected in **Table 4.15-1**.[4]

TABLE 4.15-1
LOCAL MUNI OPERATIONS

Route	AM Peak Weekday Headways (7:00-9:00 AM)[1]	PM Peak Weekday Headways (4:00-6:00 PM)[1]	Hours of Operation	Neighborhoods Served by Route	Nearest Stop Location	Distance to Campus Site (feet)
6 – Haight/ Parnassus	10	11	6:20 AM – 12:20 AM	Financial District, Golden Gate Heights	Several stops on Parnassus between Hillway Avenue and Fifth Avenue	0
43 – Masonic[2]	9	11	5:15 AM – 12:30 AM	Marina District, The Excelsior	Several stops on Parnassus between Hillway Avenue and Fifth Avenue	0
7 – Haight/ Noriega	10	11	6:15 AM – 12:10 AM	Financial District, Haight-Ashbury, Sunset District	Frederick Street and Arguello Boulevard	600
36 – Teresita	30	30	6:15 AM – 10:50 PM	Glen Park, Forest Knolls, Noe Valley	Oak Park Drive & Forest Knolls Drive	1,400 (to Aldea housing complex)
N – Judah	7	9	5:00 AM – 1:00 AM	Financial District, Sunset District	Irving Street and Second Avenue	0

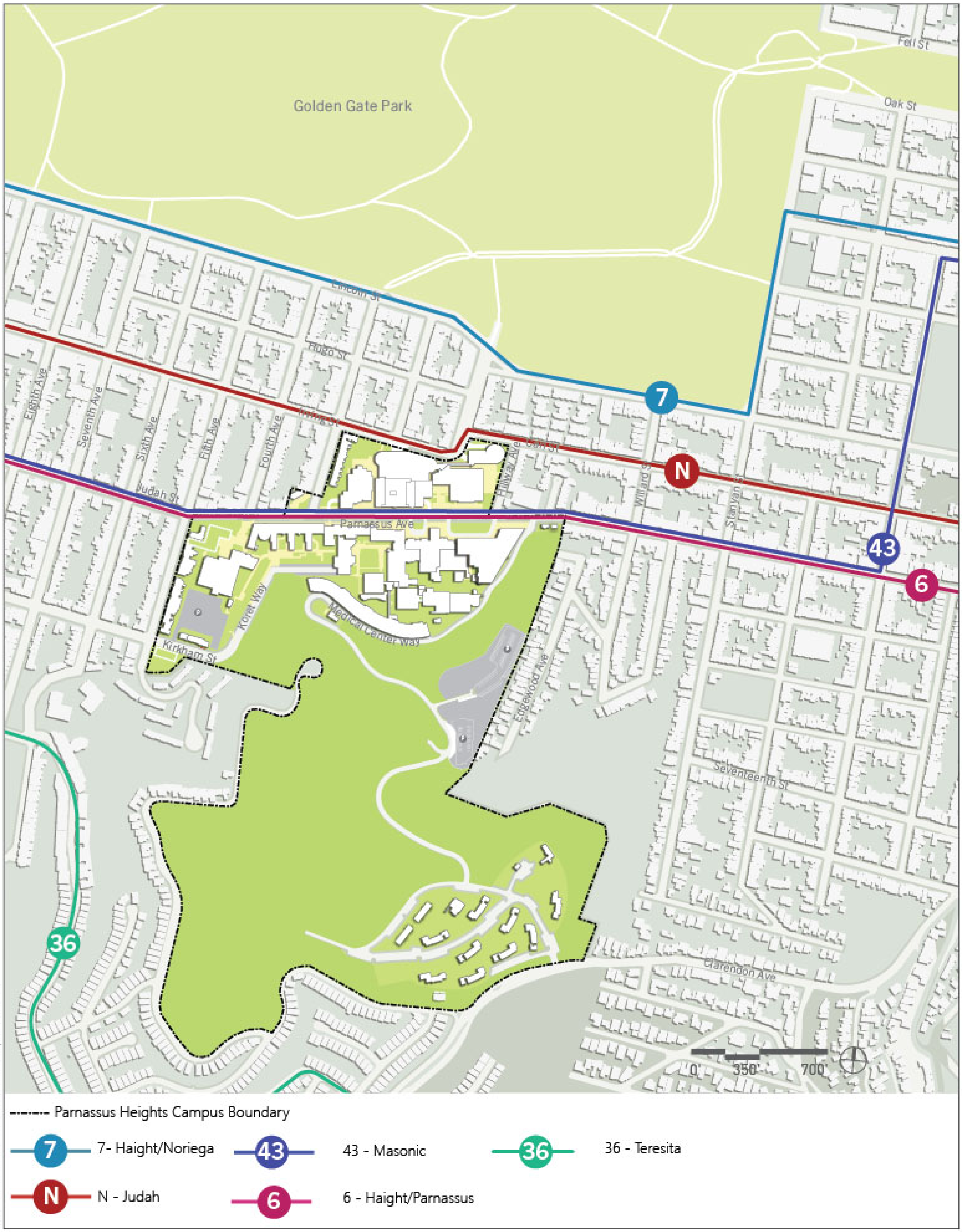
NOTES:
1 Headway in minutes.
2 For this route, there is a slight discrepancy between the peak hour frequencies for the existing schedules posted on the SFMTA website and the service changes approved as a part of Muni Forward.

SOURCE: SFMTA, July 2019; prepared by Fehr & Peers, 2020.

At the time of publication of the Draft EIR, Muni was operating reduced transit service under a COVID-19 Core Service Plan in response to the COVID-19 pandemic and the “shelter-in-place” order in San Francisco.[5] The timing and degree to which transit service is reinstated in San Francisco is uncertain at present. The SFMTA has developed a Transportation Recovery Plan, which represents a guiding framework for expanding transportation services and operations as the

4 San Francisco Municipal Transportation Agency (SFMTA), N Judah Rapid Project, 2019, https://www.sfmta.com/projects/n-judah-rapid-project, accessed August 2019.

5 San Francisco Municipal Transportation Agency (SFMTA), COVID-19 Muni Core Service Plan, https://www.sfmta.com/travel-updates/covid-19-muni-core-service-plan



SOURCE: Fehr & Peers, 2020

UCSF Comprehensive Parnassus Heights Plan EIR

Figure 4.15-2
Parnassus Campus Existing Transit Network

ESA

"shelter-in-place" order is modified and demand for travel increases.[6] SFMTA generally evaluates key factors such as annual ridership, vehicle availability, and resource availability – and relies on regularly-collected passenger data – to inform their transit service planning decisions. This approach allows SFMTA the flexibility and responsiveness to provide the most efficient transit service possible.

UCSF Shuttle System

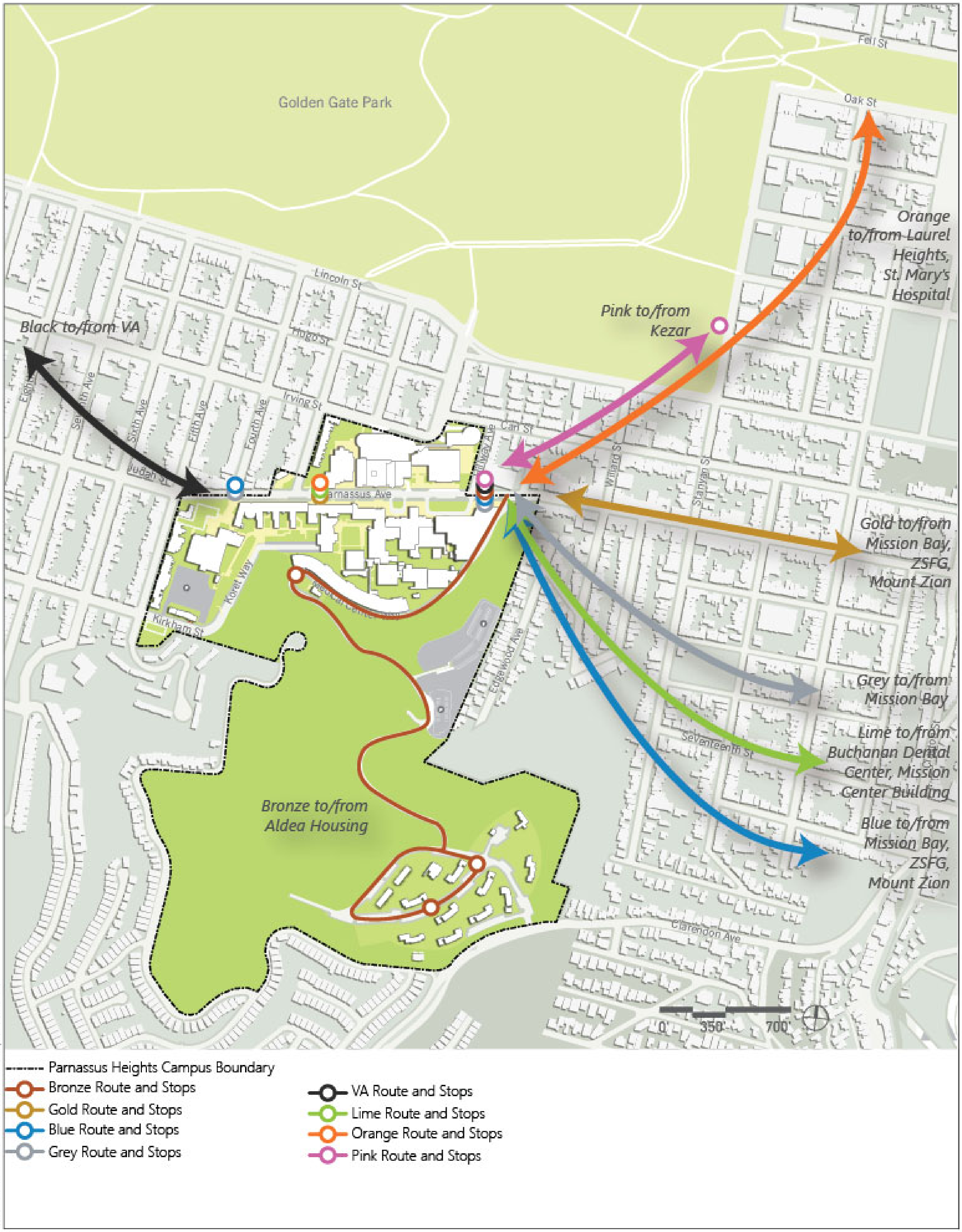
The core element of UCSF's Transportation Demand Management (TDM) plan is the shuttle service that UCSF operates throughout San Francisco. The shuttle system fleet (currently 63 shuttles) provides service between transit facilities, remote parking lots, the various UCSF campus sites, and UCSF-affiliated hospitals / medical centers within the City. The primary shuttle routes serve the Parnassus Heights, Mission Bay, Mission Center, Zuckerberg San Francisco General Hospital, Mount Zion, and Laurel Heights campus sites. As of 2019, UCSF Shuttles transport 2.5 million passengers per year. Service includes 11 fixed-route lines and three on-demand services (one daytime, and two evening services). Fixed-route shuttle headways are generally between 15 and 25 minutes, and most routes operate between 6:00 AM and 9:00 PM, Monday through Friday.

The two on-demand evening services operate both weekday and weekend nights. Riders can request on-demand service within a pre-defined border around the Parnassus Heights campus site by calling UCSF Police Department (UCPD) dispatch or via the online portal. All shuttle buses are equipped with bike racks, and many are equipped with Wi-Fi. The service is free for UCSF faculty, staff, students, patients, and visitors.

Shuttles to and from the Parnassus Heights campus site (Blue, Gold, Grey, Lime, Orange, Pink, VA-Parnassus, and Bronze) stop at shuttle zones along the north side of Parnassus Avenue, between Third Avenue and the Library, and on the south side of Parnassus Avenue, just west of UC Hall, outside the Dental Clinics plaza at Fourth Avenue, and also east of the Langley Porter Psychiatric Institute (LPPI). These stops are designated by UCSF Transportation Services and reviewed/approved by SFMTA. Existing shuttle routes and stops in the vicinity of Parnassus Heights campus site are shown on **Figure 4.15-3**.

UCSF regularly monitors the capacity utilization of its routes via a combination of boarding audits, driver and rider feedback, program analysis from external consultants, stop audits, and consultation with UCSF Campus Planning. UCSF's shuttle system is a key strategy in providing efficient inter-campus travel. As part of this service, UCSF has made and will continue to make periodic minor operational changes to improve operations, expand service to accommodate new facilities or to respond to specific community concerns.

6 San Francisco Municipal Transportation Agency (SFMTA), Transportation Recovery Plan, https://www.sfmta.com/projects/transportation-recovery-plan



SOURCE: Fehr & Peers, 2020

UCSF Comprehensive Parnassus Heights Plan EIR

Figure 4.15-3
UCSF Parnassus Campus Shuttle Routes and Stops

ESA

The seated per-vehicle capacity of the shuttle buses (Blue, Gold, Grey, Lime, Orange, Pink, VA-Parnassus, and Bronze lines) varies from 22 to 30 persons or up to 40 persons on the New Electric Buses. **Figure 4.15-4** shows the average daily boardings for the UCSF shuttle system by route for December 2019, and presents all UCSF shuttle routes, including those that serve other campus sites and the eastbound and westbound on-demand shuttles. The Grey, Blue, and Gold lines, which represent some of the highest ridership routes, serve the Parnassus Heights campus site.

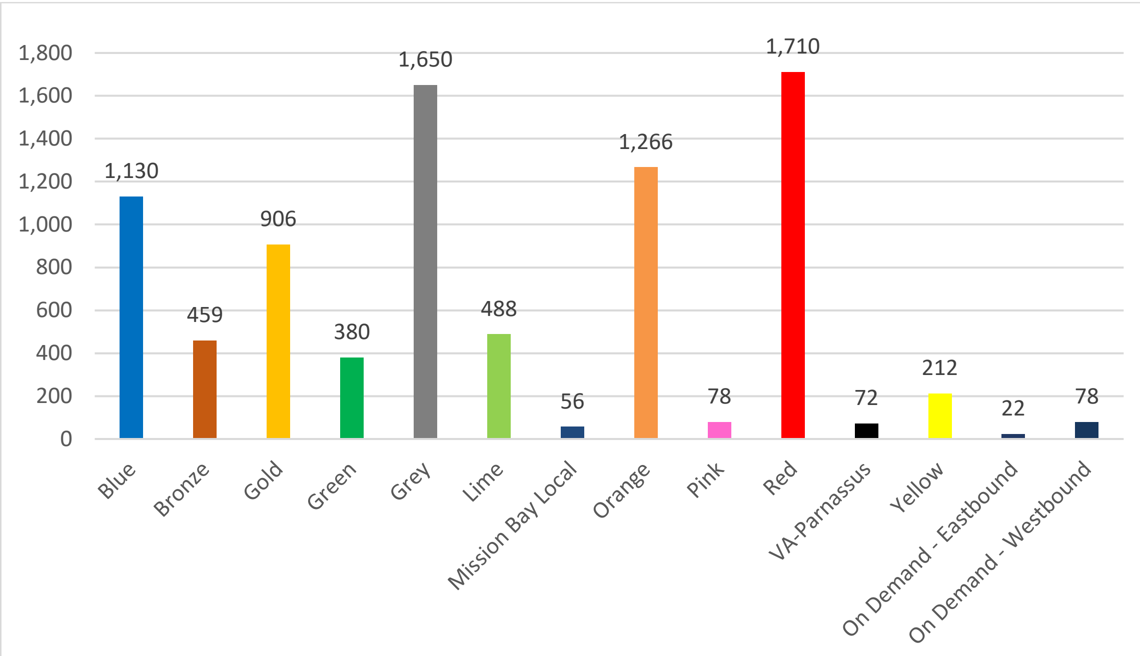


Figure 4.15-4
UCSF Shuttle Average Daily Boardings (December 2019)

UCSF Transportation Demand Management Plan (TDM)

There are many factors that determine how people travel to/from work, including home location, work shifts, access to transit, travel incentives and disincentives (e.g., how convenient or costly it is to park), or other obligations before or after work (e.g., childcare drop-off or pick-up). A TDM program is a set of policies and programs that include incentives, information, and education to encourage employees to commute to work by modes other than driving alone. The UCSF TDM program includes strategies that emphasize alternative commuting options, such as public transit, UCSF's shuttle service, biking, walking, and carpooling/vanpooling. The key elements of the UCSF TDM program are summarized in **Table 4.15-2**.

In particular, UCSF's priced permit parking, carpool/vanpool, and telecommuting programs and policies are effective TDM strategies that help reduce the number of drive-alone trips to/from the UCSF campus sites. Employee parking permits are limited by the fixed supply of permits available and by permit eligibility requirements (only certain employees are eligible to apply for parking permits), and a waitlist for permits exists. Additionally, permits are priced according to

TABLE 4.15-2
EXISTING UCSF TDM PROGRAM ELEMENTS

TDM Strategy	Description
Annual Transportation Survey	Annual employee and student survey to learn more about travel to/from, and within UCSF campus sites.
Online Commute Planning Tool	MyCommute is an online commute planning tool that helps find transit options that are custom tailored, including carpool, vanpool, public transit, biking, and walking.
Bicycle Parking	Short-term bicycle racks are provided on the campus site, with capacity generally exceeding demand. Long-term bicycle parking is provided in the Millberry Union garage.
Showers and Lockers	Showers and lockers are provided at various campus sites, which can be used by bicyclists. The Bike To Work Shower Program, in partnership with the Fitness & Recreation Centers at UCSF, provides access to the locker room and showers for a small fee.
Bicycle Permits	Free bicycle permits are provided, allowing free access to enclosed bicycle parking facilities; bike fix-it stations available at the Parnassus campus site; discounted SF Bike Coalition membership.
Carshare	Scoot mopeds and Zipcars are available at the campus site for rental as an alternative to owning or driving a personal car to campus.
Shuttle	UCSF shuttle system serving all main campus sites.
Priced Permit Parking	On-campus parking supply is limited and is prioritized for patient and visitor parking by restricting the number of parking permits that are issued per year to eligible employees based on a prioritization hierarchy. UCSF offers over 30 varieties of parking permits to employees, students and departments, which are priced at or near market rate. The price of individual permits range from $30 to $250 per month as of March 2020. Parking permit prices will increase by 32.5 percent on July 1st, 2020 as a result of a new 25 percent parking tax collected by the City of San Francisco (CCSF) and a 7.5 percent annual permit price increase collected by UCSF to reflect increasing costs. UCSF also offers single-day daytime parking permit for commuters who use alternative commuting options. These single-day “D” permits are available to UCSF faculty, staff, and students who commute to UCSF by an alternative transportation mode at least 4 of 5 days per week or 80% of their total commute to UCSF.
Limited Parking Supply	The campus parking supply is limited, and prioritized for patients and visitors, by limiting employee campus parking eligibility.
Priced Visitor Parking	UCSF offers short-term visitor parking. Both hourly and daily rates are available.
EV & Green Vehicles	Electric Vehicle Charging Stations and priority parking spaces are available for Green Vehicles.
Pre-Tax Commuter Benefits Program	The Pre-Tax commuter benefits program allows employees to reduce their public transit and vanpool costs by about one-third. The program works by allowing participants to deduct up to $270 per month (as of 2020) from their paycheck without paying payroll taxes on this income.
Carpool Parking	Preferential parking for UCSF employees with a valid carpool permit.
Pass Sales	Fare cards and monthly passes for select public transit agencies are available for purchase and reloading on campus at Transportation Offices.
Emergency Ride Home	Employees who need an emergency ride home can be reimbursed up to $50 for a transit, taxi, TNC or rental car trip.
Late Night Ride Home for Students with Lyft	Students can ride Lyft from campus to home, a transit hub, or other UCSF campus after hours and UCSF will cover the first $10 of the ride.
Telecommuting Policy	Telecommuting policies have typically been determined by job position/requirements and individual departments, for employees whose job duties are conducive to remote work.
Vanpool Program	The vanpool program requires a minimum of eight participants per vanpool. The driver participates for free and the riders pay about $250 per month per person, Currently, there are over 20 vanpools that travel throughout the Bay Area, and as far as Sacramento.

SOURCE: UCSF Staff, 2020; UCSF Campus Life Services webpage, 2020 the time periods during which permit holders may park, which encourages employees who are unable to obtain or unwilling to pay for a permit to commute by carpool, public transit, UCSF shuttle, biking, or walking. The vanpool program encourages employees to share higher occupancy vehicles (seating up to 12 passengers) for their commute trips; vanpools are organized on a UCSF-run website, and volunteer drivers participate in the program for free, while other participants pay a monthly fee. UCSF's telecommuting policies also allow certain employees to work remotely for one or more days per week, which reduces travel demand to/from the campus sites, including the Parnassus Heights campus site.

Pedestrian Circulation

Walking to and from the campus site is a common travel mode option for many UCSF employees and students. Based on the 2018 UCSF Employee Commute Survey, approximately 16 percent of employees commute by walking.

Pedestrian facilities include sidewalks, crosswalks, curb ramps, and pedestrian signals. Within the campus site, sidewalks exist on both sides of the street in most locations and are generally 12 feet to 15 feet wide. In some areas on the campus site, sidewalk widths exceed 20 feet. Most intersections on the campus site (except for some intersections near the Aldea housing complex site, such as Clarendon Avenue / Johnstone Drive, and 17th Street / Clayton Street) provide painted crosswalks and Americans with Disabilities Act (ADA)-compliant curb ramps, which are bidirectional, high contrast in color, and include truncated domes. High-visibility yellow continental stripe crosswalks are located at the Judah Street / Sixth Avenue and Judah Street / Seventh Avenue intersections, indicating the presence of a nearby school. There are two high-visibility continental stripe crosswalks mid-block on Parnassus Avenue adjacent to the Moffitt/Long Hospital Drop-off/Pick-up area, where there are two signalized pedestrian crosswalks with countdown timers. These signalized crossings accommodate the large number of pedestrians crossing from one side of Parnassus Avenue to the other. In general, crosswalks on Parnassus Avenue and Judah Street between Hillway Avenue and Seventh Avenue are continental stripe crosswalks. On Irving Street, a high-visibility continental stripe crosswalk has been installed at Arguello Boulevard in front of the pedestrian entrance to Medical Building 1 to improve pedestrian visibility and safety. High-visibility continental stripe crosswalks have also been recently installed at each intersection leg at Irving Street / Second Avenue and there are ADA-compliant curb ramps at each corner. Additionally, there are continental stripe crosswalks at the intersection of Stanyan Street / Fell Street / Oak Street. The intersection of 17th Street / Clayton includes standard crosswalks and an ADA-compliant curb ramp on the southwest corner of Clayton Street, but other curb ramps at the intersection are not ADA-compliant. Other crosswalks in the study area, except for the unpainted crosswalks near the Aldea housing complex site, include a mix of standard crosswalks (generally at signalized intersections), continental stripe crosswalks, and ladder crosswalks.

The results of pedestrian counts conducted on the campus site on a weekday in June 2019 between 12:00 PM and 2:00 PM are presented in **Table 4.15-3**. Counts were conducted at three crosswalks on Parnassus Avenue between Hillway Avenue and the Millberry Union Plaza and at the Irving Street / Second Avenue intersection. Pedestrian volumes were highest at the two signalized pedestrian crosswalks on Parnassus Avenue between Millberry Union Plaza and the Moffitt/Long Hospital Drop-off/Pick-up area, where approximately 1,500 pedestrians were observed at each crosswalk during the two-hour observation period. The number of people walking is substantially less at the Parnassus Avenue / Hillway Avenue intersection, where approximately 400 pedestrians were observed. Fewer people walking were observed crossing Irving Street; less than 200 people were observed crossing in the two crosswalks across Irving Street at the Irving Street / Second Avenue intersection.

TABLE 4.15-3
PEDESTRIAN COUNTS – PARNASSUS HEIGHTS

Crosswalk Location	Midday Counts	Daily Counts	
	2019[1]	2013[2]	2007[2]
Parnassus Avenue (in front of Millberry Union)	1,600	9,450	9,500
Parnassus Avenue (east of Moffitt Circle)	1,500	9,000	8,800
Parnassus Avenue / Hillway Avenue	400	2,750	3,000
Irving Street / Second Avenue[3]	200	1,700	1,600

NOTES:
1 Conducted between 12:00 PM and 2:00 PM.
2 Conducted between 7:00 AM and 7:00 PM.
3 Sum of pedestrians counted on the two crosswalks crossing Irving Street at the intersection with Second Avenue.

SOURCE: Fehr & Peers, 2020.

Pedestrian counts were previously conducted at similar locations in 2013 and 2007 over a 12-hour period (7:00 AM and 7:00 PM). Although these historical counts cannot be compared directly to the recent counts, they reflect a similar pattern, with most pedestrian activity occurring at the signalized pedestrian crossings on Parnassus Avenue.

As another point of comparison, during the same 12-hour time period in which the two Parnassus Avenue signalized crosswalks accommodated approximately 18,500 crossings in 2013 and 2007, the Parnassus Avenue roadway carries about 8,500 vehicles. Thus, on average, there are over two times more pedestrians crossing Parnassus Avenue than vehicles traveling along it.

Field observations at the campus site indicate that the locations of the two signalized crosswalks across Parnassus Avenue in the campus core area are not aligned with many pedestrians' desired travel paths. A number of pedestrians exiting the UCSF Medical Center walk around Moffitt Circle and walk directly across Parnassus Avenue into the entrance to the Millberry Union building and garage, rather than walk east or west to one of the two signalized crosswalks. The

Parnassus Avenue Streetscape Plan[7] would address this issue by widening the two signalized crosswalks.

In terms of pedestrian safety, there have been 12 pedestrian-involved collisions within the area immediately adjacent to the campus site over the 10-year period between 2008 and 2017 for which publicly available collision data is available.[8] Five of these collisions occurred on Parnassus Avenue between Medical Center Way and Fifth Avenue; two collisions occurred on Irving Street between Hillway Avenue and Third Avenue; three collisions occurred on Fifth Avenue between Parnassus Avenue and Kirkham Street; and two collisions occurred at the Clarendon Avenue / Johnstone Drive intersection adjacent to the Aldea Housing complex. However, these roadway segments are not part of the citywide High-Injury Network, which identifies corridors where high numbers of people have been killed or severely injured in traffic collisions and where investments in bicycle and pedestrian infrastructure could have the largest impact on reducing fatalities and severe injuries as part of the City's Vision Zero goal. The locations closest to the campus site that are a part of the High-Injury Network are Seventh Avenue between Kirkham and Noriega Streets, Lincoln Way between Arguello Avenue and 22nd Avenue, and the Stanyan Street / Fell Street / Oak Street intersection.

Bicycle Circulation

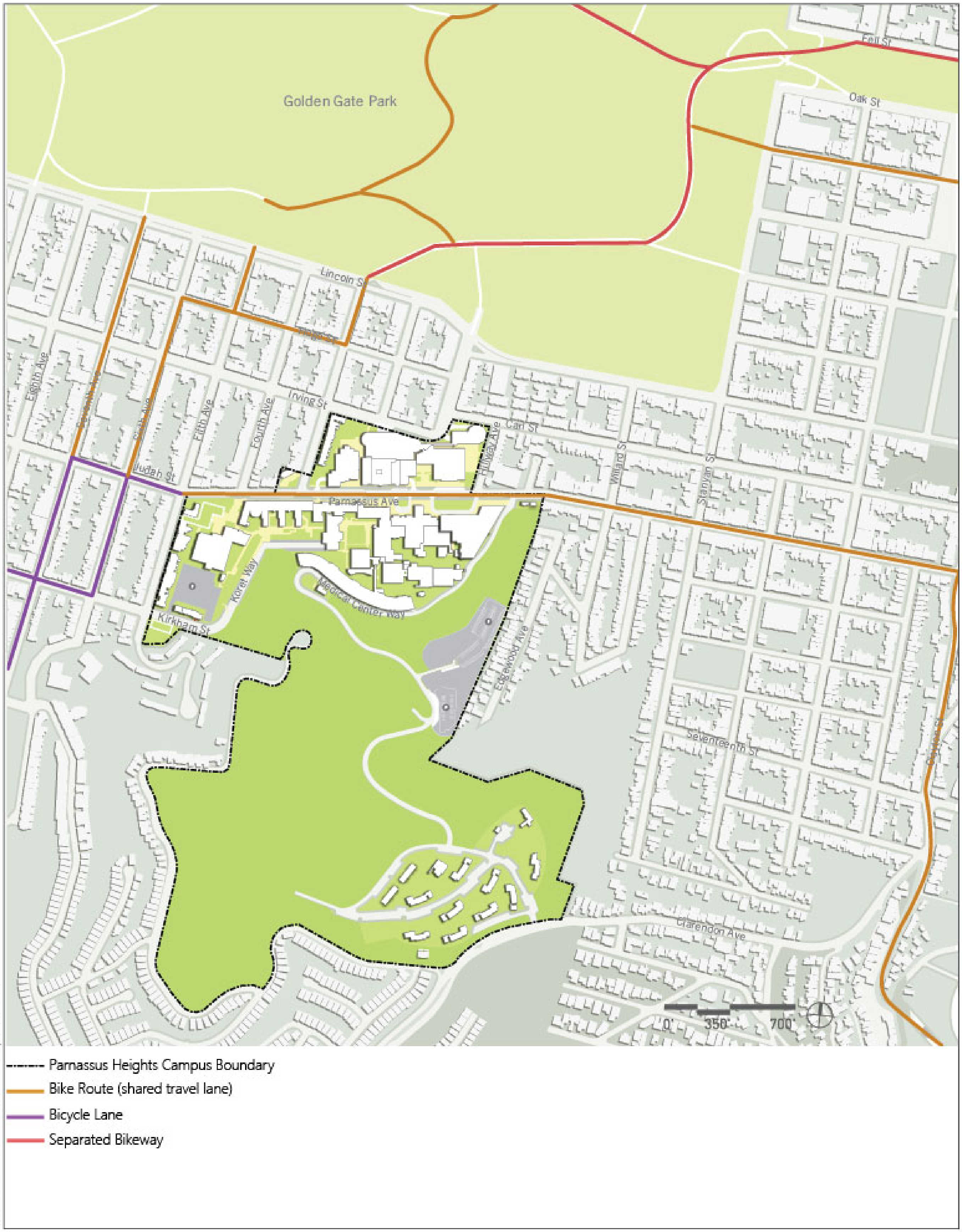
Bicycle facilities in San Francisco consist of bicycle paths, separated bikeways, bicycle lanes, and bicycle routes. Bicycle Paths (Class I) provide a completely separated right-of-way for the exclusive shared use of cyclists and pedestrians. These facilities are off-street and minimize cross-flow traffic, but they can be adjacent to an existing roadway. Separated Bicycle Lanes (Class II) provide a striped, marked, and signed bicycle lane buffered from vehicle traffic. These facilities are located on roadways and require a minimum of four to five feet of space for exclusive bicycle traffic. Bicycle Lanes (Class II) provide a striped, marked and signed lane for bicycle travel. These one-way facilities are located on roadways and reserve a minimum of four to five feet of space for exclusive bicycle traffic. Bicycle Routes (Class III) provide a shared travel lane marked and signed for shared use with motor vehicle traffic. These facilities may or may not be marked with "sharrows" to emphasize that the roadway space is shared. Separated Bikeways (Class IV), also referred to as cycle tracks or separated bikeways, are set aside for the exclusive use of bicycles and physically separated from vehicle traffic. Separated Bikeways were adopted by Caltrans in 2015. Types of separation may include, but are not limited to, grade separation, flexible posts, physical barriers, or on-street parking.

Bicycle facilities located within or near the campus site are presented in **Figure 4.15-5**. The campus site is within the Inner Sunset neighborhood, which has a mix of hilly and flat terrain.

---

[7] Note: As discussed in Chapter 3 *Project Description*, the Parnassus Avenue Streetscape Plan was proposed and analyzed as part of the 2014 LRDP FEIR. It is expected that slight modifications to the Parnassus Avenue Streetscape Plan would be made to conform to new development proposals that front Parnassus Avenue. Those modifications would be specified as adjacent new buildings are designed.

[8] Data accessed via Transportation Injury Mapping System (TIMS), *Safe Transportation Research and Education Center, University of California, Berkeley.* 2020



SFO D180291.00 - UCSF CPHP EIR/2 Graphics/Illustrator

SOURCE: Fehr & Peers, 2020

UCSF Comprehensive Parnassus Heights Plan EIR

Figure 4.15-5
Parnassus Campus Existing Bicycle Network

ESA

Hillway, Third, and Fourth Avenues connect Irving Street to Parnassus Avenue at the campus site, but they feature steep grades that are difficult for people to bicycle uphill without electrical assistance. Sixth Avenue and Seventh Avenue provide flatter north/south connections west of the campus site, and also include Class II and Class III bicycle facilities, respectively.

Although traffic volumes on Parnassus Avenue are lower than other two-lane corridors in San Francisco such as Polk Street, high pedestrian volumes, double-parking, and loading activity can make bicycling on Parnassus Avenue more challenging. While there is less pedestrian and loading activity on Irving Street, cyclists share the road with Muni light rail vehicles, and may risk catching their bicycle wheels in the light rail tracks that run through the center of the street.

Despite these challenges, bicycling is a viable and common travel mode at the campus site. UCSF has identified bicycling as an effective tool in reducing congestion and pollution, promoting good health, and creating a livable environment. Based on the 2018 UCSF Employee Commute Survey, approximately 6 percent of employees travel to and from the campus site by bicycle.

Bicycle counts were collected along Parnassus Avenue and Irving Street, between 4:00 PM and 6:00 PM on a typical weekday in May 2019, as part of the previously described gateways counts. In the eastbound direction, Irving Street/Carl Street carried approximately twice as many bicycles as Parnassus Avenue, where in the westbound direction, bicycle volumes on the two streets were similar. Higher volumes along Irving Street/Carl Street may be due to the fact that the street is relatively flat compared to Parnassus Avenue, and/or influenced by the location of the UCSF bicycle cage on the ground level of the Millberry Union Garage, which is accessible from Irving Street/Second Avenue. In terms of change over time, in 2013, bicycle counts along Parnassus Avenue had increased four-fold when compared to 2007, paralleling the uptick in bicycle use throughout the city that has been reported by the SFMTA and observed on key corridors, such as Market Street.

UCSF provides free, secured bicycle parking inside a bicycle cage in the Millberry Union garage. There are bike racks at seven additional locations throughout the campus site: from east to west, they are at the Medical Building 1, LPPI, Health Sciences East, the Kalmanovitz Library, the Clinical Sciences building, the School of Nursing, and the Dental Clinics building. There are also on-street bicycle racks located along Parnassus Avenue; however, most bicyclists are encouraged (by signs) to park in the designated bicycle parking areas in the campus site buildings. During site visits conducted in 2019, the designated bicycle parking areas were well utilized, and some bikes were observed parked at parking meters and sign poles, indicating a high demand for bicycle parking facilities.

Loading Conditions

Loading conditions on the campus site reflect both service vehicle and passenger loading activity. There are approximately 10 designated off-street service vehicle loading facilities (with a total of 17 truck loading spaces) serving the existing uses on the campus site. Although all the loading areas are used regularly for building deliveries, the Central Receiving Area and Long Hospital are typically the busiest locations throughout the day.

Passenger loading generally takes place in the Moffitt Loop, located on Parnassus Avenue in front of Moffitt Hospital, or in passenger loading zones, UCSF shuttle stops, and Muni bus stops located along Parnassus Avenue. There are approximately 13 designated passenger loading spaces provided along Parnassus Avenue and approximately six spaces provided at Moffitt Loop, which provide a total of 19 spaces. Moffitt Loop consists of two lanes: a curb lane that provides short term parking spaces (15 minutes or less) at the curb and a travel lane in which passenger loading generally occurs; parked vehicles were generally observed at 75 - 100 percent of the curb spaces. Based on observations at Moffitt Loop during a typical afternoon, passenger loading generally occurs within one to two minutes, with some vehicles waiting for up to 10 minutes for a passenger to arrive to be picked up. Based on the 2018 UCSF Employee Commute Survey, approximately 2 percent of employees/staff are dropped off at work and 4 percent travel to and from the campus site by taxi or a transportation network company vehicle (TNC; e.g., Uber or Lyft, or a future company providing a similar service).

The loading area located on Parnassus Avenue in front of the Medical Building 1 serves passenger vehicles, service vehicles, emergency vehicles, and is the location for valet service. This area is also a popular location for private vehicle and TNC pick-up and drop-off activities. Drivers picking up or dropping passengers idle at or adjacent to the designated passenger loading area (with white curb space) in front of Medical Building 1. While vehicles dropping off passengers typically occupy the curb for 30 seconds or less, those making pick-ups can take up to several minutes due to either waiting for passengers or extra time needed to communicate with passengers. This area in particular can become congested throughout the day, sometimes leading to vehicles blocking a lane of traffic as passenger and service loading occurs.

There are also approximately 25 on-street service vehicle spaces along Parnassus Avenue. Roughly 300 feet of curb space in front of the Clinical Sciences Building is currently being used for construction vehicles associated with renovation of the Clinical Sciences Building. When there are no other construction activities in progress, approximately 15 spaces would be available for parking and/or loading activities.

Emergency Vehicle Access

Emergency transport vehicles in the area typically use major streets, including Parnassus Avenue/Judah Avenue, Stanyan Street, Lincoln Way, and Seventh Avenue, heading to and from an emergency and/or emergency facility. Arterial roadways allow the emergency vehicles to travel at higher speeds and permit other traffic to maneuver out of the path of the emergency vehicle, as required by the California Vehicle Code. The San Francisco Fire Department stations closest to the campus site are: Station 12, located on Stanyan Street at Grattan Street (approximately 0.3 miles to the east); Station 20, located on Olympia Way at Clarendon Avenue (approximately 0.8 miles to the south); and Station 22, located on Irving Street at 16th Avenue (approximately 0.9 miles to the west).

The UCPD serves the campus site, and has a substation located on the campus site. The San Francisco Police Department stations closest to the campus site are Park Station, located on

Kezar Drive in Golden Gate Park (approximately one-half mile to the northeast) and Richmond Station on Sixth Avenue at Geary Boulevard (approximately 1.2 miles to the north).

Vehicle Miles Traveled

Vehicle miles traveled (VMT) per person (or per capita) is a measurement of the amount and distance that a resident, employee, or visitor drives, accounting for the number of passengers within a vehicle. In general, higher VMT areas are associated with more air pollution, including greenhouse gas emissions, and energy usage than lower VMT areas. Many interdependent factors affect the amount and distance a person might drive. In particular, the type of built environment affects how many places a person can access within a given distance, time, and cost, using different ways of travels (e.g., private vehicle, public transit, bicycling, walking, etc.). Typically, low-density development located at great distances from other land uses and in areas with few options for ways of travel provides less access than a location with high density, mix of land uses, and numerous ways of travel. Therefore, low-density development typically generates more VMT per capita compared to a similarly sized development located in urban areas.

Given these travel behavior factors, on average, persons living or working in San Francisco have a lower level of VMT per person than persons living or working elsewhere in the nine-county San Francisco Bay Area region. In addition, persons living or working in some areas of San Francisco have a lower level of VMT per person than persons living or working elsewhere in San Francisco. The City estimates different levels of VMT per capita geographically by transportation analysis zones (TAZs).[9]

To evaluate the transportation impacts of new development proposed in San Francisco, the San Francisco Planning Department has adopted a VMT analysis methodology, which is described in the current version of the *Transportation Impact Analysis Guidelines for Environmental Review* (*SF Guidelines*) published in February 2019 and updated in October 2019. The SF Guidelines use the San Francisco County Transportation Authority's (Transportation Authority) San Francisco Chained Activity Modeling Process (SF-CHAMP) travel demand forecasting model to estimate VMT by private automobiles and taxis in different TAZs. The Transportation Authority's calibration of travel behavior in the model is based on observed behavior from the California Household Travel Survey, 2010–2012; census data regarding automobile ownership rates and county-to-county worker flows; and observed vehicle counts and transit boardings. The model uses a synthetic population, which is a set of individual actors that represents the Bay Area's actual population and makes simulated travel decisions for a complete day.

The model estimates daily VMT for residential, office, and retail land use types. For residential and office uses, the Transportation Authority uses tour-based analysis. A tour-based analysis examines the entire chain of trips over the course of a day, not just single trips to and from a site. For the evaluation of retail VMT, the Transportation Authority uses a trip-based analysis.

---

9 Planners use these zones as part of transportation planning models for transportation analyses and other planning purposes. The zones vary in size from single city blocks in the downtown core, multiple blocks in outer neighborhoods, to even larger zones in historically industrial areas such as the Hunters Point Shipyard area.

A trip-based analysis counts VMT from individual trips to and from a site (as opposed to the entire chain of trips, which represents a tour). A trip-based approach, as opposed to a tour-based approach, is necessary for retail sites because a tour is likely to consist of several retail trips stopping in multiple locations. Summarizing tour VMT to each location would over-estimate the retail VMT due to longer travel distances.[10,11,12]

Because the campus site encompasses multiple TAZs, the per capita values presented in the *SF Guidelines* could not be used directly. Instead, the existing total daily VMT for the residential and office uses of each TAZ were obtained from the SF-CHAMP model, aggregated for the five TAZs, and then divided by the applicable geographic household population or office jobs to calculate the average daily VMT per capita. Existing average daily VMT per capita for the various land uses at the campus site is less than the Bay Area regional averages.

Therefore, the campus site and surrounding area have a relatively low VMT average, compared to regional averages. This is a function of the campus site's mix of uses and different populations as well as its central location and accessibility to transit. The land uses at the campus site include residential, medical work, medical visits, and retail. As discussed later in this document, medical work has been analyzed as office for VMT screening and analysis purposes. The SFCTA model does not report VMT per capita for medical visits; VMT per capita for medical visits is larger than for medical work, as given the reputation and specialized care offered by UCSF, the campus draws from beyond the immediate region – 67% of medical visits to UCSF begin or end in the San Francisco Bay Area region compared to 96% of medical work trips. Given the relatively small size and ancillary nature of the retail uses at the campus site, the potential changes in retail VMT were not evaluated in this report. **Table 4.15-4** presents the existing VMT per capita for residential and office land uses for the campus site.

TABLE 4.15-4
EXISTING DAILY VMT PER CAPITA

Area	Residential: Average VMT per Resident	Office: Average VMT per Employee
Bay Area Regional Average	17.2	19.1
UCSF Parnassus Area[1]	9.8	8.9

NOTES:
1 TAZs 226, 227, 545, 546, and 547; includes adjacent residential, retail, medical and other office uses unrelated to UCSF.

SOURCE: Adavant Consulting, 2020.

10 To state another way, a tour-based assessment of VMT at a retail site considers VMT for all trips in the tour for any tour with a stop at the retail site. If a single tour stops at two retail locations, for example, a coffee shop on the way to work and a restaurant on the way back home, then both retail locations would be allotted the total tour VMT. A trip-based approach allows an apportionment of all retail-related VMT to retail sites without double counting.

11 Retail travel is not explicitly captured in SF-CHAMP; rather, there is a generic "other" purpose that includes retail shopping and all other non-work, non-school tours. The retail efficiency metric captures all of the "other" travel generated by Bay Area households. The denominator of employment represents the size, or attraction, of the zone for this type of "other" travel.

12 San Francisco Planning Department, Executive Summary: Resolution Modifying Transportation Impact Analysis, Appendix F, Attachment A, March 3, 2016.

Parking Conditions

Although parking is not considered in determining if a project has the potential to result in significant environmental impacts, this section presents information regarding the existing parking supply in relation to the parking demand, both on- and off-street facilities, for context and for informational purposes.

On-Street Parking

On-street parking is provided on most streets near the campus site, primarily with parallel parking on both sides of the street. Due to the steep topography of the area, parking spaces perpendicular to the direction of travel are provided on some streets, on one side of the street only. A variety of parking regulations apply, with the majority of the spaces subject to Residential Parking Permit (Zone "J") restrictions (two-hour parking, except for residents, Mondays through Friday from 8:00 AM to 5:00 or 6:00 PM). Other parking spaces have meters and/or allow parking only during the non-peak commute periods.

Parking occupancies, as shown in **Table 4.15-5**, are about 90 percent on average over the course of the day. The parking demand in this area is primarily associated with residential uses and the campus site during the mid-morning (10:00 AM – 12 Noon) and midday (12 Noon – 2:00 PM) periods, and the residential and nearby neighborhood commercial uses during the evening period.

TABLE 4.15-5
ON-STREET PARKING OCCUPANCY – PARNASSUS HEIGHTS AREA

Corridor	Time	Percent Occupancy
Parnassus Avenue – Fifth Avenue to Stanyan Street	10:00 AM	88%
	12:00 PM	87%
	6:00 PM	82%
Fourth Avenue – Lincoln Way to Parnassus Avenue	10:00 AM	103%
	12:00 PM	100%
	6:00 PM	101%
Irving Street – Sixth Avenue to Arguello Boulevard	10:00 AM	85%
	12:00 PM	83%
	6:00 PM	79%
Arguello Boulevard – Frederick Street to Hugo Street	10:00 AM	96%
	12:00 PM	100%
	6:00 PM	92%
Frederick Street – Arguello Boulevard to Stanyan Street	10:00 AM	94%
	12:00 PM	91%
	6:00 PM	92%
Total	**-**	**91%**

SOURCE: Fehr & Peers, 2020.

These parking occupancies do not consider residents who park in their own driveways, which is typical in this area given the high parking demand, vehicles idling or parked in loading zones, or vehicles parked in designated motorcycle parking spots.

Based on travel behavior surveys conducted at the campus site in recent years, it is estimated that approximately 1,000 on-street parking spaces are utilized by UCSF employees, patients and/or visitors during the peak parking hour on an average weekday.

Off-Street Parking

There are several UCSF-managed off-street parking facilities on or near the campus site that provide approximately 2,300 public and permit-only parking spaces, in addition to the 236 parking spaces provided at the Aldea Housing complex. The two structured parking garages on campus are the Millberry Union / Kalmanovitz Library garage and the Medical Building 1 garage.

The Millberry Union / Kalmanovitz Library garage is located between Parnassus Avenue and Irving Street and has approximately 870 parking spaces, which are available to the general public. In addition, staff, faculty, and students may purchase monthly "N" parking permits to park in this garage on weekdays from 2:00 PM to 8:00 AM and anytime on the weekend, and monthly "L" parking permits to park in this garage on weekdays from 4:45 PM to 8:00 AM and anytime on the weekend. As shown in **Table 4.15-6**, existing parking occupancy peaks at approximately 90 percent at 11:00 AM, and remains at approximately 90 percent until after 3:00 PM.

The Medical Building 1 garage is located adjacent to the Millberry Union garage, at the Irving Street / Arguello Boulevard intersection, and provides approximately 670 marked parking spaces and approximately 100 vehicles parked outside of marked spaces via attendant parking services during peak parking hours. Permit parking is available for faculty, staff with patient care responsibilities, and senior management. As shown in Table 4.15-6, the garage is almost or fully occupied from 9:00 AM until 3:00 PM, after which parking occupancy declines.

TABLE 4.15-6
OFF-STREET PARKING GARAGE OCCUPANCY

Time	Percent Occupancy	
	Medical Building 1 Garage	Millberry Union / Kalmanovitz Library Garage
7:00 AM	78%	50%
9:00 AM	100%	62%
11:00 AM	98%	92%
1:00 PM	99%	89%
3:00 PM	95%	87%
5:00 PM	61%	59%

SOURCE: Fehr & Peers, 2020.

Other off-street parking facilities on the campus site include the following:

- Proctor surface lot is located south of Kirkham Street near the intersection of Fifth Avenue and provides 17 spaces available by permit.
- The Westside surface lot is located behind the Dental Clinics Building at Fourth Avenue and Kirkham Street, on the western edge of the campus site, and provides 151 parking spaces.
- Beckman surface lot is located on Koret Way across from the Beckman Vision Center, and provides 64 parking spaces.
- The Environmental Health and Safety Building has a 12-space surface parking lot, off Medical Center Way. Parking on this lot is available by permit.
- The Surge and Woods lots form a 157-space surface parking lot located off Medical Center Way above the campus site. Parking permits for this location are issued for staff.
- The LPPI has a 21-space surface parking lot, off Medical Center Way at the eastern edge of the campus site. Parking on this lot is available by permit.
- The Emergency Room parking area is accessed off Parnassus Avenue at the southeast end of the campus site and provides 16 parking spaces reserved for ambulances, emergency patients, and for designated radiation and chemotherapy patients.
- Aldea surface parking lots are located within the Aldea Housing complex area in the southern portion of the campus site and contain 236 parking spaces reserved for the residents of the complex.

In addition, the Kezar surface lot is a city-owned parking facility adjacent to Kezar Pavilion on Stanyan Street. UCSF has about 200 spaces reserved at this facility for staff and faculty use during the day. UCSF shuttle bus service is provided every 10 to 20 minutes on average between the Kezar lot and the campus site from 5:30 AM to 9:00 AM.

4.15.2 Regulatory Framework

UCSF is situated on land that is owned or controlled by the Regents of the University of California. As such, UCSF is exempted by the State constitution from compliance with local land use regulations, including general plans and zoning, whenever using property under its control in furtherance of its educational mission. Transportation improvements or modifications required to mitigate impacts of the CPHP to roadways under the authority of the City of San Francisco would be the responsibility of the City and would need to be approved by the applicable City agencies. However, UCSF consults and coordinates on a regular basis with the City (e.g., the Planning Department, SFMTA, San Francisco Public Works (SFPW), and Office of Community Investment and Infrastructure) when planning new development within the City, especially if improvements are being proposed within City rights-of-way adjacent to campus sites. University of California, UCSF and City plans and policies that are relevant to the CPHP are described below.

University of California

The University of California Sustainable Practices Policy

The University of California (UC) Sustainable Practices Policy lays out sustainability goals and strategies for all UC campuses and medical centers and covers climate and energy, transportation, water, green building, waste, food, and operations. UC has a goal to reach operational carbon neutrality by 2025. As a part of that goal, UC recognizes that single-occupant vehicle (SOV) commuting is a primary contributor to commute GHG emissions and localized transportation impacts, and has set the following goals related to transportation:

- By 2025, each location shall strive to reduce its percentage of employees and students commuting by SOV by 10 percent relative to its 2015 SOV commute rates.
- By 2050, each location shall strive to have no more 40 percent of its employees and no more than 30 percent of all employees and students commuting to the location by SOV.
- By 2025, each location shall strive to have at least 4.5 percent of commuter vehicles be zero-emission vehicles (ZEV).
- By 2050, each location shall strive to have at least 30 percent of commuter vehicles be ZEV.
- Each location (campus) will develop a business-case analysis for any proposed parking structures serving University affiliates or visitors to campus to document how a capital investment in parking aligns with each campus' Climate Action Plans and/or sustainable transportation policies.

UCSF Long Range Development Plan

Each campus within the University of California system is required periodically to prepare a Long Range Development Plan (LRDP), which sets forth concepts, principles, and plans intended to guide future physical growth of the campus. Currently, development at all UCSF campus sites is guided by the *2014 UCSF Long Range Development Plan (2014 LRDP)*, which includes specific policies related to future program development and space needs at each UCSF campus site, including the Parnassus Heights campus site.

The 2014 LRDP identified campus-wide objectives and objectives specific to the Parnassus Heights campus site. The following 2014 LRDP objectives relate to transportation goals:

LRDP Objectives

1. **Respond to the City and Community Context**

   D. Incorporate pedestrian-friendly urban design principles to relate campus buildings to surrounding streetscape and neighborhoods.

4. **Promote Environmental Sustainability**

   B. Reduce commute travel by providing additional campus housing.

   C. Reduce the number of UCSF remote locations by consolidation of owned and leased sites, thereby reducing travel between sites.

D. Enhance the Transportation Demand Management program by developing adequate facilities and transportation demand reduction policies, to emphasize transportation alternatives that will lessen auto traffic in and around campus sites and to meet changing needs consistent with the City's Transit First policy.

E. Continue to prioritize scarce parking for use by patients and essential healthcare providers.

The 2014 LRDP also included *Community Planning Principles*, which were produced in collaboration with the UCSF Community Advisory Group:

Community Planning Principles

Transportation

T1. Coordinate with relevant agencies to minimize congestion and provide viable transportation alternatives to single-occupancy vehicles.

T2. Coordinate UCSF planning and development efforts with San Francisco Municipal Transportation Agency operations within and around campus sites.

T3. Remain committed to San Francisco's Transit First policy and appropriate transportation demand management strategies.

T4. Recognizing UCSF's position as the second largest employer in San Francisco, take a leadership position to advance San Francisco's Transit First policy and to advocate for sustainable transportation solutions including increase in public transit ridership, use of alternative fuel vehicles, traffic calming measures, transportation demand management, demand pricing, off-peak delivery of goods and services, smart phone technologies, and other innovative strategies.

T5. Take into account transportation impacts at both the neighborhood and citywide levels in planning for UCSF's facilities.

T6. Avoid building parking in excess of anticipated need.

City of San Francisco

Transit First Policy

The City's Transit First policy is a set of principles that emphasize the City's commitment to give pedestrian, bicyclist, and public transit use of public rights-of-way priority over the private automobile.

Better Streets Plan

The Better Streets Plan is a unified set of standards, guidelines, and implementation strategies to govern how San Francisco designs, builds, and maintains its pedestrian environment, which it defines as the areas of the street where people walk, sit, shop, play, or interact. The Better Streets Plan focuses on creating a positive pedestrian environment through measures such as careful streetscape design and traffic calming measures to increase pedestrian safety. Generally speaking, the guidelines are for design of sidewalks and crosswalks; however, in some cases, the Better Streets Plan includes guidelines for certain areas of the roadway, particularly at intersections.

San Francisco Bicycle Strategy

The San Francisco Bicycle Strategy describes a City program to provide the safe and attractive environment needed to promote bicycling as a transportation mode. The Bicycle Strategy identifies the citywide bicycle route network and establishes the level of treatment (i.e., Class I, Class II or Class III facility) for each route.

4.15.3 Impacts and Mitigation Measures

This section provides the impact analysis related to transportation for the proposed project. It describes the methods used to determine the impacts of the proposed project and lists the thresholds used to conclude whether an impact would be significant. Measures to mitigate (i.e., avoid, minimize, rectify, reduce, eliminate, or compensate for) significant impacts accompany the discussion of each identified significant impact, as needed.

Significance Criteria

Would implementation of the CPHP, including the three Initial Phase projects and Initial Phase improvements:

a) Conflict with a program, plan, ordinance or policy addressing the circulation system, including transit, roadway, bicycle and pedestrian facilities?

b) Would the project conflict or be inconsistent with CEQA Guidelines Section 15064.3, subdivision (b)?[13]

c) Substantially increase hazards due to a geometric design feature (e.g., sharp curves or dangerous intersections) or incompatible uses (e.g., farm equipment)?

d) Result in inadequate emergency access?

e) Would project construction activities adversely affect travel conditions along sidewalks and roadways serving the project site?

Approach to Analysis

Consistent with the CEQA Guidelines and the *SF Guidelines*, the transportation impact analysis in this EIR analyzes the change to VMT that would result from the implementation of the CPHP at the Parnassus Heights campus site. Changes to traffic operations in the study area (i.e., the level of service of project area intersections) and transit operations (e.g. project generated transit ridership and effect on capacity utilization, potential delay to transit vehicles) is outside the scope of the CEQA analysis and are not discussed below. An analysis of the changes to traffic and

[13] CEQA Guidelines Section 15064.3, subdivision (b) refers to the discontinuation of vehicle level of service (LOS) as an impact metric for transportation analysis and instead recommends the use of vehicle miles traveled (VMT); this section gives lead agencies discretion to choose the most appropriate methodology to evaluate a project's VMT.

transit operations has, however, been completed and is presented in **Appendix TRANS** for informational purposes only. This appendix is provided for decision-makers' consideration, independent of the environmental review process.

As discussed in the Vehicle Miles Traveled section above (within the *Local Setting* section), VMT is a measurement of the amount and distance that a resident, employee, or visitor drives, accounting for the number of passengers within a vehicle. To determine VMT, travel demand was first estimated to understand the number and the length of vehicle trips associated with the CPHP by population.

At a high level, travel demand is determined through the use of a four-step process: trip generation, mode split, trip distribution, and trip assignment, which are described in more detail in the Travel Demand Estimates section. The travel demand estimates for the CPHP were primarily informed by the results of travel behavior surveys conducted at the campus site in recent years, but with two adjustments to reflect how people are reasonably expected to travel in the future with the implementation of the CPHP: (1) current travel behavior trends such as more people traveling to and from the campus site using TNCs such as Uber and Lyft, and (2) the expected amount of parking available to UCSF faculty, staff, patients, and visitors under the CPHP, which would be more constrained than existing conditions and would result in a shift away from driving alone and parking on campus. The campus off-street parking supply is expected to decrease by approximately 400 spaces with implementation of the CPHP from approximately 2,300 spaces to approximately 1,900 spaces.[14]

Analysis Scenarios

The analysis examines four scenarios: 'Existing', 'CPHP' (Future Phase), 'CPHP Initial Phase' and 'Cumulative.' Each scenario is described below.

- **Existing** – This scenario represents existing conditions at the campus site and is based on existing population numbers and existing travel behavior.
- **CPHP (Future Phase)** – This scenario represents full buildout, when the CPHP has been fully implemented. This analysis uses the projected future campus population and adjusted mode split numbers.
- **CPHP Initial Phase** – This scenario represents the implementation of the near-term projects proposed in the Initial Phase, which are anticipated to be completed by about the year 2030. This includes the Irving Street Arrival, Research and Academic Building, and initial Aldea Housing Densification projects and other Initial Phase improvements (e.g., Initial Phase Utility Improvements, the Parnassus Avenue Streetscape Plan, Renovation of Existing Buildings, and Neighborhood Investments (see Chapter 3, *Project Description* for more detail). Note: as described in Chapter 3, *Project Description*, the New Hospital is also an Initial Phase project, but is analyzed at a program level in this EIR. The New Hospital will be analyzed in more detail – at a project level – in a future, separate EIR.

[14] These estimates include garage and surface lots at the campus site, including the Kezar lot, and exclude parking associated with the Aldea Housing complex.

- **Cumulative** – The Cumulative scenario represents implementation of the CPHP in combination with past, present, and reasonably foreseeable future projects in the vicinity of the campus site.

Travel Demand Estimates

Trip Generation

UCSF provided population estimates for faculty and staff, patients and visitors, and residents under the CPHP in August 2019. Trip generation rates for the populations were based on historical UCSF travel surveys and largely consistent with the Transportation Impact Study prepared in support of the 2014 LRDP. These trip generation inputs were used in combination with the population estimates by category to estimate daily and PM peak hour person trips by population category at full implementation of the CPHP. Daily and peak hour person trip estimates by population group are displayed in **Table 4.15-7.** Compared to existing conditions, the daily population and daily and PM peak hour external person trips are expected to increase by approximately 50 percent.

TABLE 4.15-7
CPHP (FUTURE PHASE)[1] DAILY AND PEAK HOUR PERSON TRIPS (COMPARED TO EXISTING CONDITIONS)

Population Group	Population	External Daily Person Trips	External PM Peak Person Trips
Faculty/Staff/Students	16,400[2]	29,700	5,200
Patients/Visitors	9,000	18,100	1,300
Residents[3]	1,000[4]	4,400	600
Total[5]	**26,400**[6] (+50%)	**52,200** (+55%)	**7,100** (+50%)

NOTES:
1 The population and trip estimates reflect full buildout of the CPHP (Future Phase), when the CPHP has been fully implemented.
2 For purposes of the transportation analysis, sub-population estimates (e.g. faculty, staff, and student populations individually) were rounded prior to summing; this results in a difference of approximately 100 compared to the total population presented in Chapter 3, *Project Description*.
3 includes staff and student housing, market-rate housing, and hotel for patients and families proposed as part of the CPHP.
4 The trip generation estimates for the market-rate housing and hotel uses are based on the number and size of housing units and number of hotel rooms. The population associated with these uses is not included in this population estimate. However, these uses are included in the person trip estimates and the subsequent demand analyses presented below.
5 Percentages represent the percent change from the existing condition to full buildout of the CPHP.
6 The total population analyzed in the transportation analysis differs from the total population presented in Chapter 3, *Project Description*, because it includes residents.

The Parnassus Heights campus site is estimated to generate a total of approximately 52,200 external daily person trips with full implementation of the CPHP by year 2050, an increase of approximately 55 percent compared to existing conditions. This number of trips excludes internal trips that are expected to occur within the campus site (e.g., a researcher at the campus site traveling from her office to the Millberry Union to eat lunch and returning back to her office afterwards).

Mode Choice

Mode choice is the designation of trips to the various means that people use to travel, such as automobile, transit, walking, bicycling, taxi, or other modes of transportation. The determination of the mode of transportation used in trips to and from the campus site would depend on many characteristics of the trip such as who is making the trip (e.g., faculty, staff, patient, visitor, resident, vendor), the type of trip (work, medical appointment, other visit), and where people are going to or coming from. Existing mode choice data was derived from the 2018 Employee Commute Survey and the 2017-18 Patient/Visitor Survey and is displayed in **Table 4.15-8**.

TABLE 4.15-8
EXISTING MODE SPLIT (2018)

Population Group	Drive Alone	Drop-Off	Taxi/ Uber/ Lyft	Car-pool	Van-pool	Public Transit	UCSF Shuttle	Bicycle	Motor-cycle/ Scooter	Walk/ Run	Tele-com-mute	Other
Faculty/ Staff/ Students	23%	2%	4%	3%	1%	32%	10%	6%	1%	16%	2%	0%
Patient/ Visitor	22%	7%	7%	37%[1]	1%	17%	3%	1%	0%	5%	0%	0%
Residents	31%	3%	2%	0%	0%	25%	25%	4%	0%	9%	0%	0%

NOTES:
1 Surveyed patients and visitors who "traveled in a car with others" on their trip to/from the campus site are categorized under "carpool." The larger proportion of carpooling activity among patients and visitors reflects the proportion of patients (both inpatients and outpatients) who travel to/from the campus site with a companion.

To forecast anticipated travel behavior under full buildout of the CPHP, which would be completed by 2050, a methodology was developed to adjust the existing mode split to account for:

- The continuation of observed historical travel behavior trends, such as a decrease in faculty/staff drive alone trips, an increase in faculty/staff transit use and an increase in TNC and drop-off trips associated with both faculty/staff and patients/visitors
- The anticipated amount of parking provided under the CPHP for faculty/staff and patients/visitors, which would essentially "cap" the number of drive alone and carpool trips to/from campus across both the faculty/staff and patient/visitor populations

To estimate how travel patterns might change in the future, current trends in travel behavior at UCSF were first examined. In recent years, UCSF has continued implementing an extensive TDM program, prices for off-street parking have increased, and some minor transit improvements have been implemented on nearby routes. Based on regularly conducted surveys of UCSF faculty and staff travel behavior, the share of faculty and staff driving alone to campus decreased from 32 to 23 percent between 2013 and 2018. During the same period, the share of faculty and staff traveling by public transit or UCSF shuttle increased from 37 to 42 percent and the percentage of faculty and staff traveling by taxi/TNC or drop-off increased from 4 to 6 percent. Over the past 30 years, UCSF patient and visitors have been surveyed on their travel behavior twice – in 1990 and 2018. During that time period, the share of patients and visitors driving alone to campus decreased from 39 to 22 percent and the share traveling by public transit or UCSF shuttle decreased from 33 percent to 20 percent. During the same period, the share traveling by taxi, TNC, drop-off or carpool increased from 22 percent to 51 percent.

Even if these travel behavior trends continue into the future – and less faculty and staff drive alone and more travel by public transit and/or taxi/TNC – the amount of parking available at UCSF under the CPHP would not be sufficient to accommodate the number of people who would desire to drive alone or carpool to the campus site.

Under the CPHP, the amount of off-street parking available is expected to decrease by approximately 400 parking stalls from approximately 2,300 to approximately 1,900 parking stalls in off-street garages and surface lots.[15] Total parking supply would decrease even with the addition of a new structured parking garage proposed as part of the West Side Housing. A new structured parking garage with approximately 190 parking spaces would replace the Westside surface lot behind the Dental Clinics building (with 151 existing parking spaces).

As the total campus population increases in a more parking-constrained environment, people will likely change the way they travel to and from the campus site. With respect to patients, some health insurance companies and hospitals are currently partnering with TNCs, like Uber and Lyft to provide patients with free travel to and from medical appointments,[16] and in the future, TNCs could have larger roles in medical travel. One reason taxi/TNC services are attractive is that they do not require a parking space; people can travel to/from the campus site by vehicle without needing to park the vehicle. It is expected that those desiring to travel to the campus site by vehicle in the future are less likely to drive and park, and more likely travel by taxi/TNC due to the door-to-door convenience and removal of looking for and paying for parking in a parking constrained destination. Specifically, the number of people who would otherwise desire to drive alone or carpool to/from campus site – but would not under the CPHP due to the limit on parking supply – was estimated by comparing anticipated parking supply under the CPHP to estimated parking demand based on the continuation of observed historical travel behavior trends. This proportion of people would be reasonably expected to shift their travel behavior and would be more likely to travel by taxi/TNC or drop-off in the future, which reflects a desire to travel by automobile – but one that is not limited by parking availability.

This approach, which contemplates a larger shift to taxi/TNC and drop-off trips, is conservative with respect to estimating the number of vehicle trips associated with the CPHP. Each taxi/TNC or drop-off trip generates two vehicle trips for every person trip: one when the driver arrives to the campus site to pick-up/drop-off a passenger(s) and one when they depart the campus site. The future estimated mode split that reflects this analysis approach is displayed in **Table 4.15-9**. As compared to the existing mode split, the share of faculty/staff driving alone or carpooling to the campus site would decrease, while the share of faculty/staff using taxi/TNC, drop-off, and

15 These estimates include garage and surface lots at the campus site, including the Kezar lot, and exclude parking associated with the Aldea Housing complex.

16 For additional information, see *Uber Health's website* https://www.uberhealth.com/; Recent news coverage of TNC-healthcare partnerships include Sutter Health's partnership with Lyft (https://www.forbes.com/sites/brucejapsen/2020/01/13/lyft-hails-major-hospital-partner-in-sutter-health/) and Medicare Advantage's partnership with Lyft (https://healthpayerintelligence.com/news/lyft-expands-work-with-bcbs-humana-medicare-advantage-plans).

public transit would increase. For patients/visitors, travel by drive alone, carpool, and public transit is expected to decrease, and travel by taxi/TNC and drop-off is expected to increase.

TABLE 4.15-9
CPHP (FUTURE PHASE)[1] MODE SPLIT

Population Group	Drive Alone	Drop-Off	Taxi/ Uber/ Lyft	Car-pool	Van-pool	Public Transit	UCSF Shuttle	Bicycle	Motor-cycle/ Scooter	Walk/ Run	Tele-com-mute	Other
Faculty/ Staff/ Students	13%	5%	8%	2%	1%	33%	12%	6%	1%	16%	2%	0%
Patient/ Visitor	12%	20%	20%	23%	1%	15%	2%	1%	0%	5%	0%	0%
Residents	31%	3%	2%	0%	0%	25%	25%	4%	0%	9%	0%	0%

NOTES:
1 These mode split estimates reflect full buildout of the CPHP (Future Phase), when the CPHP has been fully implemented.

These estimated future mode splits were used to calculate the daily and peak hour number of vehicle trips, which are presented in **Table 4.15-10**. The daily vehicle trip estimate is an input to the VMT analysis presented below. The PM peak vehicle trip estimate is presented for informational purposes. Compared to existing conditions, the daily and PM peak hour vehicle trips are expected to increase by approximately 95 percent and 75 percent, respectively.

TABLE 4.15-10
CPHP (FUTURE PHASE)[1] DAILY AND PEAK HOUR VEHICLE TRIPS (COMPARED TO EXISTING CONDITIONS[2])

Population Group	Daily	PM Peak
Faculty/Staff/Students	10,600	1,900
Patient/Visitor	16,500	1,200
Residents	1,700	300
Total	**28,800 (+95%)**	**3,400 (+75%)**

NOTES:
1 The vehicle trip estimates reflect full buildout of the CPHP (Future Phase), when the CPHP has been fully implemented.
2 Percentages represent the percent change from the existing condition to full buildout of the CPHP.

In recent months, travel behavior has changed at a global level as a result of the COVID-19 pandemic. In San Francisco travel patterns (both amount and mode of trips) have changed significantly since a “shelter-in-place” order was issued on March 17, 2020. For example, telework and telemedicine services have increased, and transit use has decreased.

As discussed in the *Environmental Setting*, Muni has been operating reduced transit service in San Francisco under a COVID-19 Core Service Plan since April 8, 2020. The timing and degree to which transit service is reinstated in San Francisco is uncertain at present. The SFMTA has developed a Transportation Recovery Plan, which represents a guiding framework for expanding transportation services and operations as the “shelter-in-place” orders are modified and demand for travel increases. Financial constraints will also likely impact Muni’s ability to restore transit service.

At the time of publication of the Draft EIR, the medium- or long-term effects of the COVID-19 pandemic on travel behavior are uncertain and it would be speculative to estimate any of these possible changes, which may include various effects such as increased telework and telemedicine services or less transit ridership. To the degree that telework/telemedicine increases over the long-term, as compared to a 2019 baseline, this could result in less VMT than projected as part of this study. Should transit ridership decrease over the long-term, as compared to a 2019 baseline, with more people choosing to drive or be driven, this could result in additional VMT than projected as part of this study.

Trip Distribution

For each population group, project-generated vehicle trip origins and destinations were analyzed as coming to or from the four superdistricts in San Francisco, (i.e., northeast, northwest, southeast, and southwest quadrants of the City), different regions in the Bay Area (East Bay, North Bay, Peninsula, South Bay), or outside the Bay Area. Trip distributions were based on information collected by UCSF in the 2018 Employee Commute Survey, 2017-18 Patient/Visitor Survey, and a 2013 survey of Aldea and Avenue Housing as presented in the 2014 LRDP. As previously noted in Table 4.15-10, the campus site would generate 28,800 daily vehicle trips across all population groups. These trips were then distributed regionally, with the resulting trip distribution percentages shown in **Table 4.15-11**. The results of the vehicle trip distribution analysis were used in to determine average VMT by population.

TABLE 4.15-11
PROJECT TRIP DISTRIBUTION BY POPULATION GROUP

	SD 1	SD 2	SD 3	SD 4	East Bay	North Bay	Peninsula	South Bay	Outside Bay Area
Faculty/Staff/Students	3%	12%	15%	17%	15%	10%	24%	3%	1%
Patient/Visitor	4%	5%	11%	7%	18%	11%	11%	6%	27%
Residents	24%	10%	46%	11%	3%	2%	0%	3%	1%

Parking and Loading Estimates

Although parking and loading demand are not CEQA significance topics, parking and loading demand estimates are presented, as they relate to the overall travel demand analysis. Parking demand was an important consideration in the travel demand process, as described above. Passenger loading demand is an output of the travel demand process and is related to parking demand. Parking demand reflects the space needed on campus to accommodate people who travel to/from the campus site by drive alone or carpool, whereas passenger loading demand reflects the space needed for those who travel by taxi/TNC or drop-off.

Parking Demand

Parking demand estimates were calculated based on population type, expected mode of travel to and from the campus site, and average vehicle occupancy. The number of daily parked vehicles reflects vehicle trips associated with drive alone and carpool trips, and excludes vanpool vehicle trips, which are parked in a separate, dedicated parking lot. The expected daily parking demand and peak hour parking demand for a typical weekday are summarized in **Table 4.15-12** by population group. Peak parking hour is distinct from the PM peak hour and reflects the time of day with the greatest parking demand. For the off-street parking garages, the peak parking hour occurs at approximately 11:00 AM, as presented in Table 4.15-6. Compared to existing conditions, the daily and peak parking hour parking demand are expected to decrease by approximately three percent and eight percent, respectively. This decrease reflects the expected decrease in off-street parking supply (by approximately 400 parking stalls) associated with the CPHP, which would essentially "cap" the number of drive alone and carpool trips to/from campus that require a parking stall across both the faculty/staff and patient/visitor populations.

TABLE 4.15-12
CPHP (FUTURE PHASE)[1] DAILY AND PEAK PARKING DEMAND (COMPARED TO EXISTING CONDITIONS)

Population Group	Daily Parking	Peak Parking Hour
Faculty/Staff/Students	2,500	1,900
Patient/Visitor	2,600	900
Residents	700	100
Total[2]	**5,800 (-3%)**	**2,900 (-8%)**

NOTES:
1 The parking demand estimates reflect full buildout of the CPHP (Future Phase), when the CPHP has been fully implemented.
2 Percentages presented in parentheses represent the percent change from the existing condition to full buildout of the CPHP.

The on-street parking supply within the vicinity of the campus site is expected to remain constant between existing conditions and implementation of the CPHP at approximately 1,000 parking spaces. Since existing on-street parking occupancies are about 90 percent on average over the course of the day (as shown in Table 4.15-5), it is not expected that there would be additional on-street parking supply to meet additional parking demand related to UCSF populations. Therefore, the total parking demand is expected to be approximately equal to the total parking supply of 2,900 spaces, which includes both off-street and on-street parking facilities.

Loading Demand

Passenger loading demand was calculated based on the expected number of people traveling to the campus site by taxi/TNC or drop-off during the PM peak hour. As described above, more people are expected to travel to/from the campus site by taxi/TNC or drop-off as a result of the limited campus parking supply. Considering the PM peak hour passenger loading demand, it is expected that up to approximately 45 passenger loading instances would occur simultaneously during the peak minute of the peak hour. The expected PM peak hour passenger loading demand and peak minute passenger loading demand range is summarized in **Table 4.15-13** by population group. Compared to existing conditions, the PM peak hour and peak minute loading demand are expected to increase by approximately 240 percent.

TABLE 4.15-13
CPHP (FUTURE PHASE)[1] PM PEAK HOUR AND PEAK MINUTE LOADING DEMAND
(COMPARED TO EXISTING CONDITIONS)

Population Group	PM Peak Hour	Peak Minute
Faculty/Staff/Students	650	20-25
Patient/Visitor	500	15-20
Residents	40	1-2
Total[2]	**1,210 (+240%)**	**35-45 (+240%)**

NOTES:
1 The loading demand estimates reflect full buildout of the CPHP (Future Phase), when the CPHP has been fully implemented.
2 Percentages presented in parentheses represent the percent change from the existing conditions to full buildout of the CPHP.

Compared to the anticipated passenger loading supply with full implementation of the CPHP, presented in **Table 4.15-14**, once the CPHP is fully implemented, passenger loading demand during the PM peak hour may exceed supply during the peak minute.

TABLE 4.15-14
CPHP (FUTURE PHASE)[1] ANTICIPATED PASSENGER LOADING SUPPLY

Passenger Loading Location	Proposed Loading Spaces
Parnassus Avenue (On-Street)	13
Proposed Millberry Union Garage Passenger Loading Location	5-6
Proposed New Hospital Passenger Loading Loop	8-10
Proposed Fourth Avenue Extension (On-Street)	4-6
Total	**30-35**

NOTES:
1 The loading supply estimates reflect full buildout of the CPHP (Future Phase), when the CPHP has been fully implemented.

VMT Estimates

The VMT analysis presented below reflects two different methodologies: one based on the *SF Guidelines* methodology for estimating VMT for San Francisco projects, and the other based on a project-specific methodology. The estimates based on *SF Guidelines* are presented for comparison purposes. The project-specific methodology used for the impact assessment calculates average daily VMT for specific CPHP populations using the results of the travel demand analysis. Thus, the project-specific method incorporates UCSF-specific data on the travel patterns associated with the existing population and urban context of the campus site. The transportation assessment focuses on VMT per capita estimates for residential and office uses; total VMT, which includes all VMT generated by the project was also calculated and used as an input for the air quality analysis presented in *Section 4.2, Air Quality*.

VMT Estimates based on SF Guidelines

Under the *SF Guidelines*, the Transportation Authority's SF-CHAMP travel demand forecasting model is used to estimate the daily VMT for residential, office and retail land use types for existing and future (2040) cumulative conditions for the TAZ in which the proposed project is located (this approach is considered to be "map-based screening" for VMT impacts). Separate calculations of VMT are performed for residential, office, and retail uses, each one of which is then divided by the applicable geographic household population, office jobs, or retail employment to calculate the VMT per capita.

The *SF Guidelines* also indicate how to apply the map-based screening criteria to the other land use types which are not residential, office, or retail uses; for example:

- Student housing should be treated as residential for screening and analysis.
- Medical and childcare land uses, and tourist hotel workers should be treated as office for screening and analysis.

Because the Parnassus Heights campus site encompasses multiple TAZs, the per capita values presented in the *SF Guidelines* could not be used directly. Instead, the existing and future total daily VMT for the residential and office uses of each TAZ were obtained from the SF-CHAMP model, aggregated for the five TAZs, and then divided by the applicable geographic household population or office jobs to calculate the average daily VMT per capita for residential and office populations. The retail VMT was not analyzed, given the relatively small size and ancillary nature of the retail uses on the campus site.

VMT Estimates based on Project-specific Data

Given that the five TAZs encompass parts of the adjacent neighborhoods (mostly residential, but also retail, medical and other office uses unrelated to UCSF), a project-specific methodology was used to calculate the average daily VMT using travel information from the CPHP. The calculations take into account the various types and travel characteristics of the existing and future UCSF employees, residents, and visitors to estimate the average daily VMT specific to the campus site.

The average daily VMT was calculated by multiplying the number of existing and future site-generated vehicle trips originating from or destined for the four San Francisco superdistricts, the East Bay, North Bay, South Bay, and out of the bay area region by an average distance between the campus site and the estimated center of gravity for each of the eight zones. These daily VMT estimates were then divided by the appropriate household population or jobs to calculate the average daily VMT per capita. This method is considered a spreadsheet model based on project-specific data and local data on trip modes and lengths, which is consistent with the spreadsheet-based methods the Governor's Office of Planning and Research (OPR) indicates may be used to estimate VMT in its *Technical Advisory on Evaluating Transportation Impacts in CEQA* (*"Technical Advisory"*).[17]

[17] This document is accessible at http://opr.ca.gov/docs/20190122-743_Technical_Advisory.pdf

Table 4.15-15 shows the existing and future average daily VMT per capita for the campus site, using both the *SF Guidelines* methodology and the project-specific methodology described above.

TABLE 4.15-15
EXISTING AND FUTURE DAILY VMT PER CAPITA

	Residential: Average VMT per resident[1]		Office: Average VMT per employee[2]	
	Existing	2040	Existing	2040
Parnassus Heights Area (SF Guidelines)[3]	9.8	9.5	8.9	8.7
Parnassus Heights Campus Site (CPHP Estimate)[4]	6.9	8.5	9.4	10.9

NOTES:
1 Represents student housing residents and hotel guests
2 Represents UCSF faculty, physicians, nurses, students, trainees and other UCSF staff, as well as childcare and hotel workers.
3 TAZs 226, 227, 545, 546, and 547; includes adjacent residential, retail, medical and other office uses unrelated to UCSF.
4 Represents UCSF campus site exclusively; 2040 conditions represent the estimated future mode split of the CPHP project.

SOURCE: Adavant Consulting, 2020.

As presented in Table 4.15-15, the average daily VMT results for the Parnassus Heights area (five TAZs in the SF-CHAMP model) and the Parnassus Heights campus site (Parnassus Heights campus site boundaries) are similar under all conditions. Some variation is expected, since the differences between the two analysis areas reflect different study areas and associated land use mixes in their VMT calculations. For example, the existing and future residential VMT estimates for the Parnassus Heights campus site are less than that of the five TAZs in the Parnassus Heights Area, while the opposite trend can be observed for the office VMT estimates.

Impact Analysis

Impact TRANS-1: Implementation of the CPHP would not conflict with a program, plan, ordinance or policy addressing the circulation system, including transit, roadway, bicycle and pedestrian facilities. (Less than Significant)

Consistency with UC Plans and Policies

CPHP

Consistency with The University of California Sustainable Practices Policy. The proposed CPHP is consistent with the transportation-related goals and policies set forth in the *UC Sustainable Practice Policy* as it continues to encourage a shift away from drive-alone commute trips, which are a primary contributor to commute GHG emissions and localized transportation impacts. Already, approximately 23 percent of UCSF employees currently drive alone to the campus site, which is below the *UC Sustainable Practices Policy* target of having no more 40 percent of employees commuting by this mode of travel by 2050. In the future, under implementation of the proposed CPHP, it is anticipated that a lower percentage of employees would drive-alone to the campus site partially as result of the limited parking supply on campus (described above in more detail in the “Travel Demand Estimates” section).

Under the proposed CPHP, UCSF would continue its existing TDM program described in the "Local Setting" section, such as priced permit parking, carpool/vanpool, and telecommuting programs, which have historically been effective TDM strategies to reduce the number of drive-alone trips to/from the campus site.

The proposed CPHP includes a net decrease in parking spaces on campus (as described in the "Travel Demand Estimates" section), and therefore does not include a business-case analysis for new proposed parking structures, consistent with the *UC Sustainable Practices Policy.* The proposed CPHP proposes one new parking structure on the West End of the campus site, which would replace existing parking spaces that are planned to be removed under the CPHP.

Consistency with the 2014 LRDP. The proposed CPHP is also consistent with the 2014 LRDP transportation-related goals and policies. The proposed CPHP includes elements to facilitate intuitive wayfinding and easy navigation between buildings consistent with 2014 LRDP goal to "incorporate pedestrian-friendly urban design principles" in and around the campus site. In addition, the proposed CPHP included the development of a bridge across, and/or tunnel beneath, Parnassus Avenue, which would improve pedestrian connections between the north side and south side of the street.

Also, as described in the "Local Setting" section, under the proposed CPHP, UCSF would continue its existing TDM program, which have historically been effective TDM strategies to reduce the number of drive-alone trips to/from the campus site. UCSF continues to prioritize parking for use by patients and essential healthcare providers in their Millberry Union garage (public parking for patients) and Medical Building 1 garage (permit parking for faculty, staff with patient care responsibilities, and senior management). By proposing additional housing at the Aldea Housing complex site and new housing within the West Side district for students, trainees, and faculty, the proposed CPHP is also consistent with the 2014 LRDP goal of reducing commute travel by providing additional campus housing.

The proposed CPHP is also consistent with the 2014 LRDP *Community Planning Principles* as UCSF will continue implementing its comprehensive TDM program, as well as coordinating with relevant local and regional agencies to advance San Francisco's Transit First policy, minimize congestion and provide viable transportation alternatives to single-occupancy vehicles. Finally, by reducing net parking supply on the campus site, the proposed CPHP would not build parking in excess of anticipated need.

Based on the above, the proposed CPHP would be consistent with the transportation-related goals and policies set forth in the *UC Sustainable Practices Policy* and the 2014 LRDP*,* and the impact would be less than significant.

Mitigation: None required.

Irving Street Arrival

The Irving Street Arrival project would mainly involve modifications to the existing Medical Building 1 in order to develop a new and/or reconfigured multistory vertical circulation space between Medical Building 1 and Millberry Union. In doing so, the project would help improve wayfinding and navigation between Irving Street and Parnassus Avenue. The Irving Street Arrival project would not involve any modifications to city streets. The project would therefore be consistent with the transportation-related goals and policies set forth in the *UC Sustainable Practices Policy* and the 2014 LRDP*,* and the impact would be less than significant.

Mitigation: None required.

Research and Academic Building

The proposed Research and Academic building (RAB) would occupy the site currently occupied by UC Hall. The impact related to conflict with a program, plan, ordinance or policy addressing the circulation system for the CPHP as a whole, including the RAB, is set forth above and would be less than significant.

Mitigation: None required.

Initial Aldea Housing Densification

During the initial phase of housing densification on the Aldea Housing complex, three existing 3-story housing structures would be replaced with three 8-story housing structures and one 5-story building. By adding additional housing, this project helps achieve the 2014 LRDP goal to "reduce commute travel by providing additional campus housing." Therefore, the initial Aldea Housing Densification project would have a less-than-significant impact related to conflict with a program, plan, ordinance or policy addressing the circulation system.

Mitigation: None required.

Initial Phase Improvements

The Initial Phase improvements that relate to the transportation include the proposed Service Corridor (as part of larger Utility Improvements), any changes to the Parnassus Avenue Streetscape Plan, and Neighborhood Investments. The Service Corridor would facilitate the transport of goods and back-of-house commercial loading activities. The Parnassus Avenue Streetscape Plan aims to create a sense of place on the street while balancing competing needs of different street users by reallocating curbside uses and installing pedestrian safety improvements such as widened crosswalks and bulbouts.[18] Neighborhood Investments refer to voluntary improvements to public streets or other public realm areas, which - while not considered mitigation measures under CEQA - may nonetheless improve operations or otherwise enhance conditions at those locations. In these ways, these projects would generally have a positive effect on transportation in the vicinity of the campus site. Therefore, these CPHP Initial Phase improvements would have a less-than-significant impact related to conflict with a program, plan, ordinance or policy addressing the circulation system.

Mitigation: None required.

[18] Note: the Parnassus Avenue Streetscape Plan was analyzed as part of the 2014 LRDP FEIR and no specific changes have been identified as part of the CPHP at this point in time.

Consistency with Local Plans and Policies

Consistency with San Francisco's Transit First Policy. The proposed CPHP would be implemented in a way that would continue to give people walking, biking, and using public transit priority in the public rights-of-way. The design of the proposed CPHP would maintain existing Muni bus stops on Parnassus Avenue and light rail stops on Irving Street. The proposed CPHP would maintain the existing sidewalks, crosswalks, and bicycle facilities within the campus site. In addition, the proposed CPHP included the development of a bridge across, and/or tunnel beneath, Parnassus Avenue, which would improve pedestrian connections between the north side and south side of the street. Therefore, the proposed CPHP would not conflict with San Francisco's Transit First Policy.

Consistency with San Francisco's Better Streets Plan. The proposed CPHP would be implemented in a way that would continue to create a positive pedestrian environment in and around the campus site, consistent with San Francisco's Better Streets Plan. The proposed CPHP would maintain the existing sidewalks and crosswalks in the campus site. New roadways such as the proposed extension of Fourth Avenue would be designed consistent with the recommendations and design guidelines presented in the Better Streets Plan, including sidewalk width. Therefore, the proposed CPHP would not conflict with the Better Streets Plan.

Consistency with the San Francisco Bicycle Strategy. The proposed CPHP would be implemented in a way that would continue to create a safe and attractive environment for bicycling, consistent with the San Francisco Bicycle Strategy. The proposed CPHP would maintain the existing bicycle facilities within the campus site. The proposed CPHP would maintain existing short-term and long-term bicycle parking facilities as well as provide additional short-term and long-term bicycling parking facilities in convenient locations, as needed to maintain adequate bicycling parking facilities on campus. Therefore, the proposed CPHP would not conflict with the San Francisco Bicycle Strategy.

Since the CPHP would not conflict with San Francisco's Transit First Policy, Better Streets Plan, or the San Francisco Bicycle Strategy, the impact would be less than significant.

Mitigation: None required.

Irving Street Arrival

The Irving Street Arrival project would not involve any modifications to city streets. There would be no conflicts with a program, plan, ordinance or policy addressing the circulation system, and the impact would be less than significant.

Mitigation: None required.

Research and Academic Building

The proposed RAB would involve modifications to Parnassus Avenue sidewalk and streetscape adjacent to the project site. These improvements would be designed to conform to San Francisco's Better Streets Plan discussed above. There would be no conflicts with a program, plan, ordinance or policy addressing the circulation system, and the impact would be less than significant.

Mitigation: None required.

Initial Aldea Housing Densification

The proposed initial Aldea Housing Densification project would not require any modifications to city streets. There would be no conflicts with a program, plan, ordinance or policy addressing the circulation system, and the impact would be less than significant.

Mitigation: None required.

Initial Phase Improvements

To the degree to which the Initial Phase improvements - such as the proposed Service Corridor, any changes to the Parnassus Avenue Streetscape Plan, and Neighborhood Investments - would involve modifications to city streets, these improvements would be designed to conform to San Francisco's Better Streets Plan discussed above. By relocating curbside uses and implementing pedestrian safety treatments, the Parnassus Avenue Streetscape Plan would improve mobility for people walking, biking and taking transit. There would be no conflicts with a program, plan, ordinance or policy addressing the circulation system, and the impact would be less than significant.

Mitigation: None required.

Impact TRANS-2: Implementation of the CPHP would not conflict or be inconsistent with CEQA Guidelines Section 15064.3, subdivision (b). (Less than Significant)

CEQA Guidelines Section 15064.3, subdivisions (a) and (b) refer to the discontinuation of vehicle level of service (LOS) as an impact metric for transportation analysis and instead states that VMT is the most appropriate measure of transportation impacts. A project would have a significant impact related to VMT if it would cause substantial additional VMT or substantially induce additional automobile travel by increasing physical roadway capacity in congested areas (i.e., by adding new mixed-flow travel lanes) or by adding new roadways to the network. A project would generate substantial additional VMT if it would exceed regional household VMT per capita minus 15 percent.[19] Regional household VMT per capita includes both residential and office VMT. As documented in OPR's *Technical Advisory*, "achieving 15 percent lower per capita… VMT than existing development is both generally achievable and is supported by evidence that connects this level of reduction to the state's emissions goals,"[20] and therefore represents a reasonable threshold for determining VMT impacts.

[19] OPR's transportation impact guidelines state that a project would cause substantial additional VMT if it were to exceed both existing city household VMT per capita minus 15 percent and existing regional household VMT per capita minus 15 percent. In San Francisco, the city's average VMT per capita is lower (8.4) than the regional average (17.2). Therefore, city average VMT is irrelevant for the purposes of the analysis.

[20] OPR, *Technical Advisory on Evaluating Transportation Impacts in CEQA*, December 2018, page 12.

CPHP

Table 4.15-16 presents the VMT per capita estimates for Parnassus Heights campus site residents and employees under the CPHP and compares them to the project significance threshold of 15 percent below the regional average VMT per capita.

TABLE 4.15-16
EXISTING AND FUTURE DAILY VMT PER CAPITA – CPHP (FULL BUILDOUT)

	Residential: Average VMT per resident[1]		Office: Average VMT per employee[2]	
	Existing	**2040**	**Existing**	**2040**
San Francisco Bay Area Regional Average	17.2	16.1	19.1	17.0
Project Threshold (Regional minus 15%)	**14.6**	**13.7**	**16.2**	**14.5**
UCSF Parnassus Heights Campus Site (CPHP Estimate)[3]	6.9	8.5	9.4	10.9

NOTES:
1 Represents residents and hotel guests
2 Represents UCSF faculty, physicians, nurses, students, trainees and other UCSF staff, as well as childcare and hotel workers.
3 Represents UCSF campus site exclusively; 2040 conditions represent the estimated future mode split of the CPHP project.

SOURCE: Adavant Consulting, 2020.

Both the existing and future average daily VMT per capita for residential and office uses under the CPHP are substantially less than the respective thresholds of significance. Therefore, the impact related to the change in VMT per capita rates from the implementation of the CPHP would be less than significant. As the impact would be less than significant, no mitigation is required. However, the analysis of air quality impacts in Section 4.2 (Impact AIR-2), which is based on total VMT associated with the CPHP, shows that increased vehicle travel to and from the campus would result in increased emissions of PM10 that would exceed the BAAQMD thresholds. As mitigation for the significant impact on air quality, UCSF will monitor changes in its VMT per capita rates on an annual basis, and will implement enhancements to the UCSF TDM program to include strategies that reduce drive-alone, taxi/TNC, and drop-off trips which contribute most to total and VMT per capita.

Induced Automobile Travel Assessment

In addition to the proposed land use changes included in the CPHP, the CPHP includes several changes to local transportation infrastructure.

Transportation projects have the potential to induce additional automobile travel. However, OPR's recommended transportation impact guidelines include a list of transportation project types that would not be likely to lead to a substantial or measurable increase in VMT. If a project fits within the general types of projects (including combinations of types) described below, then it is presumed that VMT impacts would be less than significant, and a detailed VMT analysis is not required:

- Active Transportation, Rightsizing (aka Road Diet), and Transit Projects:
  - Infrastructure projects, including safety and accessibility improvements, for pedestrians and bicyclists.
  - Installation or reconfiguration of traffic-calming devices.
  - Creation of new or addition to roadway capacity on local or collector streets, provided the project also substantially improves conditions for people walking, bicycling, and, if applicable, riding transit (e.g., by improving neighborhood connectivity or improving safety).
- Other Minor Transportation Projects:
  - Rehabilitation, maintenance, replacement, and repair projects designed to improve the condition of existing transportation assets (e.g., highways, roadways, bridges, culverts, tunnels, transit systems, and bicycle and pedestrian facilities) that do not add additional motor vehicle capacity.
  - Installation, removal, or reconfiguration of traffic lanes that are not for through traffic, such as left-turn lanes, right-turn lanes, U-turn pockets, or emergency breakdown lanes that are not used as through lanes.
  - Installation, removal, or reconfiguration of traffic control devices, including transit signal priority features.
  - Timing of signals to optimize vehicle, bicycle, or pedestrian flow on local or collector streets.
  - Addition of transportation wayfinding signage.
  - Removal of off- or on-street parking spaces.
  - Adoption, removal, or modification of on-street parking or loading restrictions (including meters, time limits, accessible spaces, and preferential/reserved parking permit programs).

Accordingly, the proposed transportation network changes within the study area evaluated for potential VMT impacts are listed below, along with discussion regarding why each change does not require a detailed VMT assessment.

Extension of Fourth Avenue: The CPHP would add a new section of roadway between Parnassus Avenue and Kirkham Street and provide access to the future planned uses in the West End. This roadway would be a local street, primarily designed to provide access to the Parnassus Heights campus site and would include traffic-calming design elements such as narrow lanes, pedestrian crosswalks, full sidewalks, and bicycle infrastructure. In addition, the primary purpose of this roadway would be to provide access to the site, and not to provide a pathway for through traffic. The extension of Fourth Avenue would also provide access for service vehicles to/from the proposed multi-level service corridor between Medical Center Way and the Fourth Avenue extension. As such, this transportation improvement would not be expected to result in a significant impact on VMT.

Installation of new off-street roadway loop for short-term parking and passenger loading adjacent to the New Hospital: The CPHP includes an off-street roadway loop for short-term parking and passenger loading adjacent to the New Hospital. It would not be designed for through traffic and would not add additional vehicle capacity; therefore, this transportation improvement would not be expected to result in a significant impact on VMT.

The potential removal of the existing off-street roadway loop for short-term parking and passenger loading adjacent to Moffitt Hospital: In conjunction with the planning and design of a new short-term parking and passenger loading loop adjacent to the New Hospital, the New Hospital project may require removing the existing off-street roadway loop adjacent to the existing Moffitt Hospital. As the existing loop is not designed for through traffic, its removal would not result in a significant impact on VMT.

The widening and potential regrading of portions of Medical Center Way south of Parnassus Avenue adjacent to the New Hospital: The CPHP would widen Medical Center Way to meet the fire safety requirements for roadways of this type, and would not add additional vehicle capacity. Therefore, this transportation improvement would not be expected to result in a significant impact on VMT.

In addition to the changes to the roadway network described above, the CPHP contemplates installing an off-street passenger loading facility within the Millberry Union garage. Access to this facility would rely on the existing Millberry Union garage access ramps and would not require building additional access facilities. Therefore, it would not alter the local roadway network and would not be expected to result in a significant impact on VMT.

Based on the discussion provided above, the proposed changes to transportation facilities included in the CPHP would result in a less than significant impact on VMT.

Mitigation: None required.

Irving Street Arrival, RAB, Initial Aldea Housing Densification Projects, and Initial Phase Improvements

Of these Initial Phase projects, only the RAB and the initial Aldea Housing Densification projects would add additional population to the campus site. These two projects were assessed to estimate average daily VMT per capita for residential and office uses. The Irving Street Arrival project would not increase the population on the campus site or influence overall travel demand and behavior, and consequently, would have no impact on VMT.

The proposed RAB would occupy the campus site currently occupied by UC Hall, and would increase the daily population on campus by approximately 2,000 faculty, staff, and/or visitors. The initial Aldea Housing Densification project would increase the daily population on campus by approximately 300 residents and residential visitors. These projects would therefore result in more person trips to/from campus, including additional vehicle trips. However, these projects would not influence how people travel to/from the campus; they would travel similar to existing populations.

Table 4.15-17 presents the existing and future VMT per capita estimates for residents and employees related to the Initial Phase projects and compares them to the project significance threshold of 15 percent below the regional average.

TABLE 4.15-17
EXISTING AND FUTURE DAILY VMT PER CAPITA – RAB AND INITIAL ALDEA HOUSING DENSIFICATION PROJECTS

	Residential: Average VMT per resident[1]		Office: Average VMT per employee[2]	
	Existing	2040	Existing	2040
San Francisco Bay Area	17.2	16.1	19.1	17.0
Project Threshold (Regional minus 15%)	**14.6**	**13.7**	**16.2**	**14.5**
UCSF Parnassus Heights Campus Site (CPHP Initial Projects Estimate)	5.4		10.0	

NOTES:
1 Represents campus housing residents.
2 Represents UCSF faculty, physicians, nurses, students, trainees and other UCSF staff, as well as childcare and hotel workers.
3 CPHP Initial Projects are anticipated to be complete by 2030 and are compared to both existing and 2040 regional averages for average VMT per resident and per employee.

SOURCE: Adavant Consulting, 2020.

The average daily VMT per capita for residential and office uses with implementation of the RAB and the initial Aldea Housing Densification projects are substantially less than both the existing and future thresholds of significance. Therefore, the impact related to VMT per capita of the Initial Projects would be less than significant.

Mitigation: None required.

The Initial Phase improvements propose one planned transportation network change within the study area:

> **Installation of a multi-level service corridor:** The Initial Phase improvements include the construction of a multi-level service corridor that would extend from roughly Medical Center Way to Koret Way (and the new extension of Fourth Avenue in the future), and would provide access for freight and utility vehicles to transport goods and materials for back-of-house purposes. The service corridor would be designed as a local roadway and would facilitate travel by freight vehicles via Medical Center Way and/or the proposed extension of Fourth Avenue. Freight vehicles would otherwise take a longer route; therefore, this transportation element would not be expected to result in a significant impact on VMT.

Therefore, these Initial Phase projects and improvements would not result in any changes to the transportation network and do not include any transportation projects that would substantially induce additional automobile travel. Therefore, VMT impacts related to inducing additional automobile travel associated with these Initial Phase projects would be less than significant.

Mitigation: None required.

Impact TRANS-3: Implementation of the CPHP would not substantially increase hazards due to a geometric design feature (e.g., sharp curves or dangerous intersections) or incompatible uses (e.g., farm equipment). (Less than Significant)

CPHP

As described in Impact TRANS-2, above, the CPHP proposes the following changes to the roadway network within the study area:

- Extension of Fourth Avenue between Parnassus Avenue and Kirkham Street
- A new off-street roadway loop for short-term parking and passenger loading adjacent to the New Hospital
- The potential removal of the existing off-street roadway loop for short-term parking and passenger loading adjacent to Moffitt Hospital
- The widening and potential regrading of portions of Medical Center Way south of Parnassus Avenue adjacent to the New Hospital

The proposed extension of Fourth Avenue would serve as the main access point for future new buildings to the west of the proposed RAB, including the new housing structures on the West Side. As a campus street open to all vehicles, the Fourth Avenue extension would include on-street parking, sidewalks, and loading areas. The proposed Fourth Avenue extension would be designed based on applicable design standards for all roadways in the City and County of San Francisco, including the *San Francisco Public Works Standard Specification and Standard Plans*, as well as the *Project Manual* and reference documents.[21] Future streetscape design for public roadways should also apply best practices in traffic calming and pedestrian facilities to minimize conflicts and to moderate vehicle speeds, consistent with San Francisco's Better Streets Plan and the *California Manual on Uniform Traffic Control Devices*. The new roadway would also be subject to review, and approval by the relevant City departments, including SFPW, SFMTA, and San Francisco Public Utilities Commission (SFPUC).

The New Hospital would design and install a new off-street roadway loop to serve short-term parking and passenger pick-up and drop-off activities to largely serve hospital patients and visitors. A new hospital loading loop would add two new curb cuts across the sidewalk on the south side of Parnassus Avenue to accommodate vehicles entering and exiting the loading loop. The details of the proposed roadway loop are subject to further analysis and review as part of a future environmental review process specific to the New Hospital project. The new hospital loading loop would be sized to accommodate anticipated passenger loading demand. Its design will be coordinated with the Irving Street Arrival project and implementation of the Parnassus Avenue Streetscape Plan in order to also accommodate the planned widening of the pedestrian crossing located between Medical Building 1 and Millberry Union. The project would use the

21 Additional details can be found on the City's website at https://www.sfpublicworks.org/services/standards-specifications-and-plans.

appropriate design standards for any new transportation facilities, such as those described above, and would therefore not substantially increase hazards.

In conjunction with the planning and design of a new short-term parking and passenger loading loop adjacent to the New Hospital, the New Hospital project may require removing the existing off-street roadway loop adjacent to the existing Moffitt Hospital. By removing the existing Moffitt Loop, implementation of a new hospital loading loop would maintain the same number of curb cuts (location where a vehicle is able to cross a sidewalk) on Parnassus Avenue; the two curb cuts for entry/exit of Moffitt Loop would be replaced by two curb cuts for entry/exit of the new loading loop.

The New Hospital project includes widening and potentially regrading portions of Medical Center Way south of Parnassus Avenue and adjacent to the New Hospital. The roadway would be widened to meet the fire safety requirements for roadways of this type. Widening of Medical Center Way may result in encroachment on the Reserve; as indicated in Chapter 3, *Project Description*, UCSF would replace any Reserve acreage lost resulting from new development under the CPHP by creating new Reserve acreage elsewhere within the campus site. The roadway improvements will be designed based on applicable design standards described above, and would be subject to review, and approval by the relevant City departments, including SFPW, SFMTA, and SFPUC.

In addition to the changes to the roadway network described above, the CPHP contemplates installing an off-street passenger loading facility within the Millberry Union garage. Access to this facility would rely on the existing Millberry Union garage access ramps and would not require building additional access facilities. Therefore, it would not alter the local roadway network. This facility would also be designed consistent with the design guidelines referenced above.

By following the design guidelines referenced above, the CPHP would not substantially increase hazards, including hazards to pedestrian safety, due to a geometric design feature. In addition, the CPHP does not propose any incompatible uses. Therefore, the impact would be less than significant.

Mitigation: None required.

Irving Street Arrival, RAB, Initial Aldea Housing Densification Projects, and Initial Phase Improvements

These Initial Phase projects and improvements propose one transportation network change within the study area. The proposed multi-level service corridor would facilitate transport of goods and materials for back-of-house functions and provide easy access to major utility lines serving the campus site. The service corridor is envisioned to be located above ground on its east end. Given the existing topography, several options are being considered for its routing on the western end.

Similar to the proposed Fourth Avenue extension, the proposed service corridor would be designed based on applicable design standards for all roadways in the City and County of

San Francisco, including the *San Francisco Public Works Standard Specification and Standard Plans*, as well as the *Project Manual* and reference documents.[22] This new roadway would also be subject to review, and approval by the relevant City departments, including SFPW, SFMTA, and San Francisco Public Utilities Commission (SFPUC).

The Irving Street Arrival, RAB, and initial Aldea Housing Densification projects do not propose any additional new roadways or incompatible uses. Therefore, these Initial Phase projects would not substantially increase hazards due to a geometric design feature or incompatible uses, and therefore, the impact would be less than significant.

Mitigation: None required.

Impact TRANS-4: Implementation of the CPHP would not result in inadequate emergency access. (Less than Significant)

CPHP

Potential impacts on emergency access were assessed qualitatively. Specifically, the analysis assessed whether the proposed street network changes associated with the proposed CPHP would impair, hinder, or preclude adequate emergency vehicle access.

Under existing conditions, emergency vehicles travel on major local roadways including Parnassus Avenue/Judah Avenue, Stanyan Street, Lincoln Way, and Seventh Avenue, when heading to and from an emergency and/or emergency facility. In the future, emergency vehicles would use these same streets to reach the campus site from the nearest fire department stations, police department stations, or other hospitals. On all streets surrounding the campus site, non-emergency vehicles would continue to yield the right-of-way, per the California Vehicle Code.

Stanyan Street (north of Frederick Street) and Lincoln Way are multi-lane arterial roadways that allow emergency vehicles to travel at higher speeds and permit other traffic to maneuver out of the path of the emergency vehicle. Although Parnassus Avenue/Judah Avenue and Seventh Avenue have one travel lane in each direction, they are each approximately 32 feet wide and have a two-way left-turn lane in the center. Although typical vehicle travel lanes in San Francisco are between 10 and 12 feet wide, a typical passenger vehicle is between 6 and 7 feet wide. The combination of the lane widths and center turn lanes would therefore allow non-emergency vehicles enough space to yield to emergency vehicles headed to the campus site.

The proposed CPHP would not make any changes to city streets adjacent to the campus site or include elements that would conflict with adopted codes regarding street widths and turning movements. Furthermore, the proposed CPHP would not include any design features that would hinder or preclude emergency vehicle access. UCPD would also continue to maintain a substation

[22] Additional details can be found on the City's website at https://www.sfpublicworks.org/services/standards-specifications-and-plans.

on the campus site under the CPHP. Therefore, implementation of the CPHP would not result in inadequate emergency access; the impact would be less than significant.

Mitigation: None required.

Irving Street Arrival, RAB, Initial Aldea Housing Densification Projects, and Initial Phase Improvements

With implementation of the Initial Phase projects such as the Irving Street Arrival, RAB, and initial Aldea Housing Densification projects and the Initial Phase improvements, emergency vehicle access to the campus site would be similar to existing conditions. Therefore, similar to the discussion presented for the CPHP as a whole, the Initial Phase projects and improvements would not result in inadequate emergency access; the impact would be less than significant, and no mitigation measures are necessary.

Mitigation: None required.

Impact TRANS-5: Construction activities under the CPHP could temporarily impact travel conditions along sidewalks and roadways serving the campus site. (Potentially Significant; Less than Significant with Mitigation)

The discussion of construction impacts is based on currently available information from UCSF, as summarized in Chapter 3, *Project Description*; local and state regulations regarding use of the public right-of-way; and experience with typical construction practices by UCSF in San Francisco. As discussed in Chapter 3, implementation of the CPHP would be spread over the next thirty years and would preserve UCSF's operations at the Parnassus Heights campus site during the construction period. Construction would begin in mid-2021, with Initial Phase projects anticipated to be completed by 2030, and Future Phase projects implemented over the remainder of the CPHP and completed by horizon year 2050.

CPHP

Construction activities at the campus site under the proposed CPHP would result in truck trips associated with the delivery of construction materials and the off haul of demolition debris, excavated soil and construction wastes and vehicle trips to and from the site by construction workers. These trips would have the potential to cause temporary disruptions to nearby streets, transit services, and pedestrian and bicycle facilities. Specifically, construction of individual projects or phases of the CPHP, including the arrival or departure of construction vehicles and delivery of construction materials may inhibit vehicle, transit, bicycle and pedestrian movement and access both intermittently and through the duration of their construction if sidewalk and walkway closures, street closures, a temporary relocation of a transit stop, and bicycle route detours are required. They could also result in a temporary parking supply reduction, whether off- or on-street due to construction staging. Construction workers who drive to the site and potential temporary parking restrictions would cause a temporary increase in parking demand. Construction workers would park within UCSF parking garages, either in available or dedicated parking spaces, in satellite parking lots in which UCSF would lease temporary parking spaces, or in temporary surface parking lots within undeveloped blocks. Additionally, certain roads within the campus site, such as Medical Center Way, are likely to be partially or fully closed for limited durations during construction, related to widening, regrading, and/or paving.

Prior to construction of certain phases or projects associated with the CPHP, UCSF and their construction contractor(s) would meet with San Francisco Public Works and SFMTA staff to develop and review truck routing plans and any required temporary roadway or sidewalk closures or detours. For any work in the public right-of-way, the construction contractor would be required to comply with the SFMTA *Blue Book*[23], including the regulations regarding sidewalk and lane closures, and would meet with SFMTA staff to determine if any special traffic permits would be required. Prior to construction, the project contractor would coordinate with Muni's Street Operations and Special Events Office to coordinate construction activities and reduce any impacts to transit operations. Additionally, any temporary traffic controls implemented as part of a construction project would be required to conform to the California Manual of Uniform Traffic Control Devices.

Although CPHP construction activities would be temporary, construction impacts would be considered potentially significant given the magnitude and duration of the CPHP and need for on-going coordination and monitoring. **CPHP Mitigation Measure TRANS-5** is set forth to reduce this impact to a less-than-significant level.

CPHP Mitigation Measure TRANS-5: Construction Coordination and Monitoring Measures

Construction Traffic Control Plan – In order to reduce potential conflicts between construction activities and pedestrians, transit and autos during construction activities at the Parnassus Heights campus site, UCSF shall require construction contractor(s) to prepare a traffic control plan for major phases of project construction (e.g., demolition, construction, or renovation of individual buildings). UCSF and their construction contractor(s) will meet with relevant City agencies to coordinate feasible measures to reduce traffic congestion, including temporary transit stop relocations (e.g., Parnassus Avenue) and other measures to reduce potential traffic and transit disruption and pedestrian circulation effects during major phases of construction of the CPHP projects. For any work within the public right-of-way, the contractor would also be required to comply with the City of San Francisco's *Regulations for Working in San Francisco Streets*, which establish rules and permit requirements so that construction activities can be done safely and with the least possible interference with pedestrians, bicyclists, transit, and vehicular traffic.

Reduce Drive Alone Mode Share for Construction Workers **–** In order to minimize parking demand and vehicle trips associated with construction workers, UCSF shall require the construction contractor to include in the Construction Traffic Control Plan methods to encourage walking, bicycling, carpooling, and transit access to the campus site by construction workers.

23 Available at https://www.sfmta.com/reports/construction-regulations-blue-book

Project Construction Updates for Adjacent Residents and Businesses – In order to minimize construction impacts on access for nearby residences, institutions, and businesses, UCSF shall provide nearby residences and businesses with regularly-updated information regarding project construction, including construction activities, peak construction vehicle activities (e.g., concrete pours, excavation),and travel lane closures via a newsletter, website, and/or quarterly construction update meetings with neighbors.

Significance after Mitigation: Less than Significant.

Irving Street Arrival, RAB, Initial Aldea Housing Densification Projects, and Initial Phase Improvements

It is estimated that construction activity associated with these Initial Phase projects and improvements would generate an average of 10 truck trips per day and as many as 50 trucks per day. Although construction activities associated with these Initial Phase projects and improvements would be temporary, construction impacts would be considered potentially significant given the need for on-going coordination and monitoring.

Mitigation: Implement CPHP Mitigation Measure TRANS-5.

Significance after Mitigation: Less than Significant.

Cumulative Impacts

Impact C-TRANS-1: The CPHP, in combination with past, present, and reasonably foreseeable future projects, would not result in a cumulatively considerable contribution to significant transportation impacts. (Less than Significant)

Cumulative transportation impacts consider those that would result from the implementation of the CPHP combined with other future land use and transportation changes anticipated to occur by 2050. The CPHP would be implemented over an approximately 30-year horizon, and would thus also be anticipated to occur by 2050. The CPHP’s contribution to cumulative impacts may be considerable if it worsens or results in a significant cumulative impact. Cumulative transportation impacts in the project area may result from residential and commercial land use development projects that are reasonably expected to occur within the vicinity of the Parnassus Heights campus site, as well as changing travel patterns on transportation facilities within the vicinity of the Parnassus Heights campus site.

There are no identified land use development projects within the vicinity of the Parnassus Heights campus site or population change projections, which would result in traffic growth and/or changing travel patterns on transportation facilities within the vicinity of the Parnassus Heights campus site. As such, the discussions presented in Impacts TRANS-1 through TRANS-4 would be similar under cumulative conditions.

- The CPHP, in combination with past, present, and reasonably foreseeable future projects, would not result in a conflict with a program, plan, ordinance or policy addressing the circulation system, including transit, roadway, bicycle and pedestrian facilities.
- The CPHP would not result in a conflict or be inconsistent with CEQA Guidelines Section 15064.3, subdivision (b). The VMT per capita estimates presented in Impact TRANS-2 are well below the 2040 impact threshold.
- The CPHP, in combination with past, present, and reasonably foreseeable future projects, would not substantially increase hazards due to a geometric design feature (e.g., sharp curves or dangerous intersections) or incompatible uses (e.g., farm equipment).
- The CPHP, in combination with past, present, and reasonably foreseeable future projects, would not result in inadequate emergency access.

Impact TRANS-5 describes temporary conditions during project construction, which would not be present under cumulative conditions with full project build out.

Mitigation: None required.

4.15.4 References

Governor's Office of Planning and Research (OPR), 2018. *Technical Advisory on Evaluating Transportation Impacts in CEQA*, December 2018. Accessed at: http://opr.ca.gov/docs/20190122-743_Technical_Advisory.pdf. Accessed January 2020.

San Francisco Charter SEC. 2020. 8A.115, *Transit-First Policy*. Available at: https://www.sfmta.com/transit-first-policy. Accessed January 2020.

San Francisco Department of Public Works, 2020b. *Standard Specifications and Plans*. Available at: https://www.sfpublicworks.org/services/standards-specifications-and-plans. Accessed January 2020.

San Francisco Department of Public Works, 2020b. *Project Manual and Reference Documents*, Available at: https://www.sfpublicworks.org/services/project-manual-and-reference-documents. Accessed January 2020.

San Francisco Municipal Transportation Agency (SFMTA), 2013. *San Francisco Bicycle Strategy*, April 2013. Available at: https://www.sfmta.com/sites/default/files/reports-and-documents/2017/09/bicyclestrategyfinal.pdf. Accessed January 2020.

SFMTA, 2019a. Muni Routes & Stops, Available at: https://www.sfmta.com/getting-around/muni/routes-stops. Accessed July 2019.

SFMTA, 2019b.Projects. Available at: https://www.sfmta.com/projects. Accessed August 2019.

San Francisco Planning Department, 2010. *San Francisco Better Streets Plan*, December 2010, Available at: https://sfplanning.org/sites/default/files/archives/BetterStreets/docs/Better-Streets-Plan_Final-Adopted-10-7-2010.pdf. Accessed January 2020.

San Francisco Planning Department, 2016. *Resolution Modifying Transportation Impact Analysis* Accessed at: https://commissions.sfplanning.org/cpcpackets/Align-CPC%20exec%20summary_20160303_Final.pdf, accessed January 2020.

San Francisco Planning Department, 2019. *Transportation Impact Analysis Guidelines for Environmental Review – Update*. Available at: https://citypln-m-extnl.sfgov.org/SharedLinks.aspx?accesskey=79b86615648b30738b5be29ce1d6be428adebe8ad75a7e1d3cc064a715634ec5&VaultGUID=A4A7DACD-B0DC-4322-BD29-F6F07103C6E0. Accessed January 2020.

University of California, 2019. *Sustainable Practices Policy*. July 2019, Accessed at: https://policy.ucop.edu/doc/3100155/SustainablePractices. Accessed January 2020.

University of California San Francisco (UCSF), 2019. Campus Life Services, Available at: https://campuslifeservices.ucsf.edu/cls/. Accessed August 2019.

UCSF, 2014a. *Long Range Development Plan*, November 2014. Available at: https://www.ucsf.edu/cgr/cgr-projects/lrdp/downloads. Accessed January 2020.

UCSF, 2014b. *UCSF 2014 Long Range Development Plan Environmental Impact Report*, November 2014, https://www.ucsf.edu/cgr/cgr-projects/lrdp/environmental-impact-report. Accessed January 2020.

This page intentionally left blank

4.16 Utilities and Service Systems

This section assesses the potential for development under the Comprehensive Parnassus Heights Plan (CPHP or Plan), including the three Initial Phase projects and Initial Phase improvements, to result in significant impacts on utilities and service systems. The section includes a description of the existing environmental setting as it relates to utility and service systems, and provides a regulatory framework that discusses applicable federal, State, and local regulations. The section presents the significance criteria used to evaluate impacts on utility and service systems, and the results of the impact assessment, including any significant impacts and associated mitigation measures.

4.16.1 Environmental Setting

Water

Water Supply

The San Francisco Public Utilities Commission (SFPUC) provides regional water services to approximately 2.6 million people in San Francisco, Santa Clara, Alameda, San Mateo, and Tuolumne Counties, including all of the City and County of San Francisco. Approximately 97 percent of the water provided to San Francisco is supplied by the SFPUC Regional Water System (RWS), which is made up of water from the Hetch Hetchy Reservoir and Bay Area reservoirs in the Alameda Creek and Peninsula watersheds. The remaining 3 percent is supplied by local water supplies, including recycled water, groundwater and non-potable water (SFPUC, 2016).

Regional Water System

Water from the Tuolumne River watershed stored in the Hetch Hetchy Reservoir accounts for 85 percent of the water supply delivered by the RWS, while the Alameda and Peninsula watersheds accounts for the remaining 15 percent. The RWS includes over 280 miles of pipelines, over 60 miles of tunnels, 11 reservoirs, five pump stations, and two water treatment plants, and currently delivers approximately 196 million gallons of water per day (mgd) to its customers (SFPUC, 2016).

Groundwater

A small portion of the San Francisco's water is obtained from locally-produced groundwater, which is used primarily for irrigation in local parks and on highway medians. San Francisco is located atop all or part of seven un-adjudicated groundwater basins. All of the basins, except the Westside and Lobos basins, are generally inadequate to supply a substantial amount of groundwater for municipal supply because of low yields (SFPUC, 2016).

The Westside Groundwater Basin is the largest groundwater basin in San Francisco. This basin is currently used to meet water demands for some irrigation and non-potable water needs in Golden Gate Park and the San Francisco Zoo. Six deep well pumping stations currently extract up to

4.0 mgd of water from the basin, which is then conveyed to in-City reservoirs for blending with the municipal drinking water supply (SFPUC, 2016).

Recycled Water

A small percentage of San Francisco's water is sourced from recycled water, which is used primarily for golf course irrigation in some parts of San Francisco. Presently recycled water provides about 0.3 mgd. Two planned recycled water projects will significantly increase the amount of recycled water available to City users. The Westside Recycled Water Project, which is currently under construction, will provide irrigation water to replace the existing groundwater and water from RWS used on the west side of the City. This project is expected to begin making deliveries in 2021 and will provide an annual average of 1.6 mgd. In addition, the Eastside Recycled Water Project will provide up to 2 mgd (annual average) of recycled water to portions of the east side of the City for non-potable irrigation, commercial, and industrial users (SFPUC, 2016).

Non-Potable Water

Alternate water sources (i.e., rainwater, storm water, greywater and blackwater) also now may be used in San Francisco for approved non-potable use. The Non-Potable Water Ordinance allows for the collection, treatment, and use of alternate water sources for non-potable applications. In July 2015, the ordinance was amended to mandate the installation of on-site water systems to treat and reuse available alternate water sources for toilet flushing and irrigation in new developments that meet specified criteria. The use of onsite alternate water sources serves to offset demands for potable water, with a cumulative projected potable-water offset of 0.4 mgd by 2040 (SFPUC, 2016). This potable-water offset is part of SFPUC's water supply portfolio in the 2015 Urban Water Management Plan (UWMP) for the City (see discussion of SFPUC's UWMP under *Regulatory Setting*, below).

Water Demand

The SFPUC serves water to both retail and wholesale customers, with about one third of its water supplies for retail customers (primarily located in San Francisco), including UCSF for use at its campus sites, and its remaining supplies reserved for 28 wholesale customers located in Alameda, Santa Clara, and San Mateo Counties, including the Groveland Community Services District.[1] Retail customers include the residents, businesses, and industries within the City as well as other customers such as the Town of Sunol, San Francisco International Airport, and the Lawrence Livermore National Laboratory, among others. Within the City, the SFPUC provides distribution and storage for water and fire protection for the local water system; this system includes 10 reservoirs, eight water tanks, 17 pump stations, and approximately 1,250 miles of transmission lines and water mains. In 2015, retail customers demanded 70.1 mgd, which was an historic low. Of this demand, in-City retail customers used approximately 65.6 mgd, of which 1.5 mgd was

---

1 As reported in the SFPUC's 2015 *Urban Water Management Plan*, wholesale customers used about 128 mgd in 2015.

met with groundwater, and 0.2 mgd was met with recycled water, and the remainder was met with RWS supplies (SFPUC, 2016).

Water Supply Reliability

During normal precipitation years, the RWS is projected to have adequate water supplies to meet service area demands through 2040. In a single dry year, SFPUC projects to have sufficient supplies to meet demands for potable water through 2040; however, during a multiple-year drought, SFPUC would experience shortages in deliveries in 2040 without development of additional water supplies (SFPUC, 2016).

To address the reliability of its supplies, SFPUC has developed a Water System Improvement Plan (WSIP) and Water Shortage Allocation Plans (WSAP). These plans are discussed in further detail below.

Water System Improvement Program

In 2008, the SFPUC adopted the Phased Water System Improvement Program (WSIP) to ensure the ability of the regional water system to meet certain level of service goals for water quality, seismic reliability, delivery reliability, and water supply through 2018.[2] The SFPUC's level of service goals for regional water supply are to meet customer water needs in non-drought and drought periods and to meet dry-year delivery needs while limiting rationing to a maximum of 20 percent system-wide. In approving the WSIP, the SFPUC established a supply limitation of up to 265 mgd to be delivered from its water supply resources in the Tuolumne, Alameda and Peninsula watersheds in years with normal (average) precipitation.[3] The SFPUC's water supply agreement with its wholesale customers provides that approximately two-thirds of this total (up to 184 mgd) is available to wholesale purchasers and the remaining one-third (up to 81 mgd) is available to retail customers. The total amount of water the SFPUC can deliver to retail and wholesale customers in any one year depends on several factors, including the amount of water that is available from natural runoff, the amount of water in reservoir storage, and the amount of that water that must be released from the system for purposes other than customer deliveries (e.g., required instream flow releases below reservoirs). A "normal year" is based on historical hydrological conditions that allow the reservoirs to be filled by rainfall and snowmelt, allowing full deliveries to customers; similarly, a "wet year" and a "dry year" are based on historical hydrological conditions with above and below "normal" rainfall and snowmelt, respectively.

For planning purposes, the SFPUC uses a hypothetical drought that is more severe than what has historically been experienced. This drought sequence is referred to as the "design drought" and serves as the basis for planning and modeling of future scenarios. While the most recent drought (2012 through 2016) included some of the driest years on record for the SFPUC's watersheds, the design drought still represents a more severe drought in duration and overall water supply deficit.

[2] On December 11, 2018, the SFPUC Commission extended the timing of the WSIP water supply decision through 2028 in its Resolution No. 18-0212.

[3] SFPUC Resolution No. 08-200, *Adoption of the Water System Improvement Program Phased WSIP Variant,* October 30, 2008.

Based on historical records of hydrology and reservoir inflow from 1920 to 2017, current delivery and flow obligations, and fully-implemented infrastructure under the WSIP, normal or wet years occurred 85 out of 97 years. This translates into roughly nine normal or wet years out of every 10 years. Conversely, system-wide rationing is required roughly one out of every 10 years. The frequency of dry years is expected to increase as climate change intensifies.

The WSIP aims to meet customer water needs in non-drought and drought conditions through the completion of defined improvements to the RWS that improve seismic, delivery, water quality, and water supply reliability for the RWS. The WSIP includes both local projects (located within San Francisco) and regional projects (spread over seven different counties from the Sierra foothills to San Francisco). As of March 31, 2020, 34 of the 35 local projects and 48 of the 52 regional projects have been completed; the remaining projects are under construction and are forecasted to be completed by May 2023.

Water Shortage Allocation Plans

Each year, SFPUC evaluates the amount of total water storage expected to occur throughout the RWS. If the evaluation finds the projected total water storage to be less than an identified level sufficient to provide sustained delivery during drought, then the SFPUC may impose delivery reductions or rationing in accordance with: (1) the Retail Water Storage Allocation Plan (RWSAP), which pertains to retail customers, and (2) the Wholesale Water Shortage Allocation Plan (WWSAP), which pertains to wholesale customers. Both plans provide specific allocations of the available water supply between the retail and wholesale customers collectively associated with varying system-wide shortages of up to 20 percent (SFPUC, 2016). The SFPUC last implemented customer water rationing during the most recent drought from 2014-2017.

Parnassus Heights Water Infrastructure

The existing domestic and fire water system on the Parnassus Heights campus site comprises distribution pipes, storage tanks, pump stations, valves, fire hydrants, and connections to the City's water system. A description of each of these systems is provided below.

Domestic Water System

Domestic water within the Parnassus Heights campus site is supplied from two water mains. A City-owned 8-inch-diameter domestic water main along Parnassus Avenue and 5th Avenue supplies domestic water to most of the buildings within the campus core on both sides of Parnassus Avenue. A City owned 12-inch diameter high pressure domestic water main along Clarendon Avenue supplies domestic water to buildings within the Aldea Housing complex, the Central Utility Plant (CUP), Moffitt Hospital, Medical Sciences, and Health Science Instruction Research (HSIR) East buildings. The high-pressure domestic water main also supplies the two domestic water tanks along Medical Center Way and the Forest Knolls Tank to the northwest of the Aldea Housing complex through the Forest Knolls Pump Station (UCSF, 2019).

Fire Water System

Fire water within the Parnassus Heights campus site is supplied from four water mains. The City-owned 8-inch-diameter domestic water main along Parnassus Avenue and 5th Avenue discussed above supplies water to fire hydrants and sprinkler systems for buildings north of Parnassus Avenue, along 5th Avenue, and along Kirkham Street. The 12-inch-diameter high pressure domestic water main along Clarendon Avenue discussed above supplies water to the fire hydrants in the Aldea Housing complex, two fire water tanks on Mount Sutro along Medical Center Way, and to most of the major campus site buildings south of Parnassus Avenue. A 12-inch diameter Auxiliary Water Supply System[4] (AWSS) main along Parnassus Avenue serves as a secondary defense against fires if the municipal water supply system fails and supplies hydrants on the south side of Parnassus Avenue. Finally, a 30-inch-diameter domestic water main along Parnassus Avenue supplies one fire hydrant at the east end of the Parnassus Heights campus site (UCSF, 2019).

Wastewater / Stormwater

Parnassus Heights campus site straddles two City watershed basins. The west side of the Parnassus Heights campus site is located in the City's Sunset drainage basin within the larger Western Basin; and east side of the campus site is in the City's Channel drainage basin within the larger Eastern Basin.

The City's combined sewer system (CSS) is a network of pipes and tunnels that convey combined stormwater and sanitary sewage flows, referred to as combined sewer discharge, to City wastewater treatment plants. During non-storm conditions, the City's CSS collects and treats up to 80 mgd of wastewater, primarily municipal sewage.

The CSS routes flows to two treatment plants: the Southeast Treatment Plant (SEP) in the Bayview/Hunters Point neighborhood, and the Oceanside Treatment Plant (OSP) east of the Great Highway near the San Francisco Zoo. The SEP receives approximately 80 percent of the combined wastewater and stormwater flows from the city and discharges treated effluent to San Francisco Bay. On average, the SEP treats approximately 60 mgd of combined flows each day. During a rainstorm, the SEP has the capacity to treat up to 250 mgd of combined flows.

When the SEP reaches capacity, the North Point Wet Weather Facility (NPF), located on the north side of the City at 111 Bay Street, provides an additional 150 mgd of wet weather flows (San Francisco RWQCB, 2013). Treated effluent from this facility is discharged through four deep water outfalls, approximately 800 feet from the bay shoreline. Two of the deep water outfalls terminate at the end of Pier 33 and two terminate at the end of Pier 35 on the northeastern Bay shore.

The OSP treats the remaining 20 percent of flows from the west side of the City, including sewage flows from the entire Parnassus Heights campus site, and stormflows from the western half of the Parnassus Heights campus site. OSP has a dry weather capacity of 43 mgd. On an average day, the OSP treats approximately 17 mgd. During rain events, the wet-weather treatment capacity is 65 mgd (SFPUC, 2019a).

---

[4] The Auxiliary Water Supply System (AWSS) is a system of mains and high pressure fire hydrants, independent of the domestic water supply, built solely for the purpose of firefighting.

The CSS includes storage and transport boxes that, during wet weather, retain the combined stormwater and sewage flows that exceed the capacities of the SEP and the NPF for later treatment. The transport boxes connect to 36 combined sewer outfalls to the Bay (SFPUC, 2019c). When rainfall intensity results in combined flows that exceed the total capacity of the SEP, the NPF, and the storage and transport structures, the excess flows are discharged through the combined sewer discharge structures in compliance with NPDES permits. Citywide, discharges from these discharge structures receive “flow-through treatment,” which is similar to primary treatment, to remove settleable solids and floatable materials. Wet weather flows are intermittent throughout the rainy season, and combined sewer overflow events vary in nature and duration depending largely on the intensity of individual rainstorms.

The Parnassus Heights campus site is served by public and private stormwater and combined sewer pipe networks of varying pipe size, material and condition. SFPUC’s public combined sewers are located wholly within public streets, which receive effluent from UCSF’s private combined sewer system (UCSF, 2019).

Electric and Natural Gas Facilities

Campus Core

The CUP provides electricity to the campus core along Parnassus Avenue through a 12.47 kilovolt (kV) distribution network. The CUP has two gas turbine generators nominally generating 5 megawatts (MW) each, and one steam turbine generator nominally generating 3.75 MW. As a result, the combined capacity of the CUP is 13.75 MW (UCSF, 2019).

Three separate Pacific Gas and Electric (PG&E) 12.47 kV feeders provide supplemental electricity to the campus core along Parnassus Avenue when necessary. In the event of a CUP outage, the PG&E service can pick up the demand without any power interruption to the campus site. The combined electrical capacity from the three PG&E connections is 22.5 MW, of which 15 MW is available at any one time (UCSF, 2019).

PG&E also provides natural gas service to the campus core from existing lines along Parnassus Avenue. Branch lines provide natural gas service to the CUP and individual buildings.

Aldea Housing Complex

The Aldea Housing complex is served by a PG&E 12.47 kV line located in Clarendon Avenue. PG&E also provides natural gas service to the Aldea housing complex from existing lines in the area.

Heating and Chilled Water Facilities

The CUP provides heating for the entire campus core via steam networks and cooling for only six campus site buildings (Clinical Sciences Building, Medical Science Building, Dolby Regeneration Medicine Building, Health Sciences Instruction and Research Towers West and East, and Parnassus Services Building). The remaining buildings have cooling systems (e.g., absorption chillers, rooftop units). Steam is distributed through three networks to the campus for use in heating and process loads (e.g., sterilization). High pressure steam and low pressure steam are distributed to the majority of campus site buildings, while medium pressure steam is supplied to the clinical and medical buildings only. For Kalmanovitz Library, Moffitt Hospital, and Long Hospital, high pressure steam is used to power an absorption chiller for cooling. The chilled water system consists of 26-inch pipe secondary chilled water supply and return piping, which narrows in diameter as it extends to each served building (UCSF, 2019). Steam and chilled water are not provided to the Aldea Housing complex.

Telecommunications Facilities

The Parnassus Heights campus site is currently supplied with telecommunications services through various private companies. Typical telecommunications systems on campus include voice frequency, digital, fiber optic, wireless, Ethernet video over Internet Protocol, and voice over Internet Protocol. The infrastructure is located underground in vaults and conduits and aboveground on overhead power lines with pole mounted cable and transformers. Antennas are also mounted in towers or on roofs (UCSF, 2019).

Solid Waste Collection and Disposal

Recology provides solid waste collection, recycling, and disposal services for residential and commercial garbage, recycling, and composting in San Francisco. Solid waste in the City is collected and hauled to a transfer station near Candlestick Point and recycled as feasible. Recyclable materials are taken to Recology's Pier 96 facility, where they are separated into commodities (e.g., aluminum, glass, and paper) and transported to other users for reprocessing. Compostables (e.g., food waste, plant trimmings, and soiled paper) are transferred to a Recology composting facility in Solano County, where they are converted to soil amendment and compost. The remaining material that cannot otherwise be reprocessed ("trash") is transported to landfills.

In September 2015, the City approved an agreement with Recology, Inc., for the transport and disposal of the City's municipal solid waste at the Recology Hay Road Landfill in Solano County. The City began disposing its municipal solid waste at the landfill in January 2016, and that practice is anticipated to continue for approximately nine years, with an option to renew the agreement thereafter for an additional six years. The Hay Road Landfill has a permitted peak maximum daily disposal of 2,400 tons and an estimated remaining capacity of approximately 30.4 million cubic yards or 82 percent of its permitted capacity.[5] The estimated closure date of the landfill is 2077 (CalRecycle 2019a).

In 2018, San Francisco sent approximately 740,000 tons of solid waste to landfills, with, approximately 453,300 tons transported to Recology Hay Road Landfill, 74,500 tons to the Potrero Hills Landfill, 79,900 tons to the Corinda Los Trancos Landfill, and 70,500 tons to Altamont Landfill. The remaining approximate 61,900 tons of solid waste were transported to

[5] Tons is a unit of weight, and cubic yards is a unit of volume; conversion from one unit to other takes into account a density factor for the material.

24 other landfills. Together, the top four landfills used by San Francisco in 2018 have a remaining capacity of 131.9 million cubic yards (CalRecycle 2019b).

In 2018, UCSF generated approximately 7,300 tons of solid waste (not including construction and demolition [C&D] waste) at all campus sites. Of this amount, about 5,700 tons was diverted from the waste stream, resulting in a diversion rate of 78 percent.

4.16.2 Regulatory Framework

State Urban Water Management Plan

In 1983, the California Legislature enacted the Urban Water Management Planning Act (California Water Code Sections 10610 through 10656). The act states that every urban water supplier that provides water to 3,000 or more customers, or that provides over 3,000 acre-feet of water annually, should make every effort to ensure reliable water service sufficient to meet the needs of its various categories of customers during normal, dry, and multiple dry years. The act requires the urban water suppliers to prepare an Urban Water Management Plan (UWMP) and update it every five years. Details of the UWMP for the SFPUC are described below.

Water Supply Assessment

The State of California adopted Senate Bill 610 (SB 610) effective January 1, 2002. SB 610 requires cities and counties, when evaluating large development and redevelopment projects, to request an assessment of the availability of water supplies from the water supply entity that will provide water to a project. The Water Supply Assessment (WSA) is performed in conjunction with the land use approval process associated with a project and must include an evaluation of the sufficiency of the water supplies available to the water supplier to meet existing and future demands, including the demand for a project over a 20-year time period that includes normal, single-dry, and multiple dry years.

When a new development project is accounted for in the demand projections of an UWMP, the WSA can refer to the UWMP and no further analysis is necessary. The SFPUC allows for all development projects requiring a WSA under SB 610 to rely solely on the SFPUC's adopted UWMP without having to prepare individual WSAs.

Water Code Section 10910 and 14 CCR 15155 (entitled "City or County Consultation with Water Agencies") apply only to cities and counties. Water Code Section 10910(a) states: "Any city or county that determines that a project, as defined in Section 10912, is subject to the California Environmental Quality Act (Division 13 (commencing with Section 21000) of the Public Resources Code) under Section 21080 of the Public Resources Code shall comply with this part."

2018 Bay-Delta Plan Amendment

In December 2018, the State Water Resources Control Board adopted amendments to the Water Quality Control Plan for the San Francisco Bay/Sacramento-San Joaquin Delta Estuary, which establishes water quality objectives to maintain the health of the rivers and the Bay-Delta ecosystem.[6] Among the goals of the adopted Bay-Delta Plan Amendment is to increase salmonid populations in the San Joaquin River, its tributaries (including the Tuolumne River), and the Bay-Delta. Specifically, the plan amendment requires increasing flows in the Stanislaus, Tuolumne, and Merced Rivers to 40 percent of unimpaired flow[7] from February through June every year, whether it is wet or dry. During dry years, this would result in a substantial reduction in the SFPUC's water supplies from the Tuolumne River watershed (see additional detail below).

RWQCB Permits

The Porter-Cologne Water Quality Control Act authorizes the SWRCB, which, in turn, delegated certain authority to the several Regional Water Quality Control Boards (RWQCB) to issue and enforce NPDES permits. In addition, the SWRCB develops water quality standards and performs other functions to protect California's waters. The RWQCBs, pursuant to their delegated powers, carry out the SWRCB regulations and standards as well as issue and enforce permits. The SEP, the NPF, and all of the Bayside wet-weather facilities are covered by an NPDES permit (Regional Water Quality Control Board Order No. R2-2013-0029) adopted by the San Francisco Bay RWQCB in August 2013 while the OSP is covered by a separate NPDES permit (Regional Water Quality Control Board Order No. R2-2019-0028) adopted by the San Francisco Bay RWQCB in September 2019. See Section 4.8, *Hydrology and Water Quality*, for further discussion of NPDES permits.

Assembly Bill 939 and Senate Bill 1016

The California Integrated Waste Management Act of 1989, or Assembly Bill 939, established the Integrated Waste Management Board, required the implementation of integrated waste management plans, and mandated that local jurisdictions divert at least 50 percent of all solid waste generated (from 1990 levels), beginning January 1, 2000, and divert at least 75 percent by 2010. Projects that would have an adverse effect on waste diversion goals are required to include waste diversion mitigation measures to assist in reducing these impacts to less-than-significant levels. With the passage of Senate Bill 1016 (the Per Capita Disposal Measurement System) in 2006, only per capita disposal rates are measured to determine if a jurisdiction's efforts are meeting the intent of Assembly Bill 939.

University of California

UC Sustainable Practices Policy

The UC Sustainable Practices Policy, developed in 2004 and updated as recently as 2019, establishes goals in 10 areas of sustainable practices for both individual building projects and overall facilities operations: green building design, clean energy, transportation, climate protection, sustainable building operations, waste reduction and recycling, environmentally preferable purchasing, sustainable foodservice, sustainable water systems, and sustainability at UC Health locations (UCOP, 2019). Most relevant to this discussion are the goals and policies

---

6 State Water Resources Control Board Resolution No. 2018-0059, *Adoption of Amendments to the Water Quality Control Plan for the San Francisco Bay/Sacramento-San Joaquin Delta Estuary and Final Substitute Environmental Document,* December 12, 2018, available at https://www.waterboards.ca.gov/plans_policies/docs/2018wqcp.pdf.

7 "Unimpaired flow" represents the water production of a river basin, unaltered by upstream diversions, storage, or by export or import of water to or from other watersheds.

related to energy use (i.e., green building design, clean energy, sustainable building operations), solid waste (i.e., waste reduction and recycling), water supply (i.e., sustainable water systems), and sustainability at UCSF locations.

Specifically, with regard to green building design, UCSF is committed to meeting UC system–wide goals of achieving LEED Silver certification or better for all new buildings and LEED certification (not necessarily Silver) for all major renovations. The policy also requires that all new non-acute care facilities or major renovation projects outperform California Energy Code, Title 24, requirements by at least 20 percent and strive to outperform the requirements by 30 percent. UCSF saves millions of gallons of potable water annually through implementation of a comprehensive Water Action Plan, which outlines the campus's methods for reducing dependence on potable water and identifies broader opportunities for water conservation (UCSF, 2018). Development on the Parnassus Heights campus site must comply with the goals set forth in the Water Action Plan. The UC Sustainable Practices Policy identifies the goal of a 20 percent reduction in growth-adjusted potable water consumption by 2020 and 36 percent by 2025 (compared to a 3-year average baseline of FY 2005–06, FY 2006–07, and FY 2007–08) (UCOP, 2019).

The UC produces an annual report to track its progress toward achieving the system-wide goal of sustainability by 2025. The annual report outlines ongoing progress of the UC's comprehensive sustainability program, including advancement in all areas of the UC Sustainable Practices Policy; research and education; Presidential Initiatives; and student, faculty, and staff engagement.

UCSF 2014 LRDP

The UCSF 2014 LRDP included *Community Planning Principles*, which were produced in collaboration with the UCSF Community Advisory Group:

Community Planning Principles

Sustainability

S1. Meet or exceed guidelines and standards in the University of California's Sustainable Practices Policy when planning and developing projects. Policy goals are categorized as follows: Green Building; Clean Energy; Climate Protection Practices (including greenhouse gas reduction); Sustainable Transportation; Sustainable Building Operations; Recycling and Waste Management; Environmentally Preferable Purchasing Practices; Sustainable Foodservices Practices.

City of San Francisco

2015 Urban Water Management Plan

The current urban water management plan for the City and County of San Francisco is the 2015 Urban Water Management Plan.[8] The 2015 plan presents information on the SFPUC's retail and wholesale service areas, the RWS and other water supply systems operated by the SFPUC,

8 San Francisco Public Utilities Commission, *2015 Urban Water Management Plan for the City and County of San Francisco*, June 2016. This document is available at https://sfwater.org/index.aspx?page=75.

system supplies and demands, water supply reliability, Water Conservation Act of 2009 compliance, water shortage contingency planning, and water demand management.

The water demand projections in the 2015 UWMP reflect anticipated population and employment growth, socioeconomic factors, and the latest conservation forecasts. The 2015 UWMP presents water demand projections in five-year increments over a 25-year planning horizon through 2040. The plan compares anticipated water supplies to projected demand through 2040 for normal, single-dry, and multiple-dry water years. Retail water supplies are comprised of RWS, groundwater, recycled water, and non-potable water. Under normal hydrologic conditions, the total retail supply is projected to increase from 70.1 mgd in 2015 to 89.9 mgd in 2040. According to the plan, available and anticipated future water supplies would fully meet projected demand in San Francisco through 2040 during normal years.

Based on the 2015 UWMP, as modified by a 2018 amendment to the 2009 Water Supply Agreement,[9] sufficient retail water supplies would be available to serve projected growth in San Francisco through 2040. While concluding supply is sufficient, the 2015 UWMP also identifies projects that are underway or planned to augment local supply. Projects that are underway or recently completed include the San Francisco Groundwater Supply Project and the Westside Recycled Water Project. A more current list of potential regional and local water supply projects that the SFPUC is considering is provided below under *Additional SFPUC Water Supplies*.

In addition, the 2015 UWMP describes the SFPUC's ongoing efforts to improve dry-year water supplies, including participation in Bay Area regional efforts to improve water supply reliability through projects such as interagency interties, groundwater management and recharge, potable reuse, desalination, and water transfers. While no specific capacity or supply has been identified, this program may result in future supplies that would benefit SFPUC customers.

Relationship of Bay-Delta Plan Amendment to SFPUC Water Supply

The SWRCB approved the Bay-Delta Plan Amendment in December 2018. If the Bay-Delta Plan Amendment is implemented, the SFPUC would be able to meet the projected retail water demands presented in the 2015 UWMP in normal years but would experience supply shortages in single dry years and multiple dry years. Implementation of the Bay-Delta Plan Amendment would result in substantial dry-year water supply shortfalls throughout the SFPUC's RWS service area, including San Francisco. The 2015 UWMP assumes limited rationing for retail customers may be needed in multiple dry years to address an anticipated supply shortage by 2040; the 2018 amendment to the 2009 Water Supply Agreement with wholesale customers (described above) would slightly increase rationing levels indicated in the 2015 UWMP. By comparison, implementation of the Bay-Delta Plan Amendment would result in supply shortfalls in all single dry years and multiple dry years and rationing to a greater degree than previously anticipated to

[9] SFPUC, Resolution No. 18-0212, December 11, 2018. The SFPUC amended its 2009 Water Supply Agreement between the SFPUC and its wholesale customers, revising Tier 1 allocation in the Water Supply Allocation Plan to require a minimum reduction of 5 percent of the regional water system supply for San Francisco retail customers whenever system-wide reductions are required due to dry-year supply shortages.

address supply shortages not accounted for in the 2015 UWMP or as a result of the 2018 amendment to the Water Supply Agreement.

The SWRCB has stated that it intends to implement the Bay-Delta Plan Amendment by the year 2022, assuming all required approvals are obtained by that time. However, at this time, the implementation of the Bay-Delta Plan Amendment is uncertain for several reasons. First, under the federal Clean Water Act, the United States Environmental Protection Agency (USEPA) must approve the water quality standards identified in the plan amendment. It is uncertain what determination the USEPA will make and its decision could result in litigation.

Second, since adoption of the Bay-Delta Plan Amendment, over a dozen lawsuits have been filed in state and federal court, challenging the water board's adoption of the plan amendment, including legal challenges filed by the federal government at the request of the U.S. Bureau of Reclamation. That litigation is in the early stages, and there have been no dispositive court rulings as of this date.

Third, the Bay-Delta Plan Amendment is not self-executing and does not allocate responsibility for meeting its new flow requirements to the SFPUC or any other water rights holders. Rather, the plan amendment merely provides a regulatory framework for flow allocation, which must be accomplished by other regulatory and/or adjudicatory proceedings, such as a comprehensive water rights adjudication or, in the case of the Tuolumne River, the Clean Water Act, section 401 certification process in the Federal Energy Regulatory Commission's relicensing proceeding for Don Pedro Dam. The license amendment process is currently expected to be completed in the 2022–2023 timeframe. This process and other regulatory and/or adjudicatory proceeding would likely face legal challenges and have lengthy timelines, and quite possibly could result in a different assignment of flow responsibility for the Tuolumne River than currently exists (and therefore a different water supply effect on the SFPUC).

Fourth, in recognition of the obstacles to implementation of the Bay-Delta Plan Amendment, the SWRCB directed its staff to help complete a "Delta watershed-wide agreement, including potential flow measures for the Tuolumne River" by March 1, 2019, and to incorporate such agreements as an "alternative" for a future amendment to the Bay-Delta Plan to be presented to the [water board] as early as possible after December 1, 2019." In accordance with the water board's instruction, on March 1, 2019, the SFPUC, in partnership with other key stakeholders, submitted a proposed project description for the Tuolumne River that could be the basis for a voluntary agreement with the state water board that would serve as an alternative path to implementing the Bay-Delta Plan's objectives. On March 26, 2019, the SFPUC adopted Resolution No. 19-0057 to support its participation in the voluntary agreement negotiation process. To date, those negotiations are ongoing.

For these reasons, whether, when, and the form in which the Bay-Delta Plan Amendment will be implemented, and how those amendments will affect the SFPUC's water supply, is currently unknown.

Additional SFPUC Water Supplies

In light of the adoption of the Bay-Delta Plan Amendment and the resulting potential limitation to the SFPUC's RWS supply during dry years, the SFPUC is expanding and accelerating its efforts to develop additional water supplies and explore other projects that would improve overall water supply resilience. Developing these supplies would reduce water supply shortfalls and reduce rationing associated with such shortfalls. The SFPUC has taken action to fund the study of additional water supply projects, listed below:

- Daly City Recycled Water Expansion
- Alameda County Water District Transfer Partnership
- Brackish Water Desalination in Contra Costa County
- Alameda County Water District-Union Sanitary District Purified Water Partnership
- Crystal Springs Purified Water
- Eastside Purified Water
- San Francisco Eastside Satellite Recycled Water Facility
- Additional Storage Capacity in Los Vaqueros Reservoir from Expansion
- Calaveras Reservoir Expansion

The capital projects that are under consideration would be costly and are still in the early feasibility or conceptual planning stages. These projects would take 10 to 30 or more years to implement and would require environmental permitting negotiations, which may reduce the amount of water that can be developed. The yield from these projects is unknown and not currently incorporated into SFPUC's supply projections.

In addition to capital projects, the SFPUC is also considering developing related water demand management policies and ordinances, such as funding for innovative water supply and efficiency technologies and requiring potable water offsets for new developments.

4.16.3 Impacts and Mitigation Measures

Significance Criteria

Would implementation of the CPHP, including the three Initial Phase projects and Initial Phase improvements:

a) Require or result in the relocation or construction of new or expanded water, wastewater treatment or storm water drainage, electric power, natural gas, or telecommunications facilities, the construction or relocation of which could cause significant environmental effects?

b) Have sufficient water supplies available to serve the project and reasonably foreseeable future development during normal, dry and multiple dry years?

c) Result in a determination by the wastewater treatment provider which serves or may serve the project that it has adequate capacity to serve the project's projected demand in addition to the provider's existing commitments?

d) Generate solid waste in excess of State or local standards, or in excess of the capacity of local infrastructure, or otherwise impair the attainment of solid waste reduction goals?

e) Comply with federal, State, and local management and reduction statutes and regulations related to solid waste?

Approach to Analysis

The environmental impact analysis for utilities and service systems begins with an assessment of existing utility use and infrastructure services at the Parnassus Heights campus site. The projected demands for utilities and infrastructure services generated are then calculated and compared to existing usage to estimate the net increase resulting from implementation of the proposed CPHP. Typically, utility assessments focus on supply, treatment or generation capacity and distribution or collection infrastructure requirements. For each potential utility, the analysis compares the net increase resulting from implementation of the proposed CPHP against the significance criteria set forth above. If the impact would be significant, the analysis identifies feasible mitigation measures that would eliminate the impact or reduce it to a less-than-significant level. If the impact cannot be reduced to a less-than-significant level after implementation of all feasible mitigation measures, then it would remain significant and unavoidable.

As UCSF is neither a city nor a county it is not subject to SB 610. However, UCSF has voluntarily elected to prepare a WSA-like document, a Water Supply Evaluation (WSE), to determine and demonstrate the sufficiency of the SFPUC’s water supplies to satisfy the water demand of the planned development at the Parnassus Heights campus site under the 2014 LRDP and CPHP (see **Appendix WSE**).

Approach to Analysis of Initial Phase Projects, including New Hospital, and Initial Phase Improvements

This EIR includes project-level analysis for certain Initial Phase projects anticipated to be completed by about the year 2030; specifically, the Irving Street Arrival, Research and Academic Building (RAB), and initial Aldea Housing Densification; and Initial Phase improvements, as described below. The New Hospital is also an Initial Phase project anticipated to be completed by about the year 2030, but is analyzed at a program level in this EIR within the context of the overall CPHP, and will be analyzed at a project level in a subsequent EIR when more details are available.

Impact Analysis

Impact UTIL-1: Implementation of the proposed CPHP would require or result in the construction of new or expanded water, wastewater treatment or storm water drainage, electric power, natural gas, or telecommunications facilities, the construction or relocation of which could cause significant environmental effects. (Less than Significant)

CPHP

Utility infrastructure improvements are required both within the Parnassus Heights campus core and within the Aldea Housing complex to maintain existing systems and to serve future growth under the proposed CPHP. The domestic and emergency water, waste wastewater/stormwater, electric and natural gas, heating and chilled water, and/or telecommunications utility infrastructure improvements required to serve the net new development envisioned by the proposed CPHP are summarized in Chapter 3, *Project Description*.

Construction activities associated with the utility improvements described above would have the potential to result in significant or potentially significant impacts. However, compliance with mitigation measures and other construction-related regulatory requirements discussed in other sections of this EIR, including Section 4.2, *Air Quality*; Section 4.3, *Biological Resources*; Section 4.4, *Cultural Resources*; Section 4.6, *Geology and Soils*; Section 4.8, *Hazards and Hazardous Materials*; Section 4.9, *Hydrology and Water Quality*; Section 4.11, *Noise and Vibration*; and Section 4.15, *Transportation*, would reduce construction-related effects associated with utility improvements to a less than significant level. As a result, the impacts associated with the construction of new utilities to serve the proposed CPHP would be less than significant.

Mitigation: None required.

Irving Street Arrival

The Irving Street Arrival project is intended to better facilitate entry onto the campus from Irving Street. Utility demand associated with this project would be limited to electricity to power lights and equipment for proposed vertical circulation improvements. As a result, the utility demand associated with this project is not anticipated to be substantial enough to require the relocation or construction of new or expanded utility infrastructure, and this impact is considered less than significant.

Mitigation: None required.

Research and Academic Building

As discussed above, utility infrastructure improvements are required on the campus site to serve future development allowed under the proposed CPHP, including the proposed RAB. Compliance with mitigation measures and other construction-related regulatory requirements discussed in other sections of the EIR, including Section 4.2, *Air Quality*; Section 4.3, *Biological Resources*; Section 4.4, *Cultural Resources*; Section 4.6, *Geology and Soils*; Section 4.8, *Hazards and Hazardous Materials*; Section 4.9, *Hydrology and Water Quality*; Section 4.11, *Noise and Vibration*; and Section 4.15, *Transportation*, would reduce construction-related effects associated with utility improvements to a less than significant level. As a result, the impacts associated with the construction and expansion of new utilities to serve the RAB would be less than significant.

Mitigation: None required.

Initial Aldea Housing Densification

UCSF estimates the existing fire and domestic water lines, combined storm sewer lines, and electrical lines serving the Aldea Housing complex, which are located outside of the complex, have sufficient capacity to serve future development within the area. However, improvements to some utility infrastructure within the Aldea Housing complex would be required to serve the proposed new development at the Aldea Housing complex. A new booster pump station may be installed to improve water pressure in the Aldea Housing complex. In addition, modeling analysis conducted by UCSF in support of the CPHP indicated that several combined storm sewer lines within the Aldea Housing complex may need to be replaced due to insufficient existing and future capacity (UCSF 2019). Compliance with mitigation measures and other construction-related regulatory requirements discussed in other sections of the EIR, including Section 4.2, *Air Quality*; Section 4.3, *Biological Resources*; Section 4.4, *Cultural Resources*; Section 4.6, *Geology and Soils*; Section 4.8, *Hazards and Hazardous Materials*; Section 4.9, *Hydrology and Water Quality*; Section 4.11, *Noise and Vibration*; and Section 4.15, *Transportation*, would reduce construction-related effects associated with utility improvements to a less than significant level. As a result, the impacts associated with the construction and expansion of new utilities to serve the initial Aldea Housing Densification project would be less than significant.

Mitigation: None required.

Initial Phase Improvements

As described in Chapter 3, *Project Description*, the Initial Phase improvements would include various Initial Phase utility improvements, implementation of the Parnassus Avenue Streetscape Plan, renovation of certain existing buildings, and installation of miscellaneous community investments in the public realm. Compliance with mitigation measures and other construction-related regulatory requirements discussed in other sections of the EIR, including Section 4.2, *Air Quality*; Section 4.3, *Biological Resources*; Section 4.4, *Cultural Resources*; Section 4.6, *Geology and Soils*; Section 4.8, *Hazards and Hazardous Materials*; Section 4.9, *Hydrology and Water Quality*; Section 4.11, *Noise and Vibration*; and Section 4.15, *Transportation*, would reduce construction-related effects associated with these improvements to a less than significant level. As a result, the impacts associated with the construction and expansion of utilities associated with the new Initial Phase improvements would be less than significant.

Mitigation: None required.

Impact UTIL-2: Sufficient water supply would be available from existing entitlements and resources to serve development under the proposed CPHP under normal, dry and multi-dry years if the Bay Delta Plan Amendment is implemented. If the Bay Delta Plan Amendment is implemented, the SFPUC may address the shortfalls through rationing and/or develop new or expanded water supply facilities to address shortfalls in single and multiple dry years. The CPHP would not make a considerable contribution to impacts from increased rationing or from the development of new supply sources. (Less than Significant)

CPHP

Implementation of the CPHP would result in an increased demand for water at the Parnassus Heights campus site, which is supplied to the campus by the SFPUC. The analysis herein evaluates whether: (1) sufficient water supplies are available to serve the proposed CPHP and reasonably foreseeable future development in normal, dry, and multiple dry years, and (2) the proposed CPHP would require or result in the relocation or construction of new or expanded water supply facilities, the construction or relocation of which would have significant environmental impacts.

As described earlier in this section, the supply capacity of the Hetch Hetchy RWS that provides the majority of the city's drinking water far exceeds the potential demand of any single development project in San Francisco. No single development project alone in San Francisco would require the development of new or expanded water supply facilities or require the SFPUC to take other actions, such as imposing a higher level of rationing across the city in the event of a supply shortage in dry years. Therefore, a separate project-only analysis is not provided for this topic. The following analysis instead considers whether the proposed CPHP in combination with both existing development and projected growth through 2040 would be served by existing and planned supplies or would require new or expanded water supply facilities, the construction or relocation of which could have significant cumulative impacts on the environment. It also considers whether a high level of rationing would be required that could have significant cumulative impacts. Further, due to the recent 2018 Bay Delta Plan Amendments that were previously discussed, the analysis below considers the CPHP related water demand under three water supply scenarios.

Estimated CPHP Water Demand

UCSF is an in-City retail customer and purchases all of its water supplies from the SFPUC. Based on 2018 data, existing development on the Parnassus Heights campus site currently demands approximately 0.32 million gallons per day (mgd) of water. Implementation of the CPHP would result in a net increase of about 2 million gsf of building space at the campus site. As a result of this increase in building space, water demand at the Parnassus Heights campus site is projected to increase by approximately 0.20 mgd, and the total future water demand for the Parnassus Heights campus site at full development under the CPHP is projected to be approximately 0.52 mgd by 2050. This projected water demand conservatively does not take into consideration ongoing projects by UCSF to reduce water demands at the Parnassus Heights campus site. Over the past 10 years, potable water demand at the Parnassus Heights campus site has decreased from a maximum of 0.56 mgd in FY 2010/11 to 0.33 mgd in FY 2018/19 as a result of the UCSF Water Action Plan. With full implementation of the ongoing water conservation projects described in the UCSF Water Action Plan, it is estimated that UCSF would reduce the existing FY 2018/19 water demand by about 20 percent, not including the demand from the proposed CPHP. Further, full development under the proposed CPHP is anticipated to occur by 2050. The SFPUC's 2015 UWMP provides supply and demand projections through 2040. In the absence of projections that go out to 2050, the CPHP's 2050 incremental water demand is compared to the SFPUC's 2040 supply and demand. This provides for a conservative analysis as the campus site water demand in 2040 actually would be lower than the amount analyzed in this section.

The total Parnassus Heights campus site water demand (0.52 mgd) as a result of the proposed CPHP represents a small fraction (0.6 percent) of SFPUC's overall 2040 total retail demand which is projected to be about 89.9 mgd. If the incremental demand (0.20 mgd) due to the CPHP is compared to the SFPUC 2040 total retail demand, it would represent an even smaller fraction (about 0.2 percent). If the 20 percent reduction in existing use is factored in, the increase in demand would be 0.13 mgd which would represent about 0.14 percent of the total retail demand in 2040. Further, some of the incremental water demand at the Parnassus Heights campus site is likely included in SFPUC's 2040 demand projections. However, even if all of the incremental water is considered not accounted for, it represents a very small amount when compared to the extensive RWS which is capable of supplying up to almost 90 mgd.

Impact Analysis

As discussed above in *Section 4.16.2, Regulatory Framework*, with the adoption of the Bay-Delta Plan Amendment by the SWRCB in 2018, a substantial amount of uncertainty regarding future water supplies was created. It is uncertain as to whether, when, and the form in which the Bay-Delta Plan Amendment will be implemented, and how those amendments will affect the SFPUC's water supply. Three scenarios are set forth below to characterize potential future water supply scenarios and the CPHP's demand is analyzed for its impact in the context of these potential scenarios.

Scenario 1 – Current Water Supply. Scenario 1 assumes no change to the way in which water is supplied, and that neither the Bay-Delta Plan Amendment nor a Bay-Delta Plan Voluntary Agreement would be implemented. Thus, the water supply and demand assumptions contained in the 2015 Urban Water Management Plan, as amended by the 2009 Water Supply Agreement, would remain applicable to new development to be served by SFPUC. As discussed above, the incremental increase in water needed at the Parnassus Heights campus site would be on the order of 0.13 to 0.2 mgd and would represent a very small fraction (0.14 to 0.2 percent) of the total demand and supply in 2040. Under this scenario, water supplies would be available to meet the demand of the proposed CPHP in combination with existing development and projected growth in all years, except for a 5- to 7-percent shortfall during dry years through the year 2040. This relatively small shortfall is primarily due to implementation of the amended 2009 Water Supply Agreement. To manage a small shortfall such as this, the SFPUC may prohibit certain discretionary outdoor water uses and/or call for voluntary rationing by its retail customers, including UCSF. This level of rationing is well within the SFPUC's RWS supply level of service goal of limiting rationing to no more than 20 percent on a system-wide basis. Further, under this scenario, while SFPUC may choose to develop new water sources, the SFPUC would not be required to develop new or expanded water supply facilities to serve the projected growth in demand and there would be no significant cumulative environmental impacts from the development of new supplies. The impact would be less than significant.

Scenario 2 – Bay-Delta Plan Voluntary Agreement. Under Scenario 2, a voluntary agreement would be implemented as an alternative to the adopted Bay-Delta Plan Amendment. The March 1, 2019, proposed voluntary agreement submitted to the SWRCB has yet to be accepted, and the shortages that would occur with its implementation are not known. The voluntary agreement proposal contains a combination of flow and non-flow measures that are designed to benefit fisheries at a lower water cost, particularly during multiple dry years, than would occur under the Bay-Delta Plan Amendment. The resulting RWS supply shortfalls during dry years would be less than those under the Bay-Delta Plan Amendment and would require rationing of a lesser degree and closer in alignment to the RWS supply level of service goal of rationing of no more than 20 percent system-wide during dry years. The SFPUC Resolution No. 19-0057, which authorized the SFPUC staff to participate in voluntary agreement negotiations, stated its intention that any final voluntary agreement allow the SFPUC to maintain both the water supply and sustainability level of service goals and objectives adopted by the SFPUC when it approved the

WSIP. Accordingly, it is reasonable to conclude that if the SFPUC enters into a voluntary agreement, the supply shortfall under such an agreement would be of a similar magnitude to the shortfall that would occur under Scenario 1. The effect of Scenario 2 cannot be quantified at this time but as noted above, if it can be designed to achieve the SFPUC's level of service goals and is adopted, it would be expected to have effects similar to Scenario 1.

Scenario 3 – Bay-Delta Plan Amendment. Under Scenario 3, the 2018 Bay-Delta Plan Amendment would be implemented as it was adopted by the SWRCB without modification. As discussed above, there is considerable uncertainty whether, when, and in what form the plan amendment will be implemented. However, because implementation of the plan amendment cannot be ruled out at this time, an analysis of the cumulative impact of projected growth on water supply resources under this scenario is included in this document to provide a worst-case impact analysis.

Under this scenario, which is assumed to be implemented after 2022, water supplies would be available to meet projected demands through 2040 in wet and normal years with no shortfalls. However, implementation of the Bay-Delta Plan Amendment would result in a shortfall beginning in years two and three of multiple dry-years in 2025 of 33.2 percent, and dry year shortfalls by 2040 ranging from 23.4 percent in a single dry year and year one of multiple dry years to up to 49.8 percent in years seven and eight of the 8.5-year design drought. Existing and planned dry-year supplies would be insufficient for the SFPUC to satisfy its RWS supply level of service goal of no more than 20 percent rationing system-wide. The Water Shortage Allocation Plan does not specify allocations to retail supply during system-wide shortages above 20 percent. However, the plan indicates that if a system-wide shortage greater than 20 percent were to occur, the RWS supply would be allocated among retail and wholesale customers per the rules corresponding to a 16- to 20-percent system-wide reduction, subject to consultation and negotiation between the SFPUC and its wholesale customers to modify the allocation rules. Based on these allocation rules, shortfalls of 15.6 to 49.8 percent across the retail service area as a whole are estimated under Scenario 3. Significant dry-year shortfalls would occur in San Francisco, regardless of whether or not the proposed CPHP is implemented.

It is anticipated that should the Bay-Delta Plan Amendment be implemented, the SFPUC will increase and accelerate its efforts to develop additional water supplies and explore other projects that would increase overall water supply resilience. The SFPUC has identified possible projects that it will study. The SFPUC is beginning to study water supply options, but it has not determined the feasibility of the possible projects, has not made any decision to pursue any particular supply projects, and has determined that the identified potential projects would take anywhere from 10 to 30 years or more to implement. There is also a substantial degree of uncertainty associated with the implementation of the Bay-Delta Plan Amendment and its ultimate outcome, and therefore, there is substantial uncertainty in the amount of additional water supply that may be needed, if any. Moreover, there is uncertainty and lack of knowledge as to the feasibility and parameters of the possible water supply projects the SFPUC is beginning to explore. Consequently, the physical environmental impacts that could result from future supply projects would be speculative at this time and would not be expected to be reasonably determined for a period of time ranging from 10 to 30 years. Although it is not possible at this time to identify the specific environmental impacts that could result, this analysis assumes that if new or expanded water supply facilities, such as those listed above under "Additional Water Supplies," were developed, the construction and/or operation of such facilities could result in significant adverse environmental impacts, and this would be a significant cumulative impact.

As discussed above, the proposed CPHP's incremental water demand would represent between 0.14 to 0.2 percent of total demand in San Francisco in 2040, whereas implementation of the Bay Delta Plan Amendment would result in a retail supply shortfall of up to 49.8 percent. Thus, new or expanded dry-year water supplies would be needed under Scenario 3 regardless of whether the proposed CPHP is implemented. As such, any physical environmental impacts related to the construction and/or operation of new or expanded water supplies would occur with or without the proposed CPHP. Therefore, the proposed CPHP would not have a considerable contribution to any significant cumulative impacts that could result from the construction or operation of new or expanded water supply facilities developed in response to the Bay-Delta Plan Amendment.

Given the long lead times associated with developing additional water supplies, in the event the Bay-Delta Plan Amendment were to take effect sometime after 2022 and result in a dry-year shortfall, the expected action of the SFPUC for the next 10 to 30 years (or more) would be limited to requiring increased rationing. The analysis below focuses on whether rationing at the levels that might be required under the Bay-Delta Plan Amendment could result in any cumulative impacts, and if so, whether the CPHP would make a considerable contribution to these impacts.

The SFPUC has established a process through its Retail Water Shortage Allocation Plan for actions it would take under circumstances requiring rationing. Rationing at the level that might be required under the Bay-Delta Plan Amendment would require changes to how businesses operate, changes to water use behaviors (e.g., shorter and/or less-frequent showers), and restrictions on irrigation and other outdoor water uses (e.g., car washing), all of which could lead to undesirable socioeconomic effects. However, any such effects would not constitute physical environmental impacts under CEQA.

High levels of rationing could, however, lead to adverse physical environmental effects, such as the loss of vegetation cover resulting from prolonged restrictions on irrigation. Prolonged high levels of rationing within the city could also make San Francisco a less desirable location for residential and commercial development compared to other areas of the state not subject to such substantial levels of rationing, which, depending on location, could lead in turn to increased urban sprawl. Sprawl development is associated with numerous environmental impacts, including, for example, increased greenhouse gas emissions and air pollution from longer commutes and lower density development, higher energy use, loss of farmland, and increased water use from less water-efficient suburban development.[10] Thus, the higher levels of rationing on a citywide basis that could be required under the Bay-Delta Plan Amendment could lead directly or indirectly to significant cumulative impacts. The question, then, is whether the CPHP would make a considerable contribution to impacts that may be expected to occur in the event of high levels of rationing.

[10] Pursuant to the SFPUC 2015 Urban Water Management Plan, San Francisco's per capita water use is among the lowest in the state.

As discussed above, implementation of the Bay-Delta Plan Amendment would result in substantial system-wide water supply shortfalls in dry years. These shortfalls would occur with or without the proposed CPHP, and the CPHP's incremental increase in potable water demand (0.16 to 0.2 percent of total retail demand) would have a negligible effect on the levels of rationing that would be required throughout San Francisco under Scenario 3 in dry years. Furthermore, UCSF would also comply with the SFPUC's directives related to rationing. Thus, the proposed CPHP would not make a considerable contribution to any significant cumulative impacts that may result from increased rationing that may be required with implementation of the Bay-Delta Plan Amendment, were it to occur.

Therefore, for the reasons described above, under all three water supply scenarios, this impact would be considered less than significant.

Mitigation: None required.

Irving Street Arrival

The Irving Street Arrival project is intended to better facilitate entry onto the campus site from Irving Street. As this improvement is limited to the reconfiguration of interior space and new exterior treatments, no increase in demand for water would occur, and thus no impact with respect to water supply would occur.

Mitigation: None required.

Research and Academic Building

The WSE estimated that the net change is water demand associated with the RAB would be approximately 3,660 gallons per day. As this water demand generation is a sub-set of total water demand that would occur under the proposed CPHP, water demand associated with the RAB would also not be substantial and the project could be served by existing and planned supplies under normal, single dry, and multiple dry years through 2040 under Scenarios 1 and 2, and would be subject to increased rationing under Scenario 2. For the same reasons set forth above, this impact of the RAB project would be less than significant.

Mitigation: None required.

Initial Aldea Housing Densification

The WSE estimated that the net change in water demand associated with the initial Aldea Housing Densification project would be approximately 10,000 gallons per day. As this water demand is a sub-set of total water demand that would occur under the proposed CPHP, water demand associated with the initial Aldea Housing densification project would also be served by existing supplies under normal, single dry, and multiple dry years through 2040 under Scenarios 1 and 2, and would be subject to increased rationing under Scenario 3. For the same reasons set forth above, this impact of the initial Aldea Housing Densification project would be less than significant.

Mitigation: None required.

Initial Phase Improvements

The Initial Phase improvements include certain potable water conveyance improvements, heating and chilled water conveyance improvements, and new water tanks to better accommodate water demands of CPHP development, but the Initial Phase improvements are not in and of themselves a notable source of water demand. Consequently, the Initial Phase improvements would not result in a significant impact with respect to water supply, and the impact would be less than significant.

Mitigation: None required.

Impact UTIL-3: The wastewater treatment provider would have adequate wastewater treatment capacity to serve campus development under the proposed CPHP. (Less than Significant)

CPHP

Assuming wastewater generation as 90 percent of water usage, the overall increase in wastewater resulting from the 2.0 million gsf net increase of building space associated with the proposed CPHP would be roughly 0.18 mgd. Wastewater flows from the Parnassus Heights campus site would be directed to the OSP. The OSP has a dry weather capacity of 43 mgd and is currently treating approximately 17 mgd. Therefore, based on current sewage flows, the plant has about 26 mgd of excess dry weather treatment capacity, which is adequate to accommodate the increase in flow generated by the net new development envisioned under the proposed CPHP. As a result, the proposed CPHP would not result in a determination by the SFPUC that it has inadequate capacity to serve the projected demand, and the impact would be less than significant.

Mitigation: None required.

Irving Street Arrival

The Irving Street Arrival project is intended to better facilitate entry onto the campus site from Irving Street. As this improvement is limited to the reconfiguration of interior space and new exterior treatments, no wastewater generation would occur, and thus no impact to available treatment capacity would occur.

Mitigation: None required.

Research and Academic Building

Net wastewater generation associated with the RAB would be approximately 3,300 gallons per day. As this wastewater generation is a sub-set of total wastewater generation that would occur under the proposed CPHP, wastewater generation associated with the RAB would also not be substantial and the project could be served by existing treatment capacity. No new or expanded wastewater treatment facilities would be required, and this impact would be less than significant.

Mitigation: None required.

Initial Aldea Housing Densification

Net wastewater generation associated with the initial Aldea Housing Densification project would be approximately 9,000 gallons per day. As this wastewater generation is a sub-set of total wastewater generation that would occur under the proposed CPHP, wastewater generation associated with the initial Aldea Housing densification project would also be served by existing treatment capacity. No new or expanded water treatment facilities would be required, and this impact would be less than significant.

Mitigation: None required.

Initial Phase Improvements

The Initial Phase improvements include certain wastewater and stormwater improvements designed to better accommodate wastewater demands of the CPHP development, but the Initial Phase improvements are not in and of themselves a notable source of wastewater generation and need for wastewater treatment. Consequently, the Initial Phase improvements would not result in a significant impact on wastewater treatment capacity, and the impact would be less than significant.

Mitigation: None required.

Impact UTIL-4: Construction of campus development under the proposed CPHP would not generate solid waste in excess of State or local standards or the capacity of local infrastructure and would comply with federal, state and local statutes and regulations related to solid waste. (Less than Significant)

CPHP

Over the duration of the proposed CPHP, construction and demolition activities would generate construction debris at the Parnassus Heights campus site, some of which would require debris disposal. As discussed in the *Environmental Setting*, more than 60 percent of solid waste generated in San Francisco is transported to the Recology Hay Road Landfill in Solano County. The Recology Hay Road Landfill has a permitted peak maximum daily disposal of 2,400 tons per day and has an estimated remaining capacity of approximately 30.4 million cubic yards or 82 percent of its permitted capacity.

The proposed CPHP would construct a total of approximately 2.9 million square feet of new building space and demolish 688,000 square feet of existing building space. Based on the most conservative construction and demolition waste estimates provided by the USEPA, construction and demolition under the proposed CPHP would result in an estimated 61,000 tons of solid waste (USEPA, 2009).[11] Construction and demolition debris would be transported by a registered transporter to a registered facility that must recover for reuse or recycling and divert from landfill

[11] The most conservative generation rates of 4.39 pounds per square foot for construction, and 158 pounds per square foot for demolition were used for this calculation. CPHP construction/demolition generated waste was calculated based on: [(2.9 million square feet of total new CPHP construction * 4.39 pounds/square foot + 688,000 square feet of CPHP demolition * 158 pounds/square foot)/ 2,000 pounds/ton] = 61,000 tons.

at least 65 percent of all received construction and demolition debris. As a result, construction associated with the CPHP would generate an estimated 21,500 tons of waste that would require disposal at a landfill.

Given the existing and potential future landfill capacities of the landfills where UCSF solid waste is disposed, construction that would occur under the proposed CPHP would not result in solid waste generation that exceeds the permitted capacity of the landfills that serve the campus or in non-compliance with federal, State, and local statutes and regulations related to solid waste. Therefore, this impact would be less than significant.

Mitigation: None required.

Irving Street Arrival

Construction of the Irving Street Arrival would involve 25,000 square feet of new construction and 30,000 square feet of building demolition. Construction and demolition associated with the Irving Street Arrival would result in an estimated 2,400 tons of solid waste (USEPA, 2009).[12] When considering at least 65 percent of all received construction and demolition debris would be diverted, construction associated with the Irving Street Arrival would generate an estimated 850 tons of waste.

As discussed above, landfills serving the City of San Francisco have sufficient capacity to serve solid waste generated during the construction of development envisioned under the proposed CPHP. As the solid waste generation associated with the construction of the Irving Street Arrival is a sub-set of total solid waste generation that would occur during construction of the proposed CPHP, solid waste generation associated with the construction of the Irving Street Arrival would also be served by existing disposal capacity. Therefore, construction of the Irving Street Arrival would not result in solid waste generation that exceeds the permitted capacity of the landfills that serve the campus or in non-compliance with federal, state, and local statutes and regulations related to solid waste. As a result, this impact would be less than significant.

Mitigation: None required.

Research and Academic Building

Construction of the RAB would involve approximately 270,000 square of new construction and about 233,100 square feet of building demolition (associated with demolition of UC Hall and the School of Nursing buildings). Construction and demolition under the proposed CPHP would conservatively result in an estimated 19,000 tons of solid waste (USEPA, 2009).[13] When considering at least 65 percent of all received construction and demolition debris would be diverted, construction associated with the RAB would generate an estimated 6,700 tons of waste.

---

12 Irving Street Arrival construction/demolition generated waste was calculated based on: [(25,000 square feet of new construction * 4.39 pounds/square foot + 30,000 square feet of demolition * 158 pounds/square foot)/ 2,000 pounds/ton] = 850 tons.

13 RAB construction/demolition generated waste was calculated based on: [(270,000 square feet of new construction * 4.39 pounds/square foot + 233,100 square feet of demolition * 158 pounds/square foot)/ 2,000 pounds/ton] = 19,000 tons.

As discussed above, landfills serving the City of San Francisco have sufficient capacity to serve solid waste generated during the construction of development envisioned under the proposed CPHP. As the solid waste generation associated with the construction of the RAB is a sub-set of total solid waste generation that would occur during construction of the proposed CPHP, solid waste generation associated with the construction of the RAB would also be served by existing disposal capacity. Therefore, construction of the RAB would not result in solid waste generation that exceeds the permitted capacity of the landfills that serve the campus or in non-compliance with federal, state, and local statutes and regulations related to solid waste. As a result, this impact would be less than significant.

Mitigation: None required.

Initial Aldea Housing Densification

Construction of the initial phase of the Aldea Housing Densification project would involve approximately 176,900 square of new construction and about 23,850 square feet of building demolition. Construction and demolition under the proposed CPHP would conservatively result in an estimated 2,300 tons of solid waste (USEPA, 2009).[14] As discussed above, demolition debris would be transported by a registered transporter to a registered facility that must recover for reuse or recycling and divert from landfill at least 65 percent of all received construction and demolition debris. As a result, construction associated with the initial phase of the Aldea Housing Densification project would generate an estimated 800 tons of waste.

As discussed above, landfills serving the City of San Francisco have sufficient capacity to serve solid waste generated during the construction of development envisioned under the proposed CPHP. As the solid waste generation associated with the construction of the initial phase of the Aldea Housing Densification project is a sub-set of total solid waste generation that would occur during construction of the proposed CPHP, solid waste generation associated with the construction of the initial phase of the Aldea Housing Densification project would also be served by existing disposal capacity. Therefore, construction of the initial phase of the Aldea Housing Densification project would not result in solid waste generation that exceeds the permitted capacity of the landfills that serve the campus or in non-compliance with federal, state, and local statutes and regulations related to solid waste. As a result, this impact would be less than significant.

Mitigation: None required.

Initial Phase Improvements

The Initial Phase improvements would not be expected generate a substantial source of construction waste. Nevertheless, as discussed above, demolition debris associated with construction of these improvements would be transported by a registered transporter to a registered facility that must recover for reuse or recycling and divert from landfill at least 65 percent of all received construction and demolition debris. The Initial Phase improvements would not result in solid waste generation that would exceeds the permitted capacity of the

[14] Initial Aldea Housing Densification construction/demolition generated waste was calculated based on: [(176,900 square feet of new construction * 4.39 pounds/square foot + 23,850 square feet of demolition * 158 pounds/square foot)/ 2,000 pounds/ton] = 2,300 tons.

landfills that serve the campus or in non-compliance with federal, state, and local statutes and regulations related to solid waste. As a result, this impact would be less than significant.

Mitigation: None required.

Impact UTIL-5: Operation of campus development under the proposed CPHP would not generate solid waste in excess of State or local standards or the capacity of local infrastructure and would comply with federal, State and local statutes and regulations related to solid waste. (Less than Significant)

CPHP

The operation of campus facilities developed under the proposed CPHP would increase the amount of solid waste generated on the Parnassus Heights campus site. As discussed in the *Environmental Setting*, more than 60 percent of solid waste generated in San Francisco, is transported to the Recology Hay Road Landfill in Solano County. The Recology Hay Road Landfill has a permitted peak maximum daily disposal of 2,400 tons per day and has an estimated remaining capacity of approximately 30.4 million cubic yards or 82 percent of its permitted capacity.

It is estimated that net new development envisioned under the proposed CPHP would generate approximately 2,100 tons[15] of solid waste per year. UCSF employees, students, visitors and patients would continue to participate in UCSF's recycling and composting programs and other efforts to reduce the total amount of waste produced and/or requiring landfill disposal. UCSF has consistently increased its landfill diversion rate, rising from 64 percent in 2013 to 78 percent in 2018, as it strives to meet the UC Policy on Sustainable Practices goal of zero waste by 2020. As a result, if the latest diversion rate of 78 percent is applied, net new development envisioned under the proposed CPHP would generate approximately 460 tons of solid waste per year that would require disposal in a landfill.

Given the existing and anticipated increase in solid waste recycling and the existing and potential future landfill capacities of the landfills where UCSF solid waste is disposed, implementation of the proposed CPHP would not result in solid waste generation that exceeds the permitted capacity of the landfills that serve the campus or in non-compliance with federal, State, and local statutes and regulations related to solid waste. Therefore, this impact would be less than significant.

Mitigation: None required.

Irving Street Arrival

The Irving Street Arrival project is intended to better facilitate entry onto the campus from Irving Street. As this improvement is limited to the reconfiguration of interior space and new exterior

---

[15] Proposed net new on-campus housing: ([762 net new units * 4 pounds per day] * 365 days per year/2,000 pounds per ton = 556 tons/year) + Net new non-residential building space ([1.4 million square feet * 6 pounds per 1,000 square feet per day) * 365 days per year/2,000 pounds per ton = 1,600 tons) = 2,100 tons.

treatments, there would be no solid waste generation associated with operation of this project, and thus, no impact related to solid waste generation would occur.

Mitigation: None required.

Research and Academic Building

It is estimated that the RAB would generate approximately 296 tons[16] of solid waste per year. The RAB would participate in UCSF's recycling and composting programs and other efforts to reduce the amount of solid waste requiring landfill disposal. As discussed above, most of the solid waste generated on the Parnassus Heights campus site is currently diverted from the solid waste stream, and similarly, a majority of the solid waste generated by the RAB would also be diverted from the solid waste stream. If the current diversion rate of 78 percent is applied, the RAB would generate approximately 65 tons of solid waste per year that would require disposal in a landfill.

As discussed above, landfills serving the City of San Francisco have sufficient capacity to serve solid waste generated by the net new development envisioned under the proposed CPHP. As the solid waste generation associated with the RAB is a sub-set of total wastewater generation that would occur under the proposed CPHP, solid waste generation associated with the RAB would also be served by existing disposal capacity. Therefore, operation of the RAB would not result in solid waste generation that exceeds the permitted capacity of the landfills that serve the campus or in non-compliance with federal, state, and local statutes and regulations related to solid waste. Therefore, this impact would be less than significant.

Mitigation: None required.

Initial Aldea Housing Densification

It is estimated that the occupancy and operation of the initial phase of the Aldea Housing Densification project would generate approximately 104 tons[17] of solid waste per year. The initial phase of the Aldea Housing Densification project would participate in UCSF's recycling and composting programs and other efforts to reduce the amount of solid waste requiring landfill disposal. As discussed above, most of the solid waste generated on the Parnassus Heights campus site is currently diverted from the solid waste stream, and similarly, the same amount of the solid waste generated by the initial Aldea Housing Densification project would also be diverted from the solid waste stream. If the current diversion rate of 78 percent is applied, the net new units provided under the initial phase of the Aldea Housing Densification project would generate approximately 23 tons of solid waste per year that would require disposal in a landfill.

As discussed above, landfills serving the City of San Francisco have sufficient capacity to serve solid waste generated by the net new development envisioned under the proposed CPHP. As the solid waste generation associated with the initial Aldea Housing Densification project is a sub-set of total waste generation that would occur under the proposed CPHP, solid waste generation associated with the initial Aldea Housing Densification project would also be met by existing

16 (270,000 square feet * 6 pounds per 1,000 square feet per day) * 365 days per year/2,000 pounds per ton = 296 tons.
17 (142 net new units * 4 pounds per day) * 365 days per year/2,000 pounds per ton = 104 tons.

disposal capacity. Therefore, operation of the initial Aldea Housing Densification project would not result in solid waste generation that exceeds the permitted capacity of the landfills that serve the campus or in non-compliance with federal, state, and local statutes and regulations related to solid waste. Therefore, this impact would be less than significant.

Mitigation: None required.

Initial Phase Improvements

Operation of the Initial Phase improvements would not generate a substantial source of solid waste requiring disposal. In any case, landfills serving the City of San Francisco have sufficient capacity to serve solid waste generated by the net new development envisioned under the proposed CPHP including from any incidental solid waste associated with the Initial Phase improvements. As such, these improvements would not result in solid waste generation that exceeds the permitted capacity of the landfills that serve the campus or in non-compliance with federal, state, and local statutes and regulations related to solid waste. Therefore, this impact would be less than significant.

Mitigation: None required.

Cumulative Impacts

Impact-C-UTIL-1: Development under the proposed CPHP, in combination with past, present, and reasonably foreseeable future projects in the vicinity of the Parnassus Heights campus site, would not substantially contribute to cumulative impacts related to utilities and services systems. (Less than Significant)

Utility Infrastructure

Net new development under the proposed CPHP, when combined with foreseeable growth in the vicinity of the Parnassus Heights campus site, could increase the demand for utilities and service systems. As the vicinity of the campus site is a densely developed urban area, development in the vicinity of the Parnassus Heights campus site would occur as replacement or in-fill on otherwise built-out sites. City utility systems that serve the area have sufficient capacities to serve those sites and net new development under the proposed CPHP. To the extent that cumulative demands on water, wastewater or stormwater conveyance systems from reasonably foreseeable growth in the City would require the construction of new or expansion of existing conveyance systems, such construction may have the potential to cause environmental impacts. However, in general, impacts would be limited to temporary construction effects and would be minimized by best practices that are routinely imposed by the City on infrastructure projects. As discussed above, with mitigation and compliance with construction-related regulatory requirements, construction-related effects associated with utility improvements needed to serve campus development under the proposed CPHP, including the Irving Street Arrival, RAB and initial Aldea Housing Densification and Initial Phase improvements projects, would be reduced to less than significant. As a result, cumulative impacts with regard to utility infrastructure would be less than significant.

Water Supply

The analysis conducted in Impact UTIL-2, and the WSE it is based on, is a cumulative analysis of the CPHP's water demand within the overall context of the overall cumulative water demand through 2040 based on current water supply planning. The CPHP would not make a considerable contribution to cumulative impacts on water supply, and the impact would be less than significant.

Wastewater Treatment

Net new development under the proposed CPHP, when combined with foreseeable growth in the vicinity of the Parnassus Heights campus site, would also increase the demand for the wastewater treatment facilities. Reasonably foreseeable cumulative projects would need to meet the wastewater pre-treatment requirements of the SFPUC and SWRCB. The area served by the OSP on the westside of the City is largely built out. Any development in the service area would likely consist of replacement or in-fill on otherwise built-out sites. As stated above, the OSP is currently treating 17 mgd and has a dry weather capacity of 43 mgd. As large scale development is not expected to occur with the service area of the OSP due to its built-out nature and the OSP is operating at 40 percent capacity, there is enough capacity to serve development envisioned under the proposed CPHP and reasonably foreseeable future redevelopment and infill development in the service area. Therefore, cumulative impacts with regard to wastewater treatment capacity would be less than significant.

Solid Waste

The proposed project, when combined with foreseeable growth in the vicinity of the Parnassus Heights campus site, would increase demand for solid waste disposal facilities. Increased waste generation from reasonability foreseeable cumulative projects would be partially offset by existing San Francisco ordinances and policies regarding waste reduction. As discussed above, UCSF presently diverts 78 present of its solid waste and has a goal of reaching zero solid waste disposal by 2020. As stated above, the landfills serving the City of San Francisco have sufficient capacity to receive the additional waste. In particular, the Recology Hay Road Landfill has an estimated remaining capacity of approximately 30.4 million cubic yards or 82 percent of its permitted capacity left. Therefore, cumulative impacts with regard to solid waste would be less than significant.

Mitigation: None required.

4.16.4 References

California Department of Resources Recycling and Recovery (CalRecycle), 2019a. SWIS Facility Detail: Recology Hay Road (48-AA-0002) Available: https://www2.calrecycle.ca.gov/swfacilities/Directory/48-AA-0002/. Accessed September 17, 2019.

California Department of Resources Recycling and Recovery (CalRecycle), 2019b. Jurisdiction Disposal and Alternative Daily Cover (ADC) Tons by Facility. Available: https://www2.calrecycle.ca.gov/LGCentral/DisposalReporting/Destination/DisposalByFacility. Accessed September 17, 2019.

San Francisco Bay Regional Water Quality Control Board (RWQCB), 2013. Order No. R2-2013-0029, NPDES No. CA0037664, *Waste Discharge Requirements for the City and County of San Francisco Southeast Water Pollution Control Plant, North Point Wet Weather Facility, Bayside Wet Weather Facilities, and Wastewater Collection System.* Adopted August 13, 2013.

RWQCB, 2019. Order No. R2-2019-0028, NPDES No. CA0037681, *Waste Discharge Requirements and National Pollutant Discharge Elimination System Permit for the City and County of San Francisco Oceanside Water Pollution Control Plant, Wastewater Collection System, and Westside Recycled Water Project.* Adopted September 12, 2019.

San Francisco Public Utilities Commission (SFPUC), 2016. 2015 Urban Water Management Plan for the City and County of San Francisco, April 2016.

SFPUC, 2019a. Southeast Treatment Plant. https://sfwater.org/index.aspx?page=616. Accessed October 8, 2019.

SFPUC, 2019b. Oceanside Treatment Plant. https://sfwater.org/index.aspx?page=622. Accessed October 8, 2019.

SFPUC, 2019c. Wastewater Collection System. https://sfwater.org/index.aspx?page=399. Accessed October 8, 2019.

University of California, Office of the President (UCOP), 2019. University of California – Policy on Sustainable Practices, July 1, 2019.

University of California, San Francisco (UCSF), 2019. UCSF Parnassus Heights Utility Master Plan, October 1, 2019.

CHAPTER 5
CEQA Statutory Sections

5.1 Introduction

Section 15126 of the CEQA Guidelines requires that when evaluating a project's impact on the environment all phases of the project must be considered, including planning, construction, and operation, taking account of both the short-term and long-term. More specifically, section 15126.2 requires disclosure of (1) Significant Environmental Effects Which Cannot be Avoided if the Proposed Project is Implemented (CEQA Guidelines section 15126.2(b)), (2) Significant Irreversible Environmental Changes Which Would be Caused by the Proposed Project Should it be Implemented (CEQA Guidelines Section 15126.2(c)), and (3) Growth-Inducing Impact of the Proposed Project (CEQA Guidelines section 15126.2(d)).

Chapter 2, Summary, and Chapter 4, Sections 4.1 through 4.16 provide a comprehensive presentation of the environmental effects of implementation of the proposed CPHP, proposed mitigation measures, and conclusions regarding the level of significance of each impact before and after mitigation. Chapter 6, Alternatives, presents a comparative analysis of alternatives to the proposed CPHP. Other CEQA-required analyses described above are presented below.

5.2 Significant and Unavoidable Impacts

Section 15126.2(b) of the CEQA Guidelines requires that an EIR describe any significant impacts that cannot be avoided, even with the implementation of feasible mitigation measures. The environmental effects of the proposed CPHP on various aspects of the environment are discussed in detail in Chapter 4, Environmental Setting, Impacts, and Mitigation Measures. Significant impacts of the CPHP that cannot be avoided if the CPHP is approved as proposed are summarized in **Table 5-1**, below. Significant and unavoidable impacts of the Irving Street Arrival, RAB and/or initial Aldea Housing Densification projects are summarized in **Table 5-2**, below.

Section 15126.2(b) also requires: "Where there are impacts that cannot be alleviated without imposing an alternative design, their implications and reasons why the project is being proposed, notwithstanding their effect, should be described." The discussion of the feasibility of alternatives to address significant impacts of the proposed CPHP is found in Chapter 6, Alternatives.

TABLE 5-1
SIGNIFICANT AND UNAVOIDABLE IMPACTS OF THE PROPOSED CPHP

Impacts
4.1 Aesthetics, Wind and Shadow
Impact AES-4: Implementation of the CPHP would potentially create wind hazards in publicly accessible areas of substantial pedestrian use.
Impact C-AES-3: Implementation of the CPHP, combined with cumulative projects, would potentially create wind hazards in publicly accessible areas of substantial pedestrian use.
4.2 Air Quality
Impact AIR-2: Operation of campus facilities developed under the CPHP would result in a cumulatively considerable net increase of a criteria pollutant (PM_{10}) for which the project region is non-attainment under an applicable federal or state ambient air quality standard.
Impact C-AIR-1: Implementation of the CPHP would result in a cumulatively considerable net increase of a criteria pollutant (PM_{10}) for which the project region is non-attainment under an applicable federal or state ambient air quality standard.
4.4 Cultural Resources and Tribal Cultural Resources
Impact CUL-1: Implementation of the CPHP would result in a substantial adverse change in the significance of known historical resources.
Impact CUL-2: Implementation of the CPHP would result in a substantial adverse change in the significance of potential future historical resources that may become eligible by the full build-out of the CPHP in 2050.
Impact C-CUL-1: Implementation of the CPHP would result in cumulatively considerable impacts on cultural and/or tribal cultural resources, in combination with past, present and reasonably foreseeable future projects in the vicinity of the Parnassus Heights campus site.
4.11 Noise and Vibration
Impact NOI-1: Construction activities under the CPHP would generate a substantial temporary increase in ambient noise levels in the vicinity of the construction project in excess of standards established in the local general plan or noise ordinance, or applicable standards of other agencies.
Impact C-NOI-1: Implementation of the CPHP, combined with cumulative construction noise in the project area, would generate a substantial temporary increase in ambient noise levels from construction activity in the vicinity of the project in excess of standards established in the local general plan or noise ordinance, or applicable standards of other agencies.

TABLE 5-2
SIGNIFICANT AND UNAVOIDABLE IMPACTS OF THE PROPOSED IRVING STREET ARRIVAL, RAB, AND INITIAL ALDEA DENSIFICATION PROJECTS

Impacts
4.1 Aesthetics, Wind and Shadow
Impact AES-4: Implementation of the Irving Street Arrival, RAB, and initial Aldea Housing Densification projects would potentially create wind hazards in publicly accessible areas of substantial pedestrian use.
4.4 Cultural Resources and Tribal Cultural Resources
Impact CUL-1: Implementation of the RAB, Initial Aldea Densification project, and Initial Phase improvements would result in a substantial adverse change in the significance of known historical resources.
4.11 Noise and Vibration
Impact NOI-1: Construction activities under the RAB and initial Aldea Housing Densification projects would generate a substantial temporary increase in ambient noise levels in the vicinity of the construction project in excess of standards established in the local general plan or noise ordinance, or applicable standards of other agencies.

5.3 Significant Irreversible Environmental Effects

Under CEQA, an EIR must analyze the extent to which a project's primary and secondary effects would commit future generations to the allocation of nonrenewable resources and to irreversible environmental damage (CEQA Guidelines Section 15126.2(c)). Specifically, Section 15126.2(c) states:

> Uses of nonrenewable resources during the initial and continued phases of the project may be irreversible, since a large commitment of such resources makes removal or nonuse thereafter unlikely. Primary impacts and, particularly, secondary impacts (such as highway improvement which provides access to a previously inaccessible area) generally commit future generations to similar uses. Also, irreversible damage can result from environmental accidents associated with the project. Irretrievable commitments of resources should be evaluated to assure that such current consumption is justified.

Generally, a project would result in significant irreversible environmental changes if:

- The primary and secondary impacts would generally commit future generations to similar uses;
- The project would involve a large commitment of nonrenewable resources;
- The proposed consumption of resources is not justified (e.g., the project involves the wasteful use of energy); and/or
- The project would involve uses in which irreversible damage could result from any potential environmental accidents associated with the project.

With respect to the potential of the proposed CPHP to commit future generations to similar uses, the Parnassus Heights campus site is largely built out and the proposed CPHP would not alter the types of land uses and activities conducted at the campus site. As discussed in Chapter 3, Project Description, the great majority of new development would be contained within the largely developed areas within the Parnassus Heights campus site. There is also the potential for certain new development under the CPHP, including the proposed New Hospital and associated widening of Medical Center Way adjacent to the New Hospital, to result in the need to modify the Reserve boundary. UCSF would replace any Reserve area that is lost due to new development under the CPHP by designating new Reserve area elsewhere on the campus site in an amount equal to or greater than that area lost. As determined in Section 4.10, Land Use and Planning, the functional zones proposed under the CPHP are generally consistent with the existing functional zones established for the Parnassus Heights campus site under the 2014 LRDP. The functional zone changes proposed under the CPHP do not involve a functional zone change that would place a new use adjacent to existing developed land uses outside of the campus site boundaries to create a land use conflict.

With respect to the commitment of non-renewable resources, and consumption of resources, these would occur during both construction and operation of the proposed CPHP. Construction of new development under the proposed CPHP would require the use of fossil fuel, construction materials and water. During operation, the proposed CPHP would also require an irreversible commitment of energy, primarily in the form of fossil fuels for heating and cooling of buildings, for vehicle fuel, and for energy production; as well as potable and non-potable water for consumption, landscaping, and other uses.

However, as discussed in Section 4.5, Energy, the University would be required to adhere all relevant *UC Sustainable Practices Policy* provisions that are designed to conserve and reduce energy consumption. These provisions require 20 percent or better energy performance than California Code of Regulations Title 24 for new construction and renovations, and strives to achieve 30 percent; requires new laboratory buildings to meet Labs21 Environmental Performance Criteria; and requires all new construction and major renovations to meet a minimum standard of LEED-NC Silver and strive for LEED-NC Gold when possible. In addition, the projects and activities under the proposed CPHP would address UCSF's achievement of goals set forth in the adopted Carbon Neutrality Initiative (CNI), which has goals more stringent than the statewide target of achieving 80 percent below 1990 emission levels by 2050. Campus programs that are implemented to achieve the goals would have the effect of reducing overall energy usage.

As described further in Section 4.15, Transportation, future average daily VMT per capita for residential and office uses under the proposed CPHP would be substantially lower than the San Francisco Bay Area average. The VMT rates would be supported by the University's Transportation Demand Management program. In addition, the provision of additional on-campus housing for faculty and students under the CPHP would lower commuting VMT over the CPHP planning period. Lower VMT results in lower mobile fuel use per worker and per resident than the regionwide and countywide average.

In addition, as described in Section 4.7, Greenhouse Gas (GHG) Emissions, while total GHG emissions under the proposed CPHP in 2050 would increase by nearly 50 percent over existing conditions, GHG emissions per service population would incrementally decrease under the proposed CPHP by 2050. Furthermore, with GHG reduction measures recommended to be included in the GHGRS update, along with mitigation identified in the Draft EIR (implementation of water conservation strategies and air quality operational measures; and Monitor emissions annually and acquire carbon offset credits in conformance with CARB guidance to achieve and maintain carbon neutrality for the Parnassus Heights campus site under the CPHP), GHG emissions impacts would be less than significant.

With respect to uses in which irreversible damage could result from any potential environmental accidents associated with the proposed CPHP, these potential effects are discussed in detail in Section 4.8, Hazards and Hazardous Materials. Clinics, laboratories and research facilities proposed under the CPHP would involve the transport, handling, storage and disposal of varied and large quantities of hazardous materials, including low-level radioactive waste and medical/biological waste. If not handled appropriately, upset and accident conditions could result in releases of hazardous materials or wastes that could result in adverse effects to residents, workers, the public or the environment. However, with the University's adherence to existing regulatory requirements and management programs, the potential impact to workers, residents, visitors, or the environment would be reduced to a less-than-significant level.

5.4 Growth-Inducing Effects

As required under CEQA, an EIR must include a discussion of the ways in which the proposed CPHP could directly or indirectly foster economic or population growth, or the construction of additional housing and how that growth would, in turn, affect the surrounding environment (CEQA Guidelines Section 15126.2(d)). Growth can be induced in a number of ways, including the elimination of obstacles to growth, or through the stimulation of economic activity within the region. The discussion of removal of obstacles to growth relates directly to the removal of infrastructure limitations or regulatory constraints that could result in population growth or development unforeseen at the time of project approval. Under CEQA, growth is not necessarily considered beneficial, detrimental, or of little significance to the environment.

5.4.1 Direct Population and Employment Growth

As discussed in Section 4.12, Population and Housing, the proposed CPHP would directly result in development and associated population and employment growth. UCSF anticipates that the campus population, which includes faculty, staff, and students, would grow by approximately 4,100 persons by 2030 and an additional 1,080 persons by 2050. This growth includes approximately 500 students and about 3,600 faculty and staff by 2030 and approximately additional 1,080 faculty and staff by 2050.

In order to accommodate the increase in students, faculty, and staff under the proposed CPHP, UCSF plans on constructing 142 net new housing units/beds within the Aldea housing complex by 2030, and an additional 620 net new residential units within the Aldea housing complex and western portion of the campus core by 2050, for a total of 762 net new units.

Campus population growth under the proposed CPHP would not be entirely accommodated by the existing and new housing on the Parnassus Heights campus site, and therefore would result in an indirect housing demand (and associated population growth) beyond the campus site.

The City and County of San Francisco is the primary study area that would be affected directly by CPHP-related population and housing effects as well as by employment effects that could in turn result in demand for additional housing. However, effects may extend beyond San Francisco to neighboring counties in the Bay Area. As discussed in Section 4.12, Population and Housing, it is estimated that approximately 60 percent of UCSF students and employees commute from places within San Francisco, and therefore likely reside in San Francisco. Besides San Francisco, employee commuters largely travel from four other counties to UCSF campus sites: Alameda, Contra Costa, Marin, and San Mateo. It is assumed that future students and employees would make approximately the same residential location decisions as current UCSF students and employees. In addition, there would also be additional population living in those UCSF employee and student households. As estimated in Section 4.12, the total population in San Francisco associated with UCSF growth under the proposed CPHP would be approximately 5,800 persons by 2030 and an additional 1,530 persons by 2050. The total population in the remaining four counties associated with UCSF growth under the proposed CPHP would be approximately 4,410 persons by 2030 and an additional 1,160 persons by 2050.

The potential physical environmental impacts associated with the direct population growth and associated housing on the Parnassus Heights campus site under the proposed CPHP are evaluated in the environmental analysis sections of this EIR (e.g., Section 4.2, Air Quality; Section 4.5, Energy; Section 4.13, Public Services; Section 4.15, Transportation; and 4.16 Utilities and Service Systems). New off-site housing that would be constructed for the students, faculty, and staff living off-site would likely result in some environmental impacts; however, it would be speculative to characterize the site-specific environmental effects resulting from the development of such off-site housing.[1] The General Plans of jurisdictions where new off-site housing would be developed contain policies and other measures that address the environmental effects of new housing development. Specific housing development projects also would be subject to the environmental review process of affected jurisdictions.

In general, the potential effects of this population growth could include: increased traffic congestion; increased air pollutant emissions; loss of agricultural land and open space; loss of habitat and associated flora and fauna; increased demand on public utilities and services, such as fire and police protection, water, recycled water, wastewater, solid waste, energy, and natural gas; and increased demand for housing. An increase in population growth would also require governmental services including, but not limited to, public schools, libraries, and parks.

5.4.2 Indirect Economic Growth

In addition to the employment growth generated by the proposed CPHP, additional local employment could be generated through what is commonly referred to as the "multiplier effect." The multiplier effect refers to the secondary economic effects caused by spending from project-generated residents and employees.

The multiplier effect also calculates induced employment. Induced employment follows the economic effect of employment beyond the expenditures of the employees within the Parnassus Heights campus site to include jobs created by the stream of goods and services necessary to construct the proposed CPHP. For example, when a manufacturer buys products or sells products, the employment associated with those inputs or outputs are considered induced employment. As an additional example, when a staff member from the campus site goes out to lunch, the person who serves the student or employee lunch holds a job that was indirectly caused by the proposed CPHP. When the server then goes out and spends money in the economy, the jobs generated by this third-tier effect are considered induced.

The multiplier effect tends to be greater in regions with larger diverse economies (such as the Bay Area) due to a decrease in the requirement to import goods and services from outside the region, as compared to the effects of spending in smaller economies where goods and services must be imported from elsewhere.

Indirect economic growth would result under the proposed CPHP from non-UCSF jobs that might be induced by the growth in campus-affiliated populations. Indirect jobs that would be generated by

1 CEQA Guidelines section 15145 states that "[i]f, after thorough investigation, a Lead Agency finds that a particular impact is too speculative for evaluation, the agency should note its conclusion and terminate discussion of the impact."

the proposed CPHP include those of suppliers of goods and services to UCSF and induced jobs are created through the household expenditures of UCSF and supplier workers. For example, when a UCSF s staff member purchases goods or services at local businesses, additional employees are hired.

The number of indirect and induced jobs generated by a university is commonly calculated by applying a ratio, or job multiplier, to the number of jobs provided directly by such an institution. The projected increase in jobs under the proposed CPHP is approximately 3,600 staff and faculty positions by 2030 and an additional 1,080 staff and faculty positions by 2050, for a total of 4,680 new jobs. Using a job multiplier of 0.73[2], at full development of the campus site under the CPHP (by 2050), an additional 3,420 jobs elsewhere in the Bay Area could be indirectly caused by or induced by growth under the proposed CPHP.

5.4.3 Environmental Effects of Indirectly Caused and Induced Growth

The residence locations of people working in indirect and induced jobs is unknown. It would be speculative to conclude where such workers would reside or be employed in the Bay Area (or beyond), or to determine any associated environmental effects.

Growth induced directly and indirectly by the proposed CPHP would likely affect the greater Bay Area region. While it is acknowledged above that the precise nature, location, and magnitude of effects of indirect and induced growth cannot be determined, the proposed CPHP would likely increase overall demand in the region for housing, commercial and industrial space, and associated infrastructure. Potential effects could include: increased traffic congestion; increased air pollutant emissions; loss of agricultural land and open space; loss of habitat and associated flora and fauna; increased demand on public utilities and services, such as fire and police protection, water, recycled water, wastewater, solid waste, energy, and natural gas; and increased demand for housing. An increase in housing demand in the Bay Area region would also require governmental services including, but not limited to, schools, libraries, and parks to serve new commercial and residential development.

Indirect and induced employment and population growth could further contribute to the loss of open space because it would encourage conversion to urban uses for housing, commercial space, and infrastructure, although most jurisdictions have adopted smart-growth policies that discourage or prohibit this type of development.

2 Multipliers identified in studies of other college campuses range from 0.33 to 1.36 (Stanford, 2017). At 0.73 indirect and induced workers per University of San Francisco worker, the study conducted for USF may provide the best "order of magnitude" estimate for regional impacts for UCSF, as it is in the same Bay Area region with the same range of available local goods and services.

5.4.4 Removal of Obstacles to Growth

The elimination of physical obstacles to growth is considered a growth-inducing effect. The proposed CPHP would result in additional development on the Parnassus Heights campus site. The proposed CPHP would include infrastructure improvements designed to accommodate growth on the Parnassus Heights campus site through 2050. Proposed improvements include underground pipelines, electrical transmission lines, water supply infrastructure, roadway extensions and modifications, pathways, and other similar types of improvements. The scale and nature of these improvements would be to accommodate the growth and development on the Parnassus Heights campus site directly attributable to the proposed CPHP. The infrastructure improvements undertaken as part of the proposed CPHP would be designed to serve the planned development on the campus site and would not be designed to support growth outside the Parnassus Heights campus site, and thus would not remove an obstacle to growth in the City and County of San Francisco.

5.5 References

Metropolitan Transportation Commission (MTC) and Association of Bay Area Governments (ABAG), 2018. Plan Bay Area: Projections 2040. November 2018.

Stanford University, 2017. *2018 General Use Permit Application*, Technical Data to Address Population and Associated Housing Demand, July 25, 2017.

CHAPTER 6
Alternatives

6.1 Introduction

An EIR must describe a range of reasonable alternatives to the proposed project that might feasibly accomplish most of the basic objectives of the proposed project and could avoid or substantially lessen one or more of the significant effects. This chapter describes the CEQA requirements for an alternatives analysis, presents UCSF's project objectives, summarizes the significant effects of the proposed CPHP that cannot be avoided or reduced to less than significant, and describes the alternatives, including those that were considered but dismissed from further evaluation. The chapter then considers the comparative effects of each of the alternatives relative to those of the proposed CPHP, and evaluates the relationship of the alternatives to the project objectives. As required under Section 15126.6(e) of the State CEQA Guidelines, an environmentally superior alternative is identified and addressed at the end of this chapter.

6.1.1 CEQA Requirements for Alternatives Analysis

CEQA requires that an EIR describe and evaluate a range of reasonable alternatives to the proposed project, or to the location of the proposed project, and evaluate the comparative merits of the alternatives (CEQA Guidelines Section 15126.6(a), (d)). The "range of alternatives" is governed by the "rule of reason," which requires the EIR to describe and consider only those alternatives necessary to permit informed public participation, and an informed and reasoned choice by the decision-making body (CEQA Guidelines Section 15126.6(a), (f)).

The range of alternatives must include alternatives that could feasibly attain most of the basic objectives of the project and could avoid or substantially lessen any of the significant effects of the project (CEQA Guidelines Section 15126.6(a)-(c)). CEQA generally defines "feasible" to mean an alternative that is capable of being accomplished in a successful manner within a reasonable period of time, taking into account economic, environmental, social, technological, and legal factors. In addition, the following may be taken into consideration when assessing the feasibility of alternatives: site suitability; economic viability; availability of infrastructure; general plan consistency; other plans or regulatory limitations; jurisdictional boundaries; and the ability of the proponent to attain site control (CEQA Guidelines Section 15126.6(f)(1)). If the lead agency concludes that no feasible alternative locations exist, it must disclose the reasons for this conclusion, and should include the reasons in the EIR (CEQA Guidelines Section 15126.6(f)(2)(B)).

The description or evaluation of alternatives does not need to be exhaustive, and an EIR need not consider alternatives for which the effects cannot be reasonably determined and for which implementation is remote or speculative. An EIR need not describe or evaluate the environmental effects of alternatives in the same level of detail as the proposed project, but must include enough information to allow meaningful evaluation, analysis, and comparison with the proposed project (CEQA Guidelines Section 15126.6(d)).

The "no project" alternative must be evaluated. This analysis is required to include a discussion of the continuation of the existing conditions, as well as what could be reasonably expected to occur in the foreseeable future if the project were not approved, based on current plans and consistent with available infrastructure and community services (CEQA Guidelines Section 15126.6(e)(2)). When the project is the revision of an existing land use plan, the no project alternative will be the continuation of the existing plan into the future.

CEQA also requires that an environmentally superior alternative be selected from among the alternatives. The environmentally superior alternative is the alternative with the fewest or least severe adverse environmental impacts. If the "no project" alternative is the environmentally superior alternative, the EIR must also identify an environmentally superior alternative from among the other alternatives (CEQA Guidelines Section 15126.6(e)(2)).

6.2 Alternatives Selection

As noted above, the selection of alternatives for consideration in an EIR depends on whether the possible alternative can feasibly meet most of the basic objectives of the project and avoid or substantially lessen any significant impacts of the project. The project objectives presented in Chapter 3, *Project Description,* and the significant unavoidable impacts of the CPHP identified in Chapter 4, *Environmental Setting, Impact, and Mitigation Measures* are listed below.

6.2.1 Project Objectives

Parnassus Heights [from the 2014 LRDP and FEIR]

The 2014 LRDP FEIR identified objectives specific to the Parnassus Heights campus site. Those objectives which are listed below remain valid, with the exception of objective E. related to the space ceiling, to be revised as shown as part of the proposed amendment to the LRDP.

A. Continue to promote excellence and leadership in health science education, maintaining the Parnassus Heights campus site as the central location for classroom instruction.

B. Ensure that adequate space is provided to foster collaboration and to facilitate the inter-dependence and connectivity for operational efficiency and effectiveness of instruction, clinical, research and support uses in close physical proximity to each other.

C. Ensure that Long Hospital and the New Hospital Addition have adequate clinical and administrative support and are aligned with education, research and specialized care programs and support that remain at the campus site.

D. Provide additional campus housing and improve campus life amenities including outdoor space.

E. ~~Strive to better achieve the remaining unfulfilled components of the 1976 Regents' Resolution by reducing space, minimizing population growth, and improving transportation-related programs.~~ Conform to the space limits and population estimates established in the Regents' Resolution Regarding the Parnassus Heights Campus Site, as amended.

F Preserve the Mount Sutro Open Space Reserve as permanent open space, and serve as the steward of the Reserve by maintaining and expanding the trail system and by ensuring the safety of visitors and neighboring structures.

Objectives for the CPHP

The following are objectives pertaining to the CPHP, including its Initial Phase projects.

Space

- Revitalize the aging Parnassus Heights campus to enhance its place as a premier educational, research, and clinical institution -- one that draws in research and clinical faculty, staff, students, and trainees.
- Fulfill the need for contemporary research, educational, clinical, and support spaces that have been lacking at Parnassus Heights for decades.
- Increase the quantity and improve the quality of research space, to enhance synergies between research and clinical activities at Parnassus Heights for UCSF to maintain its stature as a world-class hub of basic, translational, and clinical research.
- Connect buildings and spaces at multiple levels to foster collaboration that facilitates learning and scientific discoveries.
- Facilitate patient/pedestrian safety and functional efficiency by connecting campus buildings across and under Parnassus Avenue.
- Increase the on-campus supply of housing for students, faculty and staff, thereby minimizing the impact of UCSF-demand for housing on adjoining neighborhoods.

Urban Design

- Improve the campus's functional organization and foster intuitive wayfinding.
- Develop a framework of open spaces that enhance the campus environment by connecting people to nature.
- Create welcoming spaces for enhancing the patient/visitor experience throughout the campus site.
- Enhance connectivity between the campus site and the surrounding community.

Mobility

- Promote sustainable transportation behavior.
- Improve campus circulation options to reduce impacts on the surrounding neighborhood.
- Improve the patient and visitor parking and arrival experience.

- Create safe on- and off-street passenger drop-off zones.
- Enhance Parnassus Avenue as a campus "main street."
- Optimize the use of existing parking supply.
- Enhance overall campus functionality and efficiency.
- Improve campus circulation by way of a service corridor that facilitates loading and deliveries to campus and minimizes impacts of those activities on the neighborhood.

Objectives for Irving Street Arrival

- Create a welcoming experience for patients, visitors, students, and employees arriving at the Parnassus Heights campus site.
- Enhance and speed the pedestrian journey between Irving Street and Parnassus Avenue.
- Provide amenities that benefit the UCSF community and draw in residents from the surrounding neighborhood, such as a reception area, wellness offerings, and convenience retail.

Objectives for the Research and Academic Building

- Provide new state-of-the-art, flexible research space on the Parnassus Heights campus site expediently to replace existing obsolete wet lab space and to satisfy existing demand.
- Site and develop a new research and educational building at a location that is currently underutilized or otherwise a candidate for demolition, to minimize the disruption to campus operations that would be caused by relocation of occupants of heavily-occupied buildings.
- Provide an "empty chair" i.e., space in which to move research teams so that vacated deteriorating space can be renovated.
- Provide replacement space for the seismically deficient School of Nursing building.

Objectives for the New Hospital at Parnassus Heights

- Meet seismic requirements of California Senate Bill 1953 by developing a new, seismically-sound, state-of-the-art inpatient facility.
- Site and develop a new inpatient facility in a way that optimizes operational activities with other clinical facilities at Parnassus Heights, such as Long Hospital, a renovated and repurposed Moffitt Hospital building, and Medical Building 1.
- Increase inpatient beds at Parnassus Heights to address severe constraints on capacity and access to care, and to meet the needs of a growing and aging Bay Area population.
- Increase inpatient beds at Parnassus Heights to allow for the capacity to provide inpatient health care in times of severe strain such as the current pandemic, without resorting to reducing or canceling non-essential surgeries to create bed capacity.
- Develop a new inpatient facility that has sufficient space to accommodate modern regulatory requirements and industry standards of contemporary hospitals, such as construction codes, sizes of operating rooms, ratio of operating rooms to pre-and post-recovery areas, and space for privacy and infection control issues.

- Develop a new inpatient facility that has sufficient space to accommodate modern technology, including telemedicine, robotics, and new diagnostic, imaging, testing, treatment, surgery and laboratory equipment, all requiring substantial infrastructure and space.
- Develop a new inpatient facility that has sufficient space to accommodate patient satisfaction requirements of contemporary hospitals, such as private patient rooms of sufficient size.
- Develop a new inpatient facility that is optimized in its spatial layout to enhance functionality and efficiency.
- Develop spaces for clinical and translational research and learning in or adjacent to clinical areas where patients are located.

Objectives for the Aldea Housing Densification

- Increase the supply of housing for UCSF students and potentially faculty and staff.
- Develop housing in a cost-effective manner in order to make rents as affordable as possible for housing residents.
- Develop housing at a location that minimizes cumulative construction impacts with other proposed development along Parnassus Avenue.

6.2.2 Summary of Significant and Unavoidable Environmental Effects of the Proposed CPHP

As described above, alternatives to the proposed CPHP must substantially lessen or avoid one or more of the significant project and/or cumulative environmental impacts. **Table 6-1**, below, summarizes the significant and unavoidable impacts identified in Chapter 4 of this EIR.

TABLE 6-1
SIGNIFICANT AND UNAVOIDABLE IMPACTS OF THE PROPOSED CPHP

Impacts
4.1 Aesthetics, Wind and Shadow
Impact AES4: Implementation of the CPHP would potentially create wind hazards in publicly accessible areas of substantial pedestrian use.
Impact C-AES-3: Implementation of the CPHP, combined with cumulative projects, would potentially create wind hazards in publicly accessible areas of substantial pedestrian use.
4.2 Air Quality
Impact AIR-2: Operation of campus facilities developed under the CPHP would result in a cumulatively considerable net increase of a criteria pollutant (PM_{10}) for which the project region is non-attainment under an applicable federal or state ambient air quality standard.
Impact C-AIR-1: Implementation of the CPHP would result in a cumulatively considerable net increase of a criteria pollutant (PM_{10}) for which the project region is non-attainment under an applicable federal or state ambient air quality standard.
4.4 Cultural Resources and Tribal Cultural Resources
Impact CUL-1: Implementation of the CPHP would result in a substantial adverse change in the significance of known historical resources.

TABLE 6-1 (CONTINUED)
SIGNIFICANT AND UNAVOIDABLE IMPACTS OF THE PROPOSED CPHP

Impacts
4.4 Cultural Resources and Tribal Cultural Resources (cont.)
Impact CUL-2: Implementation of the CPHP would result in a substantial adverse change in the significance of potential future historical resources that may become eligible by the full build-out of the CPHP in 2050.
Impact C-CUL-1: Implementation of the CPHP would result in cumulatively considerable impacts on cultural and/or tribal cultural resources, in combination with past, present and reasonably foreseeable future projects in the vicinity of the Parnassus Heights campus site.
4.11 Noise and Vibration
Impact NOI-1: Construction activities under the CPHP would generate a substantial temporary increase in ambient noise levels in the vicinity of the construction project in excess of standards established in the local general plan or noise ordinance, or applicable standards of other agencies.
Impact C-NOI-1: Implementation of the CPHP, combined with cumulative construction noise in the project area, would generate a substantial temporary increase in ambient noise levels from construction activity in the vicinity of the project in excess of standards established in the local general plan or noise ordinance, or applicable standards of other agencies.

6.3 Alternatives Selected for Further Evaluation

The alternatives identified for detailed evaluation and designed to inform public participation and reasoned choice by decision-makers are:

Alternative 1: No Project Alternative, consisting of:
- 1A: No Project - No Development; and
- 1B: No Project - Development under 2014 LRDP;

Alternative 2: Reduced Project;

Alternative 3: CPHP including New Hospital - 19-Story Option; and

Alternative 4: CPHP including New Hospital - Phased Option.

Table 6-2, below, provides a summary comparison of the principal differences in characteristics between the proposed CPHP and the alternatives, and the sections that follow describe each alternative, how its impacts would differ from those of the CPHP, and how it would or would not address the project objectives.

TABLE 6-2
COMPARISON SUMMARY OF PROPOSED CPHP AND ALTERNATIVES CHARACTERISTICS

		Alternative 1: No Project Alternatives				
	Proposed CPHP	**Alternative 1A: No Project - No Development**	**Alternative 1B: No Project - Development Under 2014 LRDP**	**Alternative 2: Reduced Project**	**Alternative 3: CPHP including New Hospital - 19-Story Option**	**Alternative 4: CPHP including New Hospital - Phased Option**
CPHP Development						
Net Increase in Space (gsf) at Parnassus Heights Campus Site over Existing			*By 2035:*			
Instruction, Research, Clinical, Pkg, Alteration	+1.37 mil. gsf	0 mil. gsf	+0.20 mil gsf	+0.98 mil gsf		+0.99 mil gsf
Housing	+0.67 mil gsf	0 mil gsf	+0.27 mil gsf	+0.55 ml gsf	Same as proposed CPHP	+0.67 ml gsf
Total Net Increase	**+2.04 mil gsf**	**+0 mil gsf**	**+0.47 mil. gsf**	**+1.53 mil gsf**		**+1.66 mil gsf**
Net Change in Beds at Parnassus Heights Campus Site over Existing						
Initial Phase	+200 beds	0 beds				+68 beds
Future Phase	0 beds	0 beds	*By 2035:*	Same as proposed CPHP	Same as proposed CPHP	+132 beds
Total Net Change	**+200 beds**	**0 beds**	**-36 beds**			**+200 beds**
Net Increase Housing (Units) over Existing						
Initial Phase	+142 units	+0 units		+190 units		
Future Phase	+620 units	+0 units	*By 2035:*	430 units	Same as proposed CPHP	Same as proposed CPHP
Total Net Increase	**+762 units**	**+0 units**	**+329 units**	**+620 units**		
Revision to Open Space Reserve Boundary?	Yes (potentially for widening of Medical Center Way, and for New Hospital)	No	No	Yes (potentially for widening of Medical Center Way)	Yes (potentially for widening of Medical Center Way)	Yes (potentially for widening of Medical Center Way)
LRDP Revisions						
Ave. Daily Pop. Increase over Existing	+7,855	+0	*By 2035:* +1,109	+5,891	Same as proposed CPHP	Same as proposed CPHP
Space Ceiling Amendment	Yes (increase of 1.5 mil. gsf, excluding housing)	No	No	Yes (increase of 1.1 mil. gsf, excluding housing)	Same as proposed CPHP	Yes (increase of 1.1 mil. gsf, excluding housing)
Update to GHG Reduction Strategy	Yes	Yes	Yes	Yes	Yes	Yes

6.3.1 Alternative 1A: No Project - No Development Alternative

The No Project - No Development Alternative assumes remaining development authorized under the 2014 LRDP at the Parnassus Heights campus site would not occur, and furthermore, new development proposed under the CPHP at the campus site would also not occur. As such, building demolition projects authorized, but not yet implemented under the 2014 LRDP at the Parnassus Heights campus site, including the LPPI, Koret Vision Center, EHS, Surge, Woods, and Proctor buildings; and approved but not-yet-completed improvements under the 2014 LRDP, would not be implemented under this alternative. It is further assumed Moffitt Hospital would be decommissioned and reused for uses other than inpatient care.

In addition, under this alternative, the CPHP development program envisioned at the campus site would not occur, including for clinical, research, instruction, housing, and open space uses; supporting utilities, transportation improvements (e.g., Fourth Avenue extension); implementation of the Parnassus Avenue Streetscape Plan; and community investments. This alternative also assumes no modification of the Reserve boundary that would occur under the proposed CPHP associated with the widening of Medical Center Way, and potentially, from construction of the New Hospital.

Because there would be no change in existing development or population at the Parnassus Heights campus site under this alternative, there would be no revisions to the 2014 LRDP as proposed in conjunction with the CPHP, including no revisions to campus site functional zones, no revisions to the space program, no update to the population, no revisions to the Regents' Resolution related to the space ceiling, and no update to the UCSF Greenhouse Gas Reduction Strategy.

It is assumed that UCSF would continue implementation of the *Mount Sutro Open Space Reserve Vegetation Management Plan*, and on-going campus site maintenance programs and activities.

Comparison of Effects of No Project - No Development Alternative to the Proposed CPHP

Aesthetics, Wind and Shadow

Aesthetics

No new development proposed under the CPHP would occur at the Parnassus Heights campus site under this alternative. As a result, this alternative would avoid the less than significant project or cumulative effects on scenic vistas, and conflicts with applicable zoning and other regulations governing scenic quality associated with the CPHP; and would avoid the significant but mitigable impact related to new sources of light and glare that would occur under CPHP.

Wind

No new development associated with the proposed CPHP would occur at the Parnassus Heights campus site under this alternative. Consequently, this alternative would avoid the potentially significant and unavoidable project and cumulative wind hazard impacts in publicly accessible areas of substantial pedestrian use that would occur under the CPHP.

Shadows

No new development associated with the proposed CPHP would occur at the Parnassus Heights campus site under this alternative. As a result, this alternative would avoid the impact, albeit less than significant, of creating new shadow, or contributing to cumulative shadowing, in publicly accessible open spaces, that would be associated with the CPHP.

Air Quality

No new construction or demolition activities associated with the proposed CPHP would occur at the Parnassus Heights campus site under this alternative. Consequently, this alternative would avoid the significant but mitigable air quality effects associated with increases in construction–generated criteria pollutants, and with exposure of sensitive receptors to substantial pollutant concentrations, that would occur under the CPHP. Furthermore, since no increase in operational development and associated population and traffic increases associated with CPHP would occur at the Parnassus Heights campus site under this alternative, it would avoid the significant and unavoidable project and cumulative impact related to net increases of operational criteria pollutants that would occur under the CPHP. The significant but mitigable CPHP impact associated with exposure of sensitive receptors to substantial project and cumulative operational pollutant concentrations due to increased campus site operations would also not occur under this alternative. Lastly, the significant but mitigatable impact associated with the CPHP's conflict with or obstruction of implementation of the *2017 Clean Air Plan* would not occur under this alternative.

Biological Resources

No new construction or demolition activities associated with the proposed CPHP would occur at the Parnassus Heights campus site under this alternative. As a result, this alternative would avoid the significant but mitigable project and cumulative construction-related effects on special-status plant and wildlife species associated with the CPHP. In addition, this alternative would avoid the significant but mitigable project and cumulative impacts associated with potential resident and migrating bird strikes during construction and operation identified with the CPHP. Lastly potential effects, albeit less than significant, associated with damage to or removal of landmark trees would also not occur under this alternative.

Cultural Resources

No building alteration or demolition activities associated with the proposed CPHP would occur at the Parnassus Heights campus site under this alternative. Consequently, this alternative would avoid the significant and unavoidable project and cumulative effects on historic resources, including to UC Hall, Millberry Union, School of Dentistry, LPPI, and Aldea San Miguel Housing Buildings 8, 10, and 12; as well as with impacts to potential future historical resources that may become eligible by the full build-out of the CPHP in 2050. In addition, since no ground disturbing construction activities associated with the proposed CPHP would occur at the

Parnassus Heights campus site under this alternative, it would avoid the significant but mitigable project and cumulative impacts to previously unknown archaeological resources, human remains, and tribal cultural resources that would occur under the CPHP.

Energy

No construction or demolition activities associated with the proposed CPHP would occur at the Parnassus Heights campus site under this alternative. As a result, this alternative would avoid the construction energy use impact associated with this CPHP. In addition, no increase in operational development and associated population increases associated with the CPHP would occur at the Parnassus Heights campus site under this alternative. Consequently, this alternative would not result in an increase in operational energy use. As such, the alternative would avoid the less than significant project or cumulative CPHP impact associated with consumption of energy resources, and the conflict with a state or local plan for renewable energy or energy efficiency.

Geology and Soils

No ground disturbing construction activities, or new building construction associated with the proposed CPHP would occur at the Parnassus Heights campus site under this alternative. As a result, this alternative would avoid the significant but mitigable project and cumulative impact associated with the CPHP for new development in vicinity of landslides. In addition, this alternative would avoid the potential project and cumulative less than significant impact associated with the CPHP as it relates to effects of seismic ground shaking, liquefaction or unstable soils, and erosion from ground disturbance during construction.

Greenhouse Gas Emissions

No new construction or demolition activities associated with the proposed CPHP would occur at the Parnassus Heights campus site under this alternative. As a result, this alternative would avoid the impact, albeit less than significant, related to construction-generated greenhouse gas emissions associated with the CPHP. In addition, no increase in operational development and associated population and traffic increases associated with the CPHP would occur at the Parnassus Heights campus site under this alternative. Consequently, this alternative would avoid the less than significant impact of increases in operational greenhouse gas emissions associated with the CPHP. Furthermore, this alternative would not conflict with applicable plans, policies or regulations adopted for the purpose of reducing the emissions of greenhouse gases.

Hazards and Hazardous Materials

No new construction or demolition activities associated with the proposed CPHP would occur at the Parnassus Heights campus site under this alternative. In addition, this alternative would not increase operational development and therefore would not involve the associated increases in hazardous materials use that would occur under the CPHP. Accordingly, this alternative would avoid the significant but mitigable project and cumulative CPHP impacts associated with routine transport, use, or disposal of hazardous materials; and with encountering potential legacy contaminates in soil during construction. In addition, this alternative would avoid the project and cumulative impacts, albeit less than significant, associated with potential accidental release of hazardous materials; and emitting and handling of hazardous materials within one-quarter mile of an existing or proposed school.

Hydrology and Water Quality

No new construction or ground disturbing activities associated with the proposed CPHP would occur at the Parnassus Heights campus site under this alternative. In addition, this alternative would not result in an increase in impervious surfaces, or operational changes in the amount or quality of stormwater runoff at the campus site. Accordingly, this alternative would avoid the less than significant project and cumulative CPHP impacts related to the potential to violate water quality discharges requirements; degrade surface or groundwater quality; result in erosion and siltation; affect flooding; exceed the capacity of stormwater drainage systems; provide additional sources of polluted runoff; or impede or redirect storm flows.

Land Use and Planning

No new development associated with the CPHP would occur at the Parnassus Heights campus site under this alternative, and furthermore, this alternative does not propose amendments to the 2014 LRDP that would affect land use, the space program, or population. As a result, potential project and cumulative CPHP impacts, albeit less than significant, associated with conflict with land use plans, policies and regulations adopted for the purpose of avoiding or mitigating an environmental effect, or incompatibility with adjacent land uses, would not occur under this alternative.

Noise and Vibration

No new construction or demolition activities associated with the proposed CPHP would occur at the Parnassus Heights campus site under this alternative. Consequently, this alternative would avoid the significant and unavoidable project and cumulative construction- and demolition-generated noise effects, and significant but mitigable construction vibrations effects associated with the CPHP. Furthermore, no increase in operational permanent noise sources, and increase in traffic, would occur at the Parnassus Heights campus site under this alternative. As a result, this alternative would avoid the significant but mitigable project and cumulative impact related to permanent increases in ambient noise levels from stationary noise sources in excess of applicable noise standards, and avoid the less than significant project and cumulative impact associated with increases in traffic noise levels, that would be associated with the CPHP.

Population and Housing

This alternative would not result in an increase in the existing population at the Parnassus Heights campus site, and would not result in the development of any additional housing or demolition of any existing housing at the campus site. As a result, this alternative would avoid potential project and cumulative impacts, albeit less than significant, associated with inducement of population growth, and related new demand for housing, that are associated with the CPHP. Furthermore, this alternative would avoid the less than significant temporary impacts associated with displacement of people from existing housing, as would occur under the CPHP.

Public Services

This alternative would not result in an increase in development or population at the Parnassus Heights campus site. Consequently, this alternative would avoid the less than significant project and cumulative impacts associated with need for new or altered fire protection or public school facilities, associated with the CPHP.

Recreation

This alternative would not result in new development or an increase in population at the Parnassus Heights campus site. Consequently, this alternative would avoid the less than significant project and cumulative CPHP impacts of increasing the use of existing neighborhood and regional parks or other existing on- and off-campus recreational facilities, and with the construction of new recreational facilities.

However, this alternative would not provide those recreational improvements proposed under the CPHP, including the expanded Saunders Court, Promenade and Millberry Terrace.

Transportation

This alternative would not result in new development or an increase in population and associated traffic at the Parnassus Heights campus site. Consequently, this alternative would avoid the significant but mitigable CPHP construction-related impact to travel conditions along sidewalks and roadways serving the campus site. This alternative would also avoid the less than significant project and/or cumulative CPHP impacts of conflicts with programs, plans, ordinances or policies addressing the circulation system; increases in vehicle miles traveled (VMT); increases in hazard due to design features; and emergency access.

However, this alternative would not provide those transportation improvements, including for vehicle, bicycles and pedestrians, proposed under the CPHP to improve circulation and safety at the campus site, including implementation of Parnassus Avenue Streetscape Plan, the Fourth Street extension, the overcrossing and tunnel for Parnassus Avenue, widening of Medical Center Way, service corridor, Irving Street Arrival, and Promenade.

Utilities and Service Systems

This alternative would not result in new development or an increase in population and associated increases in public utility demands at the Parnassus Heights campus site. Consequently, this alternative would avoid the less than significant project and/or cumulative impacts that would occur under the CPHP associated with: construction of new or expanded water, wastewater treatment or storm water drainage, electric power, natural gas, or telecommunications facilities; effects on water supply availability during normal, dry and multiple dry years; effects on wastewater treatment capacity; and effects on capacity of local solid waste infrastructure and compliance with federal, state and local statutes and regulations related to solid waste.

However, this alternative would not provide those improvements proposed under the CPHP to upgrade the campus's aging infrastructure, and consequently, on-going maintenance issues associated with on-campus utilities would be greater than under the CPHP.

Relationship of No Project - No Development Alternative to Meeting Project Objectives

The No Project - No Development Alternative would not provide for implementation of any remaining but unbuilt authorized development under the 2014 LRDP, or for implementation of the development program proposed under the CPHP, or accommodate associated revisions to campus site functional zones, space program, estimated population, and update to the UCSF Greenhouse Gas Reduction Strategy. As such this potential alternative would not achieve most 2014 LRDP objectives for the Parnassus Heights campus site, and would not achieve the any of proposed CPHP objectives. As such, this alternative is considered both unrealistic and infeasible.

6.3.2 Alternative 1B: No Project - Development under 2014 LRDP Alternative

As discussed above, when the project is the revision of an existing land use plan, the no project alternative will be the continuation of the existing plan into the future, which in this case is the 2014 LRDP. Accordingly, the No Project - Development under 2014 LRDP Alternative consists of implementation of the remaining authorized 2014 LRDP improvements contemplated for the Parnassus Heights campus site. This would consist of approximately 0.47 million gsf of additional development at the Parnassus Heights campus site; the most notable related to a New Hospital, which would be smaller than the New Hospital proposed under the CPHP, as illustrated in **Figure 6-1**, and described below.

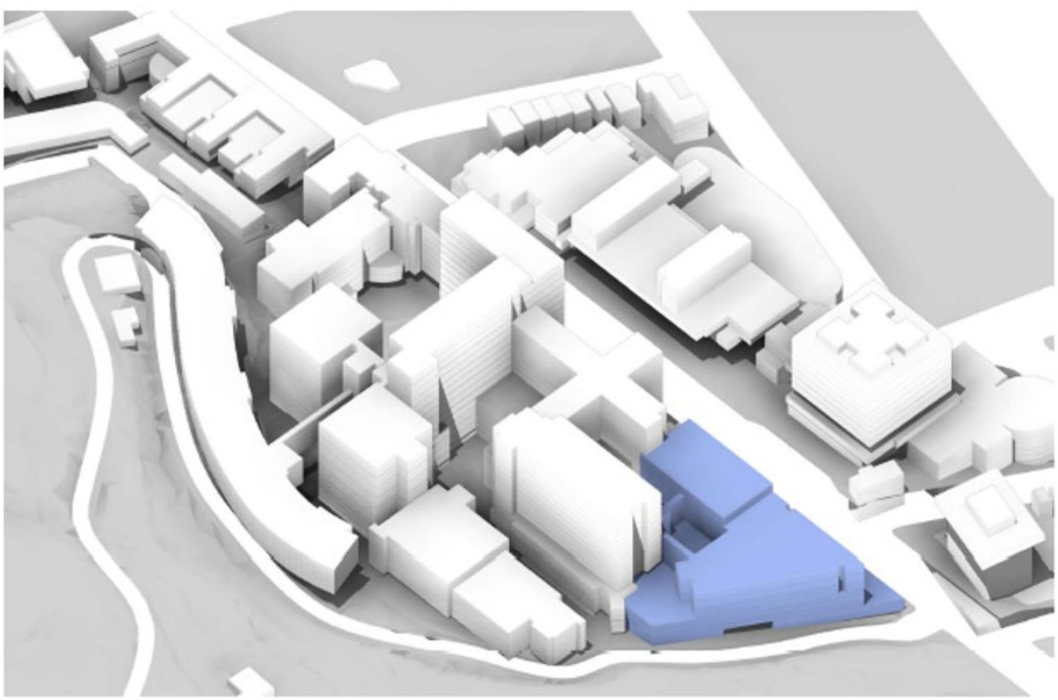


Figure 6-1
Alternative 1B: No Project - Development under 2014 LRDP

The 2014 LRDP envisioned a New Hospital of about 308,000 gsf and 140 beds on the site of LPPI to replace the inpatient facilities that were at Moffitt Hospital; renovation and reuse of Moffitt Hospital for outpatient, support and other campus uses; and reduction in the inpatient beds at Long Hospital to 299 beds, for a total of approximately 439 inpatient beds at Parnassus Heights. It should be noted that further study would be required to validate whether 140 beds would fit into a 308,000 gsf hospital building, given the space needs to meet current building codes, and other space requirements for modern hospitals.

The New Hospital was assumed to be seven stories and about 110 feet in height, plus an additional 17 feet for rooftop mechanical equipment. At the time of 2014 LRDP preparation, the New Hospital size was based on meeting basic clinical needs in response to SB 1953, with a minimal program that could fit on the site while staying as close as possible to the 3.55 million gsf space ceiling. This alternative also assumes no modification of the Reserve boundary that would occur under the proposed CPHP associated with the widening of Medical Center Way, and potentially, from construction of the New Hospital.

Previously approved but not yet implemented building demolition projects proposed under the 2014 LRDP, including the LPPI (subject to further CEQA clearance), Koret Vision Center, EHS, Surge, Woods, and Proctor buildings and other improvements identified in the 2014 LRDP would be implemented under this alternative. In addition, the Parnassus Avenue Streetscape Plan and certain utility improvements as envisioned in the 2014 LRDP would be implemented under this alternative. However, the CPHP development program at the campus site, including Initial and Future Phase projects, and supporting improvements and community investments, would not be implemented under this alternative.

Under this alternative, there would be no revisions to the 2014 LRDP as proposed by the CPHP, including no revisions to campus site functional zones, no revisions to the space program, no update to the population, and no revisions to the Regents' Resolution related to the space ceiling. However, following buildout of the 2014 LRDP before or by 2035, UCSF could seek approval for a future long range development plan to address any additional development and growth needs the University may have for its campus, including the Parnassus Heights campus site.

It is assumed that UCSF would continue implementation of the *Mount Sutro Open Space Reserve Vegetation Management Plan*, and on-going campus site maintenance programs and activities.

Comparison of Effects of No Project - Development under 2014 LRDP Alternative to the Proposed CPHP

Environmental conditions under this alternative would be essentially the same as those described for the Parnassus Heights campus site in the 2014 LRDP FEIR, except where noted, and are briefly summarized below.

Aesthetics, Wind and Shadow

Aesthetics

Implementation of the remaining authorized development contemplated for the Parnassus Heights campus site under the 2014 LRDP would occur, and no new development proposed under the CPHP would occur at the Parnassus Heights campus site under this alternative. Given the substantially smaller size and scale of development of this alternative in comparison to the CPHP, this alternative would have correspondingly less project and/or cumulative effects on: scenic vistas, and conflicts with applicable zoning and other regulations governing scenic quality compared to the CPHP, and similar to the proposed CPHP, these effects would be considered less than significant. This alternative would also have a lesser impact related to new sources of light and glare than under the CPHP, and similar to the proposed CPHP, the impact would be less-than-significant with mitigation.

Wind

Given the overall smaller size and scale of development of this alternative in comparison to the CPHP, it is expected that this alternative would have less project and cumulative wind hazard impacts compared to the CPHP. The 2014 LRDP Final EIR assessed the demolition of eight campus site buildings, including the LPPI, and determined that potential wind impacts from these development changes would be less than significant. The 2014 LRDP Final EIR also assessed the development of the New Hospital as envisioned in the 2014 LRDP (which was smaller than the New Hospital proposed in the CPHP) and determined that potential wind impacts from this development should be less than significant, while acknowledging that the New Hospital would be subject to further project-level review as necessary under CEQA. Furthermore, the 2014 LRDP Final EIR indicated that should the design shape of the New Hospital proposed under the 2014 LRPD change, it would be subject to mitigation requiring wind tunnel testing to verify compliance with the City's wind hazard criterion as defined in Planning Code Section 148, and as needed, would include feasible design measures to eliminate or reduce wind hazards. Thus, while this alternative would reduce the significant and unavoidable impacts of the CPHP related to wind hazards to less than significant, this conclusion would be subject to verification in a wind tunnel test of the hospital design.

Shadows

Given the overall smaller size and scale, and lower heights of development under this alternative in comparison to the CPHP, and based on the shadow impact analysis conducted in the 2014 LRDP Final EIR, this alternative would create correspondingly less new shadow than the proposed CPHP, and would contribute less to cumulative shadowing of publicly accessible open spaces when compared to the CPHP. Similar to the proposed CPHP, shadow impacts of this alternative would be less-than-significant.

Air Quality

This alternative would result in substantially less new construction and demolition activities compared to that proposed under the CPHP. Consequently, based on the air quality impact analysis conducted in the 2014 LRDP Final EIR, this alternative would avoid the significant but mitigable impact associated with construction and demolition emissions of criteria pollutants of the CPHP; would similarly mitigate fugitive dust impacts to less-than-significant with implementation of BAAQMD dust control measures; and would avoid the significant but mitigable impact of construction and demolition emissions of toxic air contaminants (TACs) and associated health risks for nearby sensitive receptors of the CPHP.

Furthermore, this alternative would result in a substantially smaller increase in operational development and associated population and traffic increases associated with the Parnassus Heights campus site when compared to the CPHP. As a result, based on the air quality impact analysis conducted in the 2014 LRDP Final EIR, this alternative would avoid the significant and unavoidable project impact related to net increases of operational criteria pollutants that would occur under the CPHP; and avoid the significant but mitigable CPHP impact associated with exposure of sensitive receptors to substantial project and cumulative operational pollutant concentrations.

The 2014 LRDP Final EIR reported that since the emissions from development under the 2014 LRDP as a whole (i.e. not only development at the Parnassus Heights campus site) exceeded a BAAQMD threshold for increases in operational criteria air pollutants, that its emissions would be cumulatively considerable, and therefore a significant and unavoidable cumulative impact would occur and the same would be true for this alternative, as with the proposed CPHP. Lastly, this alternative would also reduce the significant but mitigatable impact associated with the CPHP's conflict with or obstruction of implementation of the applicable *Clean Air Plan*.

Biological Resources

This alternative would result in substantially less new construction and demolition activities, and a smaller increase in operational development compared to the CPHP, and would avoid intrusion into the Reserve. As a result, overall extent of construction and development-related impacts to biological resources under this alternative would be less than that associated with the CPHP. Based on the biological resource impact analysis in the 2014 LRDP Final EIR, significant project and/or cumulative construction-related effects on special-status plant and wildlife species of this alternative would be mitigated to less-than-significant with applicable survey and resource project measures, similar to the proposed CPHP. In addition, significant project and/or cumulative impacts associated with potential resident and migrating bird strikes from new development would be similarly mitigated to less-than-significant with implementation of bird safe building treatment measures; and this alternative would have a similar less than significant effect related to damage to or removal of landmark trees as the proposed CPHP.

Cultural Resources

This alternative would result in notably less overall demolition and physical alteration of historical resources eligible for listing in the National Register and/or California Register compared to the CPHP. This alternative would not demolish the School of Dentistry, and Aldea San Miguel Housing Buildings 8, 10, and 12. It would not modify the Reserve boundary; would not renovate HSIR East and West or the Medical Sciences Building; and would not impact potential future historical resources that would be impacted by CPHP buildout. This alternative would also renovate and not demolish UC Hall or Millberry Union; and would renovate Saunders Court. As a result, this alternative would have substantially less impacts on historic resources and would substantially reduce the severity of related significant and avoidable impacts associated with the CPHP. While the 2014 LRDP Final EIR determined impacts to historical resources as a result of demolition of the LPPI would not be significant as the LPPI was not deemed a historical resource at that time, as discussed in Chapter 4, the LPPI has since been determined to be eligible for the National Register of Historic Places and the California Register of Historical Resources, and consequently, demolition of the LPPI under this alternative would result in a significant and unavoidable impact to historical resources, as under the CPHP.

This alternative would also result in overall less ground disturbing construction activities compared to the CPHP. Based on the cultural resources impact analysis in the 2014 LRDP Final EIR, potentially significant project and cumulative impacts to previously unknown archaeological resources, and human remains under this alternative would be mitigated to a less than significant level, similar to impacts with the proposed CPHP. Potential effects to previously undiscovered or buried tribal cultural resources under this alternative would similarly be expected to be mitigated to a less than significant level, as under the CPHP.

Energy

This alternative would result in substantially less new construction and demolition activities compared to the CPHP, and as a result, would have a lesser construction energy use impact compared to the CPHP. This alternative would also have less operational development and associated population increases compared to that associated with the CPHP, and consequently, would have less operational energy use than the CPHP. As such, the alternative would have a similarly less than significant project and/or cumulative impact associated with consumption of energy resources as the CPHP; and would have a similarly less than significant conflict with a state or local plan for renewable energy or energy efficiency.

Geology and Soils

This alternative would result in substantially less ground disturbing construction activities and new building construction compared to the CPHP. As a result, this alternative would have less potential project and/or cumulative impacts than the CPHP as it relates to effects of seismic ground shaking, liquefaction or unstable soils, landslides, and erosion from ground disturbance during construction.

Greenhouse Gas Emissions

This alternative would result in substantially less new construction or demolition activities compared to the CPHP, resulting in fewer greenhouse gas (GHG) emissions and as with the proposed CPHP, significant project and/or cumulative construction-related effects GHG emissions could be mitigated to less-than-significant with implementation of construction related GHG reduction measures. This alternative would also result in less overall development and associated population and traffic increases at the Parnassus Heights campus site than the CPHP, and consequently, operational-related GHG emissions would also be lower than with the CPHP. As with the proposed CPHP, the operational GHG emissions at the campus site would be less than significant with implementation of required mitigation. Also, similar to the CPHP, this alternative would not conflict with applicable plans, policies or regulations adopted for the purpose of reducing the GHG emissions.

Hazards and Hazardous Materials

This alternative would result in substantially less new construction or demolition activities compared to the CPHP. In addition, this alternative would result in a substantially smaller increase in overall development, resulting in less of an increase in hazardous materials use than with the CPHP. With mitigation, resulting impacts would be less than significant in both the alternative and the CPHP, as would project and/or cumulative impacts associated with routine transport, use, or disposal of hazardous materials. In addition, project and/or cumulative impacts associated with potential accidental release of hazardous materials; and emitting and handling of hazardous materials within one-quarter mile of an existing or proposed school, for this alternative would be similarly less than significant.

Hydrology and Water Quality

This alternative would result in substantially less new construction or ground disturbing activities, and a smaller increase in new impervious surfaces at the campus site, compared to the CPHP. Accordingly, this alternative would further reduce the CPHP's less than significant project and/or cumulative impacts related to the potential to violate water quality discharges requirements; degradation of surface or groundwater quality; erosion and siltation; effect on flooding; effect on the capacity of stormwater drainage systems; additional sources of polluted runoff; or impedance or redirection of storm flows.

Land Use and Planning

This alternative would result in substantially less new development compared to the CPHP, and furthermore, this alternative would not include the amendments to the 2014 LRDP that are proposed under the CPHP to address the organization of land uses, the space program, and population. As a result, this alternative would further reduce the CPHP's less than significant project and/or cumulative impacts at the Parnassus Heights campus site associated with conflict with land use plans, policies and regulations adopted for the purpose of avoiding or mitigating an environmental effect, and incompatibility with adjacent land uses.

Noise and Vibration

This alternative would result in substantially less new construction and demolition activities compared to the CPHP. However, the 2014 LRDP Final EIR determined demolition activities proposed under the 2014 LRDP would result in a temporary significant and unavoidable noise impact, and that the combined construction and demolition projects would lead to a significant cumulative noise impact. Thus, this alternative would have the same significant and unavoidable construction noise impacts as the proposed CPHP, although project-related construction noise impacts could be less severe than anticipated in the 2014 LRDP EIR, since pile driving would not be required under the CPHP.

This alternative would result in fewer new permanent noise sources, and less of an increase in traffic, thereby resulting in less operational noise than would occur under the CPHP. As a result, this alternative would reduce the significant but mitigable project and/or cumulative impacts related to permanent increases in ambient noise levels from stationary noise sources in excess of applicable noise standards, and the less than significant project and/or cumulative impact associated with increases in traffic noise levels.

Population and Housing

This alternative would result in a substantially smaller increase in the population at the Parnassus Heights campus site compared to the CPHP, and would not demolish and replace any existing housing at the campus site. As a result, this alternative would have similarly less than significant project and/or cumulative impacts associated with inducement of population growth, and related new demand for housing, compared to the CPHP. Furthermore, this alternative would avoid the less than significant impact associated with temporary displacement of people from existing housing that would occur under the CPHP.

Public Services

This alternative would result in substantially less increase in development and population at the Parnassus Heights campus site compared to the CPHP. Consequently, this alternative would further reduce the CPHP’s similarly less than significant project and/or cumulative impacts from the need for new or altered fire protection or public school facilities, as with the CPHP.

Recreation

This alternative would result in substantially less new development and increase in population at the Parnassus Heights campus site compared to the CPHP. Consequently, this alternative would further reduce the CPHP’s less than significant project and/or cumulative impacts of increase in the use of existing neighborhood and regional parks or other existing on- and off-campus recreational facilities, and with the construction of new recreational facilities.

However, this alternative would not provide those recreational improvements proposed under the CPHP, including the Millberry Terrace, expanded Saunders Court and Promenade.

Transportation

This alternative would result in substantially less construction than that which would occur under the CPHP, resulting in less construction traffic and fewer temporary disruptions. As under the CPHP, significant construction-related transportation impacts under this alternative could be mitigated to a less than significant level.

This alternative would result in substantially less new development and less of an increase in population and associated traffic at the Parnassus Heights campus site compared to the CPHP. Consequently, this alternative would further reduce the less than significant project and/or cumulative CPHP impacts of conflicts with programs, plans, ordinances or policies addressing the circulation system; increases in vehicle miles traveled (VMT); increases in hazard due to design features; and emergency access.[1]

However, this alternative would not provide those transportation improvements for vehicles, bicycles and pedestrians proposed under the CPHP to improve circulation and safety at the campus site, including the Fourth Street extension, the pedestrian overcrossing and tunnel for Parnassus Avenue, widening of Medical Center Way, service corridor, Irving Street Arrival, and Promenade.

Utilities and Service Systems

This alternative would result in substantially less new development and increase in population and associated increases in public utility demands at the Parnassus Heights campus site compared to the CPHP. Consequently, this alternative would further reduce the less than significant project and/or cumulative impacts of the CPHP, including those associated with: construction of new or expanded water, wastewater treatment or storm water drainage, electric power, natural gas, or telecommunications facilities; effects on water supply availability during normal, dry and multiple dry years; effects on wastewater treatment capacity; effects on capacity of local solid waste infrastructure, and compliance with federal, and state and local statutes and regulations related to solid waste.

However, while this alternative provides for some upgrades of aging infrastructure, it would not provide all the improvements proposed under the CPHP to upgrade infrastructure, and consequently, on-going maintenance issues associated with on-campus utilities may be greater than under the CPHP.

Relationship of No Project - Development under 2014 LRDP Alternative to Meeting Project Objectives

The No Project - Development under the 2014 LRDP Alternative would provide for implementation of remaining but unbuilt authorized development under the 2014 LRDP, but would not provide for implementation of the development program proposed under the CPHP. As such this potential alternative would achieve the 2014 LRDP objectives for the Parnassus Heights campus site, but would not achieve the proposed CPHP objectives.

It should be noted that, the hospital program assumed under this alternative is the version envisioned under the 2014 LRDP. The New Hospital contemplated under the 2014 LRDP would provide for 140 beds, compared to the 384 beds proposed for the New Hospital under the CPHP. In total, when considering beds at Long Hospital and the New Hospital, this alternative would result in 236 fewer beds at the Parnassus Heights campus site (439 beds under this alternative versus 675 beds under the CPHP). As discussed in the Chapter 3, *Project Description*, following the preparation of the 2014 LRDP, continued planning for the New Hospital resulted in the

[1] It should be noted the 2014 LRDP Final EIR identified significant and unavoidable cumulative level of service (LOS) impacts at several study intersections. However, as discussed in the CPHP Draft EIR, Section 4.15, *Transportation,* pursuant to CEQA Guidelines Section 15064.3, VMT is now used as the appropriate measure of assessing transportation impacts instead of vehicle LOS.

realization that the New Hospital and associated facilities would require more beds to meet the demand for inpatient care for a growing and aging Bay Area population, and to allow for the capacity to provide inpatient health care in times of severe strain without resorting to reducing or canceling non-essential surgeries to create bed capacity. The New Hospital proposed under this alternative would also not have sufficient space to accommodate modern regulatory requirements and industry standards of contemporary hospitals, such as construction codes, sizes of operating rooms, ratio of operating rooms to pre-and post-recovery areas, and space for privacy and infection control issues.

6.3.3 Alternative 2: Reduced Project

Description

This alternative is similar to the proposed CPHP with the following notable exceptions:
1) development of a smaller New Hospital in conjunction with renovation of Moffitt Hospital to provide for continued use of Moffitt Hospital for inpatient beds (see **Figure 6-2** below),
2) historic preservation of architecturally significant buildings, and 3) Future Phase Aldea Housing and child care facilities would be developed in the Initial Phase rather than later during buildout of the CPHP. Each of these aspects of the alternative are described below.

Figure 6-2
Alternative 2: Reduced Project

Smaller New Hospital and Renovation of Moffitt Hospital: This alternative assumes development of a New Hospital that would be reduced in size in terms of total square footage, building footprint, building height, and bed capacity, from that proposed under the CPHP. This alternative assumes the New Hospital would be approximately 629,000 gsf (a reduction in size of 326,000 gsf compared to the New Hospital proposed under the CPHP), and 12 stories and 212 feet in height (a reduction of 4 stories and about 82 feet). This alternative assumes the New Hospital would contain approximately 288 beds, instead of the 384 inpatient beds as proposed at the New Hospital under the CPHP. In this alternative, Moffitt Hospital would be renovated to meet SB1953 seismic standards and to meet current code standards for inpatient use, and would include about 96 beds. Long Hospital would house 291 beds, as under the CPHP. In total, this alternative would provide for 675 beds at the Parnassus Heights campus site, the same as under the CPHP. It is assumed that the renovation of Moffitt Hospital, including for beds would not take place after 2030, once the New Hospital was complete. As such, it would not provide the same number of beds required by the program (675) for over 4 years (by 2034 approximately).

By occupying a smaller building footprint, the New Hospital under this alternative would potentially avoid the need to modify the adjacent Reserve boundary, as potentially could occur with the CPHP, although the proposed widening of Medical Center Way would still be necessary and could encroach into the Reserve under this alternative. As under the CPHP, the New Hospital under this alternative would have a similar connecting pedestrian bridge across Parnassus Avenue, and a tunnel beneath Parnassus Avenue.

Historic Preservation: This alternative assumes historic preservation of existing architecturally significant buildings on the campus site (individually eligible for listing in the National Register and/or California Register) that are proposed for demolition under the CPHP, including UC Hall, the Dentistry Clinics building, and Aldea San Miguel Housing Buildings 8, 10, and 12. It is assumed these buildings may be adaptively reused, as feasible. Other buildings on the campus site that are historically significant for events, but not architecture (i.e., LPPI and Millberry Union) are assumed to be demolished under this alternative, as under the CPHP.

As such, development that was proposed at the sites of these historical resources under the CPHP would not occur under this alternative. This would include the proposed RAB (on the site of UC Hall), some of the new program adjacent to the RAB (on the site of the Dental Clinics building), and three proposed 8-story housing structures and one five-story housing structure in the Aldea Housing complex (on the sites of Aldea San Miguel Housing Buildings 8, 10, and 12). Because the Dental Clinics building would be retained under this alternative, the full Fourth Street extension between Parnassus Avenue and Kirkham Street, and connecting service corridor, proposed under the CPHP would not occur under the alternative. The LPPI would be demolished under this alternative as with the CPHP.

Aldea Housing and Child Care Developed in Initial Phase: The nine housing structures (a net increase of 190 units) and child care facilities that are proposed at the Aldea Housing complex in the Future Phase under the CPHP would be implemented in the Initial Phase under this alternative.

It is assumed that similar to under the CPHP, the proposed West Side Housing project (430 units) would be developed in the Future Phase of this alternative. In total, this alternative would provide a total of 620 net new housing units (142 less than under the CPHP due to above-described preservation of Aldea San Miguel Housing Buildings 8, 10, and 12).

This alternative would include all revisions to the 2014 LRDP that are proposed in conjunction with the CPHP, including revisions to campus site functional zones (with the exception being that modifications to Open Space Reserve boundary would be related to the widening of Medical Center Way only), revisions to the space program, update of the projected population, revisions to the Regents' Resolution, and update of the UCSF Greenhouse Gas Reduction Strategy.

It is assumed that UCSF would continue implementation of the *Mount Sutro Open Space Reserve Vegetation Management Plan*, and on-going campus site maintenance programs and activities.

Comparison of Effects of Reduced Project Alternative to the Proposed CPHP

Aesthetics, Wind and Shadow

Aesthetics

This alternative would result in overall less and smaller scale new development at the campus site compared to the CPHP. As discussed above, under this alternative, this New Hospital would occupy a smaller footprint, and would contain four less floors and would be 82 feet shorter than the New Hospital proposed under the CPHP. Furthermore, the proposed RAB, some of the proposed new program adjacent to the RAB, and four proposed Aldea housing structures would not be built under this alternative (retaining the existing structures on those sites instead). In addition, the full extension of Fourth Avenue between Parnassus Avenue and Kirkham Street and connecting service corridor, proposed under the CPHP would not occur under this alternative.

Scenic Vistas

From the viewpoint at Grandview Park, the New Hospital under this alternative would rise lower on the skyline compared to the New Hospital proposed under the CPHP, and would similarly only slightly obstruct the existing view of downtown San Francisco from this perspective, and would not obstruct scenic views from this park in other directions. This view would also not include the RAB and development on the site of Dental Clinics building that is proposed under the CPHP, as those buildings would not be developed under this alternative. As under the CPHP, this alternative would not result in a substantial adverse impact on scenic vistas from this viewpoint.

When considering available vantage points from within the Reserve, such as from the Historic Trail, given its lower height, the New Hospital under this alternative would incrementally obstruct less of the northward scenic views across the campus core. Given the overall lack of long-range scenic views from within the Reserve, implementation of the alternative would not adversely affect scenic vistas from within the Reserve, similar to the proposed CPHP.

When considering the above, and additionally that some new scenic views and new publicly-accessible open space that would be created from the campus site by this alternative (e.g. by the

Millberry Terrace), albeit less than proposed under the CPHP, the impact on scenic vistas would be less than significant.

Scenic Quality

As under the CPHP, this alternative would have an adverse effect related to scenic quality if it were to conflict with UCSF 2014 LRDP policies governing scenic quality.

2014 LRDP Sub-objective 1B. Under this alternative, the New Hospital would be visibly shorter as seem from off-site vantage points than the New Hospital proposed under the CPHP. Additionally, since the 12-story hospital under this alternative would contain a smaller footprint, it would also appear less broad from certain perspectives than the New Hospital proposed under the CPHP. At 212 feet in height, the New Hospital under this alternative would also not exceed the height limits of the City's 220-F height district that would occur under the CPHP, although this alternative would exceed the height limit within the City's 65-D height district, although to a lesser extent than under the CPHP.

In addition, four of the housing structures proposed in the Aldea Housing complex under the CPHP (on the sites of Aldea San Miguel Housing Buildings 8, 10, and 12) would not be constructed under this alternative, and consequently, this alternative would avoid exceeding the City's 40-X height limits at those sites under the CPHP; although the housing proposed on the other nine existing housing sites would still exceed the City's 40-X height limit.

2014 LRDP Sub-objective 1C. The development program under this alternative would result in approximately 75 percent of the net increase in development on the campus site proposed under the CPHP, and a correlating smaller increase in the scale and density. Given its shorter height and smaller mass, the New Hospital under this alternative would contrast less sharply both in height and scale with the existing residential development to the east than the New Hospital proposed under the CPHP. The proposed New Hospital under this alternative would be nearly 30 feet taller than the tallest existing campus site building, as compared to over 100 feet taller than the tallest existing campus site building under the CPHP. The New Hospital would also appear as a less prominent newly visible feature in the viewsheds from nearby neighborhoods, such as those along Parnassus Avenue, 17th Street, and Willard Street at Belmont Avenue, compared to the New Hospital under the CPHP. As discussed above, certain other development proposed under the CPHP, including RAB and other research and development uses on the UC Hall and Dental Clinics buildings sites; and four housing structures proposed on the sites of Aldea San Miguel Housing Buildings 8, 10, and 12, would also not be constructed under this alternative. Development proposed under this alternative, including the New Hospital, would, on balance, be generally more consistent than the CPHP with 2014 LRDP sub-objective 1C in terms of height and scale.

With respect to sensitivity to the surrounding landscape as set forth in 2014 LRDP sub-objective 1C, with its smaller footprint, the New Hospital under this alternative would avoid potential encroachment into the Reserve that could occur under the CPHP, although the widening of the Medical Center Way under this alternative would still encroach into the hillside in the Reserve to the east. Similar to the CPHP, UCSF would replace any area of the Reserve lost due to new development under this alternative by designating a new area elsewhere on the campus site as

Reserve in an amount equal to or greater than the area lost. It is assumed that new development along Parnassus Avenue immediately west of UC Hall would occur under this alternative, and as such, most or all of the existing grove of redwood trees adjacent to UC Hall would be removed, similar to the CPHP.

To the extent this sub-objective concerns noise generation, as mitigated, new buildings developed under the alternative would result in a less-than-significant effect on ambient noise levels pursuant to applicable noise standards, similar to under the CPHP.

2014 LRDP Sub-objective 1D. Similar to the CPHP, proposed new buildings along Parnassus Avenue under this alternative would be constructed concurrent with the proposed Parnassus Avenue Streetscape Plan. The Streetscape Plan improvements would serve to enhance the public realm as called for in UCSF's Physical Design Framework, and would be consistent with 2014 LRDP sub-objective 1D.

In summary, as under the CPHP, to the extent this alternative would be inconsistent with applicable 2014 LRDP objectives as described above, it is assumed UCSF would seek amendments to the 2014 LRDP to bring this alternative and 2014 LRDP into conformity. Therefore, because this alternative would include provisions regarding scenic quality that would apply broadly to the alternative based on UCSF's Physical Design Framework, with amendments to the 2014 LRDP, similar to the CPHP, this alternative would not conflict with the 2014 LRDP objectives related to scenic quality, and the impact would be less than significant.

This alternative would also have incrementally less impact related to new sources of light and glare compared to the CPHP, given the overall less development proposed, and the overall impact would be less-than-significant with mitigation, as with the proposed CPHP.

Wind

Because the New Hospital under this alternative would occupy a smaller footprint than the proposed New Hospital, because this alternative's New Hospital would not encroach into the adjacent Reserve, and because there would be more unbuilt area between the New Hospital and the steep slope to the east across Medical Center Way, the New Hospital under the Reduced Project Alternative would likely result in incrementally lower wind speeds near the northeast corner of the New Hospital compared to those under the CPHP. Additionally, the reduced height of the New Hospital under this alternative could incrementally reduce wind speeds along Parnassus Avenue near the hospital, compared to those under the CPHP. Nevertheless, the New Hospital under this alternative would still represent a substantial increase in building height and bulk at the east end of the campus' Parnassus Avenue frontage, and thus could result in exceedances of the City's pedestrian wind hazard criterion, as with the CPHP. This would be a significant effect. However, unlike the CPHP, this alternative would retain UC Hall, the westernmost campus site building along the south side of Parnassus Avenue, the Dental Clinics building, which is set back more than 100 feet south of Parnassus Avenue, and the School of Nursing building. The Reduced Project Alternative, like the CPHP, would also retain the other taller buildings along the south side of Parnassus Avenue, including the existing Clinical Sciences and Medical Sciences buildings and Moffitt Hospital. Because the entire west end of this street wall would be retained under the Reduced Project Alternative, this alternative would have little or no effect on pedestrian-level winds there, thus avoiding potential significant wind impacts adjacent to the RAB that would occur under the CPHP.

Also unlike the CPHP, the Reduced Project Alternative would retain the three oldest and historic Aldea housing buildings, which would preclude the development of the tallest of the new Aldea housing buildings that would be built under the CPHP. This would avoid the CPHP's potential exceedance of the wind hazard criterion at the Aldea Housing site. Finally, the Reduced Project Alternative would include the Irving Street Arrival, as would the CPHP, and therefore this alternative could result in a wind hazard exceedance, albeit a small potential, and a significant effect at this location that would be similar to what could occur under the CPHP.

Implementation of CPHP Mitigation Measure AES-4 (Design new buildings to minimize wind impacts at pedestrian level) would reduce the severity of the potentially significant wind impact. However, as under the CPHP, it cannot be stated with certainty that no wind hazard exceedances would result from this alternative, and therefore this impact could be significant even with mitigation under the Reduced Project Alternative.

Shadows

This alternative would result in a New Hospital 82 feet shorter than under the CPHP, and additionally, the following development proposed under the CPHP would not occur under this alternative: the 130-foot RAB, 45 to 130-foot tall development on the site of the Dental Clinics building, and three 8-story housing structures and one five-story housing structure at the Aldea Housing complex. Other development proposed at the campus site under this alternative is assumed to have generally the same building heights as that proposed under the CPHP. Shadow from this alternative could reach the three parks and two schoolyards receiving net new shadow from the CPHP, but because this alternative would result in a reduction in buildings and building heights compared to the CPHP, shadow effects from this alternative would be expected to have less impact than the CPHP in terms of the amount or duration of new shadow. As under the CPHP, shadow under this alternative would affect publicly accessible open spaces, but not to an extent that would adversely or substantially impact the use and enjoyment of open spaces. Therefore, as under the CPHP, the overall shadow impact under this alternative would be similarly less than significant on a project-level and cumulative basis.

Air Quality

This alternative would have less new construction and demolition activities than that which would occur under the CPHP. Consequently, this alternative would have less impact associated with construction and demolition emissions of criteria pollutants, and toxic air contaminants (TACs) and associated health risks at sensitive receptors, and would similarly mitigate those effects to less-than-significant with the use of clean construction equipment and implementation of BAAQMD dust control measures.

This alternative would result in approximately 25 percent less development, and less associated population and traffic increases, compared to the CPHP. The specific reduction in traffic generated under this alternative compared to those generated under the CPHP would depend on a number of factors, including the specific levels of instruction, clinical, research and support uses that would be implemented under this alternative, the potential adaptive reuse of UC Hall, the Dental Clinics building, and other factors. As a result, while operations under this alternative would generate fewer criteria pollutant emissions than operations under the CPHP, the specific reduction in emissions may not be sufficient to eliminate the CPHP's significant impact related to PM_{10} emissions (which are approximately 37% over the significance threshold). With mitigation measures requiring project-level operational measures and TDM enhancement measures, the PM_{10} emissions are still conservatively estimated to be significant and unavoidable under this alternative. This alternative would also have less project and cumulative impact associated with exposure of sensitive receptors to substantial project and cumulative operational pollutant concentrations, and require similar mitigation to reduce diesel particulate matter (DPM) which would mitigate those significant effects to less-than-significant. Lastly, this alternative would have less impact associated with the CPHP's conflict with or obstruction of implementation of the applicable *Clean Air Plan*, and with mitigation the impact would similarly be reduced to less-than-significant.

Biological Resources

This alternative would have less new construction and demolition activities compared with the CPHP, and would avoid potential intrusion into the Reserve from the New Hospital. As a result, the overall extent of construction and development-related impacts to biological resources under this alternative would be less than that associated with the CPHP. Significant project and/or cumulative construction-related effects on special-status plant and wildlife species of this alternative would be similarly mitigated to less-than-significant with applicable survey and resource project measures similar to the proposed CPHP. Also, significant project and/or cumulative impacts associated with potential resident and migrating bird strikes from new development would be similarly mitigated to less-than-significant with implementation of bird safe building treatment measures; and this alternative would have a similar less than significant effect related to damage to or removal of landmark trees.

Cultural Resources

This alternative would preserve most architecturally significant historical resources eligible for listing in the National Register and California Register at the campus site that would be demolished under the CPHP. Consequently, this alternative would avoid demolition of UC Hall, Dental Clinics building, and Aldea San Miguel Housing Buildings 8, 10, and 12, that would be demolished under the CPHP. Rather, it is assumed these buildings may be adaptively reused, as feasible. Since the New Hospital would not intrude into the Reserve, this alternative could also have less impact to this historical cultural landscape than under the CPHP. However, it is assumed other existing and/or future historical resources that may be demolished or physically altered under the CPHP (e.g., Millberry Union) would also be demolished or physically altered under this alternative. The LPPI would still be demolished to make way for the New Hospital. Overall, this alternative would have less impacts to historical resources than the CPHP, although the impact would still be significant and unavoidable.

This alternative would also result in less ground disturbing construction activities compared to the CPHP, and therefore have less potential to affect archaeological and tribal cultural resources.

Potentially significant project and cumulative impacts to previously unknown archaeological resources, human remains, and/or tribal cultural resources under this alternative would be similarly mitigated to a less than significant level as under the CPHP.

Energy

This alternative would result in less construction and demolition activities compared to the CPHP and as a result, would have less construction energy use impact compared to the CPHP. This alternative would also have approximately 25 percent less increase in development, and less associated population and traffic increases, compared to the CPHP, and consequently, less operational energy use than the CPHP. As such, the alternative would further reduce the less than significant project and/or cumulative impact associated with consumption of energy resources as under the CPHP; and would have a similarly less than significant conflict with a state or local plan for renewable energy or energy efficiency.

Geology and Soils

This alternative would result in less ground disturbing construction activities and new building construction compared to the CPHP, and therefore have overall less potential to result in effects on geology, soils and seismicity. Accordingly, this alternative would have less potential project and/or cumulative impacts than the CPHP as it relates to effects of seismic ground shaking, liquefaction or unstable soils, landslides, and erosion from ground disturbance during construction, and those effects would be similarly less than significant with compliance with applicable regulatory requirements and the implementation of geotechnical design recommendations and/or mitigation.

Greenhouse Gas Emissions

This alternative would result in less construction or demolition activities compared to the CPHP. As a result, this alternative would reduce the significant but mitigable project and/or cumulative construction-related GHG emissions effects at the Parnassus Heights campus site as under the CPHP. This alternative would have approximately 25 percent less increase in development, and less associated population and traffic increases at the Parnassus Heights campus site than the CPHP, and consequently, operational-generated GHG emissions would be less than the emissions under the CPHP. Consequently, this alternative would reduce the significant but mitigable impacts of the CPHP related to operational GHG emissions. Similar to the CPHP, this alternative would not conflict with applicable plans, policies or regulations adopted for the purpose of reducing the GHG emissions.

Hazards and Hazardous Materials

This alternative would result in less new construction or demolition activities compared to the CPHP. This alternative would also result in less increase in development, and the associated increases in hazardous materials use that would occur with operations under the CPHP. Significant project and/or cumulative impacts associated with routine transport, use, or disposal of hazardous materials under this alternative would be similarly mitigated to a less than significant level with compliance with applicable, federal and State laws and regulations regulating transportation, management, and disposal of hazardous materials and wastes. In addition, project and/or cumulative impacts associated with potential accidental release of hazardous materials; and emitting and handling of hazardous materials within one-quarter mile of an existing or proposed school, for this alternative would be similarly less than significant.

Hydrology and Water Quality

This alternative would result in less new construction and groundbreaking activities compared to the CPHP; and an incrementally smaller increase in new impervious surfaces at the campus site, compared to the CPHP, and thus, generate incrementally less runoff. Project and/or cumulative impacts related to the potential to violate water quality discharges requirements; degradation of surface or groundwater quality; erosion and siltation; effect on flooding; effect on the capacity of stormwater drainage systems; additional sources of polluted runoff; or impedance or redirection of storm flows, would be reduced compared to the proposed project and similarly less than significant, with compliance with the construction BMPs required by the NPDES Construction General Permit and operational design measures and LID stormwater requirements controls of the Phase II MS4 permit.

Land Use and Planning

This alternative would result in less new development compared to the CPHP, although it would include the amendments to the 2014 LRDP that are proposed under the CPHP affecting the organization of land uses (with the exception of extent of area of the Reserve redesignated), the space program, and population, although with smaller increases than under the CPHP. Overall, this alternative would have less project and/or cumulative CPHP impacts at the Parnassus Heights campus site associated with conflict with land use plans, policies and regulations adopted for the purpose of avoiding or mitigating an environmental effect, and incompatibility with adjacent land uses. With the proposed amendment to the 2014 LRDP, these effects would be less than significant, similar to with the proposed CPHP.

Noise and Vibration

This alternative would have less new construction and demolition activities as that proposed under the CPHP. Nonetheless, the construction activities would be sufficient to result in project and cumulative construction-generated noise effects that would be significant and unavoidable under this alternative, similar to with the proposed CPHP. Proposed mitigation requiring implementation of construction noise control measures, limits on construction hours, and pile installation noise-reducing techniques would reduce this impact, but not to a level that is less than significant. Construction vibration impacts under this alternative would be significant but mitigable with implementation of vibration control measures, as under the CPHP.

This alternative would generate less traffic than the CPHP, and consequently, transportation noise generated by this alternative would similarly be less than significant. With less development, the significant project and/or cumulative impact related to permanent increases in ambient noise levels from stationary noise sources in excess of applicable noise standards under this alternative would be less than with the proposed CPHP and could be mitigated to a less than significant level with implementation of operational noise control measures, similar to the CPHP.

Population and Housing

This alternative would have a smaller increase in the population at the Parnassus Heights campus site compared to the CPHP, demolish less existing housing at the campus site than the CPHP, and develop less new housing at the campus site than the CPHP, although more housing would be provided in the Initial Phase. For these reasons, this alternative would have similar less than significant project and/or cumulative impacts associated with inducement of population growth, and related new demand for housing, when compared to the CPHP.

Public Services

This alternative would result in a smaller increase in development and population at the Parnassus Heights campus site compared to the CPHP, resulting in lower demand for public services. For this reason, project and/or cumulative impacts associated with need for new or altered fire protection or public school facilities would be less than significant, similar to with the proposed CPHP.

Recreation

This alternative would result in less new development and smaller increase in population at the Parnassus Heights campus site compared to the CPHP. This alternative would also propose somewhat less new recreational improvements as that proposed under the CPHP, since it would not include development of the CPHP-proposed Promenade. Nonetheless, project and/or cumulative impacts of increase in the use of existing neighborhood and regional parks or other existing on- and off-campus recreational facilities, and with the construction of new recreational facilities under this alternative would remain less-than-significant, similar to the proposed CPHP.

Transportation

This alternative would result in less new construction at the Parnassus Heights campus site compared to the CPHP. Consequently, the significant construction phase impact to travel conditions along sidewalks and roadways serving the campus site under this alternative would be similarly mitigated to a less than significant level with implementation of construction coordination and monitoring measures.

This alternative would also result in less overall new development, and less increase in population and associated operational traffic, than under the CPHP. This alternative would also provide many of same transportation improvements for vehicles, bicycles and pedestrians proposed under the CPHP to improve circulation and safety at the campus site, including the pedestrian overcrossing and tunnel for Parnassus Avenue, widening of Medical Center Way, and Irving Street Arrival, although it would not include the full Fourth Street extension proposed under the CPHP, and connecting service corridor or Promenade. With less operational traffic, this alternative would have less than significant project and/or cumulative impacts related to conflicts with programs, plans, ordinances or policies addressing the circulation system; increases in VMT; increases in hazard due to design features; and emergency access, similar to the proposed CPHP.

Utilities and Service Systems

This alternative would result in less new development and increase in population, and associated increases in public utility demands at the Parnassus Heights campus site, compared to the CPHP. As a result, project and/or cumulative impacts related to utilities and service systems under this alternative would be similarly less-than-significant as with the CPHP. This would include impacts associated with: construction of new or expanded water, wastewater treatment or storm water drainage, electric power, natural gas, or telecommunications facilities; effects on water supply availability during normal, dry and multiple dry years; effects on wastewater treatment capacity; effects on capacity of local solid waste infrastructure, and compliance with federal, and state and local statutes and regulations related to solid waste.

Relationship of Reduced Project Alternative to Meeting Project Objectives

As discussed under the description of the Reduced Project Alternative, this alternative would provide for approximately 25 percent less new development at the Parnassus Heights campus site when compared to the CPHP, and would not develop those transportation and utility improvements proposed under the CPHP (e.g. Fourth Street extension, service corridor, Promenade, etc.). Consequently, this alternative would not fully meet the CPHP project objectives, for space, urban design and mobility.

Notably, this alternative would include a smaller New Hospital that would be approximately one-third smaller than the New Hospital under the CPHP. As such, this alternative assumes the New Hospital would contain approximately 288 beds, instead of the 384 inpatient bed as proposed at the New Hospital under the CPHP. It is further assumed that Moffitt Hospital would include about 96 beds following its renovation to meet SB 1953 seismic standards; and Long Hospital would provide 291 beds; for a total 675 beds at the Parnassus Heights campus site - the same total bed count as under the CPHP. However, even with a renovation of Moffitt Hospital under this alternative, it would continue to be outdated, undersized, and inflexible, including for emergency room, surgery rooms, procedure rooms, patient rooms, the clinical lab, pharmacy, and sterile processing spaces. In addition, floor to ceiling heights in Moffitt Hospital are not tall enough to accommodate contemporary equipment, and as such, are considered inadequate for modern hospital operations. In addition, since under this alternative the renovation of Moffitt Hospital beds would take place after 2030, once the New Hospital was complete, it would not provide the same number of beds required by the program (675) for over 4 years (by 2034 approximately). For these reasons, this alternative would not fully meet the CPHP project objectives for the New Hospital.

This alternative would also not develop the RAB proposed under the CPHP on the site of UC Hall or other new programmed uses proposed on the site of the Dental Clinics building, as those existing historical resources would be preserved. While these existing historical buildings could be adaptively reused for other purposes, they are considered outdated, undersized, and too inflexible to be practical for the research and academic uses proposed at these sites under the CPHP. Accordingly, since the RAB as proposed under the CPHP would not be developed under this alternative, this alternative would not fully meet the CPHP project objectives for the RAB and for increased state-of-the-art research facilities. Since the Irving Street Arrival would be developed under this alternative similar to that proposed under the CPHP, this alternative would meet the CPHP project objectives for the Irving Street Arrival.

This alternative would also develop 142 less new housing units in the Aldea Housing complex than proposed under the CPHP. Therefore, this alternative would not fully meet the CPHP project objectives for the Aldea Housing Densification.

6.3.4 Alternative 3: CPHP including New Hospital - 19-Story Option

This alternative is identical to the proposed CPHP, with the exception of the design of the New Hospital. Under this alternative, the New Hospital would be approximately the same square footage (955,000 gsf) and have the same bed capacity (384 beds) as that proposed under the CPHP. However, the building would occupy a smaller footprint and would be taller than the New Hospital proposed under the CPHP. Specifically, the New Hospital under this alternative would be three floors taller (19 stories vs. 16 stories) and approximately 47 feet taller (i.e., total of 341 feet vs. 294 feet) than the design proposed under the CPHP, as illustrated in **Figure 6-3**.

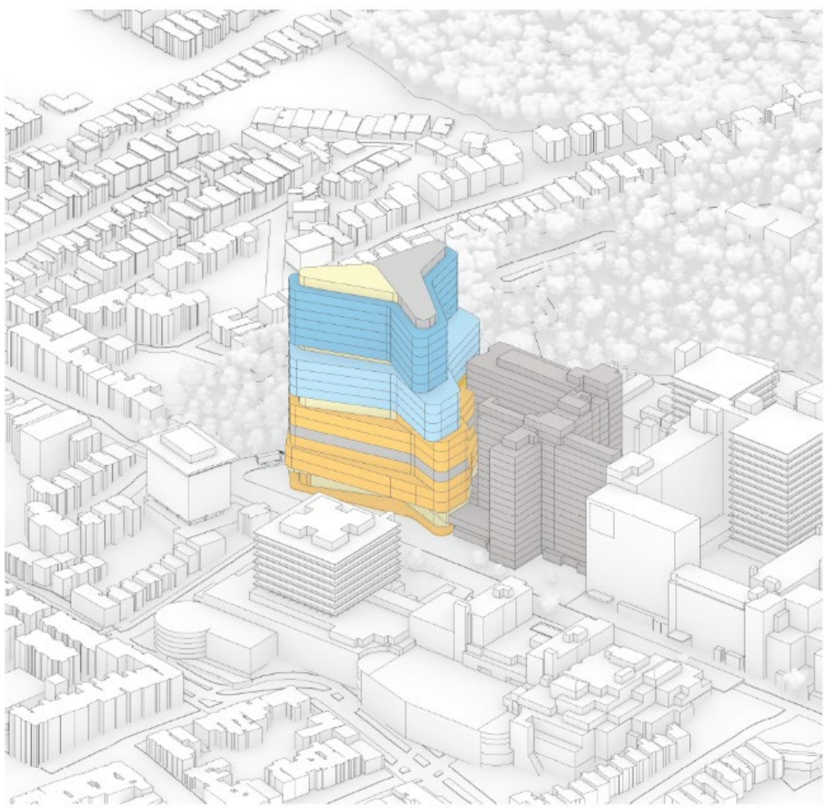


Figure 6-3
Alternative 3: CPHP including New Hospital - 19-Story Option

By occupying a smaller building footprint, the New Hospital under this alternative would avoid the potential need to modify the adjacent Reserve boundary associated with the New Hospital under the proposed CPHP, although the proposed widening of Medical Center Way would still be necessary and could encroach into the Reserve under this alternative. As under the CPHP, the New Hospital under this alternative would have a similar connecting pedestrian bridge across Parnassus Avenue, and a tunnel beneath Parnassus Avenue.

This alternative assumes the same revisions to the 2014 LRDP that are proposed in conjunction with the CPHP would occur under this alternative, including revisions to campus site functional zones (with the exception being modifications to the Open Space Reserve boundary would be related to the widening of Medical Center Way only), revisions to the space program, update to the projected population, revisions to the Regents' Resolution, and update to the UCSF Greenhouse Gas Reduction Strategy.

It is assumed that UCSF would continue implementation of the *Mount Sutro Open Space Reserve Vegetation Management Plan*, and on-going campus site maintenance programs and activities.

Comparison of Effects of CPHP including New Hospital - 19-Story Option to the Proposed CPHP

Aesthetics, Wind and Shadow

Aesthetics

All development proposed at the Parnassus Heights campus site under this alternative would be identical to that proposed under the CPHP, with the exception of the New Hospital, which would occupy a smaller footprint, but would contain an additional three floors and would be 47 feet taller than the New Hospital proposed under the CPHP.

Visual simulations were prepared for this alternative from a number of the same publicly accessible vantage points prepared for the proposed CPHP, and using the same digitized photographs and computer modeling techniques. As with the proposed CPHP, the visual simulations prepared for this alternative are based on a simple massing plan, and not on actual building designs.

Scenic Vistas

From the viewpoint at Grandview Park looking east, the New Hospital under this alternative would rise higher, but also appear incrementally less broad, on the skyline, compared to the New Hospital proposed under the CPHP, would only slightly obstruct the existing view of downtown San Francisco from this perspective, and would not obstruct scenic views from this park in other directions. Consequently, as with the CPHP, this alternative would not result in a substantial adverse impact on scenic vistas from this viewpoint.

When considering available vantage points from within the Reserve, such as from the Historic Trail, given its taller height, the New Hospital under this alternative would obstruct more sky in the northward scenic views across the campus core. However, as with the conclusion reached for the CPHP, given the overall lack of long-range scenic views from within the Reserve, implementation of the alternative would similarly not adversely affect scenic vistas from within the Reserve.

When considering the above, and additionally that new scenic views and new publicly-accessible open space that would be created from the campus site by this alternative (e.g. by the Millberry Terrace, expanded Saunders Court and the Promenade)– similar to the CPHP – the impact on scenic vistas from this alternative would be less than significant.

Scenic Quality

As under the CPHP, this alternative would have an adverse effect related to scenic quality if it were to conflict with UCSF 2014 LRDP policies governing scenic quality.

2014 LRDP Sub-objective 1B. From the viewpoint of Kezar Triangle looking south, under this alternative, the New Hospital would be visibly taller than the New Hospital proposed under the CPHP. However, since the 19-story hospital under this alternative would contain a smaller footprint, it would also appear somewhat less broad from this perspective than the New Hospital proposed under the CPHP. Nevertheless, with the 19-story hospital option at 47 feet taller than the New Hospital proposed under the CPHP, it would further exceed the height limits of the City's 65-D and 220-F height districts. Elsewhere on the campus site, exceedances of City height districts by other development proposed under this alternative (e.g., Millberry Union, Aldea Housing structures) would be identical to those under the proposed CPHP.

2014 LRDP Sub-objective 1C. **Figures 6-4** to **6-7** present a number of other views of the development program under this alternative. Similar to the CPHP, implementation of the development program of this alternative would result in a substantial increase in development, and associated increase in the scale and density, on the campus site. As shown in Figures 6-5 to 6-7, the New Hospital would similarly contrast sharply both in height and scale with the existing residential development to the east. At 341 feet in height, the proposed New Hospital under this alternative would also be over 150 feet taller than other existing buildings on the campus site. Similar to that under the CPHP, under this alternative, the New Hospital would be a prominent newly visible feature in the viewsheds from nearby neighborhoods, such as those along Parnassus Avenue (please see Figure 6-5), 17th Street (see Figure 6-6), and Willard Street at Belmont Avenue (see Figure 6-7).[2] Similar to the CPHP, while other development proposed under this alternative (e.g., in the central and west areas of the campus core, and in the Aldea Housing complex), would, on balance, be generally consistent with 2014 LRDP sub-objective 1C, the height and scale of the proposed New Hospital under this alternative would be inconsistent with 2014 LRDP sub-objective 1C.

[2] For comparison of visual simulations of the CPHP from the same viewpoints, please see Section 4.1, Figures 4.1-15, 4.1-16, 4.1-17 and 4.1-18, respectively.

SOURCE: Prevision Design, 2019

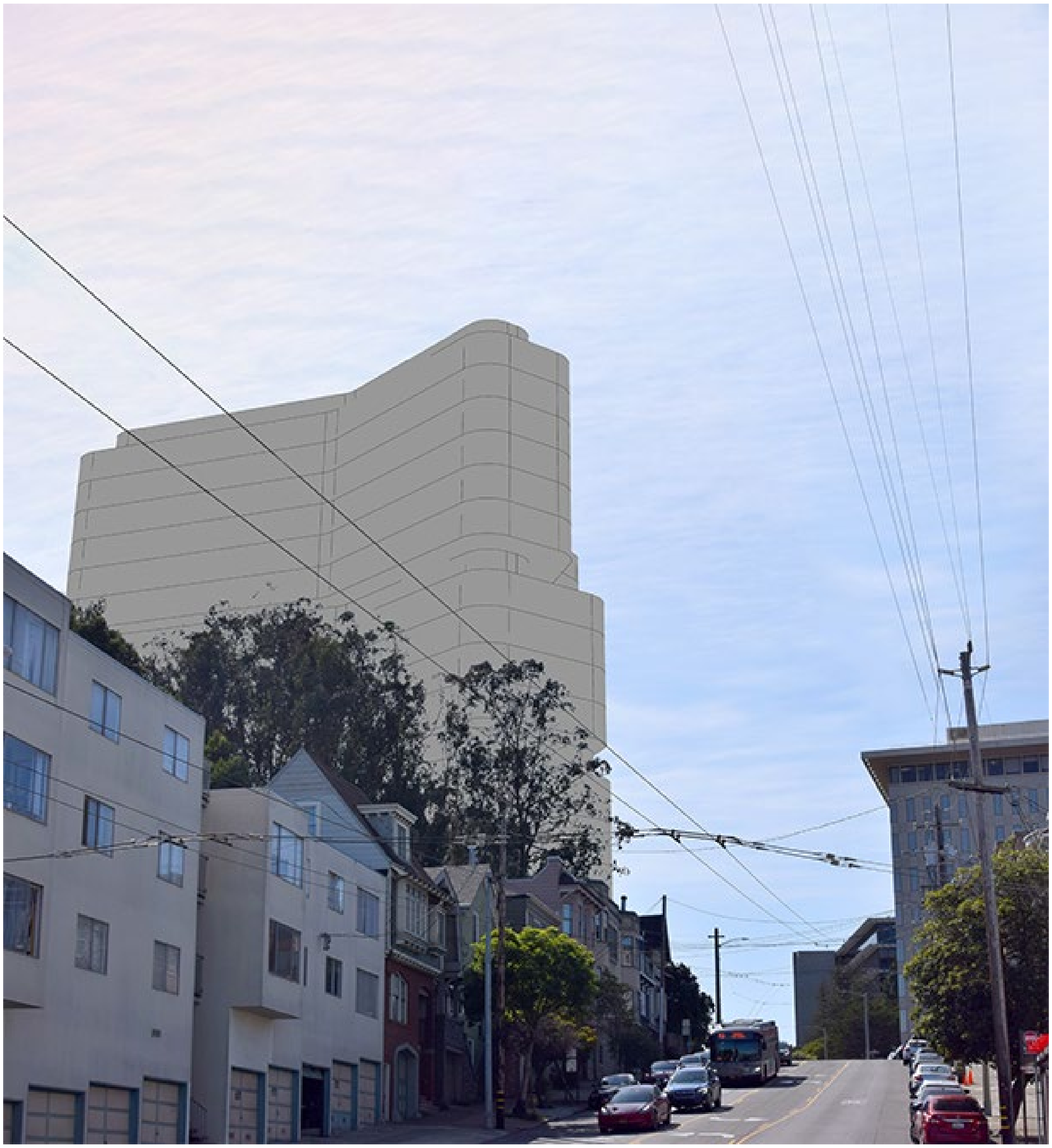
UCSF Comprehensive Parnassus Heights Plan

Figure 6-4
Viewpoint 7: Visual Simulation of the Parnassus Heights Campus Site with CPHP including New Hospital - 19-Story Option from 3rd Avenue and Parnassus Avenue, Looking East

With respect to sensitivity to the surrounding landscape as set forth in 2014 LRDP sub-objective 1C, with its smaller hospital footprint, the New Hospital under this alternative would avoid potential encroachment into the Reserve that could occur under the CPHP, although the widening of the Medical Center Way under this alternative would still encroach into the hillside in the Reserve to the east. Similar to the CPHP, UCSF would replace any area of the Reserve lost due to new development under this alternative by designating a new area elsewhere on the campus site as Reserve in an amount equal to or greater than the area lost. As under the CPHP, the existing grove of redwood trees adjacent to UC Hall would be removed.

Similar to the CPHP, UCSF would also provide publically accessible open space within the campus core, including an expanded Promenade and Saunders Court, which would serve to minimize effects of loss of existing landscaping elsewhere under this alternative.

With respect to concerns about noise generation under this sub-objective, as mitigated, new buildings developed under the alternative would result in a less-than-significant effect on ambient noise levels pursuant to applicable noise standards, similar to the CPHP.



SOURCE: Prevision Design, 2019

UCSF Comprehensive Parnassus Heights Plan

Figure 6-5
Viewpoint 8: Visual Simulation of the CPHP including New Hospital - 19-Story Option from Parnassus Avenue and Willard Street, Looking West

SOURCE: Prevision Design, 2019

UCSF Comprehensive Parnassus Heights Plan

Figure 6-6
Viewpoint 9: Visual Simulation of CPHP including New Hospital - 19-Story Option from 17th Street and Clayton Street, Looking West

SOURCE: Prevision Design, 2019

UCSF Comprehensive Parnassus Heights Plan

Figure 6-7
Viewpoint 10: Visual Simulation of the CPHP including New Hospital - 19-Story Option From Willard Street and Belmont Avenue, looking West

2014 LRDP Sub-objective 1D. Similar to the CPHP, proposed new buildings along Parnassus Avenue under this alternative would be constructed concurrent with the proposed Parnassus Avenue Streetscape Plan. The Streetscape Plan improvements would serve to enhance the public realm as called for in UCSF's Physical Design Framework, and would be consistent with 2014 LRDP sub-objective 1D.

In summary, as under the CPHP, to the extent this alternative would be inconsistent with applicable 2014 LRDP objectives as described above, UCSF would seek amendments to the 2014 LRDP to bring this alternative and 2014 LRDP into conformity. Therefore, because this alternative would include provisions regarding scenic quality that would apply broadly to the alternative based on UCSF's Physical Design Framework, and because with amendments to the 2014 LRDP, this alternative would not conflict with the 2014 LRDP objectives related to scenic quality, and the impact would be less than significant, similar to the impact with the CPHP.

Due to its overall similarity, this alternative would also have a comparable impact related to new sources of light and glare when compared to the CPHP, and the impact would be similarly less-than-significant with mitigation.

Wind

Under this alternative, the New Hospital would be taller than under the CPHP; however, because it would occupy a smaller footprint than the proposed New Hospital, and because there would be more unbuilt area between the New Hospital and the steep slope to the east, across Medical Center Way, the 19-story option could result in incrementally lower wind speeds near the northeast corner of the New Hospital, when compared to those under the CPHP. In general, a moderate increase in height—such as the additional three stories considered here—is unlikely, in and of itself, to substantially increase pedestrian-level wind speeds beyond the increase that would occur with the New Hospital under the CPHP. Nevertheless, the New Hospital under this alternative would represent a substantial increase in building height and bulk compared to existing conditions, and could result in exceedances of the City's pedestrian wind hazard criterion along Parnassus Avenue, similar to what would be anticipated under the CPHP. This would be a significant effect, as would occur with the proposed CPHP and with the remainder of the development assumed under this alternative to be the same as under the CPHP, this alternative could—like the CPHP—result in exceedances of the wind hazard criterion adjacent to the RAB (both on the north and south sides of the building), the Irving Street Arrival, and the taller new Aldea Housing buildings, also resulting in a significant effect. Implementation of CPHP Mitigation Measure AES-4 (Design new buildings to minimize wind impacts at pedestrian level) would reduce the severity of the potentially significant wind impact. However, as under the CPHP, it cannot be stated with certainty that no wind hazard exceedances would result from this alternative, and therefore this impact could be significant even with mitigation under the New Hospital 19-Story Option.

Shadows

Under this alternative, the New Hospital would occupy a smaller footprint, but would contain an additional three floors and would be 47 feet taller than the New Hospital proposed under the CPHP. Shadow cast by the New Hospital under this alternative would affect the same open spaces as shadow cast under the CPHP. These include three City parks (Golden Gate Park, Richard Gamble Memorial Park, and Grattan Playground) and two schoolyards that participate in the Shared Schoolyard Project and provide public access on weekends (Independence High School and Grattan Elementary School). Shading impacts under this alternative were quantified for Golden Gate Park, Richard Gamble Memorial Park, and Grattan Playground.

Under this alternative, the date of maximum shading at Golden Gate Park would be December 20, the same as under the CPHP. On this date, shadow from this alternative would cover both baseball fields near the southeast corner of the park early in the morning, but would recede from the park entirely by 10:00 a.m. Shadow from this alternative would reach parts of Golden Gate Park between early October and early March, compared to the CPHP, which would result in new shading at Golden Gate Park between mid-October and late February. Compared to the CPHP, shadow on the date of maximum shading as a result of this alternative would have more impact to Golden Gate Park than under the CPHP.

Shading on the Richard Gamble Memorial Park under this alternative would occur in winter between the same time periods as under the CPHP: late January to late February, and again from mid-October to mid-November. However, the total amount of annual shading would be substantially more in terms of square-foot hours; this alternative would cast approximately 12,800 square-foot hours of shading compared to approximately 800 square-foot hours of shading under the CPHP on this park.

Shading from this alternative would affect the Grattan Playground during the same time periods as the CPHP: from early April to early September. However, the total amount of annual shading would be substantially greater in terms of square-foot hours; this alternative would cast approximately 1,294,500 square-foot hours of shading compared to approximately 716,700 square-foot hours of shading under the CPHP on this park.

Overall, this alternative would result in more shadow on these open spaces than under the CPHP, however, similar to the CPHP, shadow from this alternative would reach these spaces during the time of day when usage is expected to be lowest. Thus, implementation of this alternative would not be expected to adversely or substantially affect the use and enjoyment of these open spaces, and this impact would be similarly less than significant on a project-level and cumulative basis.

Air Quality

This alternative would have a comparable amount of new construction and demolition activities as that proposed under the CPHP, with the exception being potentially less intrusion into and excavation of the hillside east of the New Hospital given its smaller building footprint Consequently, this alternative would generate similar or slightly reduced air pollutant emissions than the proposed CPHP resulting in a similar significant but mitigable impact associated with construction and demolition emissions of criteria pollutants and toxic air contaminants (TACs) and associated health risks at sensitive receptors. Mitigation would include the use of clean construction equipment and implementation of BAAQMD dust control measures.

This alternative would have the same increase in development and associated population and traffic increases compared to the CPHP. As a result, this alternative would result in the same air pollutant emissions from operations as the proposed CPHP, resulting in a similar significant and unavoidable project and cumulative impact related to net increases of operational criteria pollutants that would occur under the CPHP. Mitigation in the form of project-level operational measures and TDM enhancement measure would reduce this significant impact, but not to a level of less than significant. This alternative would also have a similar significant but mitigable impact as the CPHP associated with exposure of sensitive receptors to substantial project and cumulative operational pollutant concentrations. Lastly, this alternative would have a similar significant but mitigable impact as the CPHP associated with a conflict with or obstruction of implementation of the applicable *Clean Air Plan*.

Biological Resources

This alternative would have similar new construction and demolition activities as the CPHP, although it would avoid potential intrusion into the Reserve from the New Hospital that may occur under the CPHP. As a result, overall extent of construction and development-related impacts to biological resources under this alternative would be similar to or slightly less than that associated with the CPHP. Significant project and/or cumulative construction-related effects on special-status plant and wildlife species of this alternative would be mitigated to less-than-significant with applicable survey and resource project measures similar to the proposed CPHP; significant project and/or cumulative impacts associated with potential resident and migrating bird strikes from new development would be similarly mitigated to less-than-significant with implementation of bird safe building treatment measures; and this alternative would have a similar less than significant effect related to damage to or removal of landmark trees.

Cultural Resources

Since the New Hospital would not intrude into the Reserve, this alternative could have less impact to this historical cultural landscape than under the CPHP. Otherwise, this alternative would result in similar demolition and physical alteration of other existing and/or potential future historical resources compared to the CPHP. As a result, this alternative could have slightly less significant and unavoidable impacts to existing known historical resources than the CPHP, but similar impacts to potential future historical resources.

This alternative could also result in slightly less ground disturbing construction activities compared to the CPHP, as it would involve less potential intrusion into and excavation of the hillside east of the New Hospital. Potentially significant project and cumulative impacts to previously unknown archaeological resources, human remains, and/or tribal cultural resources under this alternative would be similarly mitigated to a less than significant level.

Energy

This alternative would result in similar construction and demolition activities compared to the CPHP, with an exception being potentially less intrusion into and excavation of the hillside east of the New Hospital, and as a result, could have a similar or slightly less construction energy use impact compared to the CPHP. This alternative would have a similar amount of development and associated population increases compared to that associated with the CPHP, and consequently, would result in similar level of operational energy use. As such, the alternative would have similar less than significant project and/or cumulative impacts associated with consumption of energy resources as the CPHP; and would have a similar less than significant conflict with a state or local plan for renewable energy or energy efficiency.

Geology and Soils

This alternative would result in similar ground disturbing construction activities and new building construction as the CPHP, with an exception being potentially less intrusion into and excavation of the hillside east of the New Hospital. Accordingly, this alternative could have similar to or slightly less potential project and/or cumulative impacts than the CPHP as it relates to effects of seismic ground shaking, liquefaction or unstable soils, landslides, and erosion from ground disturbance during construction, and those effects would be similarly less than significant with compliance with applicable regulatory requirements and the implementation of geotechnical design recommendations and/or mitigation.

Greenhouse Gas Emissions

This alternative would result in similar new construction or demolition activities compared to the CPHP, with an exception being potentially less intrusion into and excavation of the hillside east of the New Hospital. As a result, this alternative would result in similar GHG emissions from construction as the CPHP, and would have similar or slightly less significant but mitigable project and/or cumulative construction-related effects greenhouse gas emissions. This alternative would also result in a similar amount of development and associated population and traffic increases at the Parnassus Heights campus site compared to the CPHP, and consequently, operational GHG emissions would be similar to the CPHP. Consequently, this alternative would have a similar significant but mitigable impact related to operational GHG emissions. Also, similar to the CPHP, this alternative would not conflict with applicable plans, policies or regulations adopted for the purpose of reducing the GHG emissions.

Hazards and Hazardous Materials

This alternative would result in similar new construction or demolition activities as the CPHP, with an exception being potentially less intrusion into and excavation of the hillside east of the New Hospital. This alternative would also result in a similar increase in operational development as the CPHP, and is therefore likely to result in similar increases in hazardous materials use as with the CPHP. Significant project and/or cumulative impacts associated with routine transport, use, or disposal of hazardous materials under this alternative would be similarly mitigated to a less than significant level with compliance with applicable, federal and State laws and regulations regulating transportation, management, and disposal of hazardous materials and wastes. The same would be true for project and/or cumulative impacts associated with potential accidental release of hazardous materials; and emitting and handling of hazardous materials within one-quarter mile of an existing or proposed school.

Hydrology and Water Quality

This alternative would result in similar new construction and groundbreaking activities as the CPHP, with an exception being potentially less intrusion into and excavation of the hillside east of the New Hospital. Also, with a smaller New Hospital building footprint, there would be an incrementally smaller increase in new impervious surfaces at the campus site under this alternative when compared to the CPHP. Nonetheless, similar to the proposed CPHP, compliance with the construction BMPs required by the NPDES Construction General Permit and operational design measures and LID stormwater requirements controls of the Phase II MS4 permit would ensure that project and/or cumulative impacts would be less than significant, including impacts related to the potential to violate water quality discharges requirements; degradation surface or groundwater quality; erosion and siltation; effect on flooding; effect on the capacity of stormwater drainage systems; additional sources of polluted runoff; or impedance or redirection of storm flows.

Land Use and Planning

This alternative would result in substantially the same amount of new development when compared to the CPHP, although it could result in less potential intrusion into the adjacent Reserve. This alternative would require similar amendments to the 2014 LRDP as are proposed under the CPHP that would affect the organization of land uses (with the exception of extent of area of the Reserve redesignated), the space program, and population. As a result, this alternative would have similar to or slightly less project and/or cumulative impacts than the CPHP at the Parnassus Heights campus site associated with conflict with land use plans, policies and regulations adopted for the purpose of avoiding or mitigating an environmental effect, and incompatibility with adjacent land uses, and these effects would be less than significant, as with the proposed CPHP.

Noise and Vibration

This alternative would have a comparable amount of new construction and demolition activities as that proposed under the CPHP, with the exception being potentially less intrusion into and excavation of the hillside east of the New Hospital given its smaller building footprint. As a result, project and cumulative construction-generated noise effects under this alternative would similarly be significant and unavoidable, even with implementation of construction noise control measures, limits on construction hours, and pile installation noise-reducing techniques. Construction vibration impacts under this alternative would be significant but mitigable with implementation of vibration control measures, as under the CPHP.

This alternative would result in similar amount of traffic as the CPHP, and consequently, transportation noise generated under this alternative would be similar to that under the CPHP. The significant project and/or cumulative impacts related to permanent increases in ambient noise levels from stationary noise sources in excess of applicable noise standards would be similarly mitigated under this alternative to a less than significant level with implementation of operational noise control measures, and the project and/or cumulative impacts associated with increases in traffic noise levels of this alternative would be similarly less than significant with the aforementioned mitigation measures.

Population and Housing

This alternative would result in a similar increase in the existing population at the Parnassus Heights campus site compared to the CPHP, and would demolish the same amount of existing housing, and develop the same amount of new housing at the campus site. As a result, this alternative would have similar less than significant project and/or cumulative impacts associated with inducement of population growth, and related new demand for housing, compared to the CPHP.

Public Services

This alternative would result in similar increases in development and population at the Parnassus Heights campus site compared to the CPHP. Consequently, this alternative would have similar less than significant project and/or cumulative impacts associated with the need for new or altered fire protection or public school facilities, as with the CPHP.

Recreation

This alternative would result in similar amount of new development and the same increase in population at the Parnassus Heights campus site as the CPHP. This alternative also proposes the same recreational improvements proposed under the CPHP, including the Millberry Terrace, expanded Saunders Court and Promenade. Consequently, this alternative would have similar less than significant project and/or cumulative impacts from the increase in the use of existing neighborhood and regional parks or other existing on- and off-campus recreational facilities, and from the construction of new recreational facilities.

Transportation

This alternative would have a comparable amount of new construction and demolition activities as that proposed under the CPHP, with the exception being potentially less intrusion into and excavation of the hillside east of the New Hospital given its smaller building footprint. Consequently, the significant construction impact to travel conditions along sidewalks and roadways serving the campus site under this alternative would be similarly mitigated to a less than significant level with implementation of construction coordination and monitoring measures.

This alternative would result in a similar amount of new development and the same increase in population and associated traffic at the Parnassus Heights campus site as the CPHP. This alternative would also provide the same transportation improvements for vehicles, bicycles and pedestrians proposed under the CPHP to improve circulation and safety at the campus site, including the Fourth Street extension, the pedestrian overcrossing and tunnel for Parnassus Avenue, widening of Medical Center Way, service corridor, Irving Street Arrival, and Promenade. As a result, this alternative would have similar less than significant project and/or cumulative impacts related to conflicts with programs, plans, ordinances or policies addressing the circulation system; increases in VMT; increases in hazard due to design features; and emergency access.

Utilities and Service Systems

This alternative would result in a similar amount of new development and the same increase in population, and associated increases in public utility demands at the Parnassus Heights campus site, as to the CPHP. Consequently, project and/or cumulative impacts under this alternative would be similarly less-than-significant as that identified for the CPHP, including impacts related to: construction of new or expanded water, wastewater treatment or storm water drainage, electric power, natural gas, or telecommunications facilities; effects on water supply availability during normal, dry and multiple dry years; effects on wastewater treatment capacity; effects on capacity of local solid waste infrastructure, and compliance with federal, and state and local statutes and regulations related to solid waste.

Relationship of CPHP including New Hospital - 19-Story Option to Meeting Project Objectives

While the New Hospital under this alternative would be approximately the same square footage and have the same bed capacity as that proposed under the CPHP, the irregularly-shaped footprint for New Hospital would result in inefficient floor plates for patient rooms, surgery suites, diagnostics and testing, labs and other hospital functions. Consequently, this New Hospital design would have more operational inefficiencies compared to the design under the CPHP. Accordingly, the New Hospital design under this alternative would not fully meet the CPHP project objectives for the New Hospital. UCSF also acknowledges the greater visibility and visual impact created by the taller hospital design under this alternative compared to the 16-story New Hospital under the proposed CPHP.

In all other aspects, the development program at the campus site under this alternative would be identical to that proposed under the CPHP. Accordingly, this alternative would meet the CPHP project objectives, for space, urban design and mobility; as well as for the Irving Street Arrival RAB, and Aldea Housing Densification.

6.3.5 Alternative 4: CPHP including New Hospital - Phased Option

This alternative is identical to the proposed CPHP, with the exception of the design and phasing of the New Hospital. This alternative would develop the New Hospital in two phases, on the site of LPPI and Moffitt Hospital. Phase 1 would involve demolition of the LPPI building, and the new construction of a hospital of about 252 beds in about 585,000 gsf in a 13-story building (four-story podium plus nine-story tower). Phase 2 would involve demolition of Moffitt Hospital and the new construction of an adjoining hospital of about 132 beds in about 370,000 gsf in a 10-story building (four-story podium plus six-story tower); please see **Figure 6-8**. The New Hospital under this alternative would contain one basement floor (one less than that proposed by the New Hospital under the CPHP). In total under this alternative, the New Hospital would be approximately the same square footage (955,000 gsf) and have the same bed capacity (384 beds) as the New Hospital proposed under the CPHP.

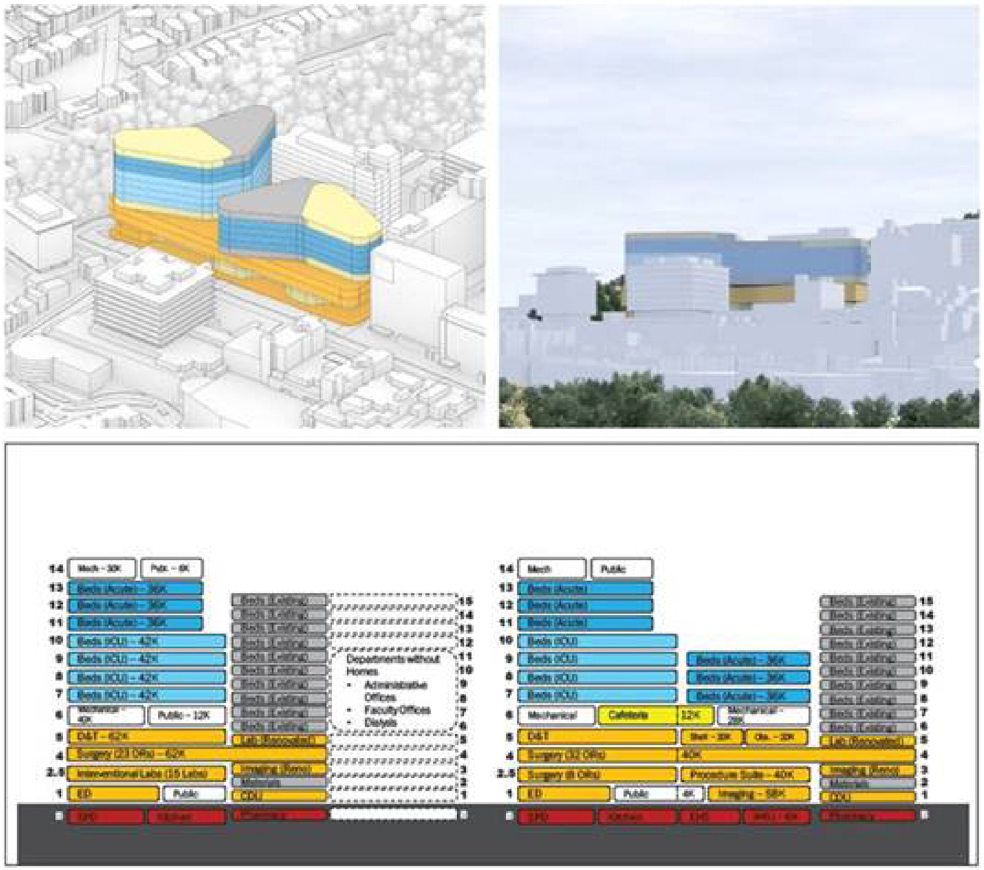


Figure 6-8
Alternative 4: CPHP including New Hospital - Phased Option

The New Hospital under this alternative would not extend into the adjacent Reserve, although the proposed widening of Medical Center Way would still be necessary and may encroach into the Reserve. As under the CPHP, the New Hospital under this alternative would have a connecting pedestrian bridge across Parnassus Avenue and a tunnel beneath Parnassus Avenue.

This alternative assumes the same revisions to the 2014 LRDP that were proposed in conjunction with the CPHP would occur under this alternative, including revisions to campus site functional zones (with the exception being modifications to the Open Space Reserve boundary would be related to the widening of Medical Center Way only), revisions to the space program, update to the estimated population, revisions to the Regents' Resolution, and update to the UCSF Greenhouse Gas Reduction Strategy.

It is assumed that UCSF would continue implementation of its existing plans and programs at Parnassus Heights not associated with the 2014 LRDP and/or CPHP, including, but not limited to, the *Mount Sutro Open Space Reserve Vegetation Management Plan*, and on-going campus site maintenance programs and activities.

Comparison of Effects of CPHP including New Hospital - Phased Option to the Proposed CPHP

Aesthetics, Wind and Shadow

Aesthetics

All development proposed at the Parnassus Heights campus site under this alternative would be identical to that proposed under the CPHP, with the exception of the New Hospital, which would occupy a broader footprint and require demolition of both LPPI and Moffitt Hospital, and would be three floors shorter than the New Hospital proposed under the CPHP. In addition, because of phasing, the full buildout of this New Hospital would not be complete and visible until approximately 2050.

Scenic Vistas

From the viewpoint at Grandview Park, the New Hospital under this alternative would rise lower on the skyline although it would be incrementally more broad, when compared to the New Hospital proposed under the CPHP, and would similarly only slightly obstruct the existing view of downtown San Francisco from this perspective, and would not obstruct scenic views from this park in other directions. Consequently, as with the CPHP, this alternative would not result in a substantial adverse impact on scenic vistas from this viewpoint.

When considering available vantage points from within the Reserve, such as from the Historic Trail, given its lower height, the New Hospital under this alternative would incrementally obstruct less of the northward scenic views across the campus core. However, as with the conclusion reached for the CPHP, given the overall lack of long-range scenic views from within the Reserve, implementation of the alternative would similarly not adversely affect scenic vistas from within the Reserve.

When considering the above, and additionally the new scenic views and new publicly-accessible open space that would be created from the campus site by this alternative (e.g., by the Millberry Terrace, expanded Saunders Court and the Promenade)– similar to the CPHP – the impact on scenic vistas from this alternative would be less than significant.

Scenic Quality

As under the CPHP, this alternative would have an adverse effect related to scenic quality if it were to conflict with UCSF 2014 LRDP policies governing scenic quality.

2014 LRDP Sub-objective 1B. Under this alternative, the 10- to 13-story New Hospital would be visibly shorter from off-site vantage points than the New Hospital proposed under the CPHP. However, New Hospital under this alternative would also appear more broad along Parnassus Avenue than the New Hospital proposed under the CPHP, as it would additionally occupy the footprint of Moffitt Hospital. While shorter than the New Hospital under the CPHP, the New Hospital under this alternative may slightly exceed the height limits of the City's 220-F height districts, and would exceed the City's 65-D height limit. Elsewhere on the campus site, exceedances of City height districts by other development proposed under this alternative (e.g., Millberry Union, Aldea Housing structures) would be identical to the proposed CPHP.

2014 LRDP Sub-objective 1C. Similar to the CPHP, implementation of the development program of this alternative would result in a substantial increase in development, and associated increase in the scale and density, on the campus site. Given its shorter height and mass, the New Hospital under this alternative would contrast less sharply both in height and scale with the existing residential development to the east than the New Hospital proposed under the CPHP. The proposed New Hospital under this alternative would also be closer in height to the nearby tallest existing buildings on the campus site compared to the New Hospital under the CPHP. The New Hospital could also appear less prominent in the viewsheds from nearby neighborhoods, such as those along Parnassus Avenue, 17th Street, and Willard Street at Belmont Avenue, compared to the New Hospital under the CPHP. Because of the reduced New Hospital height, development proposed under this alternative, would, on balance, be more consistent with 2014 LRDP sub-objective 1C in terms of height and scale when compared to the CPHP.

With respect to sensitivity to the surrounding landscape as set forth in 2014 LRDP sub-objective 1C, with its different hospital footprint, the New Hospital under this alternative would avoid potential encroachment into the Reserve that could occur for the New Hospital under the CPHP, although the widening of the Medical Center Way under this alternative would still encroach into the hillside in the Reserve to the east. Similar to the CPHP, UCSF would replace any area of the Reserve lost due to new development under this alternative by designating a new area elsewhere on the campus site as Reserve in an amount equal to or greater than that area lost. As under the CPHP, the existing grove of redwood trees adjacent to UC Hall would be removed.

Similar to the CPHP, UCSF would also provide publically accessible open space within the campus core, including an expanded Promenade and Saunders Court, which would serve to minimize effects of loss of existing landscaping elsewhere under this alternative.

With respect to the extent this sub-objective concerns noise generation, as mitigated, new buildings developed under the alternative would result in a less-than-significant effect on ambient noise levels pursuant to applicable noise standards, similar to under the CPHP.

2014 LRDP Sub-objective 1D. Similar to the CPHP, proposed new buildings along Parnassus Avenue under this alternative would be constructed concurrent with the proposed Parnassus Avenue Streetscape Plan. The Streetscape Plan improvements would serve to enhance the public realm as called for in UCSF's Physical Design Framework, and would be consistent with 2014 LRDP sub-objective 1D.

In summary, as under the CPHP, to the extent this alternative would be inconsistent with applicable 2014 LRDP objectives as described above, it is assumed UCSF would seek amendments to the 2014 LRDP to bring this alternative and 2014 LRDP into conformity. Therefore, because this alternative would include provisions regarding scenic quality that would apply broadly to the alternative based on UCSF's Physical Design Framework, with amendments to the 2014 LRDP, similar to the CPHP, this alternative would not conflict with the 2014 LRDP objectives related to scenic quality, and the impact would be less than significant.

This alternative would also have less impact related to new sources of light and glare compared to the CPHP given the shorter hospital height, and the overall impact would be similarly less-than-significant with mitigation.

Wind

Under this alternative, the New Hospital would be wider and shorter than the New Hospital proposed under the CPHP. The phased New Hospital would also create a longer street wall fronting Parnassus Avenue than the combination of the CPHP's New Hospital and the existing Moffitt Hospital, given that large portions of Moffitt Hospital's northern walls are set back from the street. Because the phased New Hospital would not encroach into the adjacent Reserve as would the project's New Hospital, the phased option could result in incrementally lower wind speeds near the northeast corner of the New Hospital, compared to those under the CPHP, because there would be more unbuilt area between the New Hospital and the steep slope to the east, across Medical Center Way. Moreover, the eastern portion of phased New Hospital would be three stories shorter than the New Hospital under the CPHP (and the western portion would be five stories shorter than the existing Moffitt Hospital). Nevertheless, the New Hospital under the phased alternative would still result in a substantial increase in building height and bulk at the east end of Parnassus Avenue on the campus site, compared to existing conditions, which could result in wind speeds that exceed the City's pedestrian wind hazard criterion along Parnassus Avenue—a significant effect, similar to what would be anticipated under the CPHP. With the remainder of development proposed under alternative the same as under the proposed CPHP, the New Hospital Phased Option could—like the CPHP—result in exceedances of the wind hazard criterion adjacent to the RAB (both on the north and south sides of the building), the Irving Street Arrival, and the taller new Aldea Housing buildings, also resulting in a significant effect. Implementation of CPHP Mitigation Measure AES-4 (Design new buildings to minimize wind impacts at pedestrian level) would reduce the severity of the potentially significant wind impact. However, as with the project, it cannot be stated with certainty that no wind hazard exceedances would result from the CPHP, and therefore this impact could be significant even with mitigation under the New Hospital Phased Alternative.

Shadows

Under this alternative, the New Hospital would occupy a broader footprint along Parnassus Avenue than the New Hospital under the CPHP because it would additionally require demolition of, and occupy the footprint of, Moffitt Hospital. The New Hospital under this alternative would also be three to six floors shorter than the New Hospital proposed under the CPHP. All other development at the campus site under this alternative would have building heights the same as that proposed under the CPHP. Shadow from this alternative would likely reach the three parks and two schoolyards receiving net new shadow cast under the CPHP, but because this alternative would result in a reduction in the overall height of the New Hospital, shadow effects from this alternative would have less impact than the CPHP. Overall, shadow under this alternative would affect publicly accessible open spaces, but not to an extent that would adversely or substantially impact the use and enjoyment of open spaces. Therefore, as under the CPHP, the overall shadow impact under this alternative would be similarly less than significant on a project-level and cumulative basis.

Air Quality

This alternative would have a comparable amount of new construction and demolition activities as that proposed under the CPHP, with the exceptions being potentially less intrusion into and excavation of the hillside east of the New Hospital, and the additional demolition of Moffitt Hospital, given its different building footprint. In addition, construction would occur over a longer time period, with Phase 2 of the New Hospital happening in the CPHP Future Phase. Consequently, this alternative could result in somewhat more construction-related air pollutant emissions, over a longer time period. This would likely result in a similar significant but mitigable impact associated with construction and demolition emissions of criteria pollutants of the CPHP, and toxic air contaminants (TACs) and associated health risks at sensitive receptors. Mitigation measures including use of clean construction equipment and implementation of BAAQMD dust control measures would mitigate those effects to less-than-significant, similar to with the CPHP.

This alternative would have the same increase in operational development and associated population and traffic increases compared to the CPHP. As a result, this alternative would have a similar significant and unavoidable project and cumulative impact related to net increases of operational criteria pollutants that would occur under the CPHP; with similar mitigation for project-level operational measures and TDM enhancement measure, albeit remaining significant and unavoidable. For the same reason, this alternative would also have similar significant but mitigable CPHP impact associated with exposure of sensitive receptors to substantial project and cumulative operational pollutant concentrations and similar mitigation to reduce DPM would mitigate those significant effects to less-than-significant. Lastly, this alternative would have a similar significant but mitigable impact associated with the CPHP's conflict with or obstruction of implementation of the applicable *Clean Air Plan*.

Biological Resources

This alternative would have similar new construction and demolition activities as the CPHP, with the exceptions being potentially less intrusion into and excavation of the hillside east of the New Hospital, and the additional demolition of Moffitt Hospital, given its different building footprint. Also, buildout of the New Hospital would occur over a longer time period, with Phase 2 of the New Hospital occurring in the CPHP Future Phase. As a result, the overall extent of construction and development-related impacts to biological resources under this alternative would be similar to or slightly less than that associated with the CPHP. Significant project and/or cumulative construction-related effects on special-status plant and wildlife species of this alternative would be mitigated to less-than-significant with applicable survey and resource project measures similar to the proposed CPHP; significant project and/or cumulative impacts associated with potential resident and migrating bird strikes from new development would be similarly mitigated to less-than-significant with implementation of bird safe building treatment measures; and this alternative would have a similar less than significant effect related to damage to or removal of landmark trees.

Cultural Resources

Since the New Hospital would not intrude into the Reserve under this alternative, it would have less impact to this historical cultural landscape than under the CPHP. Otherwise, this alternative would result in similar demolition and physical alteration of other existing and/or potential future historical resources compared to the CPHP. Moffitt Hospital is not considered eligible for the National Register or California Register. As a result, this alternative would slightly reduce but would not eliminate the significant and avoidable impacts related to the demolition/removal of historical resources under the CPHP.

This alternative would also result similar ground disturbing construction activities compared to the CPHP, although would involve potentially less intrusion into and excavation of the hillside east of the New Hospital, and would demolish Moffitt Hospital. Potentially significant project and cumulative impacts to previously unknown archaeological resources, human remains, and/or tribal cultural resources under this alternative would be similarly mitigated to a less than significant level.

Energy

This alternative would result in similar construction and demolition activities compared to the CPHP, with the exceptions being potentially less intrusion into and excavation of the hillside east of the New Hospital, and the additional demolition of Moffitt Hospital, given its different building footprint. Also, construction of the new hospital would occur over a longer time period, with Phase 2 of the New Hospital occurring in the CPHP Future Phase. As a result of its similar amount of overall development, this alternative would use a similar amount of energy for construction compared to the CPHP. For the same reason, this alternative would result in similar operational energy use than the CPHP. As such, the alternative would have a similarly less than significant project and/or cumulative impact associated with consumption of energy resources as the CPHP; and would have a similarly less than significant conflict with a state or local plan for renewable energy or energy efficiency.

Geology and Soils

This alternative would result in similar ground disturbing construction activities and new building construction compared to the CPHP, although would involve potentially less intrusion into and excavation of the hillside east of the New Hospital, and would demolish Moffitt Hospital. Accordingly, this alternative would have similar project and/or cumulative impacts than the CPHP as it relates to effects of seismic ground shaking, liquefaction or unstable soils, landslides, and erosion from ground disturbance during construction, and those effects would be similarly less than significant with compliance with applicable regulatory requirements and the implementation of geotechnical design recommendations and/or mitigation.

Greenhouse Gas Emissions

This alternative would result in similar new construction or demolition activities compared to the CPHP, with the exceptions being less potential intrusion into and excavation of the hillside east of the New Hospital, and the additional demolition of Moffitt Hospital, given its different building footprint. Also, construction of the New Hospital would occur over a longer time period, with construction of Phase 2 of the New Hospital occurring in the CPHP Future Phase. Based on the similar amount of square footage as the CPHP, this alternative would have similar significant but mitigable project and/or cumulative construction-related greenhouse gas emissions at the Parnassus Heights campus site. For the same reason, this alternative would result in similar operational GHG emissions as the CPHP. Consequently, this alternative would have a similar significant but mitigable impact related to operational GHG emissions. Similar to the CPHP, this alternative would not conflict with applicable plans, policies or regulations adopted for the purpose of reducing the emissions of greenhouse gases.

Hazards and Hazardous Materials

This alternative would result in similar new construction or demolition activities compared to the CPHP, with the exceptions being potentially less intrusion into and excavation of the hillside east of the New Hospital, and the additional demolition of Moffitt Hospital, given its different building footprint. In addition, construction of the New Hospital would occur over a longer time period, with construction of Phase 2 of the New Hospital occurring in the CPHP Future Phase. With similar overall square footage, this alternative would result in a similar increase in operations, and the associated increases in hazardous materials use as under the CPHP. Significant project and/or cumulative impacts associated with routine transport, use, or disposal of hazardous materials under this alternative would be similarly mitigated to a less than significant level with compliance with applicable, federal and State laws and regulations covering transportation, management, and disposal of hazardous materials and wastes. In addition, project and/or cumulative impacts associated with potential accidental release of hazardous materials; and emitting and handling of hazardous materials within one-quarter mile of an existing or proposed school, for this alternative would be similarly less than significant as with the CPHP.

Hydrology and Water Quality

This alternative would result in similar new construction and groundbreaking activities compared to the CPHP, although would involve less potential intrusion into and excavation of the hillside east of the New Hospital, and would demolish Moffitt Hospital. Similar to with the proposed CPHP, compliance with the construction BMPs required by the NPDES Construction General Permit and operational design measures and LID stormwater requirements controls of the Phase II MS4 permit would ensure that project and/or cumulative impacts related to the potential to violate water quality discharges requirements; degradation surface or groundwater quality; erosion and siltation; effect on flooding; effect on the capacity of stormwater drainage systems; additional sources of polluted runoff; or impedance or redirection of storm flows, would be less than significant.

Land Use and Planning

This alternative would result in substantially same amount of new development compared to the CPHP, although would result in potentially less intrusion into the adjacent Reserve, and would demolish Moffitt Hospital. This alternative would require similar amendments to the 2014 LRDP that are proposed under the CPHP that would further affect land use (with the exception of extent of area of the Reserve redesignated), the space program, and population. As a result, this alternative would have similar project and/or cumulative CPHP impacts at the Parnassus Heights campus site associated with conflict with land use plans, policies and regulations adopted for the purpose of avoiding or mitigating an environmental effect, and incompatibility with adjacent land uses, and these effects would similarly be less than significant.

Noise and Vibration

This alternative would have a comparable amount of new construction and demolition activities as that proposed under the CPHP, with the exceptions being potentially less intrusion into and excavation of the hillside east of the New Hospital, and the additional demolition of Moffitt Hospital, given its different building footprint. Also, construction of the New Hospital would occur over a longer time period, with construction of Phase 2 of the New Hospital occurring in the CPHP Future Phase. Overall, project and cumulative construction-generated noise effects under this alternative would be comparable to those under the CPHP and would similarly be significant and unavoidable, even with implementation of construction noise control measures, limits on construction hours, and pile installation noise-reducing techniques. Construction vibration impacts under this alternative would be significant but mitigable with implementation of vibration control measures, as under the CPHP.

This alternative would result in similar amount of traffic as the CPHP, and consequently, transportation noise generated by this alternative would be similar to that under the CPHP. The significant project and/or cumulative impact related to permanent increases in ambient noise levels from stationary noise sources in excess of applicable noise standards would be similarly mitigated under this alternative to a less than significant level with implementation of operational noise control measures, and the project and/or cumulative impact associated with increases in traffic noise levels of this alternative would be similarly less than significant with the aforementioned mitigation measures.

Population and Housing

This alternative would result in a similar increase in the existing population at the Parnassus Heights campus site compared to the CPHP, and would demolish the same amount of existing housing and develop the same increase in new housing at the campus site. As a result, this alternative would have similar less than significant project and/or cumulative impacts associated with inducement of population growth, and related new demand for housing, compared to the CPHP.

Public Services

This alternative would result in similar increase in development and population at the Parnassus Heights campus site compared to the CPHP. Consequently, this alternative would have similar less than significant project and/or cumulative impacts associated with need for new or altered fire protection or public school facilities, as with the CPHP.

Recreation

This alternative would result in similar amount of new development and increase in population at the Parnassus Heights campus site compared to the CPHP. This alternative also proposes the same recreational improvements proposed under the CPHP, including the Millberry Terrace, expanded Saunders Court and Promenade. Consequently, this alternative would have similar less than significant project and/or cumulative impacts of increase in the use of existing neighborhood and regional parks or other existing on- and off-campus recreational facilities, and with the construction of new recreational facilities.

Transportation

This alternative would result in a similar amount of new construction at the Parnassus Heights campus site compared to the CPHP, with the exceptions being potentially less intrusion into and excavation of the hillside east of the New Hospital, and the demolition of Moffitt Hospital, given its different building footprint. Consequently, the significant construction impact to travel conditions along sidewalks and roadways serving the campus site under this alternative would be similarly mitigated to a less than significant level with implementation of construction coordination and monitoring measures.

This alternative would result in a similar amount of new development and increase in population and associated traffic at the Parnassus Heights campus site compared to the CPHP. This alternative would provide the same transportation improvements for vehicles, bicycles and pedestrians proposed under the CPHP to improve circulation and safety at the campus site, including the Fourth Street extension, the overcrossing and tunnel for Parnassus Avenue, widening of Medical Center Way, service corridor, Irving Street Arrival, and Promenade. This alternative would have similar less than significant project and/or cumulative impacts related to conflicts with programs, plans, ordinances or policies addressing the circulation system; increases in VMT; increases in hazard due to design features; and emergency access.

Utilities and Service Systems

This alternative would result in a similar amount of new development and increase in population, and associated increases in public utility demands at the Parnassus Heights campus site, compared to the CPHP. Consequently, project and/or cumulative impacts under this alternative would be similarly less-than-significant as that identified for the CPHP, including with: construction of new or expanded water, wastewater treatment or storm water drainage, electric power, natural gas, or telecommunications facilities; effects on water supply availability during normal, dry and multiple dry years; effects on wastewater treatment capacity; effects on capacity of local solid waste infrastructure, and compliance with federal, and state and local statutes and regulations related to solid waste.

Relationship of CPHP including New Hospital - Phased Option to Meeting Project Objectives

As discussed under the description of the New Hospital -- Phased Option, the New Hospital would be built in two phases, on the site of LPPI and Moffitt Hospital. Phase 1 would include 252 beds, and in conjunction with 291 beds at Long Hospital, would provide a total of 543 beds at the campus site in 2030. Phase 2 developed later would include 132 additional beds, and together with Phase 1 would provide the same total number of beds (384) and have the same buildings square footage as that proposed under the CPHP, and in conjunction with the beds at Long Hospital have the same total bed capacity (675 beds) at the campus site as proposed under the CPHP.

UCSF indicates that a minimum of 675 beds at Parnassus Heights campus site are necessary to address inpatient demand. This alternative would not provide sufficient number of beds until Phase 2, in the late 2030's or early 2040's. This alternative would also not supply an adequate number of operating rooms in the near-term, to address patient demand. Accordingly, this alternative would not fully meet the CPHP project objectives for the New Hospital.

In all other aspects, the development program at the campus site under this alternative would be similar to that proposed under the CPHP. Accordingly, this alternative would meet the CPHP project objectives, for space, urban design and mobility; as well as for the Irving Street Arrival RAB and Aldea Housing Densification.

6.4 Alternatives Considered but Dismissed from Further Evaluation

CEQA Guidelines Section 15126.6(c) requires an EIR to identify and briefly discuss any alternatives that were considered by the lead agency but were rejected as infeasible during the scoping process. In identifying alternatives for detailed evaluation, primary consideration was given to alternatives that could reduce significant impacts while still meeting most of the project objectives.

6.4.1 No New Hospital at Parnassus Heights Campus Site / Implement Phase 2 of Medical Center at Mission Bay Campus Site

This potential alternative would not develop the New Hospital proposed at the Parnassus Heights campus site under the CPHP. Rather, UCSF would continue to advance development of "Phase 2" of the Medical Center at the Mission Bay campus site. As previously analyzed in the 2008 *UCSF Medical Center at Mission Bay Final EIR*, Phase 2 of the Medical Center is a future phase of the Medical Center at Mission Bay, and would be developed within remaining acreage of Blocks 38-39 at that campus site. Phase 2 would consist of 793,500 gsf of new development, comprised of a 261-bed hospital, medical office space, hospital support, and parking. With no New Hospital developed at the Parnassus Heights campus site, this potential alternative assumes 291 beds would be provided at Long Hospital, and up to 100 beds would be available at Moffitt Hospital (following retrofitting and renovation of this building for inpatient beds), for a total of 391 beds.

As such, this potential alternative would result in an estimated 284 fewer overall beds at Parnassus Heights campus site, and hence at UCSF campus-wide, than under the proposed CPHP. As discussed in Chapter 3 *Project Description*, under Project Need, there are bed shortages for critical and acute care in San Francisco, the greater Bay Area, and beyond, particularly for the tertiary and quaternary level of care provided by UCSF. In addition, this potential alternative would not meet this growing demand, or allow for an expansion of emergency, surgical, interventional radiology, and imaging services, at this campus site. Also, given that the Parnassus Heights campus site is the hub for the five professional programs and the majority of adult clinical care, the absence of a New Hospital at the Parnassus Heights campus site would not help to achieve the benefits that can be realized through interdisciplinary collaboration and convergence between clinical care, research and education.

As such, this potential alternative would conflict with several 2014 LRDP objectives for the Parnassus Heights campus site, including: "*(e)nsure that adequate space is provided to foster collaboration and to facilitate the inter-dependence and connectivity for operational efficiency and effectiveness of instruction, clinical, research and support uses in close physical proximity to each other;*" "*(e)nsure that Long Hospital and the New Hospital Addition have adequate clinical and administrative support and are aligned with education, research and specialized care programs and support that remain at the campus site*;" and conflict with a number of CPHP objectives, including: "*(r)evitalize the aging Parnassus Heights campus to enhance its place as a premier educational, research, and clinical institution…*;" "*(f)ulfill the need for contemporary research, educational, clinical, and support spaces …;*" and the CPHP's specific objectives for the New Hospital, including: "*…optimizes operational activities with other clinical facilities at Parnassus Heights*;" "*(i)ncrease inpatient beds at Parnassus Heights to address severe constraints on capacity and access to care, and to meet the needs of a growing and aging Bay Area population;*" "*(d)evelop spaces for clinical and translational research and learning in or adjacent to clinical areas where patients are located*;" and those objectives for meeting regulatory (including seismic) and modern industry standards, and patient satisfaction.

This potential alternative would reduce the significant wind impact identified in the vicinity of the New Hospital site at Parnassus Heights, would avoid demolition of the LPPI (individually eligible for listing in the National and California Registers), and avoid a number temporary construction and operational impacts associated with the New Hospital at the Parnassus Heights campus site that would occur under the proposed CPHP. However, by not developing a New Hospital at the Parnassus Heights campus site, and focusing future new clinical uses at the Mission Bay campus site, this potential alternative would also result in decreased efficiency for UCSF staff and students, and therefore have the potential to increase cross-town traffic between Parnassus Heights and Mission Bay campus sites, and related transportation effects and air emissions.

For these reasons, this potential alternative is not carried forward for detailed evaluation.

6.4.2 New Hospital on UC Hall Site

This potential alternative considers development of a New Hospital of similar size and capability as that proposed under the CPHP on the west side of campus core, at the site of UC Hall and a portion of the adjacent Dentistry Clinics Plaza. A similar-sized option was analyzed in the 2005 *UCSF 2005 LRDP Amendment #2 -Hospital Replacement Final EIR*, which assumed a new hospital of up to 400 beds, 800,000 gsf, and about 180 feet in height (11 stories)[3]. The New Hospital program proposed under the CPHP of 384 beds and about 955,000 gsf, if located on the UC Hall site on approximately the same footprint, would be approximately 14 to 15 stories, depending on massing.

3 Excluding about 20 feet in height of rooftop mechanical equipment on the site of UC Hall.

Under the CPHP, the UC Hall site is planned for the proposed Research and Academic building. As such, the development of a New Hospital at the site of UC Hall under this alternative would displace research and academic uses envisioned to be developed at that site under the CPHP, and therefore, would necessitate relocation of those uses elsewhere on the campus site or possibly to a different campus site. As discussed in Chapter 3, *Project Description* under Project Need, UCSF research activities are an integral part of both the clinical and teaching missions of the University. Furthermore, existing research activities at Parnassus Heights currently operate in inadequate and outdated facilities which threaten researcher recruitment and retention. In addition, by dispersing the proposed groupings of land uses envisioned under the CPHP, this relocation scheme would diverge with a fundamental goal of the CPHP to consolidate clinical uses in the Clinical East End district, and research and academic uses within the Research and Academic Commons district. The development of New Hospital at a site physically distant from Moffitt and Long Hospitals under this alternative would not facilitate operational efficiency with these hospitals, including inpatient facilities, ambulatory care clinics, support, parking.

The development of a New Hospital at the site of UC Hall would also be constrained by the site size and access, making it difficult or impossible to meet the functional needs of a new hospital. Specifically, the insufficient site area would result in floor plate sizes that would be inadequate for the amount of space and functionality of space necessary for a contemporary hospital. In addition, the UC Hall site would be inadequate to accommodate proper vehicular circulation along Parnassus Avenue for ambulances, patient drop-off, and deliveries. Also, while vehicular traffic associated with a New Hospital at this site of UC Hall could be routed to the back of this site via Koret Way, such scheme would impact residents on 5th Avenue and Kirkham Street.

As such, this potential alternative would conflict with the 2014 LRDP objective for the Parnassus Heights campus site, including: "*(e)nsure that adequate space is provided to foster collaboration and to facilitate the inter-dependence and connectivity for operational efficiency and effectiveness of instruction, clinical, research and support uses in close physical proximity to each other;"* "*(e)nsure that Long Hospital and the New Hospital Addition have adequate clinical and administrative support and are aligned with education, research and specialized care programs and support that remain at the campus site*;" and conflict with a number of CPHP objectives, including "*(i)mprove the campus's functional organization…;"* "*(i)mprove campus circulation options to reduce impacts on the surrounding neighborhood*;" *"(s)ite and develop a new inpatient facility in a way that optimizes operational activities with other clinical facilities at Parnassus Heights…*;" "*(d)evelop a new inpatient facility that is optimized in its spatial layout to enhance functionality and efficiency*;" and "*(d)evelop spaces for clinical and translational research and learning in or adjacent to clinical areas where patients are located."*

While this potential alternative would reduce the significant wind impacts in the vicinity of the CPHP-proposed New Hospital location, it would also have the potential to introduce significant new wind impacts at the UC Hall site; and furthermore, would not avoid the identified significant operational air quality and historic resource impacts that would occur under the CPHP.

For these reasons, this potential alternative is not carried forward for detailed evaluation.

6.4.3 New Hospital at Mount Zion Campus Site

This potential alternative would construct a New Hospital at the UCSF Mount Zion campus site, as previously studied in the 2002 *UCSF Mount Zion Master Planning Study*, either on the main block site (bounded by Divisadero, Post, Scott and Sutter Streets) or on the south block (bounded by Divisadero, Geary, Scott, and Post Streets).

This potential alternative would result in UCSF hospitals operating at three different campus sites (Parnassus Heights, Mission Bay, and Mount Zion) which would be less than ideal and inefficient. Also, given that the Parnassus Heights campus site is the hub for the four professional schools and the majority of adult clinical care, the absence of a New Hospital at the Parnassus Heights campus site would not help to achieve the benefits that can be realized through interdisciplinary collaboration and convergence between clinical care, research and education. Lastly, UCSF does not own the Mount Zion south block sites, which are owned by many entities, making land acquisition difficult. This potential alternative would conflict with many of the same 2014 LRDP and CPHP objectives described under Section 6.4.1, above.

This potential alternative would reduce the significant wind impact identified in the vicinity of the New Hospital site at Parnassus Heights, avoid demolition of the LPPI (individually eligible for listing in the National and California Registers), and avoid a number temporary construction and operational impacts associated with the New Hospital at the Parnassus Heights campus site, although most of these impacts would simply be shifted to the UCSF Mount Zion campus site. This potential alternative would also result in decreased efficiency for UCSF staff and students, and therefore have the potential to increase traffic between Parnassus Heights, and other hospital campus sites, and related transportation effects and air emissions.

For these reasons, this potential alternative is not carried forward for detailed evaluation.

6.5 Summary Comparison of Alternatives

Table 6-3 provides a summary of comparison of impacts of the proposed CPHP and the CPHP Alternatives, and indicates whether the impacts of the CPHP Alternatives are more or less severe than those of the proposed CPHP. For more information about the methodology used to evaluate potential impacts of the CPHP and an explanation of the resulting impact conclusions, please see *Chapter 4 Environmental Setting, Impacts, and Mitigation Measures*.

TABLE 6-3
COMPARISON OF IMPACTS OF THE PROPOSED CPHP AND ALTERNATIVES

Impact	Proposed CPHP	No Project Alternative		Alternative 2: Reduced Project	Alternative 3: CPHP including New Hospital - 19-Story Option	Alternative 4: CPHP including New Hospital - Phased Option
		Alternative 1A: No Project - No Development	Alternative 1B: No Project - Development under 2014 LRDP			
4.1 Aesthetics, Wind, and Shadow						
Impact AES-1: Development under the CPHP would not have a substantial adverse effect on a scenic vista.	LTS	- LTS	- LTS	- LTS	=/+ LTS	- LTS
Impact AES-2: Development under the CPHP would occur in an urbanized area and would not conflict with applicable zoning and other regulations governing scenic quality.	LTS	- LTS	- LTS	- LTS	=/+ LTS	- LTS
Impact AES-3: Implementation of the CPHP would not create a new source of substantial light or glare which would adversely affect daytime or nighttime views in the area.	LTSM	- LTS	- LTSM	- LTSM	-/+ LTSM	- LTSM
Impact AES-4: Implementation of the CPHP would potentially create wind hazards in publicly accessible areas of substantial pedestrian use.	SUM	- LTS	- LTSM	- SUM	- SUM	- SUM
Impact AES-5: Implementation of the CPHP would not create new shadow in a manner that would substantially and adversely affects the use and enjoyment of publicly accessible open spaces.	LTS	- LTS	- LTS	- LTS	+ LTS	- LTS
Impact C-AES-1: Implementation of the CPHP, combined with cumulative projects, would not have a substantial adverse effect on a scenic vista or conflict with applicable zoning and other regulations governing scenic quality.	LTS	- LTS	- LTS	- LTS	-/+ LTS	- LTS
Impact C-AES-2: Implementation of the CPHP, combined with cumulative projects, would not create a new source of substantial light or glare which would adversely affect daytime or nighttime views in the area.	LTS	- LTS	- LTS	- LTS	-/+ LTS	- LTS
Impact C-AES-3: Implementation of the CPHP, combined with cumulative projects, would potentially create wind hazards in publicly accessible areas of substantial pedestrian use.	SUM	- LTS	- LTSM	- SUM	- SUM	- SUM
Impact C-AES-4: Implementation of the CPHP, combined with cumulative projects, would not create new shadow that substantially and adversely affects the use and enjoyment of publicly accessible open spaces.	LTS	- LTS	- LTS	- LTS	+ LTS	- LTS

SUM Significant and Unavoidable with Mitigation
LTSM Less than Significant with Mitigation
LTS Less than Significant impact

\- Lesser impact than that of the proposed CPHP
= Same (or similar) impact as that of the proposed CPHP
-/= Less or similar impact to that of the proposed CPHP
-/+ Less or greater impact as the proposed CPHP
=/+ Similar or greater impact to that of the proposed CPHP

TABLE 6-3 (CONTINUED)
COMPARISON OF IMPACTS OF THE PROPOSED CPHP AND ALTERNATIVES

Impact	Proposed CPHP	No Project Alternative		Alternative 2: Reduced Project	Alternative 3: CPHP including New Hospital - 19-Story Option	Alternative 4: CPHP including New Hospital - Phased Option
		Alternative 1A: No Project - No Development	Alternative 1B: No Project - Development under 2014 LRDP			
4.2 Air Quality						
Impact AIR-1: Construction of campus development under the CPHP would result in a cumulatively considerable net increase of a criteria pollutant for which the project region is non-attainment under an applicable federal or state ambient air quality standard.	LTSM	- LTS	- LTSM	- LTSM	-/= LTSM	- LTSM
Impact AIR-2: Operation of campus facilities developed under the CPHP would result in a cumulatively considerable net increase of a criteria pollutant (PM_{10}) for which the project region is non-attainment under an applicable federal or state ambient air quality standard.	SUM	- LTS	- LTSM	- SUM	= SUM	=SUM
Impact AIR-3: Construction activities under the CPHP could expose sensitive receptors to substantial pollutant concentrations and exceed the LRDP EIR standard of significance by exposing receptors to toxic air contaminant emissions that (1) result in a cancer risk greater than 10 cancer cases per 1 million people exposed in a lifetime; or (2) for acute or chronic effects, result in concentrations of toxic air contaminant emissions with a Hazard Index of 1.0 or greater.	LTSM	- LTS	- LTS	- LTSM	-/= LTSM	-/+ LTSM
Impact AIR-4: Campus site operations under the CPHP could expose sensitive receptors to substantial pollutant concentrations and exceed the LRDP EIR standard of significance by exposing receptors to toxic air contaminant emissions that (1) result in a cancer risk greater than 10 cancer cases per 1 million people exposed in a lifetime; or (2) for acute or chronic effects, result in concentrations of toxic air contaminant emissions with a Hazard Index of 1.0 or greater.	LTSM	- LTS	- LTS	- LTSM	= LTSM	= LTSM
Impact AIR-5: The CPHP could conflict with or obstruct implementation of the *2017 Clean Air Plan*.	LTSM	- LTS	- LTS	- LTSM	= LTSM	= LTSM
Impact C-AIR-1**:** Implementation of the CPHP would result in a cumulatively considerable net increase of a criteria pollutant (PM_{10}) for which the project region is non-attainment under an applicable federal or state ambient air quality standard.	SUM	- LTS	-SUM	- SUM	= SUM	= SUM
Impact C-AIR-2: Implementation of the CPHP could contribute considerably to cumulative emissions of TACs and $PM_{2.5}$ that could expose sensitive receptors to substantial pollutant concentrations or health risks.	LTSM	- LTS	- LTS	- LTSM	-/= LTSM	-/+ LTSM

SUM Significant and Unavoidable with Mitigation
LTSM Less than Significant with Mitigation
LTS Less than Significant impact

\- Lesser impact than that of the proposed CPHP
= Same (or similar) impact as that of the proposed CPHP
-/= Less or similar impact to that of the proposed CPHP
-/+ Less or greater impact as the proposed CPHP
=/+ Similar or greater impact to that of the proposed CPHP

TABLE 6-3 (CONTINUED)
COMPARISON OF IMPACTS OF THE PROPOSED CPHP AND ALTERNATIVES

Impact	Proposed CPHP	No Project Alternative		Alternative 2: Reduced Project	Alternative 3: CPHP including New Hospital - 19-Story Option	Alternative 4: CPHP including New Hospital - Phased Option
		Alternative 1A: No Project - No Development	Alternative 1B: No Project - Development under 2014 LRDP			
4.3 Biological Resources						
Impact BIO-1: Implementation of the CPHP would not have a substantial adverse effect, either directly or through habitat modifications, on species identified as candidate, sensitive, or special-status species in local or regional plans, policies, or regulations, or by the California Department of Fish and Wildlife or U.S. Fish and Wildlife Service.	LTSM	- LTS	-LTSM	- LTSM	-/= LTSM	- LTSM
Impact BIO-2: Implementation of the CPHP would not interfere substantially with the movement of any native resident or migratory fish or wildlife species or with established native resident or migratory wildlife corridors, or impede the use of native wildlife nursery sites.	LTSM	- LTS	-LTSM	- LTSM	-/= LTSM	- LTSM
Impact BIO-3: Implementation of the CPHP would not conflict with any applicable local policies or ordinances protecting biological resources, including exceeding the LRDP EIR standard of significance by damaging or removing heritage or landmark trees or native oak trees of a diameter specified in a local ordinance.	LTS	- LTS	-LTS	- LTS	-/= LTS	- LTS
Impact C-BIO-1: Implementation of the CPHP would not result in cumulatively considerable impacts on biological resources, in combination with past, present and reasonably foreseeable future projects in the vicinity of the Parnassus Heights campus site.	LTSM	- LTS	-LTSM	- LTSM	-/= LTSM	- LTSM
4.4 Cultural Resources and Tribal Cultural Resources						
Impact CUL-1: Implementation of the CPHP would result in a substantial adverse change in the significance of known historical resources.	SUM	- LTS	-SUM	- SUM	- SUM	- SUM
Impact CUL-2: Implementation of the CPHP would result in a substantial adverse change in the significance of potential future historical resources that may become eligible by the full build-out of the CPHP in 2050.	SUM	- LTS	-LTS	- SUM	= SUM	= SUM
Impact CUL-3: Implementation of the CPHP could cause a substantial adverse change in the significance of an archaeological resource pursuant to CEQA Guidelines Section 15064.5.	LTSM	- LTS	-LTSM	- LTSM	-/= LTSM	-/+ LTSM
Impact CUL-4: Implementation of the CPHP could disturb human remains, including those interred outside of dedicated cemeteries.	LTSM	- LTS	-LTSM	- LTSM	-/= LTSM	-/+ LTSM

SUM	Significant and Unavoidable with Mitigation	-	Lesser impact than that of the proposed CPHP
LTSM	Less than Significant with Mitigation	=	Same (or similar) impact as that of the proposed CPHP
LTS	Less than Significant impact	-/=	Less or similar impact to that of the proposed CPHP
		-/+	Less or greater impact as the proposed CPHP
		=/+	Similar or greater impact to that of the proposed CPHP

TABLE 6-3 (CONTINUED)
COMPARISON OF IMPACTS OF THE PROPOSED CPHP AND ALTERNATIVES

Impact	Proposed CPHP	No Project Alternative		Alternative 2: Reduced Project	Alternative 3: CPHP including New Hospital - 19-Story Option	Alternative 4: CPHP including New Hospital - Phased Option
		Alternative 1A: No Project - No Development	Alternative 1B: No Project - Development under 2014 LRDP			
4.4 Cultural Resources and Tribal Cultural Resources (cont.)						
Impact CUL-5: Implementation of the CPHP could cause a substantial adverse change in the significance of a tribal cultural resource, defined in PRC Section 21074 as either a site, feature, place, cultural landscape that is geographically defined in terms of the size and scope of the landscape, sacred place, or object with cultural value to a California Native American tribe.	LTSM	- LTS	-LTSM	- LTSM	-/= LTSM	-/+ LTSM
Impact C-CUL-1: Implementation of the CPHP would result in cumulatively considerable impacts on cultural and/or tribal cultural resources, in combination with past, present and reasonably foreseeable future projects in the vicinity of the Parnassus Heights campus site.						
Historical Resources:	SUM	- LTS	-SUM	- SUM	- SUM	- SUM
Archaeological Resources, Human Remains, and Tribal Cultural Resources:	LTSM (	- LTS	-LTSM	- LTSM	-/= LTSM	-/+ LTSM
4.5 Energy						
Impact ENE-1: Implementation of the CPHP would not result in a potentially significant environmental impact due to wasteful, inefficient, or unnecessary consumption of energy resources, during project construction or operation.	LTS	- LTS	- LTS	- LTS	-/= LTS	-/+ LTS
Impact ENE-2: Implementation of the CPHP would not conflict with or obstruct a state or local plan for renewable energy or energy efficiency.	LTS	- LTS	- LTS	- LTS	-/= LTS	-/+ LTS
Impact C-ENE-1: The CPHP, combined with cumulative development in the Parnassus Heights campus site vicinity and citywide, would not result in significant cumulative energy impacts.	LTS	- LTS	-LTS	-LTS	-/= LTS	-/+ LTS
4.6 Geology and Soils						
Impact GEO-1: New development under the CPHP would not directly or indirectly cause substantial adverse effects, including the risk of loss, injury, or death involving strong seismic ground shaking.	LTS	- LTS	- LTS	- LTS	-/= LTS	-/+ LTS
Impact GEO-2: New development under the CPHP would not directly or indirectly cause substantial adverse effects, including the risk of loss, injury, or death involving strong seismic related ground failure including liquefaction.	LTS	- LTS	- LTS	- LTS	-/= LTS	-/+ LTS

SUM Significant and Unavoidable with Mitigation
LTSM Less than Significant with Mitigation
LTS Less than Significant impact

\- Lesser impact than that of the proposed CPHP
= Same (or similar) impact as that of the proposed CPHP
-/= Less or similar impact to that of the proposed CPHP
-/+ Less or greater impact as the proposed CPHP
=/+ Similar or greater impact to that of the proposed CPHP

TABLE 6-3 (CONTINUED)
COMPARISON OF IMPACTS OF THE PROPOSED CPHP AND ALTERNATIVES

Impact	Proposed CPHP	No Project Alternative		Alternative 2: Reduced Project	Alternative 3: CPHP including New Hospital - 19-Story Option	Alternative 4: CPHP including New Hospital - Phased Option
		Alternative 1A: No Project - No Development	Alternative 1B: No Project - Development under 2014 LRDP			
4.6 Geology and Soils (cont.)						
Impact GEO-3: New development under the CPHP would not directly or indirectly cause substantial adverse effects, including the risk of loss, injury, or death involving landslides.	LTSM	- LTS	- LTS	- LTSM	-/= LTSM	-/+ LTS
Impact GEO-4: Construction and operation of development associated with the CPHP would not have the potential to result in the substantial erosion or the loss of topsoil.	LTS	- LTS	-LTS	- LTS	-/= LTS	-/+ LTS
Impact GEO-5: Development and redevelopment associated with the CPHP would not be located on a geologic unit or soil that is unstable, or that would become unstable as a result of the project, and potentially result in on- or off-site landslide, lateral spreading, subsidence, liquefaction or collapse.	LTS	- LTS	-LTS	- LTS	-/= LTS	-/+ LTS
Impact GEO-6: Construction associated with the CPHP could have the potential to directly or indirectly destroy a unique paleontological resource or site or unique geologic feature.	LTSM	- LTS	-LTS	- LTSM	-/= LTSM	-/+ LTSM
Impact C-GEO-1: Implementation of the CPHP could have the potential to combine with past, present and reasonably foreseeable future projects to result in cumulatively considerable impacts related to geology and soils.	LTSM	- LTS	-LTS	- LTSM	-/= LTSM	-/+ LTSM
4.7 Greenhouse Gas Emissions						
Impact GHG-1: Implementation of the CPHP would generate GHG emissions, either directly or indirectly, that may have a significant impact on the environment.	LTSM	- LTS	- LTSM	- LTSM	-/= LTSM	-/+ LTSM
Impact GHG-2: Implementation of the CPHP would not conflict with an applicable plan, policy or regulation adopted for the purpose of reducing the emissions of greenhouse gases.	LTS	- LTS	-LTS	- LTS	-/= LTS	-/+ LTS
4.8 Hazards and Hazardous Materials						
Impact HAZ-1: Construction and operation of campus development under the proposed CPHP could create a significant hazard to the public or the environment through the routine transport, use, or disposal of hazardous materials.	LTSM	- LTS	- LTSM	- LTSM	-/= LTSM	-/+ LTSM

SUM Significant and Unavoidable with Mitigation
LTSM Less than Significant with Mitigation
LTS Less than Significant impact

- \- Lesser impact than that of the proposed CPHP
- = Same (or similar) impact as that of the proposed CPHP
- -/= Less or similar impact to that of the proposed CPHP
- -/+ Less or greater impact as the proposed CPHP
- =/+ Similar or greater impact to that of the proposed CPHP

TABLE 6-3 (CONTINUED)
COMPARISON OF IMPACTS OF THE PROPOSED CPHP AND ALTERNATIVES

Impact	Proposed CPHP	No Project Alternative		Alternative 2: Reduced Project	Alternative 3: CPHP including New Hospital - 19-Story Option	Alternative 4: CPHP including New Hospital - Phased Option
		Alternative 1A: No Project - No Development	Alternative 1B: No Project - Development under 2014 LRDP			
4.8 Hazards and Hazardous Materials (cont.)						
Impact HAZ-2: Construction and operation of campus development under the proposed CPHP would not create a significant hazard to the public or the environment through reasonably foreseeable upset and accident conditions involving the release of hazardous materials into the environment.	LTS	- LTS	- LTS	- LTS	-/= LTS	-/+ LTS
Impact HAZ-3: Construction and operation of the proposed CPHP would not emit hazardous emissions or handle hazardous or acutely hazardous materials, substances, or waste within one-quarter mile of an existing or proposed school.	LTS	- LTS	- LTS	- LTS	-/= LTS	-/+ LTS
Impact HAZ-4: Campus development under the proposed CPHP would not be located on a site which is included on a list of hazardous materials sites compiled pursuant to Government Code Section 65962.5. However, previously unknown contamination could be encountered during construction and could have the potential to create a significant hazard to the public or the environment.	LTSM	- LTS	- LTSM	- LTSM	-/= LTSM	-/+ LTSM
Impact C-HAZ-1: Construction and operation of campus development under the proposed CPHP, in conjunction with other cumulative development within the City of San Francisco, would not create a significant hazard to the public or the environment through the routine transport, use, or disposal of hazardous materials or from risk of upset and accident conditions	LTS	- LTS	- LTS	- LTS	-/= LTS	-/+ LTS
4.9 Hydrology and Water Quality						
Impact HYD-1: Construction and operation of campus development under the CPHP would not have the potential to violate water quality standards or waste discharge requirements, or otherwise substantially degrade surface or groundwater quality.	LTS	- LTS	-LTS	- LTS	-/= LTS	-/+ LTS
Impact HYD-2: Construction and operation of the campus development under the CPHP would not substantially alter the existing drainage patterns of the site or area, in a manner that has the potential to result in substantial erosion or siltation on- or off-site; substantially increase the rate or amount of surface runoff in a manner that would result in flooding on or off site; create or contribute runoff water that would exceed the capacity of existing or planned stormwater drainage systems or provide substantial additional sources of polluted runoff; or impede or redirect flow.	LTS	- LTS	- LTS	- LTS	-/= LTS	-/+ LTS

SUM Significant and Unavoidable with Mitigation
LTSM Less than Significant with Mitigation
LTS Less than Significant impact

\- Lesser impact than that of the proposed CPHP
= Same (or similar) impact as that of the proposed CPHP
-/= Less or similar impact to that of the proposed CPHP
-/+ Less or greater impact as the proposed CPHP
=/+ Similar or greater impact to that of the proposed CPHP

TABLE 6-3 (CONTINUED)
COMPARISON OF IMPACTS OF THE PROPOSED CPHP AND ALTERNATIVES

Impact	Proposed CPHP	No Project Alternative: Alternative 1A: No Project - No Development	No Project Alternative: Alternative 1B: No Project - Development under 2014 LRDP	Alternative 2: Reduced Project	Alternative 3: CPHP including New Hospital - 19-Story Option	Alternative 4: CPHP including New Hospital - Phased Option
4.9 Hydrology and Water Quality (cont.)						
Impact C-HYD-1: Construction and operation of campus development under the CPHP, in conjunction with other cumulative development within the City of San Francisco, would not cumulatively violate water quality standards or waste discharge requirements, or otherwise substantially degrade water quality.	LTS	- LTS	- LTS	- LTS	-/= LTS	-/+ LTS
Impact C-HYD-2: Construction and operation of campus development under the CPHP, in conjunction with other cumulative development in the City of San Francisco's CSS, would not have the potential to cumulatively alter the drainage pattern of the site or area, through the addition of impervious surfaces, in a manner which would result in substantial erosion or siltation on or off site; substantially increase the rate or amount of surface runoff in a manner which would result in flooding on or off site; create or contribute runoff water which would exceed the capacity of existing or planned stormwater drainage systems or provide substantial additional sources of polluted runoff; or impede or redirect flow.	LTS	- LTS	- LTS	- LTS	-/= LTS	-/+ LTS
4.10 Land Use and Planning						
Impact LU-1: Implementation of the CPHP would not cause a significant environmental impact due to a conflict with land use plans, policies and regulations adopted for the purpose of avoiding or mitigating an environmental effect.	LTS	- LTS	- LTS	- LTS	-/= LTS	- LTS
Impact LU-2: Development under the proposed CPHP would not conflict with local land use regulations such that a significant incompatibility with adjacent land uses is created.	LTS	- LTS	- LTS	- LTS	-/= LTS	- LTS
Impact C-LU-1: The proposed CPHP, in combination with past, present, and reasonably foreseeable future projects, would not result in a conflict with land use plans, policies, and regulations adopted for the purpose of avoiding or mitigating an environmental effect or a conflict with local land use regulations such that a significant incompatibility with adjacent land uses is created.	LTS	- LTS	- LTS	- LTS	-/= LTS	- LTS
4.11 Noise and Vibration						
Impact NOI-1: Construction activities under the CPHP would generate a substantial temporary increase in ambient noise levels in the vicinity of the construction project in excess of standards established in the local general plan or noise ordinance, or applicable standards of other agencies.	SUM	- LTS	SUM	- SUM	-/= SUM	-/+ SUM

SUM Significant and Unavoidable with Mitigation
LTSM Less than Significant with Mitigation
LTS Less than Significant impact

- \- Lesser impact than that of the proposed CPHP
- = Same (or similar) impact as that of the proposed CPHP
- -/= Less or similar impact to that of the proposed CPHP
- -/+ Less or greater impact as the proposed CPHP
- =/+ Similar or greater impact to that of the proposed CPHP

TABLE 6-3 (CONTINUED)
COMPARISON OF IMPACTS OF THE PROPOSED CPHP AND ALTERNATIVES

Impact	Proposed CPHP	No Project Alternative		Alternative 2: Reduced Project	Alternative 3: CPHP including New Hospital - 19-Story Option	Alternative 4: CPHP including New Hospital - Phased Option
		Alternative 1A: No Project - No Development	Alternative 1B: No Project - Development under 2014 LRDP			
4.11 Noise and Vibration (cont.)						
Impact NOI-2: Implementation of the CPHP would generate substantial permanent increases in ambient noise levels in the vicinity of the project in excess of standards established in the local general plan or noise ordinance, or applicable standards of other agencies.	LTSM	- LTS	-LTSM	- LTSM	-/= LTSM	= LTSM
Impact NOI-3: Construction activities under the CPHP could result in generation of excessive groundborne vibration or groundborne noise levels.	LTSM	- LTS	-LTSM	- LTSM	-/= LTSM	-/+ LTSM
Impact NOI-4: Implementation of the CPHP would not exceed an LRDP EIR operational standard of significance by contributing to an increase in average daily noise levels (L_{dn}) of 3 dB(A) or more at property lines, where ambient noise levels already exceed local noise levels set forth in local general plans or ordinances for such areas based on their use.	LTS	- LTS	-LTS	- LTS	= LTS	= LTS
Impact C-NOI-1: Implementation of the CPHP, combined with cumulative construction noise in the project area, would generate a substantial temporary increase in ambient noise levels from construction activity in the vicinity of the project in excess of standards established in the local general plan or noise ordinance, or applicable standards of other agencies.	SUM	- LTS	SUM	- SUM	-/= SUM	-/+ SUM
Impact C-NOI-2: Implementation of the CPHP, combined with cumulative development in the project area, would generate substantial permanent increases in ambient noise levels in the vicinity of the project in excess of standards established in the local general plan or noise ordinance, or applicable standards of other agencies.	LTSM	- LTS	-LTSM	- LTSM	= LTSM	= LTSM
Impact C-NOI-3: Implementation of the CPHP, combined with cumulative construction in the project area, would result in generation of excessive groundborne vibration or groundborne noise levels.	LTSM	- LTS	-LTSM	- LTSM	-/= LTSM	-/+ LTSM
Impact C-NOI-4: Implementation of the CPHP combined with cumulative development in the project area could exceed an LRDP EIR operational standard of significance by contributing to an increase in average daily noise levels (L_{dn}) of 3 dB(A) or more at property lines, if ambient noise levels in areas adjacent to proposed development already exceed local noise levels set forth in local general plans or ordinances for such areas based on their use.	LTS	- LTS	-LTS	- LTS	= LTS	= LTS

SUM Significant and Unavoidable with Mitigation
LTSM Less than Significant with Mitigation
LTS Less than Significant impact

- Lesser impact than that of the proposed CPHP
= Same (or similar) impact as that of the proposed CPHP
-/= Less or similar impact to that of the proposed CPHP
-/+ Less or greater impact as the proposed CPHP
=/+ Similar or greater impact to that of the proposed CPHP

TABLE 6-3 (CONTINUED)
COMPARISON OF IMPACTS OF THE PROPOSED CPHP AND ALTERNATIVES

Impact	Proposed CPHP	No Project Alternative		Alternative 2: Reduced Project	Alternative 3: CPHP including New Hospital - 19-Story Option	Alternative 4: CPHP including New Hospital - Phased Option
		Alternative 1A: No Project - No Development	Alternative 1B: No Project - Development under 2014 LRDP			
4.12 Population and Housing						
Impact POP-1: Implementation of the CPHP would induce population growth in the San Francisco Bay area, which could create demand for housing outside the market area.	LTS	-- LTS	- LTS	- LTS	= LTS	= LTS
Impact POP-2: Implementation of the CPHP would not displace substantial numbers of existing people or housing, necessitating the construction of replacement housing elsewhere	LTS	- LTS	- LTS	- LTS	= LTS	= LTS
Impact C-POP-1: The CPHP, in combination with past, present, and reasonably foreseeable future projects, would not result in a cumulatively considerable contribution to significant cumulative population and housing impacts.	LTS	- LTS	- LTS	- LTS	= LTS	= LTS
4.13 Public Services						
Impact PUB-1: Implementation of the CPHP would not result in substantial adverse physical impacts associated with the provision of new or physically altered fire protection facilities, need for new or physically altered fire protection facilities, the construction of which could cause significant environmental impacts, in order to maintain acceptable service ratios, response times or other performance objectives.	LTS	- LTS	- LTS	- LTS	= LTS	= LTS
Impact PUB-2: Implementation of the CPHP would not result in substantial adverse physical impacts associated with the provision of new or physically altered public school facilities, need for new or physically altered public school facilities, the construction of which could cause significant environmental impacts, in order to maintain acceptable service ratios, response times or other performance objectives.	LTS	- LTS	- LTS	- LTS	= LTS	= LTS
Impact C-PUB-1: The CPHP, in combination with past, present, and reasonably foreseeable future projects, would not result in substantial adverse physical impacts associated with the provision of new or physically altered public facilities, need for new or physically altered public facilities, the construction of which could cause significant environmental impacts, in order to maintain acceptable service ratios, response times or other performance objectives.	LTS	- LTS	- LTS	- LTS	= LTS	= LTS

SUM Significant and Unavoidable with Mitigation
LTSM Less than Significant with Mitigation
LTS Less than Significant impact

- \- Lesser impact than that of the proposed CPHP
- = Same (or similar) impact as that of the proposed CPHP
- -/= Less or similar impact to that of the proposed CPHP
- -/+ Less or greater impact as the proposed CPHP
- =/+ Similar or greater impact to that of the proposed CPHP

TABLE 6-3 (CONTINUED)
COMPARISON OF IMPACTS OF THE PROPOSED CPHP AND ALTERNATIVES

Impact	Proposed CPHP	No Project Alternative		Alternative 2: Reduced Project	Alternative 3: CPHP including New Hospital - 19-Story Option	Alternative 4: CPHP including New Hospital - Phased Option
		Alternative 1A: No Project - No Development	Alternative 1B: No Project - Development under 2014 LRDP			
4.14 Recreation						
Impact REC-1: Implementation of the CPHP would not increase the use of existing neighborhood and regional parks or other existing on- and off-campus recreational facilities such that substantial physical deterioration of the facility would occur or be accelerated.	LTS	- LTS	- LTS	- LTS	= LTS	= LTS
Impact REC-2: The CPHP includes new recreational facilities, the construction of which would not have an adverse impact on the environment with mitigation.	LTS	- LTS	-LTS	- LTS	= LTS	= LTS
Impact C-REC-1: The CPHP, in combination with past, present, and reasonably foreseeable future projects, would not increase the use of existing neighborhood and regional parks or other recreational facilities such that substantial physical deterioration of the facility would occur or be accelerated.	LTS	- LTS	- LTS	- LTS	= LTS	= LTS
4.15 Transportation and Traffic						
Impact TRANS-1: Implementation of the CPHP would not conflict with a program, plan, ordinance or policy addressing the circulation system, including transit, roadway, bicycle and pedestrian facilities.	LTS	- LTS	- LTS	- LTS	= LTS	= LTS
Impact TRANS-2: Implementation of the CPHP would not conflict or be inconsistent with CEQA Guidelines Section 15064.3, subdivision (b).	LTS	- LTS	- LTS	- LTS	= LTS	= LTS
Impact TRANS-3: Implementation of the CPHP would not substantially increase hazards due to a geometric design feature (e.g., sharp curves or dangerous intersections) or incompatible uses (e.g., farm equipment).	LTS	- LTS	- LTS	- LTS	= LTS	= LTS
Impact TRANS-4: Implementation of the CPHP would not result in inadequate emergency access.	LTS	- LTS	- LTS	- LTS	= LTS	= LTS
Impact TRANS-5: Construction activities under the CPHP could temporarily impact travel conditions along sidewalks and roadways serving the campus site.	LTSM	- LTS	- LTSM	- LTSM	-/= LTSM	= LTSM
Impact C-TRANS-1: The CPHP, in combination with past, present, and reasonably foreseeable future projects, would not result in a cumulatively considerable contribution to significant transportation impacts.	LTS	- LTS	- LTS	- LTS	= LTS	= LTS

SUM Significant and Unavoidable with Mitigation
LTSM Less than Significant with Mitigation
LTS Less than Significant impact

\- Lesser impact than that of the proposed CPHP
= Same (or similar) impact as that of the proposed CPHP
-/= Less or similar impact to that of the proposed CPHP
-/+ Less or greater impact as the proposed CPHP
=/+ Similar or greater impact to that of the proposed CPHP

TABLE 6-3 (CONTINUED)
COMPARISON OF IMPACTS OF THE PROPOSED CPHP AND ALTERNATIVES

Impact	Proposed CPHP	No Project Alternative		Alternative 2: Reduced Project	Alternative 3: CPHP including New Hospital - 19-Story Option	Alternative 4: CPHP including New Hospital - Phased Option
		Alternative 1A: No Project - No Development	Alternative 1B: No Project - Development under 2014 LRDP			
4.16 Utilities and Service Systems						
Impact UTIL-1: Implementation of the proposed CPHP would require or result in the construction of new or expanded water, wastewater treatment or storm water drainage, electric power, natural gas, or telecommunications facilities, the construction or relocation of which could cause significant environmental effects.	LTS	- LTS	- LTS	- LTS	= LTS	-/+ LTS
Impact UTIL-2: Sufficient water supply would be available from existing entitlements and resources to serve development under the proposed CPHP under normal, dry and multi-dry years if the Bay Delta Plan Amendment is implemented. If the Bay Delta Plan Amendment is implemented, the SFPUC may address the shortfalls through rationing and/or develop new or expanded water supply facilities to address shortfalls in single and multiple dry years. The CPHP would not make a considerable contribution to impacts from increased rationing or from the development of new supply sources.	LTS	- LTS	- LTS	- LTS	= LTS	- LTS
Impact UTIL-3: The wastewater treatment provider would have adequate wastewater treatment capacity to serve campus development under the proposed CPHP.	LTS	- LTS	- LTS	- LTS	= LTS	- LTS
Impact UTIL-4: Construction of campus development under the proposed CPHP would not generate solid waste in excess of State or local standards or the capacity of local infrastructure and would comply with federal, state and local statutes and regulations related to solid waste.	LTS	- LTS	- LTS	- LTS	= LTS	-/+ LTS
Impact UTIL-5: Operation of campus development under the proposed CPHP would not generate solid waste in excess of State or local standards or the capacity of local infrastructure and would comply with federal, State and local statutes and regulations related to solid waste.	LTS	- LTS	- LTS	- LTS	= LTS	= LTS
Impact C-UTIL-1: Development under the proposed CPHP, in combination with past, present, and reasonably foreseeable future projects in the vicinity of the Parnassus Heights campus site, would not substantially contribute to cumulative impacts related to utilities and services systems.	LTS	- LTS	- LTS	- LTS	= LTS	= LTS

SOURCE: Environmental Science Associates

SUM	Significant and Unavoidable with Mitigation	-	Lesser impact than that of the proposed CPHP
LTSM	Less than Significant with Mitigation	=	Same (or similar) impact as that of the proposed CPHP
LTS	Less than Significant impact	-/=	Less or similar impact to that of the proposed CPHP
		-/+	Less or greater impact as the proposed CPHP
		=/+	Similar or greater impact to that of the proposed CPHP

6.6 Environmentally Superior Alternative

Section 15126.6(e)(2) of the CEQA Guidelines requires the identification of an environmentally superior alternative to the proposed project. If the environmentally superior alternative is the "no project" alternative, the EIR shall also identify an environmentally superior alternative among the other alternatives.

6.6.1 Alternative 1A: No Project - No Development Alternative

From the alternatives evaluated in this EIR, the environmentally superior alternative would be the No Project - No Development Alternative. The No Project - No Development Alternative would not involve new demolition and construction at the campus site related to remaining authorized demolition/construction projects not yet implemented under the 2014 LRDP; or associated with the proposed CPHP. Furthermore, under No Project - No Development Alternative, there would be no increase in authorized operational development at the campus site related to instructional, research, clinical, housing and support uses over existing conditions, and consequently, no increase in population. Since no New Hospital would be developed under this alternative, it would also avoid potential encroachment into the Reserve that could be associated with the New Hospital under the proposed CPHP.

As such, the No Project - No Development Alternative would have substantially less overall environmental impacts that either the proposed CPHP and/or the other alternatives. The No Project - No Development Alternative would eliminate the nine significant and unavoidable Project and/or cumulative CPHP impacts: Impacts AES-and C-AES-3 (project and cumulative wind hazards); Impacts AIR-2 and C-AIR-1 (project and cumulative increases in operational criteria air pollutants); Impact CUL-1 (effects on known historical resources), Impact CUL-2 (effects on potential future historical resources), and Impact C-CUL-1 (cumulative effects on historical resources); and Impact NOI-1 and C-NOI-1 (project and cumulative construction noise effects).

The No Project - No Development Alternative would also avoid 24 other significant but mitigable impacts that would occur under the CPHP, including impacts related to operational lighting, generation of construction emissions; exposure to construction- and operational-related toxic air contaminant emissions, conflict with the 2017 Clean Air Plan, potential impacts to special-status species during construction; potential for increased bird strikes from new building development; potential to disturb unknown archaeological and tribal resources, human remains and/or paleontological resources during construction excavation; landslides; generation of GHG emissions; potentially encountering naturally occurring asbestos or contaminated soils during construction excavation; construction vibration effects; and construction traffic effects.

However, as discussed above under Section 6.3.1, this alternative is impractical because it would not provide for implementation of any remaining but unbuilt authorized development under the 2014 LRDP, or for implementation of the development program proposed under the CPHP, or accommodate associated revisions to campus site functional zones, space program, estimated population, and update to the UCSF Greenhouse Gas Reduction Strategy. Consequently, this alternative would not achieve any of the CPHP objectives. As such, this alternative is considered both unrealistic and infeasible. While comparatively more practical, Alternative 1B: No Project – Development under the 2014 LRDP would also not accomplish the CPHP objectives.

6.6.2 Reduced Project Alternative

Of the remaining alternatives that are not the no project alternative: (i.e., Reduced Project, CPHP including New Hospital - 19-Story Option, and CPHP including New Hospital - Phased Option), Alternative 2: the Reduced Project Alternative is considered the environmentally superior alternative. Among the three build alternatives, the Reduced Project Alternative would involve the least amount of demolition and construction; would involve the smallest increase in new campus site development and population over existing conditions; would include a shorter New Hospital (a reduction of 4 stories and about 82 feet) on a smaller footprint than that proposed under the CPHP; would provide historic preservation of five architecturally significant buildings on the campus site; and would avoid potential encroachment into the Reserve by the New Hospital.

While the Reduced Project Alternative would not fully avoid any of the nine significant and unavoidable impacts of the proposed CPHP (nor would the CPHP including New Hospital – 19-Story Option or CPHP including New Hospital - Phased Option alternatives), on balance, this alternative would serve to reduce the severity of the CPHP's environmental impacts more than the other two alternatives:

- With respect to wind, the smaller footprint and reduced height of the New Hospital under this alternative could result in incrementally lower wind speeds east of New Hospital and along Parnassus Avenue near the New Hospital. Retaining of UC Hall, the Dental Clinics building, and the School of Nursing building would reduce the potential for new wind hazards in the west side of the campus core.
- With respect to operational increases in criteria air pollutants, since this alternative would result in approximately 25 percent less increase in development, and less associated population and traffic increases, at the campus site compared to the CPHP, it would have less operational emissions of criteria pollutants than would occur under the CPHP.
- With respect to historical resources, since this alternative would provide historic preservation of five architecturally significant buildings on the campus site (UC Hall, Dental Clinics building; and Aldea San Miguel Housing Buildings 8, 10, and 12), it would avoid the significant and unavoidable impact to these historical resources that would occur under the CPHP; and because there would be no potential encroachment into the Reserve by the New Hospital (although the widening of Medical Center Way may still encroach), it would alter less of this historical cultural landscape than the CPHP.
- With respect to construction noise; with its smaller development program, this alternative would have less new construction and demolition activities as that proposed under the CPHP, and consequently less construction noise effects.

The Reduced Project Alternative would also serve to incrementally reduce the severity of 24 other significant but mitigable impacts that would occur under the CPHP, including impacts related to operational lighting, generation of construction emissions; exposure to construction- and operational-related toxic air contaminant emissions, conflict with the 2017 Clean Air Plan, potential impacts to special-status species during construction; potential for increased bird strikes from new building development; potential to disturb unknown archaeological and/or tribal resources, human remains and paleontological resources during construction excavation; landslides; generation of GHG emissions; potentially encountering naturally occurring asbestos or contaminated soils during construction excavation; construction vibration effects; and construction traffic effects.

However, this alternative would fail to fully achieve certain Project objectives, and in particular, would not fully meet the CPHP project objectives, for space, urban design and mobility, or for the New Hospital, RAB or Aldea Housing Densification.

This page intentionally left blank

CHAPTER 7
Report Preparation

7.1 Report Authors

7.1.1 Lead Agency

The Regents of the University of California

Sam Hawgood, MBBS, Chancellor
University of California, San Francisco

7.1.2 Authors

University of California, San Francisco

Paul Jenny, Senior Vice Chancellor, Finance and Administration
Brian Newman, Senior Associate Vice Chancellor, UCSF Real Estate
Alicia Murasaki, Assistant Vice Chancellor, Campus Planning
Kevin Beauchamp, Director, Physical Planning
Diane Wong, Principal Planner/Environmental Coordinator, Physical Planning
Paul Franke, Principal Planner, Physical Planning
Tammy Chan, Senior Planner, Physical Planning

University of California, Office of the President

Brian Harrington, Associate Director, Physical and Environmental Planning
Ha Ly, Planning Specialist 2, Physical and Environmental Planning

University of California, Office of General Counsel

Anagha Clifford, Senior Counsel

Legal Counsel

Charles Olson, Esq., Lubin, Olson & Niewiadomski

7.1.3 Lead Agency Consultants

Wind

Cermak Peterka Peterson (CPP)

John Carter, Vice President
Christian Rohr, CFD Manager
Philippe Gomme, Engineer
Kenneth Fung, Engineer

7.1.4 Environmental Consultants

Environmental Science Associates

Hillary Gitelman, Project Director
Paul Mitchell, Project Manager
Paul Stephenson, AICP, Deputy Project Manager
Cory Barringhaus
Lisa Bautista
Brandon Carroll
Jeff Caton
Natasha Eulberg
Matt Fagundes
Amber Grady
Heidi Koenig
Karl Heisler
Johanna Kahn
Jessica O’Dell
Jennifer Ostner
Sarah Patterson
Brian Pittman
Chris Sanchez
Eric Schniewind
Brian Schuster
Elliot Schwimmer
Steve Smith
Michael Stewart
Alexandra Sung-Jereczek
Ron Teitel

Transportation

Adavant Consulting

José Farrán, PE

Fehr & Peers Transportation Consultants

Eric Womeldorff, PE
Eleanor Leshner

Strategic Consulting

Barati Consulting

Shabnam Barati

Visual Simulations and Shadow

Prevision Design

Adam Phillips

Water Supply Evaluation

West Yost Associates

Elizabeth Drayer, PE
Jim Connell, PE

Health Impacts Evaluation

Ramboll

Michaell Keinath, PE
Taylor Vencill, MS, PE

This page intentionally left blank

Appendix A
Initial Study and Notice of Preparation

University of California
San Francisco

Campus Planning

Real Estate

UCSF Box 0286
654 Minnesota Street, 2nd Floor
San Francisco, CA 94143

tel: 415.476.2911

Alicia Murasaki
Assistant Vice Chancellor

Alicia.Murasaki@ucsf.edu
www.ucsf.edu

January 14, 2020

Notice of Preparation of Environmental Impact Report and Initial Study
Notice of a Public Scoping Meeting

Project:	UCSF Comprehensive Parnassus Heights Plan
Location:	UCSF Parnassus Heights campus site
Block/Lot:	2634A/011 & 005; 1849/054; 1850/001; 1758/043; 1757/035; 1756/001; 1275A/030
Sponsor:	University of California, San Francisco (UCSF)
Lead Agency:	The Regents of the University of California
Staff Contact:	Diane Wong, UCSF (415) 502-5952

This is the Notice of Preparation (NOP) of an Environmental Impact Report (EIR) and Initial Study for the above-named project. This document is available at http://campusplanning.ucsf.edu/ for a 31-day public review and comment period beginning **January 14, 2020 through February 14, 2020**.

Project Description

The University of California, San Francisco (UCSF) is proposing the Comprehensive Parnassus Heights Plan (CPHP), a conceptual, flexible plan to meet projected space needs for critical programs in research, patient care, and education at the UCSF Parnassus Heights campus site while improving upon the aesthetic and functional design of the campus environment. The Plan also includes opportunities for development of much-needed on-campus housing. While the Plan guides physical development necessary to achieve the University's mission based on projected growth, it is not a commitment for growth or specific projects. It establishes a long-term development framework for the revitalization of the physical environment at Parnassus Heights, by identifying the following:

- Opportunity sites for new buildings and major renovations of existing buildings;
- Candidate buildings for demolition;
- Opportunities for development of open spaces; and
- Opportunities for improvements to on-campus mobility and circulation.

The CPHP includes an Initial Phase that primarily comprises: 1) Irving Street Arrival improvements, 2) Research and Academic Building (RAB), 3) initial Aldea Housing Densification, and 4) New Hospital; as well as other Initial Phase activities. This phase is anticipated to be completed by approximately year 2030. Beyond the Initial Phase, the "Future Phase" encompasses the remaining development described in the CPHP envisioned for completion by the horizon year of 2050.

In total, the CPHP provides for development of approximately 2.9 million gsf of new building space at Parnassus Heights. When accounting for existing campus site development (approximately 3.9 million gsf); demolition that was approved under the

(continued on next page)

2014 Long Range Development Plan (LRDP) but yet not implemented; and potential additional building demolition that would occur under the CPHP, the total amount of campus space upon full implementation of the CPHP would be approximately 6.0 million gsf, including instruction, research, clinical, and support space; housing; and structured parking. The CPHP is available at: https://ucsf.app.box.com/v/parnassusplan

Because the CPHP proposes to modify the Parnassus Heights development plans identified in the 2014 LRDP, an amendment of the 2014 LRDP is proposed.

For purposes of the California Environmental Quality Act (CEQA), the University of California is lead agency.

This project may have a significant effect on the environment and an Environmental Impact Report is required. This determination is based upon the criteria of the State CEQA Guidelines, Sections 15063 (Initial Study), 15064 (Determining Significant Effect), and 15065 (Mandatory Findings of Significance), and for the reasons documented in the Initial Study for the project.

Public Review and Comment

As indicated above, the NOP/Initial Study is available at http://campusplanning.ucsf.edu/ for a 31-day public review and comment period beginning **January 14, 2020 through February 14, 2020.**

To give written feedback on the NOP/Initial Study, comments should be sent to the attention of Ms. Diane Wong at the address noted below, or submitted via email to the following address: **EIR@planning.ucsf.edu**. All comments must be received no later than **February 14, 2020**.

If you would like a paper copy of the NOP/Initial Study, please call the UCSF Campus Planning office at 415-476-2911.

Paper copies of the NOP/Initial Study will also be available for viewing at the UCSF Library at 530 Parnassus Avenue, and the following public library branches: San Francisco Main Branch, 100 Larkin Street; Sunset Branch, 1305 18th Avenue; and the Park Branch, 1833 Page Street.

UCSF will hold a public EIR scoping meeting on Monday, February 10, 2020. The meeting will be held at the Parnassus Heights campus site at Millberry Union, 500 Parnassus Avenue, beginning at 6:30 PM.

The EIR scoping meeting provides an opportunity for the community to provide verbal feedback on the Initial Study. This allows UCSF to learn about potential concerns early, as well as further define the issues, feasible alternatives, and potential mitigation measures that may warrant in-depth analysis in the environmental review process.

Submit comments on the Initial Study and EIR scoping to:
Diane Wong, Environmental Coordinator
UCSF Campus Planning
654 Minnesota Street
San Francisco, CA 94143-0286
EIR@planning.ucsf.edu

UCSF
University of California
San Francisco

INITIAL STUDY

University of California, San Francisco
Comprehensive Parnassus Heights Plan

Lead Agency: University of California

January 2020

UCSF COMPREHENSIVE PARNASSUS HEIGHTS PLAN

Initial Study

Prepared for
UCSF Campus Planning

January 14, 2020

D190291.00

TABLE OF CONTENTS

UCSF Comprehensive Parnassus Heights Plan Initial Study

List of Figures

This page intentionally left blank

UCSF COMPREHENSIVE PARNASSUS HEIGHTS PLAN

Initial Study

1. Project Information

1. Project Title:	UCSF Comprehensive Parnassus Heights Plan
2. Lead Agency Name and Address:	The Regents of the University of California 1111 Franklin Street, 12th Floor Oakland, California 94607
3. Contact Person and Phone Number:	Diane Wong Principal Planner/Environmental Coordinator UCSF Real Estate - Campus Planning (415) 502-5952 diane.wong@ucsf.edu
4. Project Location:	UCSF Parnassus Heights Campus Site
5. Project Sponsor's Name and Address:	See contact person listed above.
6. Custodian of the Administrative Record for this Project:	Same as above.

7. Description of Project:

See Section 2, Project Description, below.

8. Surrounding Land Uses and Setting:

See Section 2, Project Description, below.

9. Other public agencies whose approval is required (e.g., permits, financing approval, or participation agreement.)**:**

See Section 2, Project Description, below.

10. Have California Native American tribes traditionally and culturally affiliated with the project area requested consultation pursuant to Public Resources Code section 21080.3.1? If so, is there a plan for consultation that includes, for example, the determination of significance of impacts to tribal cultural resources, procedures regarding confidentiality, etc.?

On September 9, 2019, UCSF sent notification letters of UCSF's proposal to undertake the CPHP to the applicable representatives for the Amah Mutsun Tribal Band of Mission

San Juan Bautista; Coastanoan Rumsen Carmel Tribe; Ohlone Indian Tribe; Indian Canyon Mutsun Band of Costanoan; Torres Martinez Desert Cahuilla Indians; and Muwekma Ohlone Indian Tribe of the San Francisco Bay Area. No responses to the notification letters were received from the tribes within the 30-day response period, consistent with the requirements of Public Resources Code section 21080.3.1(d).

2. Project Description

2.1 Introduction

Each campus of the University of California is required to periodically prepare a Long Range Development Plan (LRDP) that sets forth concepts, principles, and plans to guide future growth of that campus. In November 2014, the Regents of the University of California (Regents) adopted the 2014 LRDP for the San Francisco campus, which outlines projected development levels and patterns for UCSF at all of its main campus sites through the year 2035. The 2014 LRDP Final EIR (FEIR) was certified by the Regents in November 2014 and includes, among other things, analysis of the potential environmental impacts from then-envisioned development at the Parnassus Heights campus site.

The Parnassus Heights campus site (Parnassus Heights, or campus site) is the oldest and largest of the UCSF campus sites. The facilities at Parnassus Heights are aging and the site as a whole lacks a cohesive identity. Over the last 20 years, UCSF has invested billions of dollars into acquiring, developing, and supporting its Mission Bay campus site, without commensurate investment in Parnassus Heights. UCSF's investment in Parnassus Heights has not kept pace with its aging facilities or changes in programmatic need, resulting in infrastructure, buildings, and interior spaces that require substantial renewal and investment.

Since the adoption of the 2014 LRDP and certification of the 2014 LRDP FEIR, UCSF undertook a planning process to re-envision and revitalize Parnassus Heights as a whole, to integrate UCSF's clinical, educational, and research missions in ways that promote collaboration and synergies in the UCSF Parnassus Heights campus community. The planning process resulted in the development of the Comprehensive Parnassus Heights Plan (CPHP, or Plan), which provides a long-term development framework for the revitalization of the Parnassus Heights physical environment, and is intended to ensure that a modernized Parnassus Heights enhances UCSF's status as an anchor institution in San Francisco.

The proposed CPHP is subject to review under the California Environmental Quality Act (CEQA). UCSF is serving as the Lead Agency under CEQA for the proposed CPHP. This Initial Study, and forthcoming EIR, respectively, has been and will be prepared in accordance with CEQA to analyze potential environmental impacts that could result from implementing the CPHP. The CPHP EIR will be a program-level EIR that programmatically analyzes the environmental impacts of the CPHP which is envisioned to be completed by horizon year 2050. The CPHP EIR also will provide project-level analyses of specific near-term projects proposed for the initial phase of CPHP implementation that are planned for completion by approximately 2030. This EIR will analyze the CPHP proposals based on the level of information available for each project at the time of preparation of this EIR.

Because the CPHP proposes to modify the Parnassus Heights development plans identified in the 2014 LRDP, an amendment of the 2014 LRDP is proposed.

UCSF has also begun to plan the New Hospital at Parnassus Heights (NHPH or New Hospital) and is projecting the need for a larger hospital than was planned in the 2014 LRDP. The planning, design and construction of a new, world-class hospital at Parnassus Heights would ensure that UCSF can continue to provide premier care to patients in the San Francisco Bay Area and beyond in the 21st century. Although parameters for the New Hospital project (location, size, projected population) are accounted for in the CPHP and will be analyzed at a program level in the Draft EIR, the New Hospital represents a major project for UCSF and many details of the New Hospital are still being developed. Therefore, the New Hospital will be the subject of a subsequent project-specific environmental review separately from the CPHP when more details become available.

2.2 Campus Site Location and Existing Site Characteristics

Figure 1 presents an aerial of the Parnassus Heights campus site location and vicinity. The Parnassus Heights campus site is located in the Inner Sunset mixed-use neighborhood in San Francisco, bounded by Carl and Irving Streets to the north; Third Avenue and Fifth Avenue to the west; and Clarendon Avenue, Christopher Drive, and Crestmont Drive to the south. The campus site's east boundary abuts the Cole Valley neighborhood and the City's Interior Greenbelt Natural Area.

The irregularly-shaped campus site comprises 107 acres. UCSF's facilities are concentrated at the north end of the campus site, where Moffitt and Long Hospitals, four professional schools, clinics, research, housing, parking, and other support uses are located. The 61-acre Mount Sutro Open Space Reserve (Reserve) occupies the central and southern portion of the campus site. The Aldea Housing complex is located in the southeast portion of the campus site adjacent to the Reserve.

The current average daily population at Parnassus Heights is estimated at approximately 17,400 persons, including faculty and staff, students, patients, and visitors. There are currently nearly 7,400 UCSF faculty and staff employed at the campus site. About 580 residents currently reside in UCSF housing at the Parnassus Heights campus site.

2.3 Relationship of CPHP to 2014 LRDP

The 2014 LRDP serves as a comprehensive physical land use plan and policy document to guide the physical development of the San Francisco campus, accommodating future increases in enrollment and academic and research activities at UCSF and meeting its projected educational and research demand. The existing 2014 LRDP accommodates development anticipated to occur by horizon year 2035. The 2014 LRDP contains objectives to guide decisions for future facilities to meet demands and projects the quantities and uses of new building space needed during this time frame.

Because the CPHP proposes to modify the Parnassus Heights development plan identified in the 2014 LRDP, an amendment of the 2014 LRDP is proposed. The proposed LRDP Amendment would revise those portions of the 2014 LRDP pertaining to Parnassus Heights to incorporate concepts and proposals identified in the CPHP. Proposed changes would include revisions to

SOURCE: Google Earth, 2019; ESA, 2019

UCSF Comprehensive Parnassus Heights Plan EIR

Figure 1
Parnassus Heights Campus Site Location and Vicinity

SFO/D190291.00 - UCSF CPHP EIR/2. Graphics/Illustrator functional zones; revisions to the space program, update to estimated population; revisions to existing planning agreements, including revisions to the Regents' Resolution, and an update to the Greenhouse Gas Reduction Strategy.

If the CPHP is approved by the Regents and the 2014 LRDP is amended, the CPHP would become the primary planning document for Parnassus Heights and would be used by UCSF to guide the development of the campus site through the next 30 years, or an approximate horizon year of 2050. Nevertheless, all other UCSF campus sites addressed by the UCSF 2014 LRDP would continue to have an approximate horizon year of 2035.

2.4 CPHP

CPHP Features

The CPHP establishes a long-term development framework for the revitalization of the physical environment at Parnassus Heights, by identifying the following:

- Opportunity sites for new buildings and major renovations of existing buildings;
- Candidate buildings for demolition;
- Opportunities for development of open spaces; and
- Opportunities for improvements to on-campus mobility and circulation.

In total, the CPHP provides for development of approximately 2.9 million gross square feet (gsf) of new building space at Parnassus Heights. When accounting for existing campus site development; demolition that was approved under the 2014 LRDP but yet not implemented, and potential additional building demolition that would occur under the CPHP, the total amount of campus space upon full implementation of the CPHP would be approximately 6.0 million gsf, including instruction, research, clinical, and support space; housing; and structured parking.

The CPHP includes an "Initial Phase" that primarily comprises: 1) Irving Street Arrival improvements, 2) Research and Academic Building (RAB), 3) New Hospital and 4) initial Aldea Housing Densification. The Initial Phase would account for approximately 1.4 million gsf of new building development, and is anticipated to be completed by approximately year 2030. Beyond the Initial Phase, the "Future Phase" encompasses the remaining approximately 1.5 million gsf of new building development described in the CPHP, and is envisioned for completion by the horizon year of 2050.

A program EIR will be prepared for the CPHP that will establish a framework for tiered or project-level environmental documents that would be prepared in accordance with the overall program. Accordingly, the EIR will provide a program-level analysis of the environmental impacts from the development of the entire space program under the CPHP, and identify Plan-level mitigation measures to reduce potential significant effects of the CPHP. In addition, the EIR will include project-level analysis for the following CPHP Initial Phase developments: Irving Street Arrival, RAB, and initial Aldea Housing Densification. The analysis of these Initial Phase development proposals at the project-level is intended to provide sufficient detail permit to permit project approval and implementation following certification of the CPHP Final EIR. The fourth CPHP

Initial Phase project – the proposed New Hospital – will be analyzed at a program level in this EIR, but because it represents a major project for UCSF, it will undergo additional project-level environmental review separately from the CPHP when more details become available. Similarly, when details on CPHP Future Phase projects are known, each Future Phase project would be reviewed in light of the CPHP Final EIR to determine the appropriate level of additional environmental review, if any, needed before approval and implementation of the particular project.

Opportunity Sites for New Development

Opportunities for new development under the CPHP include:

- New construction of clinical, educational, research, and housing facilities on opportunity sites throughout the campus (see **Figure 2**);
- Additional housing development at the Aldea Housing site;
- Open space enhancements throughout the campus, most notably the Millberry Terrace, the expansion of Saunders Court, and the Promenade to the south of the current UC Hall;
- Extension of Fourth Avenue as a campus street between Parnassus Avenue and Kirkham Street;
- Development of a service and utility corridor at the back of the campus to connect Medical Center Way to Koret Way and the proposed extension of Fourth Avenue;
- Public realm improvements, including within the campus core (along Parnassus Avenue generally between Fifth Avenue and Medical Center Way); and
- Development of a bridge across, and tunnel beneath, Parnassus Avenue associated with the New Hospital.

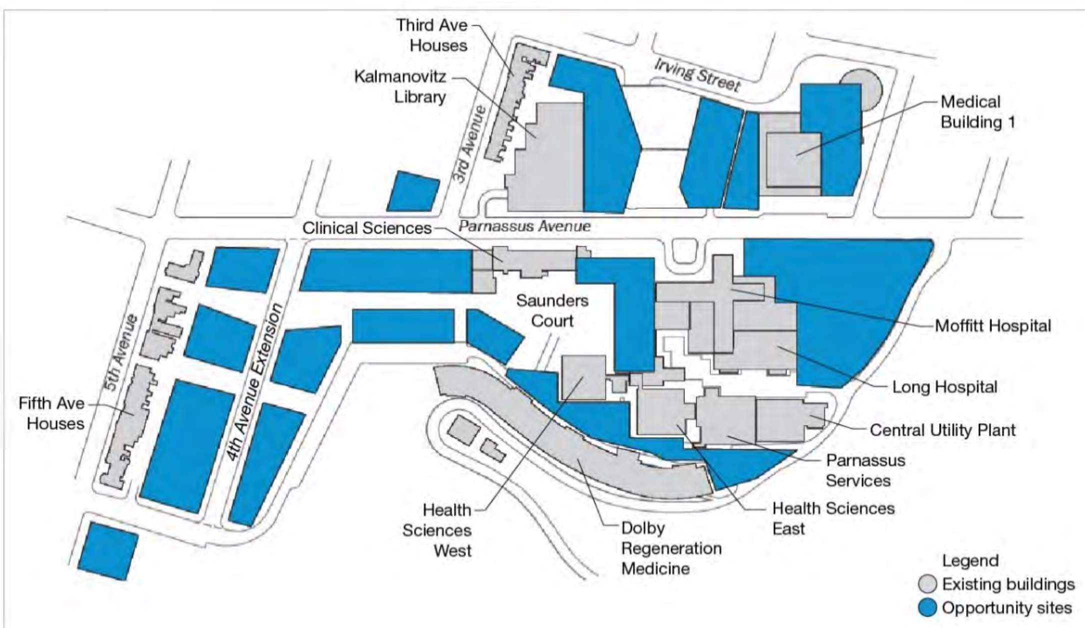


Figure 2
CPHP Opportunity Sites in Campus Core

Redevelopment under the CPHP would entail demolition of structures beyond those identified in the 2014 LRDP, to make way for new buildings (see **Figure 3** for an illustration of potential demolitions within the campus core). Demolitions to occur as part of the CPHP may include UC Hall, Dental Clinics, School of Nursing building, Millberry Union and Garage (either wholly or partially), Lucia Child Care Center, Kirkham Child Care Center, and all of the residential structures of the Aldea Housing complex.

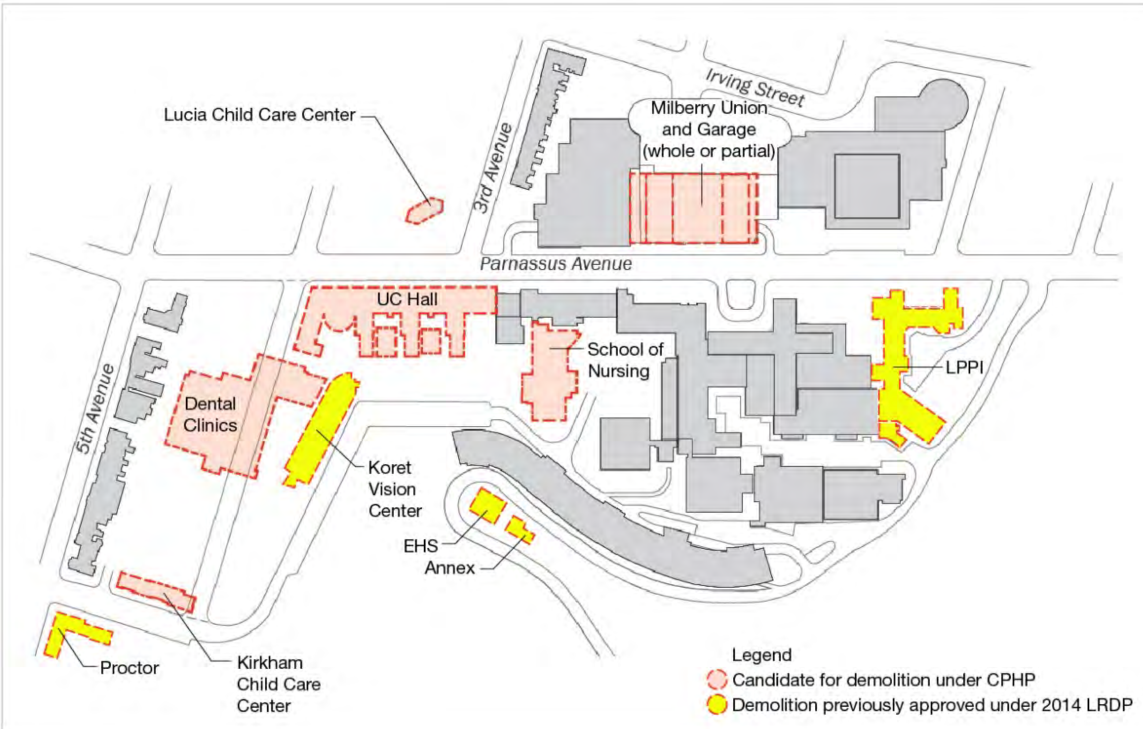


Figure 3
Potential Demolitions in Campus Core

There is the potential for certain new development under the CPHP to result in the need to modify the Reserve boundary. UCSF proposes to replace any area of the Reserve that is lost due to new development under the CPHP by designating new Reserve area elsewhere on the campus site in an amount equal to or greater than that area lost.

CPHP Initial Phase

Figure 4 identifies the location of each of the Initial Phase developments.

Irving Street Arrival

The proposed Irving Street Arrival includes modification of the portion of the existing Medical Building 1 in order to develop a new and/or reconfigured multi-story vertical circulation space to include express elevators or escalators, stairs, and arrival features such as information and orientation areas (the “unified lobby”). The new/modified structure would be about 25,000 gsf, and include an additional two stories on the Irving Street side (increasing to a total of 8 stories and up to 86 feet in height) and an additional two stories on the Parnassus Avenue side (increasing to a total of three stories and up to 45 feet in height). The Irving Street Arrival project would also include replacing the facades or reskinning of the Millberry Union and Medical Building 1 garage structures.

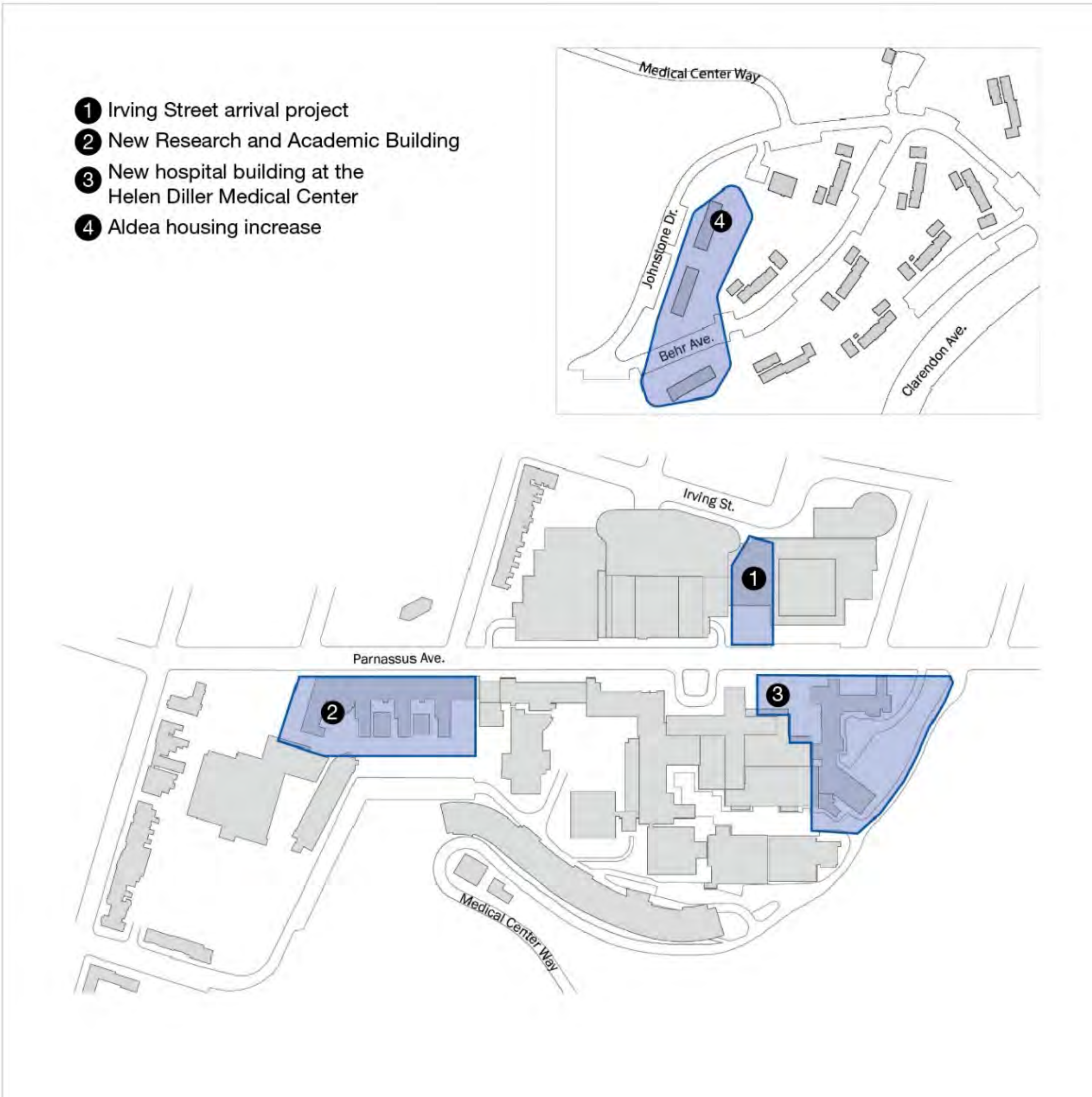


Figure 4
CPHP Initial Phase Projects

Research and Academic Building

The proposed RAB would be located on the current site of UC Hall, following the proposed demolition of this building. UC Hall is potentially eligible for the National Register of Historic Places and the California Register of Historic Resources, although is not currently formally nominated for either register. The School of Nursing building would also be demolished as part of this Initial Phase project.

The proposed RAB would be approximately 270,000 gsf and eight stories tall (up to 130 feet in height), and would contain primarily research and education space. Development of the RAB site could also include components of the CPHP intended to be constructed incrementally that are adjacent to the RAB site, such as a portion of the promenade, the service/utility corridor to the south of the RAB site, and the first increment of Fourth Avenue extension to the west of the RAB site.

New Hospital, and Bridge and Tunnel Across Parnassus Avenue

The proposed New Hospital would be located on the site of LPPI on the south side of Parnassus Avenue between Medical Center Way and Moffitt Hospital. As currently proposed, the New Hospital would be about 955,000 gsf, and 16 stories tall (up to 294 feet in height).[1] The New Hospital would have the capacity for approximately 384 inpatient beds. The portion of Medical Center Way adjacent to the New Hospital site would be widened for fire safety purposes. The widening of Medical Center Way and the New Hospital footprint are projected to result in the need to modify the Reserve boundary. As indicated above, UCSF would replace any area of the Reserve that is lost due to new development under the CPHP by designating new Reserve area elsewhere within the campus site.

To facilitate pedestrian safety, ease of crossing Parnassus Avenue, and patient transport, a pedestrian bridge over Parnassus Avenue is proposed connecting the New Hospital to the Irving Street Arrival. A tunnel beneath Parnassus Avenue connecting the south side of the campus to the north side is also proposed. The tunnel is intended for pedestrians, utility lines, and the movement of goods and materials, to reduce the amount of activity and congestion that occurs on Parnassus Avenue and to provide a safer crossing experience for patients, visitors, employees, and students.

Initial Aldea Housing Densification

The CPHP envisions densification of the Aldea Housing site by demolishing the existing student housing structures, and constructing student housing in new buildings, in the approximate location of existing building foundations. In this initial phase, the three existing 3-story 1960s-era housing structures (individually eligible for the CRHR and NRHP) at Aldea would be replaced with three 8-story housing structures (up to 96 feet in height) and one 5-story housing structure (up to 60 feet in height), increasing the number of dwelling units by 142 units (i.e., from 42 existing units to a proposed 184 units).

Other Improvements

Utility Improvements

A proposed multi-level service corridor would extend from roughly Medical Center Way to Koret Way and the new extension of Fourth Avenue to facilitate transport of goods and materials for

[1] Excluding potential rooftop design features, observation deck, elevator vestibule and roof top mechanical that would occupy a portion of the roof, and that would consist of about 5% to 7% of the height of the New Hospital. This will be analyzed in more detail in the EIR for the New Hospital. As currently conceived, the majority of mechanical equipment would be contained within various levels of the New Hospital to minimize the amount of equipment located on the roof.

back-of-house functions and to provide easy access to major utility lines serving the campus. Utilities anticipated in the service corridor include steam, chilled water, condensate return pipes, domestic and fire water, electrical and communications. In addition, additional emergency and domestic water storage, and emergency sewer effluent storage, is proposed at the campus site.

In addition, existing utilities in the vicinity of the New Hospital site would be modified or relocated, including at the existing site of the ammonia tank at Parnassus Avenue near Medical Center Way, to enhance functionality of utilities serving the campus site and to improve aesthetics along Parnassus Avenue.

Parnassus Avenue Streetscape Plan

The 2014 LRDP FEIR analyzed the Parnassus Streetscape Plan, a proposal that called for improvements along Parnassus Avenue generally between Fifth Avenue and Medical Center Way. Slight modifications to the Parnassus Avenue Streetscape Plan would be made to conform to new development proposals that front Parnassus Avenue.

Renovation of Existing Buildings

The CPHP identifies opportunity sites for building renovations (i.e., separate from those buildings identified in the CPHP as opportunity sites for demolition and new construction). Opportunity sites for notable renovations include the HSIR Towers and the Medical Sciences Building.

Cushioning Actions

UCSF may voluntarily propose improvements to public streets or other public realm areas that, while not considered mitigation measures under CEQA, may nonetheless improve operations or otherwise enhance conditions at those locations.

CPHP Future Phase

The CPHP Future Phase comprises all remaining development opportunities identified under the CPHP. Potential development includes the following:

Millberry Union New Towers and Terrace

The CPHP envisions redevelopment of Millberry Union by demolishing the existing Millberry Union towers and constructing a larger facility of about 260,000 gsf. The two new towers that would flank a new terrace would be five stories (approximately 64 feet in height) as measured from Parnassus Avenue; and eight stories (up to 86 to 90 feet in height) along Irving Street. The new building could contain clinical, instruction, and research space, as well as campus community space.

It is possible that in order to construct the facility, the existing Millberry Union would need to be demolished in its entirety, depending on the seismic condition of the building, cost, and other factors at the time the proposal is implemented. It is also possible that the Millberry Union garage, upon which Millberry Union sits, would need to be reconstructed in order to support the new structure.

Hotel for Patients and Families

The CPHP envisions the demolition of the existing Lucia Child Care center and the construction of a 48,000 gsf hotel to provide lodging for both patients and families of patients who are staying at the hospital for an extended period. The Plan envisions a building of about three stories and up to 53 feet in height. A nominal amount of parking could be constructed on this site.

New Program Adjacent to RAB

The CPHP identifies opportunities for future development behind the future RAB on a site that is largely vacant except for a small storage and loading area. The CPHP also identifies opportunities for future development to the southwest of the RAB, which would necessitate demolition of the Koret Vision Center building and Dental Clinics building. Future uses in these new spaces, which would total about 582,000 gsf, would include primarily research and academic space. The buildings would range from three to nine stories (up to 45 to 130 feet in height). The existing Faculty Alumni House as well as UCSF-owned housing along the east side of Fifth Avenue would remain.

West Side Housing

The CPHP includes the development of new housing for students and staff to address the pressing need for affordable housing in San Francisco, which has reached crisis levels. Approximately 281,000 gsf of new housing within the West Side district would be located on both sides of the proposed Fourth Avenue extension. Approximately 430 units of housing are proposed. The structures would range from approximately six to ten stories up to 72 to 120 feet in height, and would step down (east to west) along the slope.

Development on the site would require demolition of the Kirkham Child Care center and the West Side Parking Lot. Parking spaces lost from demolition of the West Side Parking Lot and from alterations of the Millberry Union garage would be replaced at the West Side Housing site.

Child Care on Proctor Site

The CPHP envisions that the Proctor building would be demolished and replaced with a new three-story, up to 35-foot tall childcare facility of about 35,000 gsf. An outdoor play area, a nominal amount of on-site parking, and a drop-off area would be included.

Future Phase of Aldea Housing

In the Future Phase, the remaining nine 3-story existing housing structures in the Aldea complex would be replaced with eight 5-story housing structures (up to 60 feet in height), increasing the number of dwelling units in this phase by 190 units). A small daycare center of about 15,000 gsf is also proposed within the complex under the CPHP.

Open Space

The Plan envisions an increase in the amount of usable open space on campus. The most notable of these spaces include the Millberry Terrace, to be located atop the altered or new Millberry Union garage; an expansion of Saunders Court; and the proposed Promenade, to be located to the west of Saunders Court and south of the RAB. The Plan also indicates potential additional pathways leading to the Mount Sutro Open Space Reserve. As part of providing a visual and physical connection to open spaces such as Saunders Court and the Promenade, as well as to the pathways to the Reserve, the façade of the Medical Sciences Building could be altered.

Utilities and Infrastructure

Additional domestic and emergency water, waste wastewater/stormwater, electric and natural gas, heating and chilled water, and/or telecommunications utility improvements would occur throughout the campus site to accommodate Future Phase development, including but not limited to, utility improvements to serve the proposed Future Phase development on the west side of the campus core, and Future Phase Aldea Housing development. In addition, existing utilities in the vicinity of the New Hospital site would be modified or relocated, including at the existing site of the ammonia tank at Parnassus Avenue near Medical Center Way, to enhance functionality of utilities serving the campus site and to improve aesthetics along Parnassus Avenue.

Circulation, Transportation and Parking

As mentioned above, the Plan envisions the extension of Fourth Avenue as a campus street between Parnassus Avenue and Kirkham Street. The extension of Fourth Avenue would serve as the main access point for future new buildings to the west of the proposed RAB, including the new housing structures on the West Side.

2.5 Revisions to the 2014 LRDP

Proposed LRDP Amendment No. 6 would revise those portions of the 2014 LRDP pertaining to Parnassus Heights to incorporate concepts and proposals identified in the CPHP. Proposed changes would include the following:

- Revisions to functional zones
- Revisions to the space program
- Update to estimated population
- Revisions to Regents’ Resolution
- Update to Greenhouse Gas Reduction Strategy

Revised Functional Zones

Each primary campus site identified in the 2014 LRDP includes a functional zone map reflecting the plans for predominant land uses. The functional zone map would be amended to be consistent with the districts proposed in the CPHP.

Revised Space Profile

The LRDP amendment would increase the future buildout space program at Parnassus Heights from the currently approved 3.61 million gsf (excluding housing) in horizon year 2035 to approximately 5.05 million gsf (excluding housing) in horizon year 2050, a net increase of approximately 1.44 million gsf. When compared to the existing (2019) space developed at the campus site (approximately 3.68 million gsf, excluding housing), the proposed LRDP amendment would result in a net increase in the space program by approximately 1.37 million gsf (excluding housing) by 2050.

Updated Population Estimates

The LRDP amendment would result in an increase in the estimated average daily population from approximately 18,500 in horizon year 2035 to about 25,300 in horizon year 2050, a net increase of approximately 6,800. When compared to the existing (2018) average daily population at the campus site (approximately 17,400), the proposed LRDP amendment would result in a net increase in the average daily population by nearly 7,900 by 2050 (approximately 74 percent of which would occur in the Initial Phase).

Revisions to Regents' Resolution

UCSF proposes to ask the Regents to update the Regents' Resolution to:

- Reaffirm continuing commitments, including 1) maintaining the designation of the Mount Sutro Open Space Reserve as permanent open space, potentially including an adjustment to the Reserve boundary while maintaining a minimum of 61 acres in the Reserve; 2) continuing to respect the Parnassus Heights campus boundary established in 1976; and 3) continuing to adhere to the expansion restriction area within which UCSF would not acquire property or lease residential property.
- Increase the space ceiling limit from the current 3.55 million gsf to a proposed 5.05 million gsf, excluding housing (an increase of approximately 1.5 million gsf above the current space ceiling limit) in recognition of the tremendous need for program space in order for UCSF to retain its leadership position in patient care, research, and education.

Update to Greenhouse Gas Reduction Strategy

The 2014 LRDP included a UCSF Greenhouse Gas Reduction Strategy (GHGRS) to ensure that the LRDP is implemented in alignment with UC Sustainable Practices Policy, and to fulfill the GHG reduction requirements of the State of California Assembly Bill 32 (AB 32): the California Global Warming Solutions Act of 2006. Proposed LRDP Amendment No. 6 includes an update to the GHGRS which incorporates emissions generated by CPHP construction and operations.

3. Environmental Factors Potentially Affected

The environmental factors checked below would be potentially affected by this project, involving at least one impact that is a “Potentially Significant Impact” as indicated by the checklist on the following pages.

☒ Aesthetics	☐ Agriculture and Forestry Resources	☒ Air Quality
☒ Biological Resources	☒ Cultural Resources	☒ Energy
☒ Geology/Soils	☒ Greenhouse Gas Emissions	☒ Hazards & Hazardous Materials
☒ Hydrology/Water Quality	☒ Land Use/Planning	☐ Mineral Resources
☒ Noise	☒ Population/Housing	☒ Public Services
☒ Recreation	☒ Transportation	☒ Tribal Cultural Resources
☒ Utilities/Service Systems	☐ Wildfire	☒ Mandatory Findings of Significance

4. Determination

On the basis of this initial study:

☐ I find that the proposed project COULD NOT have a significant effect on the environment, and a NEGATIVE DECLARATION will be prepared.

☐ I find that although the proposed project could have a significant effect on the environment, there will not be a significant effect in this case because revisions in the project have been made by or agreed to by the project proponent. A MITIGATED NEGATIVE DECLARATION will be prepared.

☒ I find that the proposed project MAY have a significant effect on the environment, and an ENVIRONMENTAL IMPACT REPORT is required.

☐ I find that the proposed project MAY have a “potentially significant impact” or “potentially significant unless mitigated” impact on the environment, but at least one effect 1) has been adequately analyzed in an earlier document pursuant to applicable legal standards, and 2) has been addressed by mitigation measures based on the earlier analysis as described on attached sheets. An ENVIRONMENTAL IMPACT REPORT is required, but it must analyze only the effects that remain to be addressed.

☐ I find that although the proposed project could have a significant effect on the environment, because all potentially significant effects (a) have been analyzed adequately in an earlier EIR or NEGATIVE DECLARATION pursuant to applicable standards, and (b) have been avoided or mitigated pursuant to that earlier EIR or NEGATIVE DECLARATION, including revisions or mitigation measures that are imposed upon the proposed project, nothing further is required.

______________________	January 14, 2020
Signature	Date

5. Evaluation of Environmental Effects

Appendix G of the CEQA Guidelines provides a suggested format to use when preparing an Initial Study. The Environmental Checklist used in this document adopts a different format while still addressing the Appendix G checklist questions for each environmental issue area.

The attached Environmental Checklist uses the following response headings to identify potential environmental effects that will be addressed in the CPHP EIR:

1. **Impact to be Analyzed in CPHP EIR:** An effect that may or may not be significant that will be addressed in the CPHP EIR. The effect may be a less-than-significant impact that will be addressed to provide a more comprehensive analysis; an impact for which further analysis is necessary or desirable before a determination about significance can be made; an impact that is potentially significant but may be reduced to a less-than-significant level with the adoption of mitigation measures; or an impact that may be significant and unavoidable. The CPHP EIR will programmatically analyze the environmental impacts of the proposed CPHP which is envisioned to be completed by horizon year 2050. The CPHP EIR will also provide project-level analyses of specific projects proposed for the initial phase of CPHP implementation.

2. **No Additional Analysis Required:** Implementation of the proposed CPHP or a specific project under the initial phase of the CPHP would clearly result in no impact or result in a less-than-significant impact under CEQA criteria, no analysis beyond that provided in this Initial Study is necessary.

The 2014 LRDP FEIR analyzed the impacts of the planned growth and development at the Parnassus Heights campus site under the 2014 LRDP at a program level. It also included a project-level analysis for a number of specific projects, and those projects were approved for implementation at the time the 2014 LRDP was approved.

The CPHP is a revised plan for the Parnassus Heights campus site, and includes a larger development program for the campus site than previously analyzed in the 2014 LRDP FEIR with a longer time horizon under which the envisioned development program would be implemented. The CPHP excludes some of the specific projects that were previously approved in the 2014 LRDP as they will be implemented separately from the CPHP based upon the prior analysis and approval. If approved, the CPHP will replace the 2014 LRDP as the land use planning document for the Parnassus Heights campus site.

This Initial Study, and forthcoming EIR, analyze the potential significant environmental impacts that could result if the CPHP is approved and implemented. The CPHP EIR and its Initial Study will replace in full the program-level analysis for the Parnassus Heights campus site contained in the 2014 LRDP FEIR. As some of the information in the 2014 LRDP FEIR is still relevant and has been used to characterize existing conditions and inform the impact analysis in the CPHP EIR, including applying pertinent 2014 LRDP EIR mitigation measures to the CPHP projects, the 2014 LRDP FEIR is incorporated by reference in this EIR and its Initial Study.

5.1 Aesthetics

Issues (and Supporting Information Sources):		Impact to be Analyzed in CPHP EIR	No Additional Analysis Required
I.	**AESTHETICS —** Except as provided in Public Resources Code Section 21099, would the project:		
a)	Have a substantial adverse effect on a scenic vista?	☒	☐
b)	Substantially damage scenic resources, including, but not limited to, trees, rock outcroppings, and historic buildings within a state scenic highway?	☐	☒
c)	In non-urbanized areas, substantially degrade the existing visual character or quality of public views of the site and its surroundings? (Public views are those that are experienced from publicly accessible vantage point). If the project is in an urbanized area, would the project conflict with applicable zoning and other regulations governing scenic quality?	☒	☐
d)	Create a new source of substantial light or glare which would adversely affect daytime or nighttime views in the area?	☒	☐
e)	Create new shadow that substantially and adversely affects the use and enjoyment of publicly accessible open spaces?	☒	☐
f)	Create wind hazards in publicly accessible areas of substantial pedestrian use?	☒	☐

Discussion

a) As described in Section 2, *Project Description*, the Initial Phase projects contemplated under the proposed CPHP would range from three to eight stories (up to 45 to 130 feet) in height, with the exception of the New Hospital, which would be 16 stories (up to 294 feet in height). Future Phase projects would range in height from three to ten stories (up to 35 to 130 feet in height). Given the heights of the proposed structures, the prominent location of the Parnassus Heights campus core on the north-facing slope of Mount Sutro, and the location of the Aldea Housing area on the south-facing slope of Mount Sutro, development under the proposed CPHP would be visible from a number of distant public view locations. As a result, the CPHP EIR will consider the potential effects of the proposed development on scenic vistas.

b) There are no state-designated scenic highways in the vicinity of the Parnassus Heights campus site. Therefore, no further study of the effects of CPHP implementation on scenic resources within a state scenic highway is necessary, and this topic will not be analyzed in the CPHP EIR.

c) The location, height, and massing of the structures and other development contemplated under the proposed CPHP would alter the visual character of the Parnassus Heights campus site. For this reason, the potential effects of the proposed CPHP on the existing visual character and quality of the campus site and its surroundings will be evaluated in the CPHP EIR.

d) The Parnassus Heights campus core is densely developed with multiple structures and is located in an urban environment characterized by high level of ambient nighttime illumination. Development under the proposed CPHP would increase the amount of nighttime illumination on the campus site and vicinity. In addition, building roofs, windows and other exterior building features and materials would have the potential to include reflective surfaces and increase glare under the proposed CPHP. As a result, the CPHP EIR will consider the potential effects of light and glare from new development.

e) The proposed CPHP would increase overall development at the Parnassus Heights campus site and consequently, would have the potential to create new shadows. Public open spaces under the control of the San Francisco Recreation and Park Department (RPD) are protected by the City's Sunlight Ordinance (Section 295 of the Planning Code). Section 295 prohibits the issuance of building permits for structures or additions to structures greater than 40 feet in height that would shade property under the jurisdiction of or designated to be acquired by the Recreation and Park Commission, during the period from one hour after sunrise to one hour before sunset. Pursuant to the University of California's constitutional autonomy, development and uses on property under the control of the University that are used in furtherance of the University's educational purposes are not subject to local land use regulation, including City of San Francisco Planning Code. Although UCSF is not subject to local standards, UCSF will strive to be consistent with the standards, where feasible.

The nearest public open spaces under control of the San Francisco RPD to the Parnassus Heights campus site are Golden Gate Park, located one block (approximately 400 feet) to the north of the campus site, Richard Gamble Memorial Park, located about five blocks or 2,000 feet to the northeast of the campus site, Grattan Playground, located approximately 1,000 feet to the east of the campus site, and the Interior Greenbelt, located adjacent to the campus site, east of the Reserve. Due in part to the height of the Parnassus Heights campus site relative to surrounding development, new development under the proposed CPHP, including the New Hospital, would cast shadow on nearby public open spaces. In addition, development under the proposed CPHP, including the New Hospital, would cast shadow on the Reserve, which is also open to the public, but not subject to the jurisdiction of RPD. Therefore, the CPHP EIR will consider the potential effects of shadow on public open space from new development under the CPHP for informational purposes.

f) Building development under the proposed CPHP could create street-level winds that could be detrimental to pedestrians on the Parnassus Heights campus site. For this reason, the CPHP EIR will consider the potential for development under the proposed CPHP to create hazardous street-level winds in publicly accessible areas of substantial pedestrian use within the Parnassus Heights campus site.

5.2 Agriculture and Forestry Resources

Issues (and Supporting Information Sources):		*Impact to be Analyzed in CPHP EIR*	*No Additional Analysis Required*
II.	**AGRICULTURE AND FORESTRY RESOURCES —** In determining whether impacts to agricultural resources are significant environmental effects, lead agencies may refer to the California Agricultural Land Evaluation and Site Assessment Model (1997) prepared by the California Dept. of Conservation as an optional model to use in assessing impacts on agriculture and farmland. In determining whether impacts to forest resources, including timberland, are significant environmental effects, lead agencies may refer to information compiled by the California Department of Forestry and Fire Protection regarding the state's inventory of forest land, including the Forest and Range Assessment Project and the Forest Legacy Assessment project; and forest carbon measurement methodology provided in Forest Protocols adopted by the California Air Resources Board. Would the project:		
a)	Convert Prime Farmland, Unique Farmland, or Farmland of Statewide Importance (Farmland), as shown on the maps prepared pursuant to the Farmland Mapping and Monitoring Program of the California Resources Agency, to non-agricultural use?	☐	☒
b)	Conflict with existing zoning for agricultural use, or a Williamson Act contract?	☐	☒
c)	Conflict with existing zoning for, or cause rezoning of, forest land (as defined in Public Resources Code section 12220(g)), timberland (as defined by Public Resources Code section 4526), or timberland zoned Timberland Production (as defined by Government Code section 51104(g))?	☐	☒
d)	Result in the loss of forest land or conversion of forest land to non-forest use?	☐	☒
e)	Involve other changes in the existing environment which, due to their location or nature, could result in conversion of Farmland, to non-agricultural use or conversion of forest land to non-forest use?	☐	☒

Discussion

a) No agricultural uses are located on the Parnassus Heights campus site, and no land on the campus site is designated as Important Farmland on maps prepared pursuant to the Farmland Mapping and Monitoring Program. Consequently, no impact related to conversion of agricultural land would occur under the proposed CPHP, and this topic will not be evaluated further in the CPHP EIR.

b-c) The Parnassus Heights campus site is designated for urban uses. No portion of the campus site is zoned for agricultural use, forest land or timberland. In addition, there is no Williamson Act contract applicable to the Parnassus Heights campus site or its vicinity. Consequently, no impact related to conflicts with zoning for these lands would occur under the proposed CPHP, and these topics will not be evaluated further in the CPHP EIR.

d) The Reserve includes a variety of vegetation, including, but not limited to, blue gum eucalyptus (*Eucalyptus globulus*), Monterey cypress (*Cupressus macrocarpa*), and Blackwood acacia (*Acacia melanoxylon*) (UCSF, 2014; UCSF, 2018). There is the potential for certain new development under the CPHP, including the proposed New Hospital and associated widening of Medical Center Way adjacent to the New Hospital, to result in on the need to modify the Reserve boundary, and therefore, may result in a loss and conversion of forest land within the Reserve to a non-forest use. UCSF proposes to replace any area of the Reserve that is lost, including forest land, due to new development under the CPHP by designating new Reserve area elsewhere on the campus site in an amount equal or greater to that area lost. Consequently, the impact to loss or conversion of forest land would be less than significant, and this topic will not be evaluated further in the CPHP EIR.

e) No Important Farmland or other agricultural land is present in the vicinity of the campus site. Therefore, development under the proposed CPHP would not involve any changes that could indirectly cause conversion of Important Farmland to non-agricultural use. As discussed in checklist item "d," above, UCSF proposes to replace any area of the Reserve that is lost, including forest land, due to new development under the CPHP by designating new Reserve acreage elsewhere on the campus site in an amount equal or greater to that area lost. Consequently, the impact resulting from conversion of forest land would be less than significant, and this topic will not be evaluated further in the CPHP EIR.

References

University of California, San Francisco (UCSF). 2014. *UCSF 2014 Long Range Development Plan Final Environmental Impact Report*. November.

UCSF. 2018. *UCSF Vegetation Management Plan for the Mount Sutro Open Space Reserve Final Environmental Impact Report*. March.

5.3 Air Quality

Issues (and Supporting Information Sources):	Impact to be Analyzed in CPHP EIR	No Additional Analysis Required
III. AIR QUALITY — Where available, the significance criteria established by the applicable air quality management district or air pollution control district may be relied upon to make the following determinations. Would the project:		
a) Conflict with or obstruct implementation of the applicable air quality plan?	☒	☐
b) Result in a cumulatively considerable net increase of any criteria pollutant for which the project region is non-attainment under an applicable federal or state ambient air quality standard?	☒	☐
c) Expose sensitive receptors to substantial pollutant concentrations?	☒	☐
d) Result in other emissions (such as those leading to odors) adversely affecting a substantial number of people?	☐	☒
e) Exceed the LRDP EIR standard of significance by exposing receptors to toxic air contaminant emissions that (1) result in a cancer risk greater than 10 cancer cases per 1 million people exposed in a lifetime; or (2) for acute or chronic effects, result in concentrations of toxic air contaminant emissions with a Hazard Index of 1.0 or greater.	☒	☐

Discussion

a) The most recent clean air plan is the Bay Area 2017 Clean Air Plan that was adopted by the Bay Area Air Quality Management District (BAAQMD) in April 2017. Consistency with this plan is the basis for determining whether development under the proposed CPHP would conflict with or obstruct implementation of air quality plans. Development under the proposed CPHP would increase both stationary and mobile sources of air emissions, which contribute to regional air pollution. Air pollutant emissions also could occur over the short term in association with construction activities that emit exhaust and dust that could affect local and regional air quality. The CPHP EIR will include an evaluation of the potential for the proposed project to conflict with the local clean air plan.

b) Construction and operation of development projects under the proposed CPHP would generate air pollutants that could be considerable in a regional, cumulative context. The CPHP EIR will include an evaluation of the air quality impacts that could result from pollutant emissions related to implementation of the CPHP for which the air basin is in nonattainment of the ambient air quality standards.

c, e) Construction and operation of development under the proposed CPHP could expose sensitive receptors on the campus site and in adjacent residential neighborhoods to substantial pollutant concentrations (including toxic air contaminants). The CPHP EIR will include an evaluation of the air quality impacts related to exposure of sensitive receptors to pollutant concentrations.

d) The proposed CPHP would not include development of land uses identified by BAAQMD as typically associated with odors, such as wastewater treatment plants, landfills, composting facilities, refineries, or chemical plants (BAAQMD, 2017). As the proposed CPHP would not result in development that would be a potential source of odors, this topic will not be evaluated further in the CPHP EIR.

References

Bay Area Air Quality Management District (BAAQMD). 2017. *California Environmental Quality Act Air Quality Guidelines*. May.

5.4 Biological Resources

Issues (and Supporting Information Sources):		*Impact to be Analyzed in CPHP EIR*	*No Additional Analysis Required*
IV.	**BIOLOGICAL RESOURCES —** Would the project:		
a)	Have a substantial adverse effect, either directly or through habitat modifications, on any species identified as a candidate, sensitive, or special-status species in local or regional plans, policies, or regulations, or by the California Department of Fish and Wildlife or U.S. Fish and Wildlife Service?	☒	☐
b)	Have a substantial adverse effect on any riparian habitat or other sensitive natural community identified in local or regional plans, policies, regulations, or by the California Department of Fish and Wildlife or U.S. Fish and Wildlife Service?	☐	☒
c)	Have a substantial adverse effect on state or federally protected wetlands (including, but not limited to, marsh, vernal pool, coastal, etc.) through direct removal, filling, hydrological interruption, or other means?	☐	☒
d)	Interfere substantially with the movement of any native resident or migratory fish or wildlife species or with established native resident or migratory wildlife corridors, or impede the use of native wildlife nursery sites?	☒	☐
e)	Conflict with any local policies or ordinances protecting biological resources?	☒	☐
f)	Conflict with the provisions of an adopted Habitat Conservation Plan, Natural Community Conservation Plan, or other approved local, regional, or state habitat conservation plan?	☐	☒
g)	Exceed the LRDP EIR standard of significance by damaging or removing heritage or landmark trees or native oak trees of a diameter specified in a local ordinance?	☒	☐

Discussion

a) Construction and operational activities under the proposed CPHP that would be within or in the vicinity of the Reserve have the potential to adversely impact special-status wildlife species migratory birds, and bats inhabiting the Reserve forest through increased noise and visual disturbance. In addition, resident and migrating birds and bats could nest or roost in buildings within the Parnassus Heights campus site. Demolition of existing structures on the campus site, or removal of campus trees or other vegetation could result in the loss of nests or roosts, and construction of individual projects under the proposed CPHP could adversely impact resident and migratory birds or bats through increased noise and visual disturbance during building construction. These potential impacts will be analyzed and discussed further in the CPHP EIR.

b) Development under the proposed CPHP would not have a substantial adverse effect on any riparian habitat or other sensitive natural community identified in local or regional plans, policies, or regulations, or by the CDFW or USFWS as no riparian habitat or other sensitive natural community is mapped or identified within the campus site. While there is the potential for certain new development under the CPHP, including the proposed New Hospital and associated widening of Medical Center Way adjacent to the New Hospital, to result in the need to modify the Reserve boundary, the Reserve is largely comprised of non-native eucalyptus forest with a non-native understory (UCSF 2014; UCSF, 2018). No development under the proposed CPHP is planned within undeveloped areas of the Reserve where sensitive habitats are present; thus, there would be no impacts on riparian or sensitive habitats. No impact would occur, and this topic will not be evaluated further in the CPHP EIR.

c) Development at the Parnassus Heights campus site under the proposed CPHP would not have a substantial adverse effect on State or federally protected wetlands (including, but not limited to, marsh, vernal pool, coastal, etc.) through direct removal, filling, hydrological interruption, or other means as there are no jurisdictional or non-jurisdictional wetlands mapped or identified within the campus site. The only wetland feature on the Parnassus Heights campus site is an intermittent stream (Woodland Creek) that is located in the Reserve. The stream originates on the eastern slope of Mount Sutro and flows into the City's Interior Greenbelt to the east. However, as no development is proposed in this portion of the Reserve, this wetland feature would not be affected by development under the proposed CPHP. No impact would occur, and this topic will not be evaluated further in the CPHP EIR.

d) The Reserve contains suitable habitat for resident and migrating birds moving along the Pacific Flyway due to its expanse of mature trees and dense understory isolated within an urban setting. In addition, given the heights of new structures proposed under the proposed CPHP, development under the proposed CPHP could result in an increase in bird collisions with buildings on the campus site. These potential impacts will be analyzed and discussed further in the CPHP EIR.

e) Pursuant to the University of California's constitutional autonomy, development and uses on property under the control of the University that are in furtherance of the University's educational purposes are not subject to local land use regulation, including City of San Francisco General Plan policies regarding the protection of urban biological resources. Although UCSF is not subject to local standards, UCSF will strive to be consistent with the standards, where feasible. Potential conflicts of any off-site improvements that may occur under the CPHP with the San Francisco Urban Forestry Ordinance, however, will be discussed [see topic (g), below].

f) There are no adopted habitat conservation plans, natural community conservation plans, or other applicable habitat conservation plan that would be applicable to development under the proposed CPHP. No impact would occur, and this topic will not be analyzed in the CPHP EIR.

g) The San Francisco Urban Forestry Ordinance (Article 16 of the San Francisco Public Works Code) was enacted to ensure the protection of trees on private land within and adjacent to public areas. The City of San Francisco currently considers street trees, significant trees, and landmark trees as protected. Significant trees are trees within 10 feet of the public right-of-way and are either 20 feet or greater in height, 15 feet or greater in canopy width, or 12 inches or greater in trunk diameter at 4.5 feet above grade. Landmark trees are trees that have received special designation by the San Francisco Board of Supervisors due to species rareness, size, age, structure, ecological contribution, or historical and cultural importance. Although development and uses on property under the control of the University that are in furtherance of the University's educational purposes are not subject to local land use regulation, development under the proposed CPHP could affect protected trees, and the potential impact will be analyzed and discussed further in the CPHP EIR.

References

University of California, San Francisco (UCSF). 2014. *UCSF 2014 Long Range Development Plan Final Environmental Impact Report*. November.

UCSF. 2018. *UCSF Vegetation Management Plan for the Mount Sutro Open Space Reserve Final Environmental Impact Report*. March.

5.5 Cultural Resources

Issues (and Supporting Information Sources):		*Impact to be Analyzed in CPHP EIR*	*No Additional Analysis Required*
V.	**CULTURAL RESOURCES —** Would the project:		
a)	Cause a substantial adverse change in the significance of a historical resource pursuant to §15064.5?	☒	☐
b)	Cause a substantial adverse change in the significance of an archaeological resource pursuant to §15064.5?	☒	☐
c)	Disturb any human remains, including those interred outside of formal cemeteries?	☒	☐

Discussion

a) The Parnassus Heights campus site is the oldest of the UCSF campus sites, having begun in 1896 as the Affiliated Colleges, and contains numerous buildings and structures that are listed in, or are eligible for listing in, the California Register of Historical Resources (CRHR) (UCSF, 2014). Demolition and renovation of structures proposed as part of the proposed CPHP have the potential to demolish or materially alter in an adverse manner those physical characteristics of an historical resource that convey its historical significance and that justify its inclusion in, or eligibility for inclusion in, the CRHR. This potential impact will be analyzed and discussed further in the CPHP EIR.

b) Previous studies and archival research conducted for the Parnassus Heights campus site have not identified archaeological resources at the site. Archaeological sites are generally located near watercourses or water bodies, and the Parnassus Heights campus site is not such a setting. Additionally, this campus site has been extensively modified over time, and the likelihood of discovering prehistoric archaeological resources is low (UCSF, 2014). However, given the substantial new site alteration and excavation that would occur under the proposed CPHP, the potential for uncovering archaeological resources, including historical period resources, cannot be entirely discounted. The CPHP EIR will analyze the effects of the proposed CPHP on archaeological resources.

c) There are no known human remains, including those interred outside of formal cemeteries located at the Parnassus Heights campus site (UCSF 2014). However, the potential for uncovering human remains cannot be entirely discounted. The CPHP EIR will analyze the effects of the proposed CPHP on human remains.

References

University of California, San Francisco (UCSF). 2014. *UCSF 2014 Long Range Development Plan Final Environmental Impact Report*. November.

5.6 Energy

Issues (and Supporting Information Sources):	Impact to be Analyzed in CPHP EIR	No Additional Analysis Required
VI. ENERGY — Would the project:		
a) Result in potentially significant environmental impact due to wasteful, inefficient, or unnecessary consumption of energy resources, during project construction or operation?	☒	☐
b) Conflict with or obstruct a state or local plan for renewable energy or energy efficiency?	☒	☐

Discussion

a) Construction and operation of individual projects under the proposed CPHP would require the use of refined fossil fuels, primarily gasoline and diesel. Construction activities would require the short-term use of heavy-duty construction equipment that would run on diesel fuel or electricity. Gasoline would be required primarily to fuel construction-worker automobiles to commute to and from the construction sites. Once operational, development under the proposed CPHP would generate new long-term automobile and truck trips that would require the use of gasoline and diesel fuel. Operation of the proposed CPHP development projects would also result in energy consumption that could increase the natural gas demand of the Central Utility Plant. Natural gas consumption could also increase relative to increased space heating. Potential effects related to wasteful, inefficient, or unnecessary consumption of energy resources will be analyzed in the CPHP EIR.

b) Individual projects under the proposed CPHP would be required to comply with the *UC Policy on Sustainable Practices*, which requires that new construction meet a minimum standard of LEED-NC Silver and strive for LEED-NC Gold when possible and requires 20 percent better energy performance than Title 24 (and strives to achieve 30 percent). While new development under the proposed CPHP is not expected to conflict with the University's policy, this potential impact will be analyzed in the CPHP EIR.

5.7 Geology and Soils

Issues (and Supporting Information Sources):	Impact to be Analyzed in CPHP EIR	No Additional Analysis Required
VII. GEOLOGY AND SOILS — Would the project:		
a) Directly or indirectly cause 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 Division of Mines and Geology Special Publication 42.	☐	☒
ii) Strong seismic ground shaking?	☒	☐
iii) Seismic-related ground failure, including liquefaction?	☒	☐
iv) Landslides?	☒	☐
b) Result in substantial soil erosion or the loss of topsoil?	☒	☐
c) Be located on a geologic unit or soil that is unstable, or that would become unstable as a result of the project, and potentially result in on- or off-site landslide, lateral spreading, subsidence, liquefaction, or collapse?	☒	☐
d) Be located on expansive soil, as defined in Table 18-1-B of the Uniform Building Code (1994), creating substantial direct or indirect risks to life or property?	☐	☒
e) Have soils incapable of adequately supporting the use of septic tanks or alternative waste water disposal systems where sewers are not available for the disposal of waste water?	☐	☒
f) Directly or indirectly destroy a unique paleontological resource or site or unique geologic feature?	☒	☐
g) Exceed the LRDP EIR standard of significance by exposing people to structural hazards in an existing building rated Level V (Poor), or Level VI (Very Poor), under the University's seismic performance rating system, or substantial nonstructural hazards?	☐	☒

Discussion

a.i) The Parnassus Heights campus site is located on a bedrock outcrop of the Franciscan Complex, a mix of chert, greenstone, meta-sandstone and shale. The Parnassus Heights campus site is not located within or immediately adjacent to an active fault trace (i.e., Alquist-Priolo Earthquake Fault zone) and as a result is considered to have a very low potential for fault rupture (Jennings, 2010). No impact would occur, and this topic will not be analyzed in the CPHP EIR.

a.ii) The entire City of San Francisco, including the Parnassus Heights campus site, is located in a very seismically active area with a high probability of experiencing a substantial earthquake in the future. Development under the proposed CPHP could put people or structures at risk of loss, injury, or death involving strong seismic ground shaking. The CPHP EIR will assess the potential for the proposed CPHP to directly or indirectly cause substantial adverse effects resulting from strong seismic ground shaking.

a.iii) The Parnassus Heights campus site is mapped as having a low risk of liquefaction from seismic ground shaking (ABAG, 2019). However, development under the proposed CPHP could expose people or structures to loss, injury, or death due to seismic-related ground failure, including liquefaction. The CPHP EIR will assess the potential for the proposed CPHP to directly or indirectly cause substantial adverse effects resulting from seismic-related ground failure.

a.iv) A number of sites within the Parnassus Heights campus site have the potential for future slope movement (Rutherford & Chekene 2019). As a result, development under the proposed CPHP could result in exposure of persons or structures to loss, injury, or death due to landslides. The CPHP EIR will assess the potential for the proposed CPHP to directly or indirectly cause substantial adverse effects resulting from landslides.

b) Development under the proposed CPHP could potentially change drainage patterns that could lead to substantial soil erosion or the loss of topsoil. The CPHP EIR will assess the potential for the proposed CPHP to result in substantial soil erosion and loss of topsoil from land development activities.

c) The Parnassus Heights campus site is located on geologic units and soils that could become unstable as a result of land development activities under the proposed CPHP. The CPHP EIR will assess the potential for the proposed CPHP to result in substantial harm due to geologic and soil instability, including on- or off-site landslides, lateral spreading, subsidence, liquefaction, or collapse.

d) Expansive soils are defined as those that shrink when dry and swell when moist; they typically contain a high proportion of clay particles. In general, expansive soils are commonly addressed in the evaluation of onsite geotechnical hazards, and past geotechnical investigations at the campus site has not revealed the presence of expansive soils. Furthermore, the University requires all new facilities to adhere to the current California Building Code (CBC), which includes detailed provisions to ensure that the design of new facilities is appropriate to site soil conditions, including requirements to address expansive and otherwise problematic soils. With adherence to the CBC, impacts related to site soil conditions – including but not limited to expansive soils, if any are present – would be less than significant, and this topic will not be evaluated further in the CPHP EIR.

e) The proposed CPHP does not propose any activities that would require the utilization of septic systems or alternative wastewater disposal systems. Therefore, there are no anticipated adverse effects from wastewater disposal associated with development under the proposed CPHP and this topic will not be analyzed in the CPHP EIR.

f) Review of geological maps and previous analysis suggests that there no unique paleontological resources or unique geologic features at the Parnassus Heights campus site, which is underlain by dune sands (UCSF, 2014). However, the potential for uncovering paleontological resources cannot be entirely discounted. The CPHP EIR will analyze the effects of the proposed CPHP on paleontological resources.

g) None of the structures planned for renovation under the proposed CPHP would expose people to structural hazards in buildings rated Level V (Poor), or Level VI (Very Poor) under the University's seismic performance rating system for structural hazards. No impact would occur, and this topic will not be analyzed in the CPHP EIR.

References

Association of Bay Area Governments (ABAG), 2019. Liquefaction Study Zones and Liquefaction Susceptibility, http://gis.abag.ca.gov/website/Hazards/?hlyr=cgsLiqZones, accessed September 3, 2019.

Jennings C. W. 2010. 2010 Fault Activity Map of California.

Rutherford & Chekene. 2019. New Campus-Wide Slope Stability Risk Assessment, University of California San Francisco, Parnassus Campus, San Francisco, California. March 29.

University of California, San Francisco (UCSF). 2014. *UCSF 2014 Long Range Development Plan Final Environmental Impact Report*. November.

5.8 Greenhouse Gas Emissions

Issues (and Supporting Information Sources):		*Impact to be Analyzed in CPHP EIR*	*No Additional Analysis Required*
VIII.	**GREENHOUSE GAS EMISSIONS —** Would the project:		
a)	Generate greenhouse gas emissions, either directly or indirectly, that may have a significant impact on the environment?	☒	☐
b)	Conflict with an applicable plan, policy or regulation adopted for the purpose of reducing the emissions of greenhouse gases?	☒	☐

Discussion

a, b) Construction and operation of campus development under the proposed CPHP would generate greenhouse gas (GHG) emissions that could result in a potentially significant impact. The CPHP EIR will estimate the direct and indirect GHG emissions from development under the proposed CPHP and discuss whether the emissions would exceed the BAAQMD's recommended threshold for GHGs emitted by land use development projects. The CPHP EIR will also estimate and report GHG emissions that would be generated during construction of development under the proposed CPHP. In addition, the CPHP EIR will discuss any conflicts that development under the proposed CPHP may have with UCSF's Climate Action Plan and applicable state regulations such as Assembly Bill 32, Executive Order B-30-15, Senate Bill 350, and Senate Bill 32.

5.9 Hazards and Hazardous Materials

Issues (and Supporting Information Sources):		*Impact to be Analyzed in CPHP EIR*	*No Additional Analysis Required*
IX.	**HAZARDS AND HAZARDOUS MATERIALS —** Would the project:		
a)	Create a significant hazard to the public or the environment through the routine transport, use, or disposal of hazardous materials?	☒	☐
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?	☒	☐
c)	Emit hazardous emissions or handle hazardous or acutely hazardous materials, substances, or waste within one-quarter mile of an existing or proposed school?	☒	☐
d)	Be located on a site which is included on a list of hazardous materials sites compiled pursuant to Government Code Section 65962.5 and, as a result, would it create a significant hazard to the public or the environment?	☒	☐
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, would the project result in a safety hazard or excessive noise for people residing or working in the project area?	☐	☒
f)	Impair implementation of or physically interfere with an adopted emergency response plan or emergency evacuation plan?	☐	☒
g)	Expose people or structures, either directly or indirectly, to a significant risk of loss, injury or death involving wildland fires.	☐	☒

Discussion

a) Although small quantities of hazardous materials would be used on the site of each individual project contemplated by the proposed CPHP during construction, compliance with local, state, and federal regulations would minimize risks associated with the routine transport, use, or disposal of hazardous materials. However, during operation the proposed CPHP would include an increase in research and clinical uses on the campus site that could involve the routine use, transport, or disposal of hazardous materials, including hazardous chemical, radioactive, and biohazardous materials and research animals. The CPHP EIR will evaluate potential effects that could arise through the routine transport, use, or disposal of hazardous materials during operation of campus facilities developed pursuant to the proposed CPHP.

b) Demolition and renovation of structures under the proposed CPHP would disturb older structures and improvements where hazardous building materials such as asbestos, lead-based paint (LBP), polychlorinated biphenyls (PCBs), and mercury may be present (UCSF, 2014). If present, demolition and renovation activities could disturb these materials, thus resulting in potentially adverse effects to workers and the public. In addition, San Francisco is among the identified counties where ultramafic bedrock materials are present and have the potential for naturally occurring asbestos fibers, which could be encountered during excavation activities (UCSF, 2014). If present, groundbreaking activities could disturb these fibers causing them to become airborne, thus resulting in potentially adverse effects to workers and the public. The CPHP EIR will evaluate potential effects that could arise from the inadvertent release of hazardous materials into the environment during construction activities associated with development under the proposed CPHP.

c) There are two child care centers currently operating within the campus site (Kirkham Child Development Center and UCSF Marilyn Reed Lucia Child Development Center). There are also several public schools (Independence High School, Grattan Elementary School and Clarendon Alternative Elementary School) and private child care centers located within a quarter mile of the Parnassus Heights campus site boundary. Demolition and replacement of the structures on the Aldea Housing complex site could result in hazardous emissions due to the presence of hazardous building materials. The CPHP EIR will evaluate potential effects that could arise due to hazardous emissions or the handling of hazardous or acutely hazardous materials, substances, or waste within one-quarter mile of an existing or proposed school.

d) Two cases for the Parnassus Heights campus site found on the Geotracker database maintained by the State Water Resources Control Board were closed in accordance with applicable regulatory agency oversight, with no further action required (SWRCB 2019a; SWRCB 2019b). However, given the routine use of hazardous materials on the campus site, it is possible that unknown contamination may be present on other portions of the campus site. The CPHP EIR will evaluate potential hazards to the public or the environment from potential contamination on the campus site.

e) There are no public use airports within two miles of the City of San Francisco. San Francisco International Airport and Oakland International Airport are over eight and 12 miles from the campus site, respectively. No impact would occur, and this topic will not be discussed in the CPHP EIR.

f) Individual projects and proposed improvements contemplated by the proposed CPHP would be required to ensure that the street system can accommodate emergency response and evacuation. All projects and improvements would be designed to ensure appropriate emergency access to and egress from all areas. Additionally, all project-specific designs, including private internal circulation and building site plans, would be subject to review and approval by the State Fire Marshall for emergency response and evacuation concerns. UCSF design criteria and existing emergency response requirements are sufficient to ensure that the potential health and safety effects resulting from possible impairment or interference with any emergency response or evacuation plans would remain less than significant, and this topic will not be analyzed in the CPHP EIR.

g) According to CAL FIRE’s Fire Hazard Severity Zone Map of San Francisco County, the Reserve is designated as Local Responsibility Area (LRA) moderate fire hazard severity zone (CAL FIRE, 2007). In September 2018, UCSF began implementing the Mount Sutro Open Space Reserve Vegetation Management Plan, a 20-year phased plan covering the management of the Reserve. Implementation of the vegetative management plan would change fire hazards and fire behavior within the Reserve, and fire hazards within the Reserve would generally decrease as a result of vegetation management activities, such as creating defensible space, removing diseased and/or dead trees, and increasing the diversity of tree types (UCSF 2018). The remainder of the Parnassus Heights campus site is not located within a fire hazard severity zone. The Vegetation Management Plan would mitigate the wildfire risk to new development under the CPHP, and consequently, the impact associated with the exposure of people or structures developed under the proposed CPHP, either directly or indirectly, to a significant risk of loss, injury, or death involving wildland fires would be less than significant. This topic will not be analyzed in the CPHP EIR.

References

California Department of Forestry and Fire Protection (CAL FIRE). 2007. Draft Fire Hazard Severity Zones in LRA – San Francisco County. October 5.

State Water Resources Control Board (SWRCB). 2019a. Geotracker database, http://geotracker. waterboards.ca.gov/map/?CMD=runreport&myaddress=315+Parnassus+Avenue. Accessed August 21, 2019.

SWRCB. 2019b. Geotracker database, http://geotracker. waterboards.ca.gov/map/?CMD=runreport&myaddress=50+Medical+Center+Way. Accessed August 21, 2019.

University of California, San Francisco (UCSF). 2018. *UCSF Vegetation Management Plan for the Mount Sutro Open Space Reserve Final EIR*. March.

5.10 Hydrology and Water Quality

Issues (and Supporting Information Sources):		*Impact to be Analyzed in CPHP EIR*	*No Additional Analysis Required*
X.	**HYDROLOGY AND WATER QUALITY —** Would the project:		
a)	Violate any water quality standards or waste discharge requirements or otherwise substantially degrade surface or ground water quality?	☒	☐
b)	Substantially decrease groundwater supplies or interfere substantially with groundwater recharge such that the project may impede sustainable groundwater management of the basin?	☐	☒
c)	Substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river or through the addition of impervious surfaces, in a manner which would:		
	i) result in substantial erosion or siltation on- or off-site;	☒	☐
	ii) substantially increase the rate or amount of surface runoff in a manner which would result in flooding on- or offsite;	☒	☐
	iii) create or contribute runoff water which would exceed the capacity of existing or planned stormwater drainage systems or provide substantial additional sources of polluted runoff; or	☒	☐
	iv) impede or redirect flood flows?	☒	☐
d)	In flood hazard, tsunami, or seiche zones, risk release of pollutants due to project inundation?	☐	☒
e)	Conflict with or obstruct implementation of a water quality control plan or sustainable groundwater management plan?	☒	☒

Discussion

a) The majority of surface water runoff from the Parnassus Heights campus site is directed to the City's combined sewer system (CSS) that conveys flows to both the City's Oceanside Treatment Plant at Ocean Beach on the City's western shoreline and the Southeast Treatment Plant at Hunters Point on the City's eastern waterfront. Both treatment plants have a permit from the National Pollutant Discharge Elimination System (NPDES) program administered by the San Francisco Regional Water Quality Control Board (RWQCB) that regulates discharge from the plant to the Pacific Ocean. As discussed above in Section 5.7, *Geology and Soils*, development under the proposed CPHP could potentially generate surface water runoff that could lead to substantial soil erosion or the loss of topsoil during construction. Development under the proposed CPHP could also potentially generate surface water runoff with elevated levels of sediment and urban contaminants such as oil, grease, metals, pesticides, herbicides and entrained dust during operation. The CPHP EIR will evaluate potential impacts related to water quality during both construction and operation of campus development under the proposed CPHP.

b) Portions of the Parnassus Heights campus site where development under the proposed CPHP would occur are currently under impervious surfaces. Development under the proposed CPHP could result in an increase in impervious surfaces but not enough to interfere with groundwater recharge. In addition, dewatering during construction may be required. However, dewatering activities would be temporary and would not result in a long-term lowering of the local water table. Finally, development under the proposed CPHP would not require the use of groundwater during construction or operation. For these reasons, development under the proposed CPHP would not substantially deplete groundwater supplies or interfere substantially with groundwater recharge, and this topic will not be discussed in the CPHP EIR.

c.i) The Parnassus Heights campus site is located within both the Sunset watershed basin which drains to the Pacific Ocean and the Channel watershed basin, which drains to the bay. Development under the proposed CPHP would primarily occur within the developed portions of the campus site. Development under the proposed CPHP would change drainage patterns on the Parnassus Heights campus site that could potentially result in erosion and siltation off-site downstream within the Sunset and Channel drainage basins. The CPHP EIR will evaluate potential impacts related to increased erosion and siltation.

c.ii) Development under the proposed CPHP would change drainage patterns on the campus site that could potentially result in flooding on- or off-site downstream within either the Sunset of Channel drainage basins. The CPHP EIR will evaluate potential impacts related to flooding on- or off-site.

c.iii) Development under the proposed CPHP could potentially result in additional sources of polluted runoff during demolition or construction. As discussed under item (a) above, the CPHP EIR will evaluate potential impacts to water quality from stormwater runoff.

c.iv) An intermittent stream (Woodland Creek) is located in the Reserve. The stream originates on the eastern slope of Mount Sutro and flows into the City's Interior Greenbelt to the east. No other water features are located on the Parnassus Heights campus site. Development under the proposed CPHP would increase the amount of impervious surfaces on the Parnassus Heights campus site, which could impede or redirect flood flows. However, the proposed CPHP would not impede or redirect flood flows in Woodland Creek as no development would occur in that portion of the Reserve. The CPHP EIR will evaluate potential impacts related to the impediment or redirection of flood flows on other portions of the campus site.

d) The campus site is not located within a 100-year flood zone (SFWPS, 2019). In addition, with an elevation ranging from 300 to 900 feet, the campus site has no potential to be affected by future sea level rise (CCSF 2016). Finally, due to its elevation and inland location, and its distance from the nearest major body of water, the campus site is not susceptible to the potential effects of a tsunami or seiche (CalEMA 2009). No impact would occur, and no additional analysis is required.

e) Water quality in the City and County of San Francisco is regulated by the San Francisco RWQCB through the Water Quality Control Plan (Basin Plan) for the San Francisco Bay Basin. As discussed under item (a) above, development under the proposed CPHP could negatively impact water quality during construction and operation. The CPHP EIR will evaluate potential conflicts with the Basin Plan.

The project site is located in the Westside groundwater basin. The basin has not been identified as a medium- or high-priority groundwater basin by the California Department of Water Resources (DWR, 2019); therefore, a Groundwater Sustainability Plan (GSP) does not need to be prepared for the basin per the requirements of the Sustainable Groundwater Management Act (SGMA). Thus, development under the proposed CPHP would not conflict with a sustainable groundwater management plan, no impact would occur, and no additional analysis is required.

References

San Francisco Water Power Sewer (SFWPS). 2019. 100-Year Storm Flood Risk Map, http://www.sfwater.org/index.aspx?page=1229. Accessed August 27, 2019.

City and County of San Francisco (CCSF). 2016. *San Francisco Sea Level Rise Action Plan*. March.

California Department of Water Resources (DWR). 2019. Basin Prioritization, https://water.ca.gov/Programs/ GroundwaterManagement/Basin-Prioritization. Accessed August 28, 2019.

California Emergency Management Agency (CalEMA). 2009. Tsunami Inundation Map for Emergency Planning, State of California – City and County of San Francisco, San Francisco North Quadrangle, San Francisco South Quadrangle (Pacific Coast). June 15.

5.11 Land Use and Planning

Issues (and Supporting Information Sources):		*Impact to be Analyzed in CPHP EIR*	*No Additional Analysis Required*
XI.	**LAND USE AND PLANNING —** Would the project:		
a)	Physically divide an established community?	☐	☒
b)	Cause a significant environmental impact due to a conflict with any land use plan, policy, or regulation adopted for the purpose of avoiding or mitigating an environmental effect?	☒	☐
c)	Exceed an LRDP EIR standard of significance by conflicting with local land use regulations such that a significant incompatibility is created with adjacent land uses?	☒	☐

Discussion

a) No development outside of the established campus boundary is proposed, and no intrusion into, or division of, surrounding residential communities would occur under the proposed CPHP. The Parnassus Heights campus site would continue to remain as a distinct entity, consisting of educational and medical land uses that are woven into the fabric of the surrounding neighborhood, and the boundary of the campus site would not change as a result of the proposed CPHP. While the extension of Fourth Avenue under the proposed CPHP would add a new roadway on the Parnassus Heights campus site, this extension would occur entirely within the campus site boundaries and would not affect the surrounding neighborhood. No impact would occur, and no additional analysis is required.

b) The 2014 LRDP is the current applicable land use plan for the Parnassus Heights campus site through 2035. The CPHP EIR will evaluate the consistency of the proposed CPHP with the 2014 LRDP.

c) Land within the City and County of San Francisco’s jurisdiction is subject to plans, policies and zoning controls that regulate future development proposals and mitigate certain environmental effects. UCSF is not subject to local land use regulations whenever using property under its control in furtherance of its education mission, however, the CPHP EIR will evaluate the potential for growth under the proposed CPHP to directly or indirectly conflict with City plans, policies and zoning controls such that a significant incompatibility is created with adjacent land uses.

5.12 Mineral Resources

Issues (and Supporting Information Sources):		*Impact to be Analyzed in CPHP EIR*	*No Additional Analysis Required*
XII.	**MINERAL RESOURCES —** Would the project:		
a)	Result in the loss of availability of a known mineral resource that would be of value to the region and the residents of the state?	☐	☒
b)	Result in the loss of availability of a locally-important mineral resource recovery site delineated on a local general plan, specific plan, or other land use plan?	☐	☒

Discussion

a, b) The Parnassus Heights campus site is not located in an area of known mineral resources. In addition, the campus site does not contain a locally important mineral resource recovery site. Therefore, no impact would occur, and this topic will not be analyzed in the CPHP EIR.

5.13 Noise

Issues (and Supporting Information Sources):		*Impact to be Analyzed in CPHP EIR*	*No Additional Analysis Required*
XIII.	**NOISE —** Would the project result in:		
a)	Generation of a substantial temporary or permanent increase in ambient noise levels in the vicinity of the project in excess of standards established in the local general plan or noise ordinance, or applicable standards of other agencies?	☒	☐
b)	Generation of excessive groundborne vibration or groundborne noise levels?	☒	☐
c)	For a project located within the vicinity of a private airstrip or 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, would the project expose people residing or working in the project area to excessive noise levels?	☐	☒
d)	Exceed an LRDP EIR standard of significance by contributing to an increase in average daily noise levels (Ldn) of 3 dB(A) or more at property lines, if ambient noise levels in areas adjacent to proposed development already exceed local noise levels set forth in local general plans or ordinances for such areas based on their use?	☒	☐

Discussion

a) Development under the proposed CPHP could result in increases or changes in noise levels from sources such as construction activities, stationary sources, and increased vehicular traffic, which could exceed applicable noise standards. The CPHP EIR will evaluate the potential for development under the proposed CPHP to expose sensitive receptors to noise in excess of applicable standards.

b) Demolition and construction activities that would occur under the proposed CPHP would generate perceptible groundborne vibration levels when heavy equipment or impact tools are used. Structures, researchers and residents in the proximity of the Parnassus Heights campus site could be adversely affected by groundborne vibration and groundborne noise generated during the construction of campus development projects under the proposed CPHP. These potential impacts will be assessed in the CPHP EIR.

c) There are no public use airports within two miles of the City of San Francisco. San Francisco International Airport and Oakland International Airport are over eight and 12 miles from the campus site, respectively, and therefore well outside of the area of influence identified in their respective airport land use compatibility plans. Consequently, there would be a less than significant impact with regard to exposure to excessive noise levels from public use airports, and this topic will not be analyzed in the CPHP EIR.

d) Modeled noise levels in the vicinity of the campus site are above 70 dB(A) Ldn along the Parnassus Avenue and Irving Street frontages (San Francisco 2009). While operation of individual projects under the proposed CPHP is not expected to contribute to an increase in average daily noise levels of 3 dB(A) Ldn or more at property lines in an area where ambient noise levels already exceed local noise levels set forth in City's General Plan, as that would require the projects to result in a doubling of traffic in the area, this potential impact will be analyzed in the CPHP EIR. In addition, there will likely be some new mechanical equipment (e.g. heating ventilation and air conditioning) associated with the operation of new development on the Parnassus Heights campus site under the proposed CPHP. The potential impact of noise from these stationary sources will also be analyzed in the CPHP EIR.

References

City and County of San Francisco (CCSF). 2009. *San Francisco General Plan Environmental Protection Element*.

5.14 Population and Housing

Issues (and Supporting Information Sources):		*Impact to be Analyzed in CPHP EIR*	*No Additional Analysis Required*
XIV.	**POPULATION AND HOUSING —** Would the project:		
a)	Induce substantial unplanned 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)?	☒	☐
b)	Displace substantial numbers of existing people or housing, necessitating the construction of replacement housing elsewhere?	☒	☐
c)	Exceed the LRDP EIR standard of significance by creating a demand for housing outside the market area where the facilities or site are located?	☒	☐

Discussion

a) The proposed CPHP would result in population growth on the Parnassus Heights campus site through increased employment, student enrollment, patients, and visitors. The proposed CPHP would accommodate an increase in campus population from approximately 17,400 under existing conditions to approximately 25,300 by the year 2050. In addition, the proposed CPHP would increase the number of housing units in the Aldea housing complex on the campus site from 172 units to 504 units (a net increase of 332 units), and would add an additional 430 units as part of the West Side Housing project on the campus site. The CPHP EIR will evaluate the potential for the proposed CPHP to induce substantial unplanned population growth in the San Francisco Bay Area.

b) The demolition and replacement of existing housing in the Aldea housing complex would temporarily displace UCSF residents from those residences. It is the intent of UCSF to relocate residents to alternative campus housing locations for the duration of construction. However, it is possible that alternative campus housing will not be available. As a result, the temporary displacement of Aldea housing residents may necessitate the construction of replacement housing elsewhere in the City. The CPHP EIR will evaluate the potential for the proposed CPHP to displace substantial numbers of existing people or housing, necessitating the construction of replacement housing elsewhere.

c) The proposed CPHP would result in population growth in the San Francisco Bay Area through increased employment and student enrollment. The proposed CPHP would accommodate an increase in campus population from approximately 17,400 under existing conditions to approximately 25,300 by the year 2050. This anticipated population increase could result in an increased demand for housing in the Bay Area. The CPHP EIR will evaluate the potential for the proposed CPHP to create demand for housing.

5.15 Public Services

Issues (and Supporting Information Sources):	Impact to be Analyzed in CPHP EIR	No Additional Analysis Required
XV. PUBLIC SERVICES —		
a) Would the project result in substantial adverse physical impacts associated with the provision of new or physically altered governmental facilities, need for new or physically altered governmental facilities, the construction of which could cause significant environmental impacts, in order to maintain acceptable service ratios, response times or other performance objectives for any of the following public services:		
i) Fire protection?	☒	☐
ii) Police protection?	☐	☒
iii) Schools?	☒	☐
iv) Parks?	☒	☐
v) Other public facilities?	☐	☒

Discussion

a.i) The San Francisco Fire Department (SFFD) provides fire protection and emergency services to the Parnassus Heights campus site. The nearest fire station is Station No. 12, located about a quarter mile from the campus site at 1145 Stanyan Street. Development under the proposed CPHP would have the potential to increase the demand for fire protection services, and potentially result in the need for new or altered fire station facilities. This impact will be evaluated in the CPHP EIR.

a.ii) The UC Police Department (UCPD) provides police protection services to the Parnassus Heights campus site. The UCPD is headquartered at 654 Minnesota Street, approximately four miles from the campus site. The UCPD also operates a patrol station at the Parnassus Heights campus site. The increase in daily population at the Parnassus Heights campus site under the proposed CPHP would increase demand on UCPD services. It is UCPD's practice to review staffing levels and to provide necessary staffing to meet standard response times (less than 3 min for emergency/in-progress calls and less than 5 min for normal service). New staffing required to serve the increase in daily population as a result of the proposed CPHP would either be accommodated by existing facilities or within new facilities that are covered under the building space envelope being analyzed in the CPHP EIR. The UCPD also has a mutual-aid agreement with the San Francisco Police Department (SFPD) to provide cooperative assistance within a 1-mile radius of the Parnassus Heights campus site. However, the SFPD is generally only called where an unusual need for assistance is required. As a result, daily campus population growth under the proposed CPHP is not anticipated to substantially increase demand on SFPD services. For these reasons, impacts to police protection services would be less than significant, and this topic will not be analyzed in the CPHP EIR.

a.iii) The City's public schools are operated by the San Francisco Unified School District (SFUSD). Public schools serving the area around the Parnassus Heights campus site include Alice Fong Yu Alternative School (grades K-8) at 1541 12th Avenue, Clarendon

Alternative Elementary School (K-5) at 500 Clarendon Avenue, Grattan Elementary School (grades K-5) at 165 Grattan Street, Everett Middle School (grades 6-8) at 450 Church Street, Independence High School (grades 9-12) at 1350 7th Avenue, and Mission High School (grades 9-12) at 3750 18th Street. Development under the proposed CPHP would alter the demand for public school services and therefore this topic will be evaluated in the CPHP EIR.

a.iv) Effects on local and regional parks are discussed in Section 5.16, *Recreation*, below.

a.v) Campus development under the proposed CPHP would not affect any other public facilities. No impact would occur, and this topic will not be analyzed in the CPHP EIR.

5.16 Recreation

Issues (and Supporting Information Sources):		*Impact to be Analyzed in CPHP EIR*	*No Additional Analysis Required*
XVI. RECREATION —			
a)	Would the project increase the use of existing neighborhood and regional parks or other recreational facilities such that substantial physical deterioration of the facility would occur or be accelerated?	☒	☐
b)	Does the project include recreational facilities or require the construction or expansion of recreational facilities which might have an adverse physical effect on the environment?	☒	☐

Discussion

a) Several public parks are located within a quarter mile of the Parnassus Heights campus site, including Golden Gate Park, which is located one block north of the campus site. The additional campus population under the proposed CPHP would result in an increased demand for recreational facilities. This impact will be evaluated in the CPHP EIR.

b) The proposed CPHP would result in construction of a various new recreational facilities at the campus site. This impact will be evaluated in the CPHP EIR.

5.17 Transportation

Issues (and Supporting Information Sources):	*Impact to be Analyzed in CPHP EIR*	*No Additional Analysis Required*
XVII. TRANSPORTATION — Would the project:		
a) Conflict with a program plan, ordinance or policy addressing the circulation system, including transit, roadway, bicycle and pedestrian facilities?	☒	☐
b) Would the project conflict or be inconsistent with CEQA Guidelines section 15064.3, subdivision (b)?	☒	☐
c) Substantially increase hazards due to a geometric design feature (e.g., sharp curves or dangerous intersections) or incompatible uses (e.g., farm equipment)?	☒	☐
d) Result in inadequate emergency access?	☒	☐

Discussion

a) Although UCSF is not subject to local land use regulation whenever using property under its control in furtherance of its educational mission, the CPHP EIR will evaluate the potential for development under the proposed CPHP to conflict with programs, plans, ordinances, and policies addressing the circulation system, including transit, roadway, bicycle and pedestrian facilities.

b) Development under the proposed CPHP would increase both the amount of building space on the Parnassus Heights campus site and the daily population, which would result in increased vehicle trips to and from the campus site. This increase in trips would in turn increase the total amount of vehicle miles traveled (VMT) to and from the campus site. The CPHP EIR will evaluate the potential for development under the proposed CPHP to conflict or be inconsistent with CEQA Guidelines section 15064.3, subdivision (b).

c) Although development under the proposed CPHP is not expected to include hazardous roadway design features or incompatible uses, the potential for impacts related to site access will be evaluated in the CPHP EIR.

d) Although development under the proposed CPHP is not expected to result in inadequate emergency access, this issue will be evaluated in the CPHP EIR.

5.18 Tribal Cultural Resources

Issues (and Supporting Information Sources):	*Impact to be Analyzed in CPHP EIR*	*No Additional Analysis Required*
XVIII. TRIBAL CULTURAL RESOURCES —		
a) Would the project cause a substantial adverse change in the significance of a tribal cultural resource, defined in Public Resources Code section 21074 as either a site, feature, place, cultural landscape that is geographically defined in terms of the size and scope of the landscape, sacred place, or object with cultural value to a California Native American tribe, and that is:		
i) Listed or eligible for listing in the California Register of Historical Resources, or in a local register of historical resources as defined in Public Resources. Code Section 5020.1(k), or	☒	☐
ii) A resource determined by the lead agency, in its discretion and supported by substantial evidence, to be significant pursuant to criteria set forth in subdivision (c) of Public Resources Code Section 5024.1. In applying the criteria set forth in subdivision (c) of Public Resources Code Section 5024.1, the lead agency shall consider the significance of the resource to a California Native American tribe.	☒	☐

Discussion

a.i-ii) As discussed in Section 5.5, *Cultural Resources*, above, no prehistoric archaeological resources have been identified on the Parnassus Heights campus site. In addition, the likelihood of discovering intact prehistoric archaeological resources on the campus site is low as it has been extensively modified over time. For these reasons, the potential for the Parnassus Heights campus site to contain tribal cultural resources is also low. However, given the substantial site alteration and excavation that would occur under the proposed CPHP, the potential for uncovering or disturbing tribal cultural resources cannot be entirely discounted. As discussed under Section 1, *Project Information*, consistent with AB 52, UCSF contacted the applicable representatives for several local Native American tribes regarding UCSF's proposal to undertake the CPHP, however, no responses were received from the tribes. The CPHP EIR will analyze the effects of the proposed CPHP on tribal cultural resources.

5.19 Utilities and Service Systems

Issues (and Supporting Information Sources):		*Impact to be Analyzed in CPHP EIR*	*No Additional Analysis Required*
XIX. UTILITIES AND SERVICE SYSTEMS — Would the project:			
a)	Require or result in the relocation or construction of new or expanded water, wastewater treatment or storm water drainage, electric power, natural gas, or telecommunications facilities, the construction or relocation of which could cause significant environmental effects?	☒	☐
b)	Have sufficient water supplies available to serve the project and reasonably foreseeable future development during normal, dry and multiple dry years?	☒	☐
c)	Result in a determination by the wastewater treatment provider which serves or may serve the project that it has adequate capacity to serve the project's projected demand in addition to the provider's existing commitments?	☒	☐
d)	Generate solid waste in excess of State or local standards, or in excess of the capacity of local infrastructure, or otherwise impair the attainment of solid waste reduction goals?	☒	☐
e)	Comply with federal, state, and local management and reduction statutes and regulations related to solid waste?	☒	☐

Discussion

a) Development under the proposed CPHP could require or result in relocation or construction of new or expanded water, wastewater treatment or storm water drainage, electric power, natural gas, or telecommunications facilities. The CPHP EIR will evaluate whether the construction or relocation of these facilities would cause significant environmental effects.

b) The San Francisco Public Utilities Commission (SFPUC) provides regional water services to approximately 2.6 million people in San Francisco, Santa Clara, Alameda, San Mateo, and Tuolumne Counties, including all of the City and County of San Francisco. About 85 percent of the water delivered to SFPUC customers comes from the Tuolumne River watershed stored in Hetch Hetchy Reservoir in the Sierra Nevada, and the remaining 15 percent comes from runoff in the Alameda and Peninsula watersheds captured in reservoirs located in San Mateo and Alameda Counties, supplemented with local groundwater and recycled water. Development under the proposed CPHP would require additional water supplies, and the CPHP EIR will evaluate whether the SFPUC would have sufficient water supplies to serve the projected campus development under the proposed CPHP and reasonably foreseeable future development during normal, dry, and multiple dry years.

c) The SFPUC maintains and operates the City's combined sewer system (CSS) that serves most of San Francisco, including the Parnassus Heights campus site. Wastewater generated on the Parnassus Heights campus site would enter the CSS and would be treated at the City's Oceanside Treatment Plant (only storm water generated on the east portion of the campus site would be treated at the City's Southeast Treatment Plant). Development under the proposed CPHP could result in the need for additional wastewater treatment capacity at the Oceanside Treatment Plant, and the CPHP EIR will evaluate whether the Oceanside Treatment Plant has adequate capacity to serve projected demand under the proposed CPHP in addition to current and future demands.

d-e) Solid waste generated on the campus site is collected and hauled to a transfer station near Candlestick Point and recycled as feasible. The remaining waste is then sent to the Recology Hay Road Landfill in Solano County. The CPHP EIR will evaluate whether solid waste providers have the capacity to serve development under the proposed CPHP in addition to current and future demands. In addition, the CPHP EIR will evaluate whether the proposed project would conflict with federal, state, and local management and reduction statutes and regulations related to solid waste.

5.20 Wildfire

Issues (and Supporting Information Sources):		*Impact to be Analyzed in CPHP EIR*	*No Additional Analysis Required*
XX.	**WILDFIRE —** If located in or near state responsibility areas or lands classified as very high fire hazard severity zones, would the project:		
a)	Substantially impair an adopted emergency response plan or emergency evacuation plan?	☐	☒
b)	Due to slope, prevailing winds, and other factors, exacerbate wildfire risks, and thereby expose project occupants to, pollutant concentrations from a wildfire or the uncontrolled spread of a wildfire?	☐	☒
c)	Require the installation or maintenance of associated infrastructure (such as roads, fuel breaks, emergency water sources, power lines or other utilities) that may exacerbate fire risk or that may result in temporary or ongoing impacts to the environment?	☐	☒
d)	Expose people or structures to significant risks, including downslope or downstream flooding or landslides, as a result of runoff, post-fire slope instability, or drainage changes?	☐	☒

Discussion

a-d) As discussed in Section 5.9, *Hazards and Hazardous Resources*, above, the Reserve is designated as LRA moderate fire hazard severity zone by CAL FIRE. Development under the proposed CPHP would not be located in or near a state responsibility area or land classified as a very high fire hazard severity zone. In addition, with implementation of the vegetation management practices listed in the Mount Sutro Open Space Reserve Vegetation Management Plan, the risk of wildland fires on the campus site is being minimized. Finally, individual projects and proposed improvements contemplated by the proposed CPHP would be required to ensure that the street system can accommodate emergency response and evacuation. All projects and improvements would be designed to ensure appropriate emergency access to and egress from all areas. No impact would occur, and this topic will not be analyzed in the CPHP EIR.

5.21 Mandatory Findings of Significance

Issues (and Supporting Information Sources):		*Impact to be Analyzed in CPHP EIR*	*No Additional Analysis Required*
XXI.	**MANDATORY FINDINGS OF SIGNIFICANCE —**		
a)	Does the project have the potential to substantially degrade the quality of the environment, substantially reduce the habitat of a fish or wildlife species, cause a fish or wildlife population to drop below self-sustaining levels, threaten to eliminate a plant or animal community, substantially reduce the number or restrict the range of a rare or endangered plant or animal or eliminate important examples of the major periods of California history or prehistory?	☒	☐
b)	Does the project have impacts that are individually limited, but cumulatively considerable? ("Cumulatively considerable" means that the incremental effects of a project are considerable when viewed in connection with the effects of past projects, the effects of other current projects, and the effects of probable future projects)?	☒	☐
c)	Does the project have environmental effects which will cause substantial adverse effects on human beings, either directly or indirectly?	☒	☐

Discussion

a) As indicated in the discussions above, campus development under the proposed CPHP has the potential to result in significant biological and cultural resource impacts, and substantially degrade the quality of the environment. The CPHP EIR will evaluate the potential for development under the proposed CPHP to substantially reduce the habitat of a fish or wildlife species, cause a fish or wildlife population to drop below self-sustaining levels, threaten to eliminate a plant or animal community, reduce the number or restrict the range of a rare or endangered plant or animal or eliminate important examples of the major periods of California history or prehistory.

b) The proposed CPHP would add approximately 2.9 million gsf of new clinical and academic space, support facilities, and student housing to the Parnassus Heights campus site. In addition, the proposed CPHP would increase campus population by approximately 7,900. The CPHP EIR will evaluate whether the potential impacts of development under the proposed CPHP, combined with other current projects and probable future projects and projected regional growth in the surrounding area, would be cumulatively considerable.

c) As indicated in the discussions of each topic above, development under the proposed CPHP has the potential to result in significant impacts. The CPHP EIR will evaluate whether any of those impacts have the potential to result in substantial adverse effects on human beings either directly or indirectly.

Appendix B
EIR Scoping Comments

Agency Letters

Organization Letters

Individual Letters

Scoping Meeting

Agency Letters

STATE OF CALIFORNIA
Governor's Office of Planning and Research
State Clearinghouse and Planning Unit

Gavin Newsom
Governor

Kate Gordon
Director

Notice of Preparation

January 14, 2020

To: Reviewing Agencies

Re: University of California, San Francisco (UCSF) Comprehensive Parnassus Heights Plan
SCH# 2020010175

Attached for your review and comment is the Notice of Preparation (NOP) for the University of California, San Francisco (UCSF) Comprehensive Parnassus Heights Plan draft Environmental Impact Report (EIR).

Responsible agencies must transmit their comments on the scope and content of the NOP, focusing on specific information related to their own statutory responsibility, within 30 days of receipt of the NOP from the Lead Agency. This is a courtesy notice provided by the State Clearinghouse with a reminder for you to comment in a timely manner. We encourage other agencies to also respond to this notice and express their concerns early in the environmental review process.

Please direct your comments to:

Diane Wong
University of California, Regents of the
UCSF Campus Planning, 654 Minnesota Street
San Francisco, CA 94143-0286

with a copy to the State Clearinghouse in the Office of Planning and Research at state.clearinghouse@opr.ca.gov . Please refer to the SCH number noted above in all correspondence concerning this project on our website: https://ceqanet.opr.ca.gov/2020010175/2.

If you have any questions about the environmental document review process, please call the State Clearinghouse at (916) 445-0613.

Sincerely,

Scott Morgan
Director, State Clearinghouse

2020010175

Notice of Completion & Environmental Document Transmittal

Mail to: State Clearinghouse, P. O. Box 3044, Sacramento, CA 95812-3044 (916) 445-0613
For Hand Delivery/Street Address: 1400 Tenth Street, Sacramento, CA 95814

Project Title: University of California, San Francisco (UCSF) Comprehensive Parnassus Heights Plan

Lead Agency: The Regents of the University of California — Contact Person: Diane Wong, UCSF
Mailing Address: UCSF Campus Planning, 654 Minnesota Street — Phone: (415) 502-5952
City: San Francisco — Zip: 94143-0286 — County: San Francisco

Project Location: County: San Francisco — City/Nearest Community: San Francisco
Cross Streets: Parnassus Avenue, generally between 5th Ave. and east of Medical Center Way; Irving Street at Arguello; Clarendon Ave. at Johnstone Drive — Zip Code: 94143
Lat. / Long. (degrees, minutes, and seconds): ____° ____′ ____″ N/ ____° ____′ ____″ W — Total Acres:

Assessor's Parcel No.: 2634A/011 & 005; 1849/054; 1850/001; 1758/043; 1757/035; 1756/001; 1275A/030 — Section: -- Twp.: -- Range: -- Base: --
Within 2 Miles: State Hwy #: CA Hwy 1 — Waterways: --
Airports: -- — Railways: Muni — Schools: SFUSD

Document Type:

CEQA: ☒ NOP ☐ Early Cons ☐ Neg Dec ☐ Mit Neg Dec ☐ Draft EIR ☐ Supplement/Subsequent EIR (Prior SCH No.) Other ____
NEPA: ☐ NOI ☐ EA ☐ Draft EIS ☐ FONSI
Other: ☐ Joint Document ☐ Final Document ☐ Other

Governor's Office of Planning & Research
JAN 14 2020
STATE CLEARINGHOUSE

Local Action Type:

☐ General Plan Update ☐ General Plan Amendment ☐ General Plan Element ☐ Community Plan
☐ Specific Plan ☐ Master Plan ☐ Planned Unit Development ☐ Site Plan
☐ Rezone ☐ Prezone ☐ Use Permit ☐ Land Division (Subdivision, etc.)
☐ Annexation ☐ Redevelopment ☐ Coastal Permit ☒ Other UCSF CPHP

Development Type:

☐ Residential: Units ____ Acres ____
☐ Office: Sq.ft. ____ Acres ____ Employees ____
☐ Commercial: Sq.ft. ____ Acres ____ Employees ____
☐ Industrial: Sq.ft. ____ Acres ____ Employees ____
☒ Educational 2.9 million gsf new building space, including clinical, research, educational, and housing
☐ Recreational ____
☐ Water Facilities: Type ____ MGD ____
☐ Transportation: Type ____
☐ Mining: Mineral ____
☐ Power: Type ____ MW ____
☐ Waste Treatment: Type MGD ____
☐ Hazardous Waste: Type ____
☐ Other: ____

Project Issues Discussed in Document:

☒ Aesthetic/Visual
☒ Agricultural Land
☒ Air Quality
☒ Archeological/Historical
☒ Biological Resources
☐ Coastal Zone
☒ Drainage/Absorption
☒ Economic/Jobs
☐ Fiscal
☒ Flood Plain/Flooding
☒ Forest Land/Fire Hazard
☒ Geologic/Seismic
☒ Minerals
☒ Noise
☒ Population/Housing Balance
☒ Public Services/Facilities
☒ Recreation/Parks
☒ Schools/Universities
☐ Septic Systems
☒ Sewer Capacity
☒ Soil Erosion/Compaction/Grading
☒ Solid Waste
☒ Toxic/Hazardous
☒ Traffic/Circulation
☒ Vegetation
☒ Water Quality
☒ Water Supply/Groundwater
☒ Wetland/Riparian
☒ Growth Inducement
☒ Land Use
☒ Cumulative Effects
☐ Other: ____

Present Land Use/Zoning/General Plan Designation:

Development and land uses of the University of California, San Francisco (UCSF) are guided by the UCSF 2014 Long Range Development Plan (LRDP). UCSF is not subject to local zoning, but City of San Francisco zoning is identified below for informational purposes.

City of San Francisco Zoning Districts: P (Public), and Residential House District, Two-Familly (RH-2). City of San Francisco Height and Bulk Districts: 25-X, 40-X, 65-D, 80-D, 130-D, and 220-F.

Note: The state Clearinghouse will assign identification numbers for all new projects. If a SCH number already exists for a project (e.g. Notice of Preparation or previous draft document) please fill in.

NOP Distribution List

County: San Francisco OR

SCH# 2020010175

Resources Agency

- ■ **Resources Agency** Nadell Gayou
- ☐ **Dept. of Boating & Waterways** Denise Peterson
- ☐ **California Coastal Commission** Allyson Hitt
- ☐ **Colorado River Board** Elsa Contreras
- ☐ **Dept. of Conservation** Crina Chan
- ☐ **Cal Fire** Dan Foster
- ☐ **Central Valley Flood Protection Board** James Herota
- ■ **Office of Historic Preservation** Ron Parsons
- ■ **Dept of Parks & Recreation** Environmental Stewardship Section
- ■ **S.F. Bay Conservation & Dev't. Comm.** Steve Goldbeck
- ■ **Dept. of Water Resources** Resources Agency Nadell Gayou

Fish and Wildlife

- ☐ **Depart. of Fish & Wildlife** Scott Flint Environmental Services Division
- ☐ **Fish & Wildlife Region 1** Curt Babcock
- ☐ **Fish & Wildlife Region 1E** Laurie Harnsberger
- ☐ **Fish & Wildlife Region 2** Jeff Drongesen
- ■ **Fish & Wildlife Region 3** Craig Weightman
- ☐ **Fish & Wildlife Region 4** Julie Vance
- ☐ **Fish & Wildlife Region 5** Leslie Newton-Reed Habitat Conservation Program
- ☐ **Fish & Wildlife Region 6** Tiffany Ellis Habitat Conservation Program
- ☐ **Fish & Wildlife Region 6 I/M** Heidi Calvert Inyo/Mono, Habitat Conservation Program
- ☐ **Dept. of Fish & Wildlife M** William Paznokas Marine Region

Other Departments

- ■ **California Department of Education** Lesley Taylor
- ■ **OES (Office of Emergency Services)** Monique Wilber
- ☐ **Food & Agriculture** Sandra Schubert Dept. of Food and Agriculture
- ■ **Dept. of General Services** Cathy Buck Environmental Services Section
- ■ **Housing & Comm. Dev.** CEQA Coordinator Housing Policy Division

Independent Commissions,Boards

- ☐ **Delta Protection Commission** Erik Vink
- ☐ **Delta Stewardship Council** Anthony Navasero
- ☐ **California Energy Commission** Eric Knight
- ■ **Native American Heritage Comm.** Debbie Treadway
- ■ **Public Utilities Commission** Supervisor
- ☐ **Santa Monica Bay Restoration** Guangyu Wang
- ■ **State Lands Commission** Jennifer Deleong
- ☐ **Tahoe Regional Planning Agency (TRPA)** Cherry Jacques

Cal State Transportation Agency CalSTA

- ☐ **Caltrans - Division of Aeronautics** Philip Crimmins
- ☐ **Caltrans – Planning HQ LD-IGR** Christian Bushong
- ■ **California Highway Patrol** Suzann Ikeuchi Office of Special Projects

Dept. of Transportation

- ☐ **Caltrans, District 1** Rex Jackman
- ☐ **Caltrans, District 2** Marcelino Gonzalez
- ☐ **Caltrans, District 3** Susan Zanchi
- ■ **Caltrans, District 4** Patricia Maurice
- ☐ **Caltrans, District 5** Larry Newland
- ☐ **Caltrans, District 6** Michael Navarro
- ☐ **Caltrans, District 7** Dianna Watson
- ☐ **Caltrans, District 8** Mark Roberts
- ☐ **Caltrans, District 9** Gayle Rosander
- ☐ **Caltrans, District 10** Tom Dumas
- ☐ **Caltrans, District 11** Jacob Armstrong
- ☐ **Caltrans, District 12** Maureen El Harake

Cal EPA

Air Resources Board

- ☐ **Airport & Freight** Jack Wursten
- ☐ **Transportation Projects** Nesamani Kalandiyur
- ☐ **Industrial/Energy Projects** Mike Tollstrup
- ■ **California Department of Resources, Recycling & Recovery** Kevin Taylor/Jeff Esquivel
- ☐ **State Water Resources Control Board** Regional Programs Unit Division of Financial Assistance
- ☐ **State Water Resources Control Board** Cindy Forbes – Asst Deputy Division of Drinking Water
- ☐ **State Water Resources Control Board Div. Drinking Water #**________
- ■ **State Water Resources Control Board** Student Intern, 401 Water Quality Certification Unit Division of Water Quality
- ☐ **State Water Resouces Control Board** Phil Crader Division of Water Rights
- ■ **Dept. of Toxic Substances Control Reg. #**________ CEQA Tracking Center
- ☐ **Department of Pesticide Regulation** CEQA Coordinator

Regional Water Quality Control Board (RWQCB)

- ☐ **RWQCB 1** Cathleen Hudson North Coast Region (1)
- ■ **RWQCB 2** Environmental Document Coordinator San Francisco Bay Region (2)
- ☐ **RWQCB 3** Central Coast Region (3)
- ☐ **RWQCB 4** Teresa Rodgers Los Angeles Region (4)
- ☐ **RWQCB 5S** Central Valley Region (5)
- ☐ **RWQCB 5F** Central Valley Region (5) Fresno Branch Office
- ☐ **RWQCB 5R** Central Valley Region (5) Redding Branch Office
- ☐ **RWQCB 6** Lahontan Region (6)
- ☐ **RWQCB 6V** Lahontan Region (6) Victorville Branch Office
- ☐ **RWQCB 7** Colorado River Basin Region (7
- ☐ **RWQCB 8** Santa Ana Region (8)
- ☐ **RWQCB 9** San Diego Region (9)
- ■ Other OSHPD
- ☐ ________ Conservancy

Last Updated 5/22/18

NATIVE AMERICAN HERITAGE COMMISSION

NAHC HEADQUARTERS
1550 Harbor Boulevard
Suite 100
West Sacramento,
California 95691
(916) 373-3710
nahc@nahc.ca.gov
NAHC.ca.gov

January 15, 2020

Diane Wong
University of California, Regents of the
UCSF Campus Planning, 654 Minnesota Street
San Francisco, CA 94143-0286

Re: 2020010175, University of California, San Francisco (UCSF) Comprehensive Parnassus Heights Plan Project, San Francisco County

Dear Ms. Wong:

The Native American Heritage Commission (NAHC) has received the Notice of Preparation (NOP), Draft Environmental Impact Report (DEIR) or Early Consultation for the project referenced above. The California Environmental Quality Act (CEQA) (Pub. Resources Code §21000 et seq.), specifically Public Resources Code §21084.1, states that a project that may cause a substantial adverse change in the significance of a historical resource, is a project that may have a significant effect on the environment. (Pub. Resources Code § 21084.1; Cal. Code Regs., tit.14, §15064.5 (b) (CEQA Guidelines §15064.5 (b)). If there is substantial evidence, in light of the whole record before a lead agency, that a project may have a significant effect on the environment, an Environmental Impact Report (EIR) shall be prepared. (Pub. Resources Code §21080 (d); Cal. Code Regs., tit. 14, § 5064 subd.(a)(1) (CEQA Guidelines §15064 (a)(1)). In order to determine whether a project will cause a substantial adverse change in the significance of a historical resource, a lead agency will need to determine whether there are historical resources within the area of potential effect (APE).

CEQA was amended significantly in 2014. Assembly Bill 52 (Gatto, Chapter 532, Statutes of 2014) (AB 52) amended CEQA to create a separate category of cultural resources, "tribal cultural resources" (Pub. Resources Code §21074) and provides that a project with an effect that may cause a substantial adverse change in the significance of a tribal cultural resource is a project that may have a significant effect on the environment. (Pub. Resources Code §21084.2). Public agencies shall, when feasible, avoid damaging effects to any tribal cultural resource. (Pub. Resources Code §21084.3 (a)). **AB 52 applies to any project for which a notice of preparation, a notice of negative declaration, or a mitigated negative declaration is filed on or after July 1, 2015.** If your project involves the adoption of or amendment to a general plan or a specific plan, or the designation or proposed designation of open space, on or after March 1, 2005, it may also be subject to Senate Bill 18 (Burton, Chapter 905, Statutes of 2004) (SB 18). **Both SB 18 and AB 52 have tribal consultation requirements**. If your project is also subject to the federal National Environmental Policy Act (42 U.S.C. § 4321 et seq.) (NEPA), the tribal consultation requirements of Section 106 of the National Historic Preservation Act of 1966 (154 U.S.C. 300101, 36 C.F.R. §800 et seq.) may also apply.

The NAHC recommends consultation with California Native American tribes that are traditionally and culturally affiliated with the geographic area of your proposed project as early as possible in order to avoid inadvertent discoveries of Native American human remains and best protect tribal cultural resources. Below is a brief summary of portions of AB 52 and SB 18 as well as the NAHC's recommendations for conducting cultural resources assessments.

Consult your legal counsel about compliance with AB 52 and SB 18 as well as compliance with any other applicable laws.

AB 52

AB 52 has added to CEQA the additional requirements listed below, along with many other requirements:

1. Fourteen Day Period to Provide Notice of Completion of an Application/Decision to Undertake a Project: Within fourteen (14) days of determining that an application for a project is complete or of a decision by a public agency to undertake a project, a lead agency shall provide formal notification to a designated contact of, or tribal representative of, traditionally and culturally affiliated California Native American tribes that have requested notice, to be accomplished by at least one written notice that includes:

- **a.** A brief description of the project.
- **b.** The lead agency contact information.
- **c.** Notification that the California Native American tribe has 30 days to request consultation. (Pub. Resources Code §21080.3.1 (d)).
- **d.** A "California Native American tribe" is defined as a Native American tribe located in California that is on the contact list maintained by the NAHC for the purposes of Chapter 905 of Statutes of 2004 (SB 18). (Pub. Resources Code §21073).

2. Begin Consultation Within 30 Days of Receiving a Tribe's Request for Consultation and Before Releasing a Negative Declaration, Mitigated Negative Declaration, or Environmental Impact Report: A lead agency shall begin the consultation process within 30 days of receiving a request for consultation from a California Native American tribe that is traditionally and culturally affiliated with the geographic area of the proposed project. (Pub. Resources Code §21080.3.1, subds. (d) and (e)) and prior to the release of a negative declaration, mitigated negative declaration or Environmental Impact Report. (Pub. Resources Code §21080.3.1(b)).

- **a.** For purposes of AB 52, "consultation shall have the same meaning as provided in Gov. Code §65352.4 (SB 18). (Pub. Resources Code §21080.3.1 (b)).

3. Mandatory Topics of Consultation If Requested by a Tribe: The following topics of consultation, if a tribe requests to discuss them, are mandatory topics of consultation:

- **a.** Alternatives to the project.
- **b.** Recommended mitigation measures.
- **c.** Significant effects. (Pub. Resources Code §21080.3.2 (a)).

4. Discretionary Topics of Consultation: The following topics are discretionary topics of consultation:

- **a.** Type of environmental review necessary.
- **b.** Significance of the tribal cultural resources.
- **c.** Significance of the project's impacts on tribal cultural resources.
- **d.** If necessary, project alternatives or appropriate measures for preservation or mitigation that the tribe may recommend to the lead agency. (Pub. Resources Code §21080.3.2 (a)).

5. Confidentiality of Information Submitted by a Tribe During the Environmental Review Process: With some exceptions, any information, including but not limited to, the location, description, and use of tribal cultural resources submitted by a California Native American tribe during the environmental review process shall not be included in the environmental document or otherwise disclosed by the lead agency or any other public agency to the public, consistent with Government Code §6254 (r) and §6254.10. Any information submitted by a California Native American tribe during the consultation or environmental review process shall be published in a confidential appendix to the environmental document unless the tribe that provided the information consents, in writing, to the disclosure of some or all of the information to the public. (Pub. Resources Code §21082.3 (c)(1)).

6. Discussion of Impacts to Tribal Cultural Resources in the Environmental Document: If a project may have a significant impact on a tribal cultural resource, the lead agency's environmental document shall discuss both of the following:

- **a.** Whether the proposed project has a significant impact on an identified tribal cultural resource.
- **b.** Whether feasible alternatives or mitigation measures, including those measures that may be agreed to pursuant to Public Resources Code §21082.3, subdivision (a), avoid or substantially lessen the impact on the identified tribal cultural resource. (Pub. Resources Code §21082.3 (b)).

7. Conclusion of Consultation: Consultation with a tribe shall be considered concluded when either of the following occurs:

a. The parties agree to measures to mitigate or avoid a significant effect, if a significant effect exists, on a tribal cultural resource; or

b. A party, acting in good faith and after reasonable effort, concludes that mutual agreement cannot be reached. (Pub. Resources Code §21080.3.2 (b)).

8. Recommending Mitigation Measures Agreed Upon in Consultation in the Environmental Document: Any mitigation measures agreed upon in the consultation conducted pursuant to Public Resources Code §21080.3.2 shall be recommended for inclusion in the environmental document and in an adopted mitigation monitoring and reporting program, if determined to avoid or lessen the impact pursuant to Public Resources Code §21082.3, subdivision (b), paragraph 2, and shall be fully enforceable. (Pub. Resources Code §21082.3 (a)).

9. Required Consideration of Feasible Mitigation: If mitigation measures recommended by the staff of the lead agency as a result of the consultation process are not included in the environmental document or if there are no agreed upon mitigation measures at the conclusion of consultation, or if consultation does not occur, and if substantial evidence demonstrates that a project will cause a significant effect to a tribal cultural resource, the lead agency shall consider feasible mitigation pursuant to Public Resources Code §21084.3 (b). (Pub. Resources Code §21082.3 (e)).

10. Examples of Mitigation Measures That, If Feasible, May Be Considered to Avoid or Minimize Significant Adverse Impacts to Tribal Cultural Resources:

a. Avoidance and preservation of the resources in place, including, but not limited to:

i. Planning and construction to avoid the resources and protect the cultural and natural context.

ii. Planning greenspace, parks, or other open space, to incorporate the resources with culturally appropriate protection and management criteria.

b. Treating the resource with culturally appropriate dignity, taking into account the tribal cultural values and meaning of the resource, including, but not limited to, the following:

i. Protecting the cultural character and integrity of the resource.

ii. Protecting the traditional use of the resource.

iii. Protecting the confidentiality of the resource.

c. Permanent conservation easements or other interests in real property, with culturally appropriate management criteria for the purposes of preserving or utilizing the resources or places.

d. Protecting the resource. (Pub. Resource Code §21084.3 (b)).

e. Please note that a federally recognized California Native American tribe or a non-federally recognized California Native American tribe that is on the contact list maintained by the NAHC to protect a California prehistoric, archaeological, cultural, spiritual, or ceremonial place may acquire and hold conservation easements if the conservation easement is voluntarily conveyed. (Civ. Code §815.3 (c)).

f. Please note that it is the policy of the state that Native American remains and associated grave artifacts shall be repatriated. (Pub. Resources Code §5097.991).

11. Prerequisites for Certifying an Environmental Impact Report or Adopting a Mitigated Negative Declaration or Negative Declaration with a Significant Impact on an Identified Tribal Cultural Resource: An Environmental Impact Report may not be certified, nor may a mitigated negative declaration or a negative declaration be adopted unless one of the following occurs:

a. The consultation process between the tribes and the lead agency has occurred as provided in Public Resources Code §21080.3.1 and §21080.3.2 and concluded pursuant to Public Resources Code §21080.3.2.

b. The tribe that requested consultation failed to provide comments to the lead agency or otherwise failed to engage in the consultation process.

c. The lead agency provided notice of the project to the tribe in compliance with Public Resources Code §21080.3.1 (d) and the tribe failed to request consultation within 30 days. (Pub. Resources Code §21082.3 (d)).

The NAHC's PowerPoint presentation titled, "Tribal Consultation Under AB 52: Requirements and Best Practices" may be found online at: http://nahc.ca.gov/wp-content/uploads/2015/10/AB52TribalConsultation_CalEPAPDF.pdf

SB 18

SB 18 applies to local governments and requires local governments to contact, provide notice to, refer plans to, and consult with tribes prior to the adoption or amendment of a general plan or a specific plan, or the designation of open space. (Gov. Code §65352.3). Local governments should consult the Governor's Office of Planning and Research's "Tribal Consultation Guidelines," which can be found online at: https://www.opr.ca.gov/docs/09_14_05_Updated_Guidelines_922.pdf.

Some of SB 18's provisions include:

1. Tribal Consultation: If a local government considers a proposal to adopt or amend a general plan or a specific plan, or to designate open space it is required to contact the appropriate tribes identified by the NAHC by requesting a "Tribal Consultation List." If a tribe, once contacted, requests consultation the local government must consult with the tribe on the plan proposal. **A tribe has 90 days from the date of receipt of notification to request consultation unless a shorter timeframe has been agreed to by the tribe.** (Gov. Code §65352.3 (a)(2)).

2. No Statutory Time Limit on SB 18 Tribal Consultation. There is no statutory time limit on SB 18 tribal consultation.

3. Confidentiality: Consistent with the guidelines developed and adopted by the Office of Planning and Research pursuant to Gov. Code §65040.2, the city or county shall protect the confidentiality of the information concerning the specific identity, location, character, and use of places, features and objects described in Public Resources Code §5097.9 and §5097.993 that are within the city's or county's jurisdiction. (Gov. Code §65352.3 (b)).

4. Conclusion of SB 18 Tribal Consultation: Consultation should be concluded at the point in which:

  a. The parties to the consultation come to a mutual agreement concerning the appropriate measures for preservation or mitigation; or

  b. Either the local government or the tribe, acting in good faith and after reasonable effort, concludes that mutual agreement cannot be reached concerning the appropriate measures of preservation or mitigation. (Tribal Consultation Guidelines, Governor's Office of Planning and Research (2005) at p. 18).

Agencies should be aware that neither AB 52 nor SB 18 precludes agencies from initiating tribal consultation with tribes that are traditionally and culturally affiliated with their jurisdictions before the timeframes provided in AB 52 and SB 18. For that reason, we urge you to continue to request Native American Tribal Contact Lists and "Sacred Lands File" searches from the NAHC. The request forms can be found online at: http://nahc.ca.gov/resources/forms/.

NAHC Recommendations for Cultural Resources Assessments

To adequately assess the existence and significance of tribal cultural resources and plan for avoidance, preservation in place, or barring both, mitigation of project-related impacts to tribal cultural resources, the NAHC recommends the following actions:

1. Contact the appropriate regional California Historical Research Information System (CHRIS) Center (http://ohp.parks.ca.gov/?page_id=1068) for an archaeological records search. The records search will determine:

  a. If part or all of the APE has been previously surveyed for cultural resources.

  b. If any known cultural resources have already been recorded on or adjacent to the APE.

  c. If the probability is low, moderate, or high that cultural resources are located in the APE.

  d. If a survey is required to determine whether previously unrecorded cultural resources are present.

2. If an archaeological inventory survey is required, the final stage is the preparation of a professional report detailing the findings and recommendations of the records search and field survey.

  a. The final report containing site forms, site significance, and mitigation measures should be submitted immediately to the planning department. All information regarding site locations, Native American human remains, and associated funerary objects should be in a separate confidential addendum and not be made available for public disclosure.

b. The final written report should be submitted within 3 months after work has been completed to the appropriate regional CHRIS center.

3. Contact the NAHC for:

a. A Sacred Lands File search. Remember that tribes do not always record their sacred sites in the Sacred Lands File, nor are they required to do so. A Sacred Lands File search is not a substitute for consultation with tribes that are traditionally and culturally affiliated with the geographic area of the project's APE.

b. A Native American Tribal Consultation List of appropriate tribes for consultation concerning the project site and to assist in planning for avoidance, preservation in place, or, failing both, mitigation measures.

4. Remember that the lack of surface evidence of archaeological resources (including tribal cultural resources) does not preclude their subsurface existence.

a. Lead agencies should include in their mitigation and monitoring reporting program plan provisions for the identification and evaluation of inadvertently discovered archaeological resources per Cal. Code Regs., tit. 14, §15064.5(f) (CEQA Guidelines §15064.5(f)). In areas of identified archaeological sensitivity, a certified archaeologist and a culturally affiliated Native American with knowledge of cultural resources should monitor all ground-disturbing activities.

b. Lead agencies should include in their mitigation and monitoring reporting program plans provisions for the disposition of recovered cultural items that are not burial associated in consultation with culturally affiliated Native Americans.

c. Lead agencies should include in their mitigation and monitoring reporting program plans provisions for the treatment and disposition of inadvertently discovered Native American human remains. Health and Safety Code §7050.5, Public Resources Code §5097.98, and Cal. Code Regs., tit. 14, §15064.5, subdivisions (d) and (e) (CEQA Guidelines §15064.5, subds. (d) and (e)) address the processes to be followed in the event of an inadvertent discovery of any Native American human remains and associated grave goods in a location other than a dedicated cemetery.

If you have any questions or need additional information, please contact me at my email address: Nancy.Gonzalez-Lopez@nahc.ca.gov.

Sincerely,

Nancy Gonzalez

Nancy Gonzalez-Lopez
Staff Services Analyst

cc: State Clearinghouse

DEPARTMENT OF TRANSPORTATION
DISTRICT 4
OFFICE OF TRANSIT AND COMMUNITY PLANNING
P.O. BOX 23660, MS-10D
OAKLAND, CA 94623-0660
PHONE (510) 286-5528
TTY 711
www.dot.ca.gov

Making Conservation
a California Way of Life.

January 29, 2020

SCH #2020010175
GTS # 04-SF-2020-00303
GTS ID: 18365
SF/1/PM 3.61

Diane Wong, Principal Planner
UCSF Campus Planning
654 Minnesota Street
San Francisco, CA 94143-0286

University of California, San Francisco (UCSF) Comprehensive Parnassus Heights Plan – Notice of Preparation (NOP)

Dear Diane Wong:

Thank you for including the California Department of Transportation (Caltrans) in the environmental review process for the UCSF Comprehensive Parnassus Heights Plan. We are committed to ensuring that impacts to the State's multimodal transportation system and to our natural environment are identified and mitigated to support a safe, sustainable, integrated and efficient transportation system. The following comments are based on our review of the January 2020 NOP.

Project Understanding

The Regents of the University of California propose the Comprehensive Parnassus Heights Plan (CPHP), which is a conceptual, flexible plan to meet projected space needs for critical programs in research, patient care, and education at Parnassus Heights, while improving upon the aesthetic and functional design of the campus environment. The CPHP also includes opportunities for development of needed on-campus housing. The CPHP establishes a long-term development framework for the revitalization of the physical environment at Parnassus Heights, by identifying opportunity sites for new buildings and major renovations of existing buildings; candidate buildings for demolition; opportunities for development of open spaces; and opportunities for improvements to on-campus mobility and circulation. The CPHP includes an Initial Phase that primarily comprises: 1) Irving Street Arrival improvements, 2) Research and Academic Building, 3) Initial Aldea Housing Densification, and 4) New Hospital; as well as other Initial Phase activities. This phase is anticipated to be completed by approximately year 2030. Beyond the Initial Phase, the "Future Phase" encompasses the remaining development described in the CPHP envisioned for completion by the horizon year of 2050. Regional access is provided from State Route (SR)-1 approximately 0.82-mile away.

Multimodal Planning
The project's primary and secondary effects on pedestrians, bicyclists, travelers with disabilities, and transit users should be evaluated, including countermeasures and trade-offs resulting from mitigating Vehicle Miles Traveled (VMT) increases. Access for pedestrians and bicyclists to transit facilities must be maintained. These smart growth approaches can be consistent with Metropolitan Transportation Commission's Regional Transportation Plan/Sustainable Communities Strategies and would help meet Caltrans Strategic Management Plan targets.

Vehicle Trip Reduction
Given the place, type and size of the project, it should include a robust Transportation Demand Management (TDM) Program to reduce VMT and greenhouse gas emissions. Such measures are critical to facilitating efficient site access. The measures listed below can promote smart mobility and reduce regional VMT.

- Project design to encourage walking, bicycling and transit access;
- Transit and trip planning resources such as a commute information kiosk;
- Real-time transit information system;
- Transit subsidies on an ongoing basis;
- Ten percent vehicle parking reductions;
- Charging stations and designated parking spaces for electric vehicles;
- Carpool and clean-fuel parking spaces;
- Designated parking spaces for a car share program;
- Unbundled parking;
- Showers, changing rooms and clothing lockers for employees that commute via active transportation;
- Emergency Ride Home program;
- Employee transportation coordinator;
- Increasing access to common goods and services, such as groceries and daycare;
- Incorporating affordable housing into the project;
- Secured bicycle storage facilities;
- Fix-it bicycle repair station(s);
- Bicycle route mapping resources;

- Participation in a Transportation Management Association (TMA) in partnership with other developments in the area; and
- Aggressive trip reduction targets with Lead Agency monitoring and enforcement.

TDM programs should be documented with annual monitoring reports by a TDM coordinator to demonstrate effectiveness. If the project does not achieve the VMT reduction goals, the reports should also include next steps to take in order to achieve those targets. Also, reducing parking supply can encourage active forms of transportation, reduce regional VMT, and lessen future transportation impacts on State facilities.

For additional TDM options, please refer to the Federal Highway Administration's *Integrating Demand Management into the Transportation Planning Process: A Desk Reference* (Chapter 8). The reference is available online at: http://www.ops.fhwa.dot.gov/publications/fhwahop12035/fhwahop12035.pdf.

Transportation Impact Fees
UCSF should identify project-generated travel demand and estimate the costs of transit and active transportation improvements necessitated by the proposed project; viable funding sources such as development and/or transportation impact fees should also be identified. We encourage a sufficient allocation of fair share contributions toward multimodal and regional transit improvements to fully mitigate cumulative impacts to regional transportation. We also strongly support measures to increase sustainable mode shares, thereby reducing VMT.

The UCSF should also ensure that a capital improvement plan identifying the cost of needed improvements, funding sources, and a scheduled plan for implementation is prepared. Caltrans welcomes the opportunity to work with the Lead Agency and local partners to secure the funding for needed mitigation. Traffic mitigation- or cooperative agreements are examples of such measures.

Lead Agency
As the Lead Agency, the University of California is responsible for all project mitigation, including any needed improvements to the State Transportation Network (STN). The project's fair share contribution, financing, scheduling, implementation responsibilities and lead agency monitoring should be fully discussed for all proposed mitigation measures.

Thank you again for including Caltrans in the environmental review process. Should you have any questions regarding this letter, please contact Andrew Chan at 510-622-5433 or andrew.chan@dot.ca.gov.

Sincerely,

Mark Leong

Mark Leong
District Branch Chief
Local Development - Intergovernmental Review

c: State Clearinghouse

February 10, 2020

Dianne Wong, Environmental Coordinator
UCSF Campus Planning
654 Minnesota Street
San Francisco, CA 94143-0286

RE: UCSF Comprehensive Parnassus Heights Plan – Notice of Preparation

Dear Ms. Wong,

Bay Area Air Quality Management District (Air District) staff has reviewed the Notice of Preparation (NOP) of an Environmental Impact Report (EIR) for the Comprehensive Parnassus Heights Plan (Project). The Project establishes a long-term development framework for growth including new research, patient care, education, housing and open space land uses; demolition and major renovations; and improvements to on-campus mobility and circulation. In total, the Project provides for development of approximately 2.9 million gross square feet of new building at the campus. The Initial Phase is anticipated to be completed by 2030; the next and final Future Phase is anticipated to be completed by 2050. Because the Project proposes to modify the Parnassus Heights development plans identified in the 2014 Long Range Development Plan (LRDP), an amendment to the 2014 LRDP is proposed as part of the Project.

Air District staff recommends the EIR include the following information and analysis:

- **The GHG impact analysis should include an evaluation of the Project's consistency with the most recent draft of the AB 32 Scoping Plan by the California Air Resources Board and with the State's 2030 and 2050 climate goals.** The Air District's current recommended GHG thresholds in our CEQA Guidelines are based on the State's 2020 GHG targets, which are now superseded by the 2030 GHG targets established in SB 32. The EIR should demonstrate how the Project will be consistent with the Scoping Plan.
- **The EIR should estimate and evaluate the potential health risk to existing and future sensitive populations within and near the Project area from toxic air contaminants (TACs) and fine particulate matter ($PM_{2.5}$) as a result of the Project's construction and operation.** Air District staff recommends that the EIR evaluate potential cumulative health risk impacts of TACs and $PM_{2.5}$ emissions on sensitive receptors within and near the Project area.

- **The EIR should include design features that lessen Project air quality and GHG impacts.** Examples of potential design features that lessen air quality and GHG impacts include, but are not limited to:
  - Creating a construction phase traffic management plan that reduces diesel equipment idling.
  - Creating a Transportation Demand Management Program that includes funding for zero-emission transportation projects, including a neighborhood electric vehicle program, community shuttle/van services and car sharing, and enhancement of active transportation initiatives, among others.
  - Providing the funding and infrastructure for new, and connections to existing bicycle and pedestrian projects that improve access to transit, employment, and major activity centers.
  - Prohibiting or minimizing the use of diesel fuel, consistent with the Air District's Diesel Free By '33 initiative (http://dieselfree33.baaqmd.gov/).
  - Implementing green infrastructure and fossil fuel alternatives in the development and operation of the Project, such as solar photovoltaic (PV) panels, renewable diesel, electric heat pump water heaters, and solar PV back-up generators with battery storage capacity.
  - Requiring construction vehicles to operate with the highest tier engines commercially available.
  - Implementing a zero-waste program consistent with SB 1383 organic waste disposal reduction targets including the recovery of edible food for human consumption.

  The EIR should prioritize onsite project features to reduce air quality and GHG impacts first. Only when onsite features have been exhausted should the EIR consider offsite mitigation measures within the Project area.

- **The EIR should evaluate the Project's consistency with the Air District's 2017 Clean Air Plan (2017 CAP).** The EIR should discuss 2017 CAP measures relevant to the Project and show the Project's consistency with the measures. The 2017 CAP can be found on the Air District's website: http://www.baaqmd.gov/plans-and-climate/air-quality-plans/current-plans.

- **The EIR should analyze the Project's consistency with the *2017 Greenhouse Gas Reduction Strategy Update,* the City and County of San Francisco's most recently adopted Climate Action Plan.** The *Strategy Update* can be found at this link: https://sfmea.sfplanning.org/GHG/GHG_Strategy_October2017.pdf. The EIR should also analyze the Project's consistency with the University of California's Carbon Neutrality Initiative.

- **The Air District's CEQA website contains several tools and resources to assist lead agencies in analyzing air quality and GHG impacts.** These tools include guidance on quantifying local emissions and exposure impacts. The tools can be found on the Air District's website: http://www.baaqmd.gov/plans-and-climate/california-environmental-quality-act-ceqa/ceqa-tools. If the Project requires a site-specific analysis, please contact Air District staff to obtain more recent data.

- **Certain aspects of the Project may require a permit from the Air District (for example, back-up diesel generators and hot water/space heat boilers).** Please contact Barry Young, Senior Advanced Projects Advisor, at (415) 749-4721 or byoung@baaqmd.gov to discuss permit requirements. Any applicable permit requirements should be discussed in the EIR. All stationary sources of air pollution should be described in the EIR.

We encourage UCSF to contact Air District staff with any questions and/or to request assistance during the environmental review process. If you have any questions regarding these comments, please contact Alison Kirk, Principal Environmental Planner, at 415-749-5169 or akirk@baaqmd.gov.

Sincerely,

Greg Nudd
Deputy Air Pollution Control Officer

cc: BAAQMD Director Shamann Walton
BAAQMD Director Tyrone Jue

Organization Letters

Sutro Stewards

Diane Wong
Principal Planner/Environmental Coordinator
UCSF Real Estate - Campus Planning
EIR@planning.ucsf.edu

Dear Ms. Wong,

Sutro Stewards has helped UCSF to protect and enhance the Mount Sutro Open Space Reserve since our formation in 2006. Our mission is to build community, connect people with nature, and to protect and enhance Mount Sutro, one of the City's wildest and most beautiful green spaces. We are deeply dedicated to keeping Mount Sutro healthy and accessible. Over the past 14 years, we have enhanced public access through a network of trails and worked to restore and conserve native plant habitat throughout the open space. All of our work has been supported by tens of thousands of volunteers.

Because of our commitment to this special place, we want to express our concerns about some aspects of UCSF's proposed Comprehensive Parnassus Heights Plan. In particular, we are concerned about a dramatic increase in the density of Aldea housing from 171 units to 271 units, increasing the population along with greatly increased transportation needs. Most impactful to open space users are the proposed sites where this development would occur.

Sutro Stewards relies heavily on the Aldea Center and Aldea parking to run our community volunteer events. Increasing residential density closest to the forest and our nursery will impact our ability to use these spaces and, therefore, our ability to attract volunteers who support our beneficial programs. We are also concerned that densification and increased building heights will undermine the unique aesthetics, views, wildness, and user experience that make Mount Sutro such a valuable place for connecting to nature. In addition, we believe that wildlife, including sensitive bird species, butterflies, mammals, and native plant populations could be adversely affected by the proposed building locations, increased light pollution, noise pollution, traffic, and human interaction. In addition to impacts during demolition and construction, increased building heights will potentially alter local climate, wind, and sunlight patterns. We believe all potential impacts related to aesthetics, biological resources, geology, soils, and transportation should be thoroughly evaluated including looking at the use of alternate Aldea sites at lower elevations so that no development extends higher than current existing rooftops.

Sutro Stewards wishes to support UCSF in ensuring that Mount Sutro remains a healthy ecological oasis that provides UCSF students, faculty, staff, and San Francisco residents a natural refuge for walking, running, biking, and connecting with nature. Please support our concerns by working to minimize impacts to the Mount Sutro Open Space by incorporating our suggestions into your plans.

Sincerely,

Craig Dawson

Craig Dawson
Senior Program Advisor, Sutro Stewards
craig@sutrostewards.org

Individual Letters

From:	Roger Hofmann
To:	Campus Planning - EIR
Cc:	Maria Wabl; Antenore, Dennis
Subject:	Comments to the initial study
Date:	Thursday, February 6, 2020 5:42:53 PM
Attachments:	UCSF Kirkham Project IS - UCSF Comments - 2017-04-07.pdf

Dear Ms. Wong,

The attached document is the April 7, 2017 comments letter from UCSF regarding the scoping phase of a development proposed at 1530 - 1585 5th Avenue. This property is directly adjacent to the UCSF Parnassus Heights campus. A large number of concerns were cited by the author, Lori Yamauchi.

In the spirit of fairness, it is only fitting that the concerns UCSF expressed regarding the development of an adjacent property be applied to UCSF itself. I request that these concerns be considered in the scoping of future development of the UCSF campus.

Best regards,

Roger Hofmann

UCSF
University of California
San Francisco

Campus Planning

Real Estate, Planning, & Capital Programs

UCSF Box 0286
654 Minnesota Street, 2nd Floor
San Francisco, CA 94143

tel: 415.476.2911

Lori Yamauchi
Associate Vice Chancellor

lori.yamauchi@ucsf.edu
www.ucsf.edu

April 7, 2017

Lisa Gibson
Acting Environmental Review Officer
San Francisco Planning Department
1650 Mission Street, Suite 400
San Francisco, CA 94103

RE: Comments on 1530 5th Avenue (the Kirkham Project) Initial Study, Case No. 2014.1584ENV

Dear Ms. Gibson:

Thank you for the opportunity to review and comment on the Initial Study for the proposed project at 1530 5th Avenue (the Kirkham Project). The proposed project site directly abuts the University of California, San Francisco (UCSF) Parnasuss Heights campus, UCSF's oldest and largest campus site.

On the Parnassus Heights campus site, most of UCSF's educational, clinical, and research facilities are concentrated to the north, where Moffitt and Long Hospitals, UCSF's four schools (Medicine, Nursing, Dentistry, and Graduate Division), clinics, research, and parking are located. However, there are several important UCSF facilities in the vicinity of 5th Avenue and Kirkham Street that may be impacted by the proposed project. These facilities include the following:

- The Kirkham Child Development Center, a child care facility licensed for 93 children. Access to the facility is via Kirkham Street. Parking access to the facility is via a driveway at Kirkham Street and 4th Avenue. The facility includes an outdoor play area.

- The Proctor Foundation building is located on the southeast corner of 5th Avenue and Kirkham Street. It is a three-story structure containing patient care, research, and laboratory uses. The site includes a parking lot at the rear of the building. UCSF's 2014 Long Range Development Plan calls for the building to be demolished and replaced with housing or open space.

- The Westside Parking Lot, a 166-space surface parking lot, provides staff, patient and visitor parking adjacent to the UCSF School of Dentistry and Dentistry clinic. The lot also provides temporary parking for child drop-off at the Kirkham Child Development Center. The eastern portion of the parking lot at Kirkham Street at 4th Avenue provides access to the Dentistry building loading dock and trash/recycling pick-up area.

- 5th Avenue Housing. The residential structures on the east side of 5th Avenue between Parnassus Avenue and Kirkham Street are owned by UCSF and house UCSF faculty and their families.

- The Koret Vision Research building is located along Koret Way and occupied with ophthalmology research programs.

- UC Hall contains a mix of uses, including offices, research, and ophthalmology clinics accessed off Koret Way.

- Koret Way serves as a critical service roadway to the rear of the campus, behind buildings that front Parnassus Avenue. Koret Way terminates at the rear of the Nursing Building, providing limited access from that point to Saunders Court and the Health Sciences Institute Research towers. Parking along Koret Way is available to construction contractors, employees and patients.

- The Mount Sutro Open Space Reserve occupies the central and southern portion of the campus site and reaches 400 feet in elevation above Parnassus Avenue. The 61-acre Reserve is designated as permanent open space and is accessible to the public. A vegetation management plan for the Reserve is proposed by the University and a draft environmental impact report is being prepared. The project site abuts the Reserve on the project's east side.

Out of concern for impacts on the above UCSF facilities, we offer the following comments on the scope of the Draft EIR:

1. UCSF's Kirkham Child Development Center, the Proctor building, and 5th Avenue residential uses are located just north of the project site. During construction, maintaining emergency vehicle access and managing and mitigating construction impacts (air quality, dust, noise, and water quality) will be of the utmost concern to UCSF to maintain health and safety. We request that these topics be analyzed in the EIR.

2. Construction at the project site will involve extensive excavation and earth-moving activities that may have air quality impacts on children and residents in the area. Air quality impacts on these sensitive receptors should be studied in the EIR, and mitigation measures identified.

3. The Initial Study, Figure 8 on page 13 shows a "possible stair to forest overlook" on the northeast side of the site. It is unclear if this implies future access to UCSF's Mount Sutro Open Space Reserve. For safety and risk management reasons, UCSF has no plans to allow public access to the Reserve at this location.

4. On the UCSF campus, the Medical Research 4 (MR 4) and Laboratory of Radiobiology buildings have been demolished and the sites converted to parking areas. Please correct your maps to reflect this as an existing condition. Also, please note that the southern portion of the MR 4 parking lot may be developed with an expansion of the outdoor play yard for the nearby Kirkham Child Development Center in about year 2020 or later.

5. We would like to understand the shade/shadow impacts of the proposed project on the Kirkham Child Development Center and its current and future outdoor play yards.

6. Although CEQA Guidelines and the San Francisco Planning Department no longer require analysis of traffic impacts utilizing the level-of-service (LOS) methodology, we request that LOS analysis be prepared on a voluntary basis for this project. The 5th Avenue/Kirkham Street intersection is a critical access point to the UCSF campus, and it is important that an analysis of impacts at this intersection be evaluated in the EIR, both during construction and project operations.

7. Access to UCSF's Westside parking lot is on Kirkham Street just east of 5th Avenue. The potential for the project to impede access to this important parking and loading facility, both during construction and operation of the proposed project, should be analyzed in the EIR.

8. The proposed truck loading dock on Kirkham Street would be located directly across the street from the entrance to the Kirkham Child Development Center, where there is a frequent hub of activity with parents and children arriving and departing from the center on foot and by vehicle. This design concern was discussed in detail at a previous meeting. The ongoing activity projected to occur at the Kirkham Project truck loading entrance is of great concern – the frequency of trucks, and potential impacts related to traffic safety, pedestrian safety, noise, truck idling, and diesel fumes.

9. Although the creation of parking demand that is not met by the project would not be considered a significant impact under CEQA, we request that the project's estimated parking demand relative to the project's parking supply be evaluated in the EIR. In addition, the proposed project would involve the removal of several metered on-street parking spaces on Kirkham Street. The impacts of parking shortfalls, if any, should be discussed in the EIR.

10. We agree that the EIR should study the potential for the project to cause an increase in landslide risk. On page 100, it is stated that the project site is "not located in the immediate vicinity of any landslide prone areas." This statement is incorrect. Landslides have occurred in this area in the past, necessitating the construction of retaining walls: the large shotcrete retaining wall with tiebacks which currently exists on the project site on the south side of Kirkham Street at 4th Avenue, as well as the wood retaining wall on the UCSF campus along the east side of Koret Way.

11. Page 103. The Initial Study indicates that impacts related to hydrology will not be studied in the EIR. We believe changes to hydrological runoff may affect the potential for erosion and landslides, and therefore should be studied in the EIR.

12. The Initial Study does not mention the naturally-occuring asbestos that is likely to be encountered at the project site during excavation activities. This topic should be studied and mitigation measures should be identified in the EIR to protect nearby children, residents, employees, patients, and construction workers.

13. For public safety and aesthetic reasons, we request that the Kirkham Project developers initiate the required actions with the City and County of San Francisco for installation of new street lights and poles (consistent with the neighborhood street light standards) to replace the existing overhead power lines and poles. These new streetlights would connect to the already existing underground trenches constructed during the mid-1990s neighborhood-wide Inner Sunset Underground District.

14. UCSF's 2014 Long Range Development Plan Environmental Impact Report (LRDP EIR) included a list of potential UCSF projects to be undertaken through the LRDP horizon year of 2035, along with an estimate of when these projects might be implemented. To inform the cumulative analysis that must be undertaken in the Kirkham Project EIR, we have updated the UCSF project list (see attached).

15. In addition to the projects identified in the LRDP EIR, outside of the LRDP EIR UCSF proposes to approve and implement the Mount Sutro Vegetation Management Plan, for which an EIR is being prepared. The Initial Study is available on the UCSF Campus Planning website: https://campusplanning.ucsf.edu/. The Draft EIR will be available in summer 2017.

16. Also outside of the LRDP EIR, UCSF has initiated a complete renovation of the Clinical Sciences Building (CSB), which is currently on hold. The renovation of CSB is expected to resume in May 2017 and be completed between December 2018 and March 2019.

17. The San Francisco Municipal Transportation Agency (SFMTA) will be implementing a traffic-calming project at 5th Avenue / Kirkham Street. While the City's current schedule calls for the work to be completed before the Kirkham Project would break ground, it is possible that the traffic-calming project could be delayed and overlap with the construction of the Kirkham Project.

Should you have any questions about these comments, please contact me at (415) 476-8312, or Diane Wong of my staff at (415) 502-5952.

Sincerely,

Lori Yamauchi

Lori Yamauchi
Associate Vice Chancellor
UCSF Campus Planning

UCSF PROJECTS

Red text indicates a change from LRDP EIR Table 5-1

LRDP PROPOSAL CONSTRUCTION TIME FRAMES – PARNASSUS PROJECTS

As of April 7, 2017

Proposal Category	Proposal Title	Square Feet / Number of Dwelling Residential Units
2015 - 2019		
Demolition – completed	Medical Research 4 (PH)	12,300 gsf
Demolition – completed	Laboratory of Radiobiology (PH)	18,200 gsf
Demolition	Woods (PH)	3,900 gsf
Demolition	Surge (PH)	11,400 gsf
Other	Parnassus Avenue Streetscape Plan-Phase 1 (PH)	--
Other	Mount Sutro Open Space Reserve trails (PH)	--
Other	Medical gas storage tanks (PH)	--
2020 -2024		
Demolition	Proctor (PH)	9,900 gsf
Demolition	Langley Porter Psychiatric Institute and support structures (PH)	111,100 gsf
Renovation	UC Hall-Phase 1 (PH)	74,700 gsf/105 units
Renovation	Faculty Alumni House (PH)	7,400 gsf
Construction	Housing at Fifth and Parnassus Avenues (PH)	48,400 gsf/45 units
Construction	Proctor housing (PH)	30,400 gsf/32 units
Other	Parnassus Avenue Streetscape Plan-Phase 2 (PH)	--
Other	Saunders Court renovation (PH)	--
Other	Retaining wall (PH)	--
2025-2030		
Construction	New Hospital Addition (PH)	308,000 gsf
2031-2035		
Demolition	Koret Vision Research (PH)	43,000 gsf
Demolition	Environmental Health and Safety (PH)	6,200 gsf
Renovation	UC Hall-Phase 2 (PH)	68,300 gsf/64 units
Renovation	Millberry Union towers (PH)	46,600 gsf/83 units
Renovation	Moffitt Hospital (PH)	378,700 gsf

NON-UCSF PROJECTS

The Kirkham Project

http://sfmea.sfplanning.org/1530%205th%20Avenue%20NOP_IS_Published.pdf

http://thekirkhamproject.com/

Schedule: Construction starting summer 2018 and ending in winter 2020/2021.

The Overlook Project

http://www.sfoverlook.com/

http://sf.curbed.com/2016/11/10/13588440/overlook-crestmont-drive-sf

http://sfmea.sfplanning.org/2004.0093E_DEIR.pdf

http://sfmea.sfplanning.org/2004.0093E_RTC1.pdf

Schedule: Unknown. Approved by SF Planning Commission March 2013 and May 2015. Property recently sold?

Significant Natural Resources Areas Management Plan

http://sf-planning.org/environmental-impact-reports-negative-declarations

(numerous links on Planning Department EIR page. Click on link above and scroll down.)

Schedule: Unknown. Suggest contacting Recreation and Park Department regarding schedule for Interior Greenbelt.

From:	Roger Hofmann
To:	Campus Planning - EIR
Cc:	Maria Wabl; Antenore, Dennis
Subject:	Re: Comments to the initial study
Date:	Friday, February 7, 2020 2:20:49 PM
Attachments:	ucsf_hazard_mapping.pdf

Hi Diane,

I request that the attached document is included in your EIR analysis.

The attached document is a copy of the Haneberg, et. al., UCSF commissioned study of landslide hazard risk on the Parnassus Heights campus. The study is based on LiDAR data collected in November 2005 "*with vertical accuracy conforming to United States National Standard for Spatial Data Accuracy (NSSDA) and Federal Emergency Management Agency (FEMA) standards as shown for high resolution data*".

The subsequent computer analysis and computer generated risk maps included in the the document remain an authoritative source of information about landslide risk on the Parnassus Heights campus.

Abstract
We used airborne LiDAR (Light Detection And Ranging) to create a high-resolution digital elevation model (DEM) and produce landslide hazard maps of the University of California at San Francisco Parnassus Campus. Much of the campus consists of steep forested terrain, limiting the utility of aerial photographs and conventional topographic maps for landslide hazard mapping. The LiDAR DEM consisted of nearly 2.8 million interpolated elevation values covering approximately 100 hectares and posted on an 0.6 m horizontal grid. The primary deliverable product was a set of 16 maps. The first subset showed aspects of the topography useful for landslide mapping (e.g., shaded relief, contours, slope angle, surface roughness, and topographic contours), an engineering geologic map, and a qualitative slope hazard map. The second subset consisted of physics-based probabilistic landslide hazard maps for wet static, wet seismic, and dry seismic conditions using the computer program PISA-m. A third subset, not discussed in this paper, showed modeled runoff for a hypothetical storm and delineated watersheds on campus.

A cautionary message regarding campus development is found on page 14 of the report (emphasis mine):

The probabilistic models suggest that thin translational landsliding of the kind simulated by the infinite slope approximation should be restricted to a relatively small proportion of campus under wet static conditions. Many of these potentially unstable areas, however, are adjacent to roads, buildings, and parking lots (including off-campus property). Thus, the possibility that *landslides or rockfalls might block roads or partially cover parking lots during wet conditions should be taken into account by campus planners. The likelihood of the same general kinds of landslides increases for dry seismic conditions, although the general pattern of instability is similar.* ***Under wet seismic conditions, however, wholesale translational landsliding is to be expected in all but the flattest areas on campus****. Even if the probability of a landslide occurring on flat ground is low, campus plans should take into account the possibility that landslides from adjacent steep slopes may cover flat areas such as roads and parking lots.*

In other words, if an earthquake occurs during or after a heavy rain, there is a high probability of landslides throughout the campus. This should be considered by your planning.

Best regards,

Roger

From: Wong, Diane C. <Diane.Wong@ucsf.edu> on behalf of Campus Planning - EIR <EIR@ucsf.edu>
Sent: Friday, February 7, 2020 9:51 AM
To: Roger Hofmann <bosco22@hotmail.com>; Campus Planning - EIR <EIR@ucsf.edu>
Cc: Maria Wabl <mariawabl@gmail.com>; Antenore, Dennis <antenored@earthlink.net>
Subject: RE: Comments to the initial study

Thank you Roger for your email. We will address the issues raised. Diane

---

From: Roger Hofmann <bosco22@hotmail.com>
Sent: Thursday, February 6, 2020 5:41 PM
To: Campus Planning - EIR <EIR@ucsf.edu>
Cc: Maria Wabl <mariawabl@gmail.com>; Antenore, Dennis <antenored@earthlink.net>
Subject: Comments to the initial study

Dear Ms. Wong,

The attached document is the April 7, 2017 comments letter from UCSF regarding the scoping phase of a development proposed at 1530 - 1585 5th Avenue. This property is directly adjacent to the UCSF Parnassus Heights campus. A large number of concerns were cited by the author, Lori Yamauchi.

In the spirit of fairness, it is only fitting that the concerns UCSF expressed regarding the development of an adjacent property be applied to UCSF itself. I request that these concerns be considered in the scoping of future development of the UCSF campus.

Best regards,

Roger Hofmann

High-resolution LiDAR-based landslide hazard mapping and modeling, UCSF Parnassus Campus, San Francisco, USA

William C. Haneberg

Haneberg Geoscience, 10208 39th Avenue SW, Seattle WA 98146 USA
bill@haneberg.com

William F. Cole

GeoInsite, 15919 Orange Blossom Lane, Los Gatos CA 95032 USA
rockguy1@earthlink.net

Gyimah Kasali

Rutherford & Chekene, 55 Second Street, Ste. 600, San Francisco CA 94105 USA
GKasali@ruthchek.com

Abstract We used airborne LiDAR (Light Detection And Ranging) to create a high-resolution digital elevation model (DEM) and produce landslide hazard maps of the University of California at San Francisco Parnassus Campus. Much of the campus consists of steep forested terrain, limiting the utility of aerial photographs and conventional topographic maps for landslide hazard mapping. The LiDAR DEM consisted of nearly 2.8 million interpolated elevation values covering approximately100 hectares and posted on an 0.6 m horizontal grid. The primary deliverable product was a set of 16 maps. The first subset showed aspects of the topography useful for landslide mapping (e.g., shaded relief, contours, slope angle, surface roughness, and topographic contours), an engineering geologic map, and a qualitative slope hazard map. The second subset consisted of physics-based probabilistic landslide hazard maps for wet static, wet seismic, and dry seismic conditions using the computer program PISA-m. A third subset, not discussed in this paper, showed modeled runoff for a hypothetical storm and delineated watersheds on campus.

INTRODUCTION

Landslide hazard mapping in steep and heavily forested terrain is a difficult proposition for at least three reasons: First, limited visibility and difficult access reduce the area that can be directly observed during field-based mapping. Second, aerial photograph interpretation can provide only limited information because landforms are obscured by vegetation. Third, conventional topographic maps derived from aerial photographs can be inaccurate or lack the detail necessary to identify actual or potential landslide hazards. During the past decade, airborne LiDAR (Light Detection And Ranging) — also known as airborne laser scanning (ALS), airborne laser swath mapping (ALSM), and laser altimetry— has provided practicing geologists with a new way to create high resolution digital elevation models (DEMs) and associated map products that allow accurate mapping of landforms even in areas covered by thick forest or jungle. The utility of airborne LiDAR-based maps and images for landslide hazard mapping and assessment has been shown in many parts of the United States, including the Puget Sound region of Washington (Schultz 2006, Troost et al. 2006), Oregon (Roering et al. 2005, Drazba et al. 2006), northern California (Falls et al. 2004, Stillwater Sciences 2007, Weppner et al. 2008), Idaho (Glenn et al. 2005), North Carolina (Wooten et al. 2007), and Pennsylvania (Delano and Braun 2007)), as well as other countries such as Papua New Guinea (Haneberg et al. 2005), Japan (Sato et al. 2007), Italy (Ardizzone et al. 2006), Belgium (Van Den Eeckhaut et al. 2006), and New Zealand (McKean and Roering 2004). The techniques used by those authors range from qualitative interpretation of shaded relief images to quantification of topographic roughness and implementation of physics-based mathematical models.

In this paper we describe the use of high-resolution airborne LiDAR data to support landslide hazard mapping and modeling of the steep and heavily forested Parnassus Campus of the University of California at San Francisco (Figure 1). This included collection of project-specific airborne LiDAR data, processing to create a geologically optimal DEM and related derivative maps, qualitative engineering geologic mapping, and physics-based probabilistic landslide hazard modeling of extreme conditions for which the landslide hazard could not be evaluated on the basis of mapping alone. Although virtually all LiDAR data are good enough to produce DEMs of much higher resolution than conventional photogrammetric or satellite based DEMs, we use the term "high-resolution" in a special sense to describe LiDAR data with a higher than usual ground strike density as discussed below. Our results were intended primarily for campus-wide emergency planning and to provide a geological context for more detailed design-level geotechnical investigations undertaken for specific construction projects on campus. Although existing borehole logs were reviewed and incorporated into our interpretations, this project placed heavy emphasis on the collection, processing, and interpretation of airborne LiDAR topographic data to aid in the identification of geomorphic features and conditions conducive to landsliding.

GEOLOGIC SETTING

The general geology of San Francisco is described in many maps and reports, both published and unpublished. The Parnassus campus lies in the San Francisco North 7.5’ quadrangle, which was mapped by Schlocker (1974) and is included in the more recent regional map compiled by Blake et al. (2000).

The geology of San Francisco is characterized by bedrock knobs and hills of Jurassic Francisan Complex bedrock (highly deformed chert, greenstone, meta-sandstone, and shale) that protrude through such younger deposits as Quaternary alluvium, dune sand, and shallow marine sediments. The Parnassus campus is located on a prominent Franciscan bedrock knob known as Mt. Sutro. As shown in Figure 2, the steep slopes of Mt. Sutro are covered with a dense eucalyptus forest and, with the notable exception of a winding two-lane road, most of the campus infrastructure lies around its edges. Bedrock occurs at or very near the ground surface throughout much of the project area, but locally is overlain by surficial materials (colluvium and shallow landslides) within drainages that have developed on the steep hillsides of Mt. Sutro.

Wilson et al. (2000) conducted a seismic slope stability hazard analysis of San Francisco and noted several landslides on Mt. Sutro, but do not appear to have collected detailed information on the campus per se, and produced a table of susceptible geologic units rather than a hazard map. Other sources of information used in this project include historical and recent borehole logs and unpublished consulting reports on file at Rutherford & Chekene.

LiDAR DATA COLLECTION AND PROCESSING

LiDAR data for this project were collected in November 2005 by a commercial vendor as part of a project to obtain standard resolution LiDAR coverage of San Francisco. The vendor reduced the typical flying height from

1400 m to 900 m and collected approximately 400 hectares of high-resolution LiDAR data covering the UCSF campus and adjacent areas with vertical accuracy conforming to United States National Standard for Spatial Data Accuracy (NSSDA) and Federal Emergency Management Agency (FEMA) standards as shown for high resolution data in Table 1. The FEMA contour interval is that which can typically be supported using the listed quality of LiDAR data. For normally distributed errors, approximately 68% of the measured errors should fall within the tabulated root mean square error (RMSE) and 95% should fall within twice the tabulated RMSE. Vegetation and cultural features were removed by the vendor prior to data delivery in order to produce a so-called bald earth or bare earth data set.

Compliance with the contract accuracy specifications was documented by a licensed surveyor under contract to the vendor, who collected GPS elevations at 145 points within the vendor's overall LiDAR project area (but outside of the more limited UCSF project area described in this paper). Measured vertical errors followed a distribution that, while not strictly normal, displayed a strong central tendency with minimal bias (Figure 3). The RMSE of ±0.06 m was less than the maximum acceptable value of ±0.09 m. Horizontal errors were estimated by the vendor to be on the order of 1/3000 of the flying altitude.

Quality assurance GPS measurements for contract compliance are generally collected in flat and open areas to reduce data analysis complications, including the contribution of horizontal errors, and the practical or operational accuracy of LiDAR-based DEMs can be nearly an order of magnitude worse than that suggested by quality assurance measurements. In a comparison of a LiDAR DEM covering a portion of Seattle, Washington, with GPS measurements, Haneberg (2008) found that LiDAR elevation errors had a standard deviation of ±0.75 m and statistically significant correlations slope angle, topographic roughness, and to some extent elevation (but not slope aspect). He did not separately evaluate the effects of interpolation errors arising from different DEM gridding algorithms, which may also be important. The accuracy of the LiDAR data DEM was, however, substantially better than a conventional 10 m DEM covering the same area, which had a standard deviation of ±2.36 m (Haneberg 2006a).

The LiDAR data were supplied to us as ASCII text files containing the xyz coordinates and uncalibrated laser return intensity values separated into files identified as ground strikes and extracted features such as trees and buildings. Coordinates were converted by the vendor from the original WGS84 coordinates to the California State Plane Coordinate System (U.S. survey feet, NAD83 HARN horizontal datum, NAVD88 vertical datum) as preferred by both the client and principal engineering contractor.

Optimally Interpolated Digital Elevation Model

We produced an optimally interpolated DEM from the xyz bare earth point cloud supplied by the LiDAR vendor using a trial-and-error process in which two different interpolation algorithms (inverse distance squared and regularized splines with tension) and different interpolation parameters were evaluated in order to produce a DEM suitable for geologic interpretation and slope hazard mapping at the UCSF site. Selection of an appropriate DEM grid spacing begins with review of the LiDAR ground strike data, particularly with regard to ground strike spacing and density in geologically critical areas such as steep slopes. Care was taken to minimize obvious interpolation artifacts such as dimples or rectilinear patterns that can arise if the chosen grid is too fine, while at the same time maximizing the geologic utility of the DEM. Experience has shown that DEMs useful for landform mapping are best when the grid spacing is no less than ¼ to 1/5 the typical ground strike spacing in geologically critical areas. The DEM for this project was interpolated onto a 0.6 m (2 feet) horizontal grid using completely regularized splines with tension as implemented in the commercial raster GIS software MFWorks, with a precision of 0.01 foot (0.03 m), tension of 1.0, a block size of 1, an overlap area of 200 cells, and a sufficient sample number of 5. The advantages of creating a geologically optimal DEM rather than obtaining a DEM from the LiDAR vendor are addressed in the DISCUSSION section at the end of this paper.

Geomorphic Derivative Maps

The optimally interpolated DEM was used to create a series of geomorphic derivative maps similar to those described by Haneberg et al. (2005), Haneberg (2007), and Troost et al. (2006). These included topographic contour maps (Figure

4), a suite of shaded relief images with different simulated illumination directions (Figure 5), and maps depicting quantitative measures such as slope angle and topographic roughness. Although topographic roughness maps have been proven useful in other landslide studies, we found roughness maps showing eigenvalue ratios (McKean and Roering 2004) and residual deviations (Haneberg et al. 2005, Haneberg 2007) to be of limited utility in this study.

INTERPRETIVE MAPS

We created a series of three engineering geologic maps: 1) A standard engineering geologic map using the Unified Engineering Geologic Mapping System (Keaton and DeGraff 2004) to show the genesis and lithology of mapped features, 2) a cut and fill slope map showing areas in which natural slopes had been modified by human activity, and 3) a slope hazard map based upon qualitative interpretations by the project team. These are shown draped over a shaded relief image in Figures 5 through 7.

Engineering Geologic Map

The engineering geologic map (Figure 5) was created by integrating the DEM and its derivatives with field-based observations of geologic conditions. Following preliminary processing of the LiDAR data, fieldwork took place over two days in May 2006 and the map was finalized in the office to allow the use of digital mapping techniques such as the superposition of engineering geologic information with the shaded relief, slope angle, roughness, and contour maps.
Soil and rock types are shown on the engineering geologic map using the Unified Engineering Geologic Mapping System (Keaton and DeGraff 1996), with vertical series of soil or rock types used to indicate the stratigraphic sequence of map units. Other features relevant to the project— for example, areas of slow soil creep, landslides, and rock outcrops— are also shown on the map. Much of the area shown as chert (CH) on the engineering geologic map is overlain by thin soil, but outcrops are common and the soil thickness is not likely to exceed a meter or so. Thus, the thin soil over chert was not shown on the map. Although features that may be indicative of potential future instability (for example old landslides or areas undergoing soil creep) are shown, the engineering geologic map does not evaluate the likelihood of future occurrence or severity of slope hazards.

Most of the bedrock exposed on campus is folded and thinly bedded red and green chert of the Franciscan Complex. A small area of sandstone occurs in the northwestern portion of the campus. In the few locations where strike and dip directions could be measured in the tightly folded to wavy chert beds, the orientations represent average conditions. Relatively young shallow marine sediments of the Colma Formation were encountered at depth in previous geotechnical borings but the formation is not exposed at the surface in the project area.

The engineering geologic map (Figure 5) shows a possible ancient landslide occupying much of the area beneath the most highly developed north-central portion of the campus. Identification of this feature is tentative because naturally occurring landforms indicative of landsliding have been largely destroyed by development. The large bowl-shaped feature, information from borehole logs on file at Rutherford & Chekene, and an unpublished bedrock structure contour map completed after this project suggest that the area may be underlain by a large landslide, perhaps involving Franciscan bedrock, of old but uncertain age.

The possibility of a large ancient landslide in this highly developed area was raised as long ago as 1948 by in a letter to UCSF from engineering geologist Chester Marliave but was discounted in later investigations by local consultants based primarily on the contention that the northward sloping sedimentary strata encountered in a campus construction project were 1) continuous and 2) bore no resemblance to chaotic strata that had been identified by others to be associated with large ancient landslides in the region. A thorough evaluation of the potential ancient landslide, which would include a detailed subsurface synthesis supported by additional drilling and testing, was beyond the scope of this project. Therefore, a possible landslide is shown on the engineering geologic map.

Cut and Fill Slope Map

Cut and fill slopes, which are often shown on engineering geologic maps such as that in Figure 5, were shown on a separate map for clarity (Figure 6). Both types of slopes were identified on the basis of preliminary field observations and refined using digital terrain analysis to identify the extent of over-steepened slopes inferred to have been produced by human activity. Detailed as-built construction documents were not available, so the cut and fill slope map represents a geologic interpretation based on slope form and a general knowledge of construction techniques. Some cut or fill slopes may not be shown.

Qualitative Slope Hazard Map

The qualitative slope hazard map (Figure 7) is an interpretive map that combines the information shown on the engineering geologic map (Figure 5), the cut and fill slope map (Figure 6), and our field observations with professional experience to depict areas in which we infer slope instability is most likely to occur. Areas with signs of very recent or imminent movement are shown in red, whereas areas with the potential for future movement as a consequence of heavy rain or seismic shaking, or some combination of the two, are shown in yellow and orange. Although there is a potential for shallow landslides and debris flows in the areas shown as chert overlain by thin soil on the engineering geologic map (Figure 5), we did not include this as potential slope hazard on Figure 7 because any such slides are likely to be small and, because of their remote locations, without much effect on campus safety or access. Areas underlain by chert adjacent to roads, from which shallow slope failures have the potential to limit campus access, are shown as cut or fill slope hazards as appropriate.

The possible landslide shown on the engineering map is categorized as stable on the qualitative slope hazard map because 1) it lies low on the slope and therefore possesses little potential energy relative to the areas it might affect, 2) it appears to be buried and buttressed by younger sediments, and 3) this investigation yielded no signs of recent movement, for example open cracks or deformed cultural features, in the area. This project did not, however, include a quantitative stability evaluation of the possible landslide and the potential for future movement is unknown.

PROBABILISTIC SLOPE STABILITY MODELING

The high-resolution LiDAR DEM was used to produce physics-based probabilistic landslide hazard maps using the first-order, second-moment (FOSM) approach described by such authors as Haneberg (2000, 2004), van Westen and Terlien (1996), Wu et al. (1996), Wolff (1996), and Mankelow and Murphy (1998). We used the computer program PISA-m (the acronym stands for map-based Probabilistic Infinite Slope Analysis) written by Haneberg (2006b) to perform the calculations for this project. PISA-m takes as input a digital elevation model, maps showing geotechnical soil units and forest cover units, and information about geotechnical parameters and their probability distributions for each map unit. Unlike previous approaches in which all of the input variables were restricted to normal distributions (van Westen and Terlien 1996, Mankelow and Murphy 1998), PISA-m accepts normal, uniform, triangular, and β-PERT distributions as well as constant values as input, calculating equivalent means and variances for non-normal distributions (Haneberg 2006b). PISA-m output options include maps showing the probability that the calculated factor of static safety against landsliding is less than the critical value (Prob [$FS \leq 1$]), the mean factor of safety, the standard deviation of the factor of safety, or a non-parametric slope reliability index for each raster within the DEM.

PISA-m is based on the infinite slope approximation, and is therefore most useful for simulating the occurrence of landslides that are thin relative to their lengths and widths. As used in this project, the calculated probability does not explicitly include any reference to time or recurrence intervals, for example as an annual probability of landsliding. Instead, it should be interpreted as a conditional probability given the pore water pressure distributions used as input for the model. Stillwater Sciences (2007) and Weppner et al. (2008) describe watershed-scale applications of PISA-m in which the pore water pressure variable was assigned temporal significance by using an extreme value distribution to model peak annual pore pressure and the model results compared to landslide inventory maps.

PISA-m Theoretical Background

Details of the first-order, second-moment approximation used in PISA-m are given in Haneberg (2000, 2004, 2006b) and briefly summarized without further reference below. The static component of the probabilistic model is based on the factor of safety against sliding for a forested infinite slope (Hammond et al. 1992):

$$FS = \frac{c_r + c_s + \left[q_t + \gamma_m D + (\gamma_{sat} - \gamma_w - \gamma_m) H_w D\right]\cos^2\beta\tan\phi}{\left[q_t + \gamma_m D + (\gamma_{sat} - \gamma_m) H_w D\right]\sin\beta\cos\beta} \tag{1}$$

in which

c_r	=	cohesive strength contributed by tree roots (kPa)
c_s	=	cohesive strength of soil (kPa)
q_t	=	uniform surcharge due to weight of vegetation (kPa)
γ_m	=	unit weight of moist soil above phreatic surface (N/m^3)
γ_{sat}	=	unit weight of saturated soil below phreatic surface (N/m^3)
γ_w	=	unit weight of water (9810 N/m^3)
D	=	thickness of soil above slip surface (m)
H_w	=	relative height of phreatic surface (dimensionless)
β	=	slope angle (degrees)
ϕ	=	angle of internal friction (degrees)

The influence of groundwater is incorporated using a slope-parallel phreatic surface, so that the pore water pressure is the pressure exerted by a column of water equal in height to that of the phreatic surface above a potential slip surface. This is a common but not necessary assumption for infinite slope analyses. It is, however, reasonable in cases where a relatively permeable surficial deposit is underlain by less permeable bedrock. The variable H_w represents a normalized phreatic surface height that has a range of 0 to 1 for non-artesian conditions.

The effects of parameter uncertainty and variability are incorporated using first-order, second-moment (FOSM) approximations. A mean value of FS is first calculated using the mean values of each of the independent variables, or

$$\overline{FS} = FS(\bar{x}) \tag{2}$$

For uncorrelated independent variables, the variance (or second moment about the mean) of FS can then be estimated by the first-order truncated Taylor series

$$s_F^2 = \sum_i \left(\frac{\partial FS}{\partial x_i} \right)_{\bar{x}}^2 s_{x_i}^2 \tag{3}$$

in which $s_{x_i}^2$ is the variance of the i^{th} independent variable. The terms in parentheses are evaluated using mean values for each of the independent variables (implying that each of the derivatives is a constant), and their squares are lengthy equations when all of the variables in equation (1) are included.

Means and variances for the soil properties and pore pressures were estimated on the basis of tabulated data and professional experience. The mean and variance for the slope angle at each point (r,c) within the DEM was calculated using the approximations

$$\beta_{r,c} = \arctan\left[\frac{\sqrt{(z_{r,c+1} - z_{r,c-1})^2 + (z_{r+1,c} - z_{r-1,c})^2}}{2\Delta s}\right] \tag{4}$$

and

$$s_\beta^2 = \frac{8(\Delta s)^2 s_z^2}{\left[4(\Delta s)^2 + \left(z_{r+1,c} - z_{r-1,c}\right)^2 + \left(z_{r,c+1} - z_{r,c-1}\right)^2\right]^2} \tag{5}$$

The static method of Haneberg (2004) can be extended to include seismic slope stability by using the calculated mean factor of safety to calculate the mean Newmark (1965) yield acceleration:

$$\overline{a_N} = g\left(\overline{FS} - 1\right)\sin\overline{\beta} \tag{6}$$

in which a_N is the yield acceleration beyond which seismically-induced movement can occur, FS is the static factor of safety for a slope, g is gravitational acceleration, and (for infinite slopes) β is the slope angle. The overbars indicate that in each case the mean value for each point within the DEM is used for the calculation. The calculated $\overline{a_N}$ value at each point within the DEM was then combined with the Arias intensity for a postulated earthquake to calculate the expected mean downslope movement using the regression equation developed by Jibson et al. (2000):

$$\overline{\log D_N} = 1.521 \log I_A - 1.993 \log \overline{a_N} - 1.546 \tag{7}$$

in which D_N is the displacement (in centimeters) of an unstable slope as the result of seismic shaking, I_A is the observed or predicted Arias intensity (m/s), and a_N is the Newmark critical acceleration with units of g. The Jibson et al. (2000) regression model has a published standard deviation of ±0.375, which is used along with the calculated mean displacement to calculate the probability that the displacement for the modeled earthquake is greater than a user specified threshold, or Prob[$D_N > D_{thresh}$]. Based on the results of numerical Monte Carlo simulations of seismic slope instability, this probability was calculated using the assumption that D_N is log-normally distributed (Haneberg 2006, 2008).

PISA-m Model Input

Slope angles for the probabilistic model were calculated from the DEM using a standard second-order accurate finite difference approximation as described in equations (4) and (5). Soil properties were estimated using representative values for San Francisco tabulated in Wilson et al. (2000), literature compilations such as Hammond et al. (1992), and our local experience. In particular, the scarcity of outcrops on the UCSF campus and small-scale structural complexity of the thinly bedded and highly deformed Franciscan chert bedrock made it impossible to make useful model-scale distinctions between favorable and adverse bedding conditions throughout the campus. Moreover, the shear strength of deformed rocks at or near the surface is controlled by discontinuities such as pervasive joints or faults. Therefore, the probabilistic model uses average values with uncertainties to reflect the structural complexity, which allows for the possibility of adverse, average, or favorable discontinuity orientations of both bedding and fractures at any given location. As discussed by Haneberg (2006, 2008) DEM elevation errors are spatially correlated and can create slope angle errors that propagate into slope stability calculations. PISA-m takes elevation errors into account using equation (5). Based upon previous experience with LiDAR and conventional DEM elevation errors, we specified an elevation error standard deviation of ±3 mm (±0.01 feet) for points separated by 1.2 m (4 feet), the distance over which the slope angles are calculated by PISA-m.

Based upon site-specific engineering geologic mapping, the probabilistic analyses were conducted using two soil types (geotechnical map units): thin soil over chert and thick colluvium in valleys. As shown in Tables 2 and 3, the geotechnical variables were specified as either being random variables (in this case following either normal or uniform distributions) or single-valued constants. Normally distributed variables are shown in Tables 2 and 4 using their means and standard deviations whereas uniformly distributed variables are shown in terms of their minimum and maximum values, although PISA-m calculates equivalent means and variances for the latter.

Both soil types were assigned similar shear strength parameters and unit weights, but differed in thickness and degree of saturation as shown in Tables 2 and 3. The assumed increased wetness of thick colluvium-filled valleys was incorporated using a dimensionless degree of saturation of $H_w = 0.75 \pm 0.084$ (mean ± standard deviation) versus a value of $H_w = 0.50 \pm 0.084$ for the soil over chert for the static calculations to represent a range of realistically possible wet season values (no piezometric field data were available to constrain extreme pore pressure values). The seismic calculations were performed first using the same wet season values and then again with zero pore pressure to represent a dry season earthquake. Wet season pore pressure values are likely to occur during the rainy season that generally occurs between October 15 and April 15. High pore water pressure values can occur locally outside of the rainy season as the result of such artificial causes as leaking or broken water lines, storm drains, or water tanks.

The Arias intensity of the modeled earthquake was calculated from the same strong motion record used by Wilson et al. (2000) for their citywide analysis, from the Southern California Edison Lucerne station during the 1992 M7.3 Landers earthquake. Digital versions of all three components were downloaded from the Pacific Earthquake Engineering Research Center (PEER) web site and integrated to calculate Arias intensities of $I_A = 7.0$ m/s (azimuth 260°), $I_A = 6.6$ m/s (azimuth 345°), and $I_A = 8.2$ m/s (vertical). The two horizontal intensities are indistinguishable from those calculated by Jibson and Jibson (2003) from the same records, and the stronger of the two horizontal intensities ($I_A = 7.0$ m/s) was chosen for the modeled earthquake. Figure 9 shows the 260° horizontal strong motion record used to calculate the $I_A = 7.0$ m/s value. A displacement threshold of 30 cm was selected for the seismic probabilistic slope stability maps, corresponding to the 30 cm threshold used to delineate high hazard areas by Wilson et al. (2000).

PISA-m Model Results

Results for the three probabilistic models (static wet, seismic wet, and seismic dry conditions) are shown on separate maps (Figures 10, 11, and 12). The probabilistic results share both similarities and differences with the qualitative slope hazard map (Figure 8). Some areas shown as potentially unstable colluvium on the qualitative slope hazard map are shown to have a low probability of landsliding on the static and dry seismic probabilistic maps. Conversely, many steep areas shown as chert covered by ostensibly stable thin soil on the qualitative slope hazard map are shown to have a high probability of landsliding on the static and dry seismic probabilistic maps. This is because the qualitative slope hazard map is based on criteria that emphasize the inferred importance of thick cohesive soil accumulations in topographic depressions such as hollows, swales, and valleys. The qualitative map does not incorporate any information about steepness; thus, a relatively flat colluvium filled valley bottom would receive the same designation as a steeper colluvium mantled slope. The qualitative model also assumes that landslides in thin soils are insignificant compared to landslides in thick wet colluvium in depressions, whereas the probabilistic models allow for landslides in thin soils overlying chert and explicitly take into account the fact that the thickness of cohesive soils has an effect on their stability.

Both the qualitative slope hazard map (Figure 9) and the probabilistic maps (Figures 10, 11, and 12) show over-steepened cut and fill slopes to be potentially unstable even though the actual modes of failure are likely to depart from translational sliding of thin soil layers or rock slabs. Cut slope failures observed in chert and sandstone are mostly topples and wedge failures controlled by rock discontinuities. Fill slope failures are likely to be rotational.

The probabilistic models suggest that thin translational landsliding of the kind simulated by the infinite slope approximation should be restricted to a relatively small proportion of campus under wet static conditions. Many of these potentially unstable areas, however, are adjacent to roads, buildings, and parking lots (including off-campus property). Thus, the possibility that landslides or rockfalls might block roads or partially cover parking lots during wet conditions should be taken into account by campus planners. The likelihood of the same general kinds of landslides increases for dry seismic conditions, although the general pattern of instability is similar. Under wet seismic conditions, however, wholesale translational landsliding is to be expected in all but the flattest areas on campus. Even if the probability of a landslide occurring on flat ground is low, campus plans should take into account the possibility that landslides from adjacent steep slopes may cover flat areas such as roads and parking lots.

DISCUSSION

The combination of high-resolution LiDAR-based digital terrain modeling, field-based engineering geologic mapping supplemented by office-based virtual mapping, and physics-based probabilistic slope stability modeling allowed us to evaluate existing and potential slope stability hazards on the steep and densely forested UCSF Parnassus Campus. Neither the mapping nor modeling could have been accomplished at the same level of detail without the LiDAR coverage. Traditional engineering geologic mapping on aerial photographs or a photogrammetrically derived topographic base would have been too generalized for precise modeling or interpretation of slope behavior. Conversely, the combination of field-based mapping, office-based virtual mapping, and physics-based probabilistic modeling allowed us to augment and maximize the value of the LiDAR data by going beyond simple qualitative interpretation of shaded relief images or contour maps.

Processing of the scattered point cloud as one of the geologic parts of a project data has distinct advantages over the use DEMs created by a LiDAR vendor without geologic considerations. Using point cloud data allows the LiDAR ground strike density patterns in geologically critical areas— for example, steep vegetated slopes— to be critically examined by experienced geologists, geomorphologists, or geotechnical engineers. Ground strike spacing can influence the detail shown on a gridded DEM and control the scales of features that can be identified in different parts of a project area. Regardless of the supposed resolution of a DEM, geomorphic features smaller than the actual ground strike spacing in different parts of a project area will not be depicted. Our experience has been that landforms with characteristic dimensions less than an order of magnitude greater than the typical ground strike spacing cannot be reliably recognized as such. Thus, the ability superimpose a LiDAR ground strike map during virtual mapping sessions in the office can help to show the minimum size of features that one might hope to map in different parts of the project area. Working with the point cloud data also allows experienced geo-professionals to experiment with different gridding algorithms and parameters with the objective of producing a DEM that is optimized for landform mapping in a particular project area.

The benefit of creating a set of derivative maps is that, whereas only a finite number of paper maps can be carried in the field, an almost infinite number of map combinations can be created electronically for preliminary office interpretation before fieldwork and virtual map refinement after fieldwork. For example, the geologist can create combinations such as a shaded relief image with illumination from the east draped with a color map of slope angles and 1.5 m contour lines and then alternate shaded relief maps to see if his or her interpretations change. Supporting imagery such as aerial orthophotos, multispectral images, or historical geologic maps can also be included if available, particularly if the work is done within a GIS framework that supports the use of files with different projections, coordinate systems, and geodetic datums. For this project, contour maps with a 1.5 m contour interval proved to be the most useful base for engineering geologic mapping in the field.

Finally, we found physics-based probabilistic modeling using PISA-m to be a useful tool for evaluating extreme or rare conditions such as very wet slopes or large earthquakes. Field-based engineering geologic mapping can provide critical information about recent or current slope instability. Precise forecasting of the areal consequences of rare, extreme, or unprecedented events based on field observations, however, is difficult to impossible. Thus, observation and modeling are best used as complementary— rather than mutually exclusive— approaches to leverage the value of LiDAR digital elevation data.

Acknowledgements. This work was funded by a Federal Emergency Management Agency (FEMA) grant to the University of California at San Francisco (UCSF). The UCSF project manager was Ms. Ivy Chiao. Collection and initial processing of the LiDAR data was performed by Airborne 1 of El Segundo, California. Laurel Jiang of Rutherford & Chekene provided invaluable assistance during this project. The authors also appreciate the early involvement of Dr. Edmund Medley, who helped to initiate the project and bring together the authors.

REFERENCES

Ardizzone F, Cardinali M, Galli M, Guzzetti F, Hovius N, Peruccacci S, Reichenbach P, Rossi M, and Stark CP (2006), Identification and mapping of landslides using lidar technology. Geophysical Research Abstracts 8: 05603 (SRef-ID: 1607-7962/gra/EGU06-A-05603).

Blake MC, Graymer RW, Jones DL (2000) Geologic map and map database of parts of Marin, San Francisco, Alameda, Contra Costa, and Sonoma Counties, California. U. S. Geological Survey, Miscellaneous Field Studies Map MF-2337.

California Division of Mines and Geology (1997) Guidelines for Evaluating and Mitigating Seismic Hazards in California. CDMG Special Publication 117, 74 pp.

Delano HL and Braun DD (2007) PAMAP lidar-based elevation data: a new tool for geologic and hazard mapping in Pennsylvania: Geological Society of America Abstracts with Programs 39(6): 167.

Drazba MC, Inglish AR, Burns S (2006) Mapping landslide thresholds, using lidar in the West Hills of Portland, Oregon. Geological Society of America Abstracts with Programs, 38(7): 563.

Falls JN, Wills CJ, Hardin BC (2004) Utility of lidar survey for landslide mapping of the Highway 299 corridor, Humboldt County, California. Geological Society of America Abstracts with Programs 36(5): 331.

Glenn NF, Streutker DR, Chadwick DJ, Thackray GD, Dorsch SJ (2005) Analysis of LiDAR-derived topographic information characterizing and differentiating landslide morphology and activity. Geomorphology 73(1-2): 131-148 (doi: 10.1016/j.geomorph.2005.07.006).

Hammond C, Hall D, Miller S, Swetik P (1992) Level I Stability Analysis (LISA) Documentation for Version 2.0. U.S. Forest Service, Intermountain Research Station General Technical Report INT-285, 190 pp.

Haneberg WC (2000) Deterministic and probabilistic approaches to geologic hazard assessment. Environmental & Engineering Geoscience, 6: 209-226.

Haneberg WC (2004) A rational probabilistic method for spatially distributed landslide hazard assessment. Environmental & Engineering Geosience 10(1): 27-43 (doi: 10.2113/10.1.27).

Haneberg WC (2006a) Effects of digital elevation model errors on spatially distributed seismic slope stability calculations: an example from Seattle, Washington. Environmental & Engineering Geoscience 12(3): 247-260 (doi: 10.2113/gseegeosci.12.3.247).

Haneberg WC (2006b) PISA-m: Map-Based Probabilistic Infinite Slope Analysis, Version 1.0 User Manual. Seattle, Washington, Haneberg Geoscience. (http://www.haneberg.com/manual_1_0_1.pdf). Accessed 8 July 2008.

Haneberg WC (2007) Large-scale terrain visualization using SRTM digital elevation models: an example from the Indian Himalaya: Geological Society of America Abstracts with Programs (39)6:166.

Haneberg WC (2008) Elevation errors in a LiDAR digital elevation model of West Seattle and their effects on slope stability calculations. In: Baum RL, Godt J, and Highland L (eds) Landslides and Engineering Geology of the Greater Seattle Area, Washington, Geological Society of America, Boulder, in press.

Haneberg WC, Creighton AL, Medley EW, and Jonas DA (2005) Use of LiDAR to assess slope hazards at the Lihir gold mine, Papua New Guinea. In: Hungr O, Fell R, Couture R, Eberhardt E (eds) Landslide Risk Management: Proceedings of International Conference on Landslide Risk Management, Vancouver, Canada, 31 May - 3 June, 2005, Supplementary CD.

Jibson RW, Harp EL, and Michael JA (2000) A method for producing digital probabilistic seismic landslide hazard maps. Engineering Geology 58: 271-289.

Jibson RW and Jibson MW (2003) Java Programs for Using Newmark's Method and Simplified Decoupled Analysis to Model Slope Performance During Earthquakes (Version 1.1). U.S. Geological Survey Open-File Report 03-005 (CD-ROM).

Keaton JR and DeGraff JV (1996) Surface observation and geologic mapping. In: Turner AK and Schuster RL (eds), Landslides, Investigation and Mitigation. Washington, DC, Transportation Research Board Special Report 247, pp. 178-230.

Mankelow JM and Murphy W (1998) Using GIS in the probabilistic assessment of earthquake triggered landslide hazards. Journal of Earthquake Engineeirng 2(4): 593-623.

McKean J and Roering J (2004) Objective landslide detection and surface morphology mapping using high-resolution airborne laser altimetry. *Geomorphology* 57: 331-351.

Newmark NM (1965) Effects of earthquakes on dams and embankments. Geotechnique, 15: 139-160.

Roering JJ, Kirchner JW, and Dietrich WE (2005) Characterizing structural and lithologic controls on deep-seated landsliding: Implications for topographic relief and landscape evolution in the Oregon Coast Range, USA. Geological Society of America Bulletin 117 (5/6): 654-668 (doi: 10.1130/B25567.1).

Sato HP, Yagi H, Moarai M, Iwahashi J, Sekiguchi T (2007) Airborne LIDAR data measurement and landform classification mapping in Tomari-no-tai landslide area, Shirakami Mountains, Japan. In: Sassa K, Fukuoka H, Wang F, Wang G (eds) Progress in Landslide Science, Springer, Berlin, pp. 237-249.

Schlocker J (1974) Geology of the San Francisco North Quadrangle, California. U.S. Geological Survey Professional Paper 782, 109 pp.

Schulz WH (2006) Landslide susceptibility revealed by LIDAR imagery and historical records, Seattle, Washington. Engineering Geology 89(1-2): 67-87 (doi: 10.1016/j.enggeo.2006.09.019).

Stillwater Sciences (2007) Landslide hazard in the Elk River basin, Humboldt County, California. Unpublished consulting report, Stillwater Sciences, Arcata, California.

Troost KG, Wisher AP, Haneberg WC (2006) A multifaceted approach to high-resolution geologic mapping of Mercer Island, near Seattle, Washington, Geological Society of America Abstracts with Programs 37(7):164.

Van Den Eeckhaut M, Poesen J, Verstraeten G, Vanacker V, Nyssen J, Moeyersons J, van Beek LPH, Vandekerckhove L (2006) Use of LIDAR-derived images for mapping old landslides under forest. Earth Surface Processes and Landforms 32(5): 754-769 (doi: 10.1002/esp.1417).

van Westen CJ and Terlien MTJ (1996) An approach towards eterministic landslide hazard analysis in GIS: A case study from Manizales (Columbia). Earth Surface Processes and Landforms 21(9): 853-868. (doi: 10.1002/(SICI)1096-9837(199609)21:9<853::AID-ESP676>3.0.CO;2-C)

Weppner E, Hoyt J, Haneberg WC (2008) Slope stability modeling and landslide hazard in Freshwater Creek and Ryan Slough, Humboldt County, California: unpublished consulting report, Pacific Watershed Associates, Arcata, California.

Wilson RI, Wiegers MO, and McCrink TP (2000) Earthquake-induced landslide evaluation report. In: Seismic Hazard Zone Report for the City and County of San Francisco, California. California Division of Mines and Geology Seismic Hazard Zone Report 043, pp. 19-39.

Wolff TF (1996) Probabilistic slope stability in theory and practice. In: Shackleford CD and Roth MJS (eds), Uncertainty in the Geologic Environment: From Theory to Practice. Proceeding, Uncertainty ’96, American Society of Civil Engineers Special Paper 58, American Society of Civil Engineers, New York, pp 419-433.

Wooten RM, Latham RS, Witt AC, Douglas TJ, Gillon KA, Fuemmeler SJ, Bauer JB, Nickerson JG, Reid JC (2007) Landslide hazard mapping in North Carolina— geology in the interest of public safety and informed decision making: Geological Society of America Abstracts with Programs 39(2): 76.

Wu TH, Tang WH, and Einsten HH (1996) Landslide hazard and risk assessment. In: Turner AK and Schuster RL (eds), Landslides, Investigation and Mitigation. Washington, DC, Transportation Research Board Special Report 247, pp. 106-118.

Table 1. LiDAR vendor resolution specifications (measurements in meters)

LiDAR Resolution	Typical Flying Altitude	FEMA Contour Interval	Typical LiDAR Spot Spacing	Allowable NSSDA RMSE[1]
High	900	0.3	1.0	±0.09
Standard	1400	0.6	1.4	±0.18
Low	2000	1.0	1.8	±0.30

[1] RMSE = root mean squared error

Table 2. PISA-m geotechnical parameters for Soil Type 1: Thin soil over chert.

Variable	Distribution	Mean	Std. Dev.	Minimum	Maximum
ϕ (degrees)	Normal	30	±1.67		
c_{soil} (kPa)	Normal	19.2	±6.2		
d (m)	Normal	0.76	±0.26		
h_{wet}	Normal	0.50	±0.084		
h_{dry}	Constant	0			
γ_{moist} (N/m^3)	Uniform			15,700	18,900
$\gamma_{saturated}$ (N/m^3)	Uniform			18,900	20,400
c_{roots} (kPa)	Normal	6.2	±1.5		
q (kPa)	Constant	0			

Table 3. PISA-m geotechnical parameters for Soil Type 2: Thick soil in valleys.

Variable	Distribution	Mean	Std. Dev.	Minimum	Maximum
ϕ (degrees)	Normal	30	±1.67		
c_{soil} (kPa)	Normal	19.2	±6.2		
d (m)	Normal	3.05	±0.91		
h_{wet}	Normal	0.75	±0.084		
h_{dry}	Constant	0			
γ_{moist} (N/m^3)	Uniform			15,700	18,900
$\gamma_{saturated}$ (N/m^3)	Uniform			18,900	20,400
c_{roots} (kPa)	Constant	0			
q (kPa)	Constant	0			

FIGURE CAPTIONS

Figure 1. Landsat false color image of the San Francisco peninsula and adjacent areas. Red colors denote green vegetation and light blue colors denote urbanized areas. The UCSF project area is marked by the yellow circle.

Figure 2. Color 30 cm (1 foot) raster orthophoto showing approximate extent the UCSF Parnassus Campus (pink dashed line) and dense forest cover on Mt. Sutro. Photo source: US Geological Survey, photo date 27 February 2004.

Figure 3. Histogram of measured vertical LiDAR errors for 145 quality assurance points collected near, but not in, the UCSF project area by the LiDAR vendor. The project contract specifications called for a maximum permissible RMSE of ±0.09 m compared to the measured value of ±0.06 m. A scaled normal distribution with the measured mean and standard deviation is superimposed for comparison.

Figure 4. Contour map of the project area based on the 0.6 m (2 foot) LiDAR DEM with no smoothing applied. Contour interval: 1.5 m (5 feet).

Figure 5. Shaded relief images illustrating the effects of changing simulated illumination azimuth with a constant inclination of 30°. A) Illumination from 270°. B) Illumination from 000°. C) Illumination from 090°. D) Ommidirectional illumination created by adding together the maps shown in parts A, B, and C of this figure.

Figure 6. Engineering geologic map draped over the omnidirectional shaded relief image from Figure 5D. Lithologic units are shown using the Unified Engineering Geologic Mapping System with stacked lithologic symbols indicating the local stratigraphy (Keaton and DeGraff, 1994).

Figure 6. Engineering geologic map draped over the omnidirectional shaded relief image from Figure 5D. Lithologic units are shown using the Unified Engineering Geologic Mapping System with stacked lithologic symbols indicating the local stratigraphy (Keaton and DeGraff, 1994).

Figure 7. Cut and fill slope map draped over the omnidirectional shaded relief image from Figure 5D. Areas of cut and fill were inferred from a combination of field observations and office based digital terrain modeling using the high-resolution LiDAR DEM.

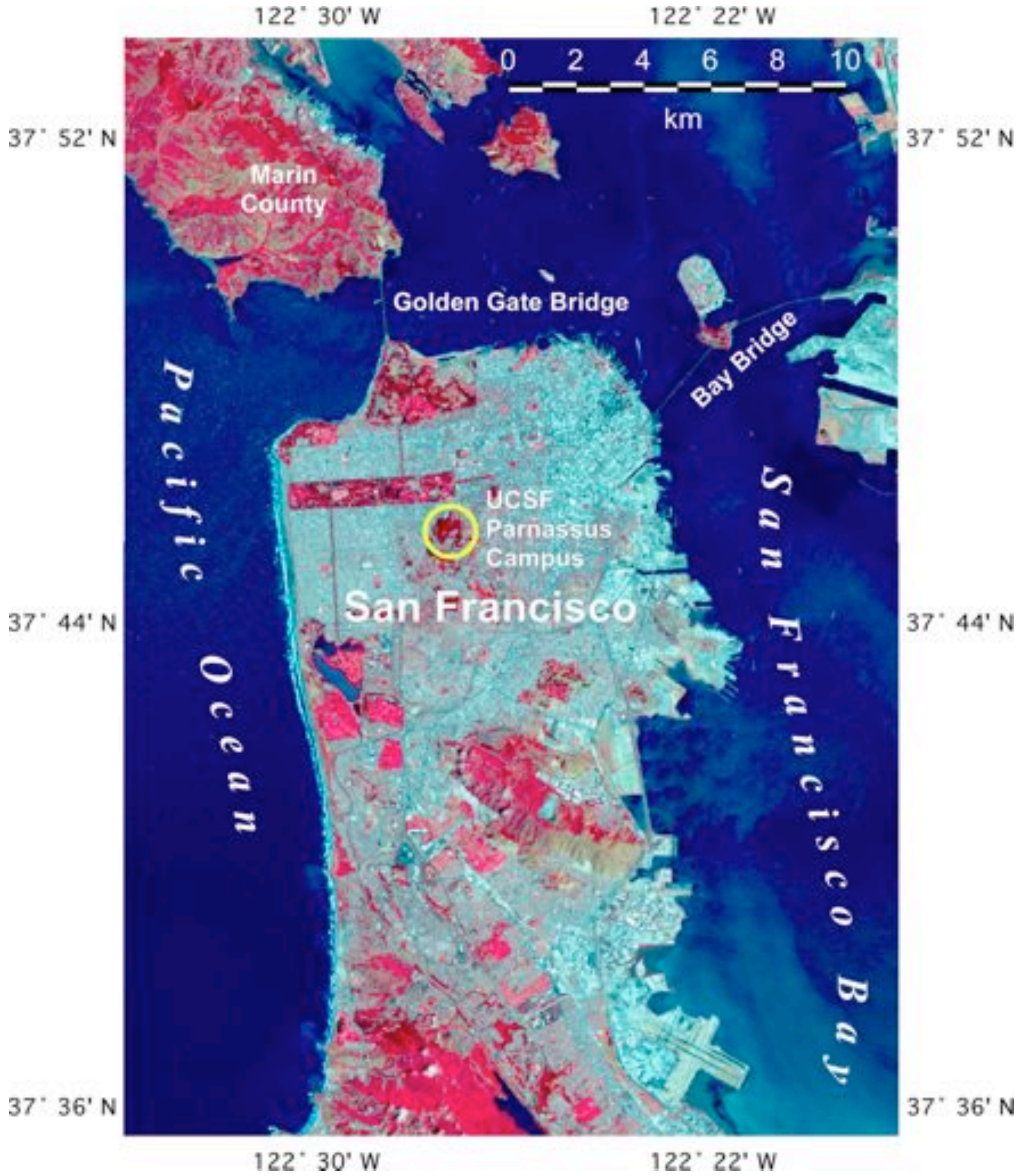
Figure 8. Qualitative landslide hazard map draped over the omnidirectional shaded relief image from Figure 5D.

Figure 9. PISA-m probabilistic landslide hazard map for wet static conditions, draped over the omnidirectional shaded relief image from Figure 5D. See Tables 2 and 3 for geotechnical parameters.

Figure 10. Strong motion record used to calculate the Arias intensity of I_A = 7.0 m/s used as input for the seismic component of the rational probabilistic slope stability model. The record was obtained from the Pacific Earthquake Engineering Research Center (PEER) strong motion database. Record is for the Southern California Edison Lucerne station during the 1992 Landers M = 7.3 earthquake (direction: 260°).

Figure 11. PISA-m probabilistic landslide hazard map for dry seismic conditions, draped over the omnidirectional shaded relief image from Figure 5D. See Tables 2 and 3 for geotechnical parameters.

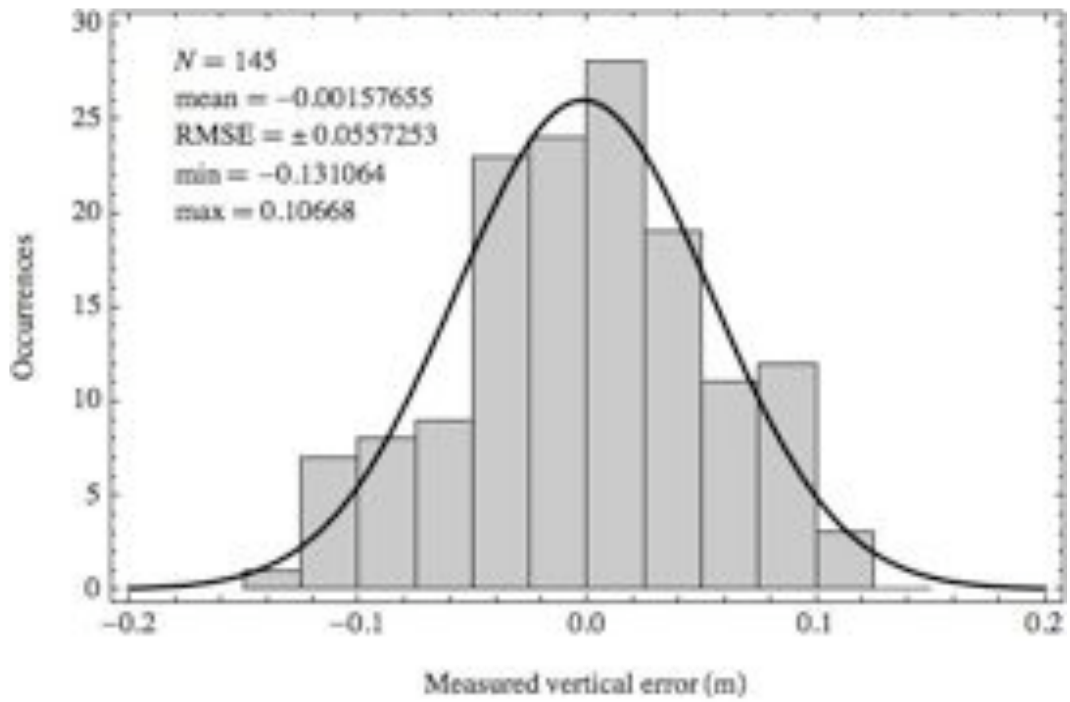
Figure 12. PISA-m probabilistic landslide hazard map for wet seismic conditions, draped over the omnidirectional shaded relief image from Figure 5D. See Tables 2 and 3 for geotechnical parameters.



122° 30' W
122° 22' W
0 2 4 6 8 10
km
37° 52' N
37° 52' N
Marin County
Golden Gate Bridge
Bay Bridge
Pacific Ocean
UCSF Parnassus Campus
San Francisco
San Francisco Bay
37° 44' N
37° 44' N
37° 36' N
37° 36' N
122° 30' W
122° 22' W

Figure 1

Figure 2



N = 145
mean = −0.00157655
RMSE = ± 0.0557253
min = −0.131064
max = 0.10668
Occurrences
30
25
20
15
10
5
0
−0.2
−0.1
0.0
0.1
0.2
Measured vertical error (m)

Figure 3

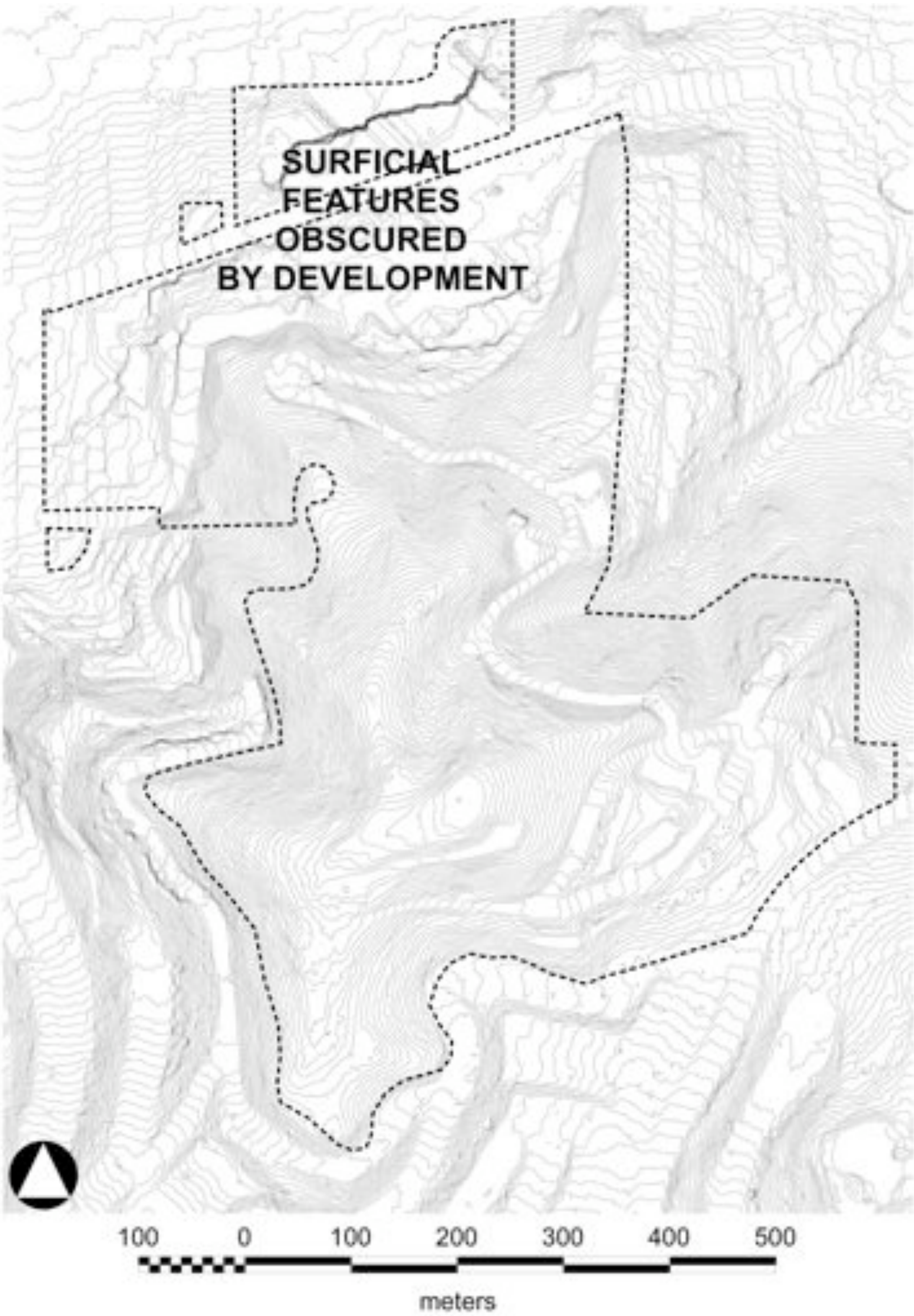

SURFICIAL FEATURES OBSCURED BY DEVELOPMENT
100
0
100
200
300
400
500
meters

Figure 4

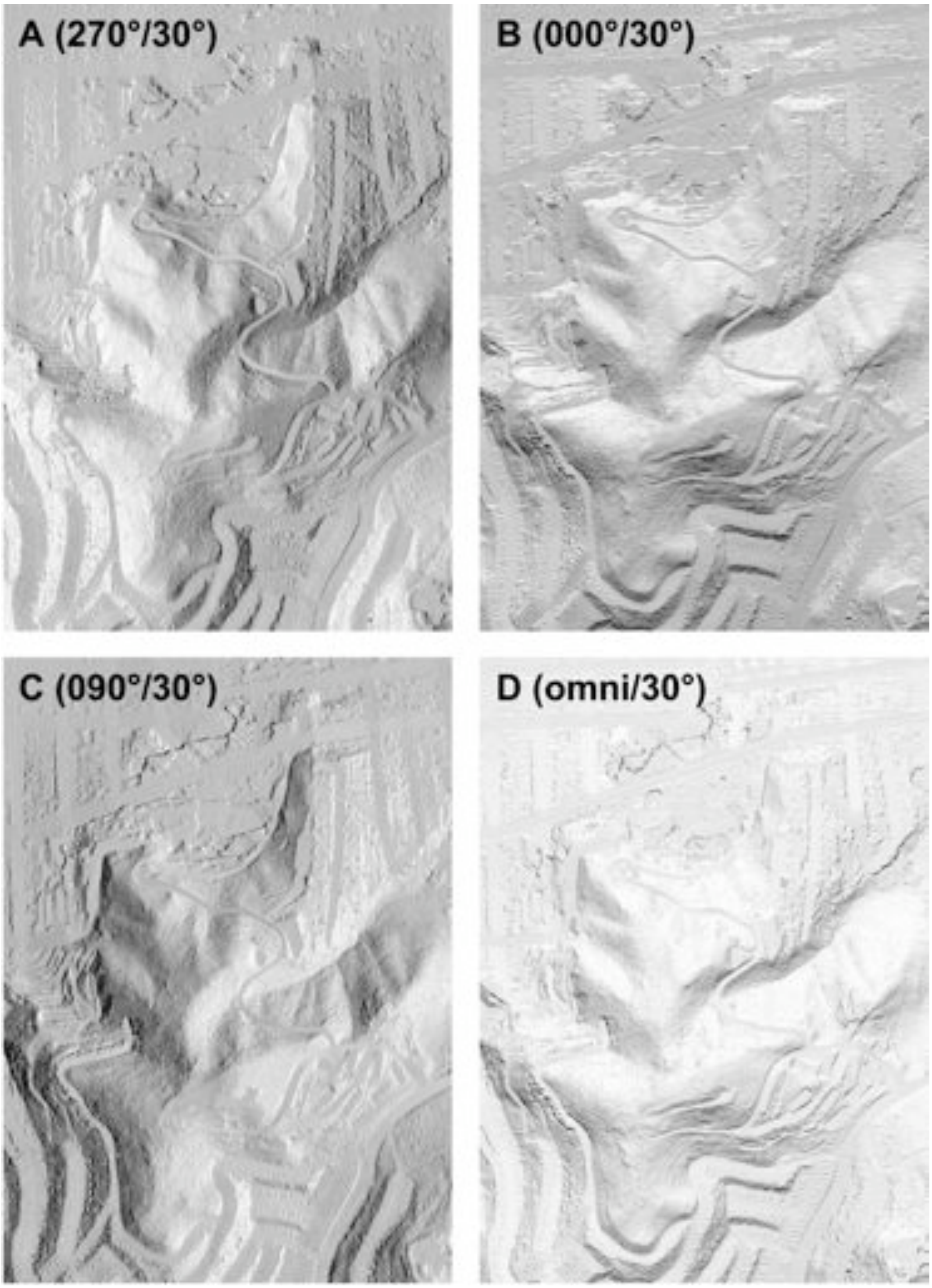


Figure 5

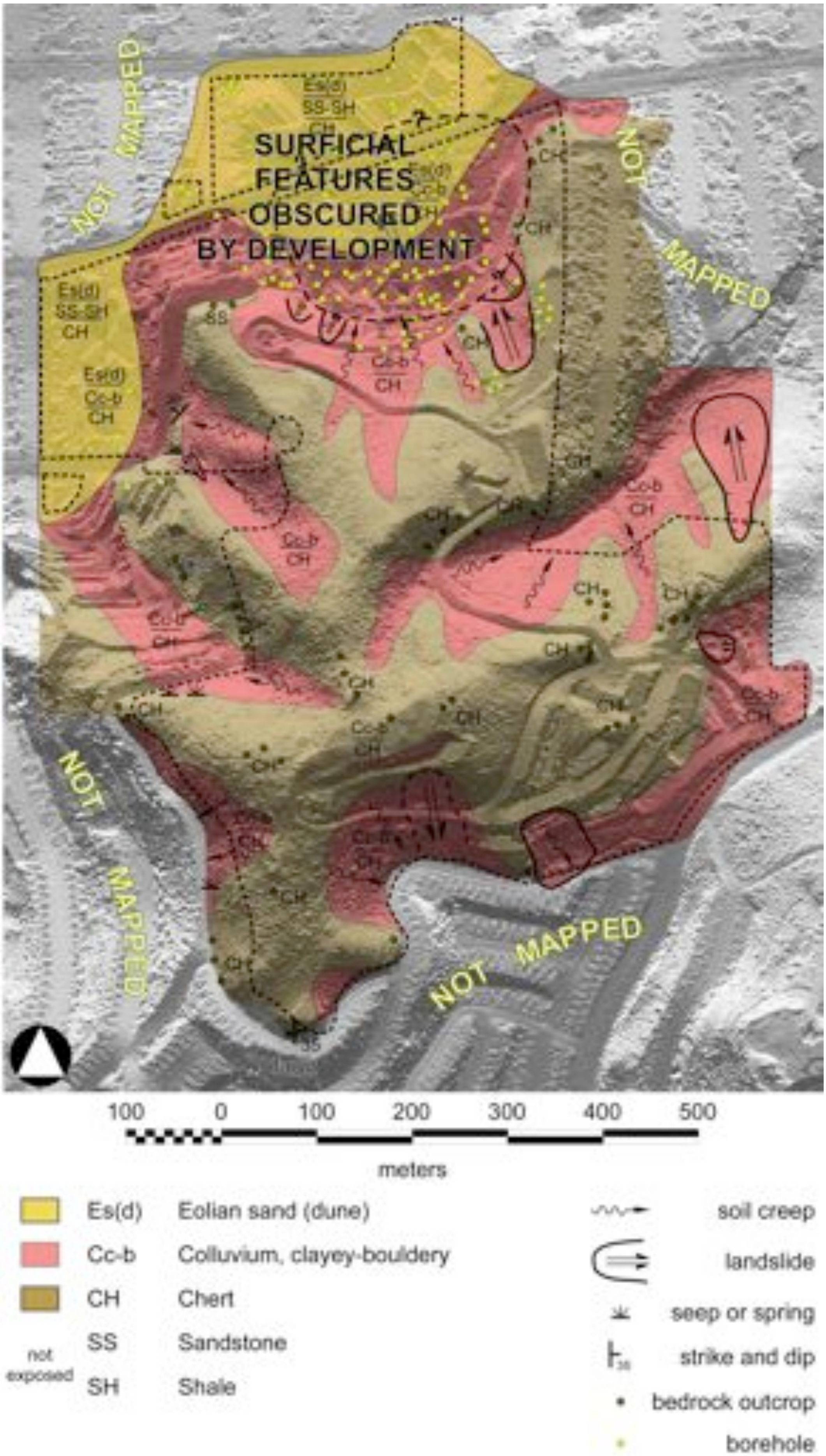

SURFICIAL FEATURES OBSCURED BY DEVELOPMENT
NOT MAPPED
NOT MAPPED
NOT MAPPED
NOT MAPPED
Es(d)
SS-SH
CH
Es(d)
Cc-b
CH
Cc-b
CH
CH
SS
100
0
100
200
300
400
500
meters
Es(d)
Eolian sand (dune)
Cc-b
Colluvium, clayey-bouldery
CH
Chert
not exposed
SS
Sandstone
SH
Shale
soil creep
landslide
seep or spring
strike and dip
bedrock outcrop
borehole

Figure 6

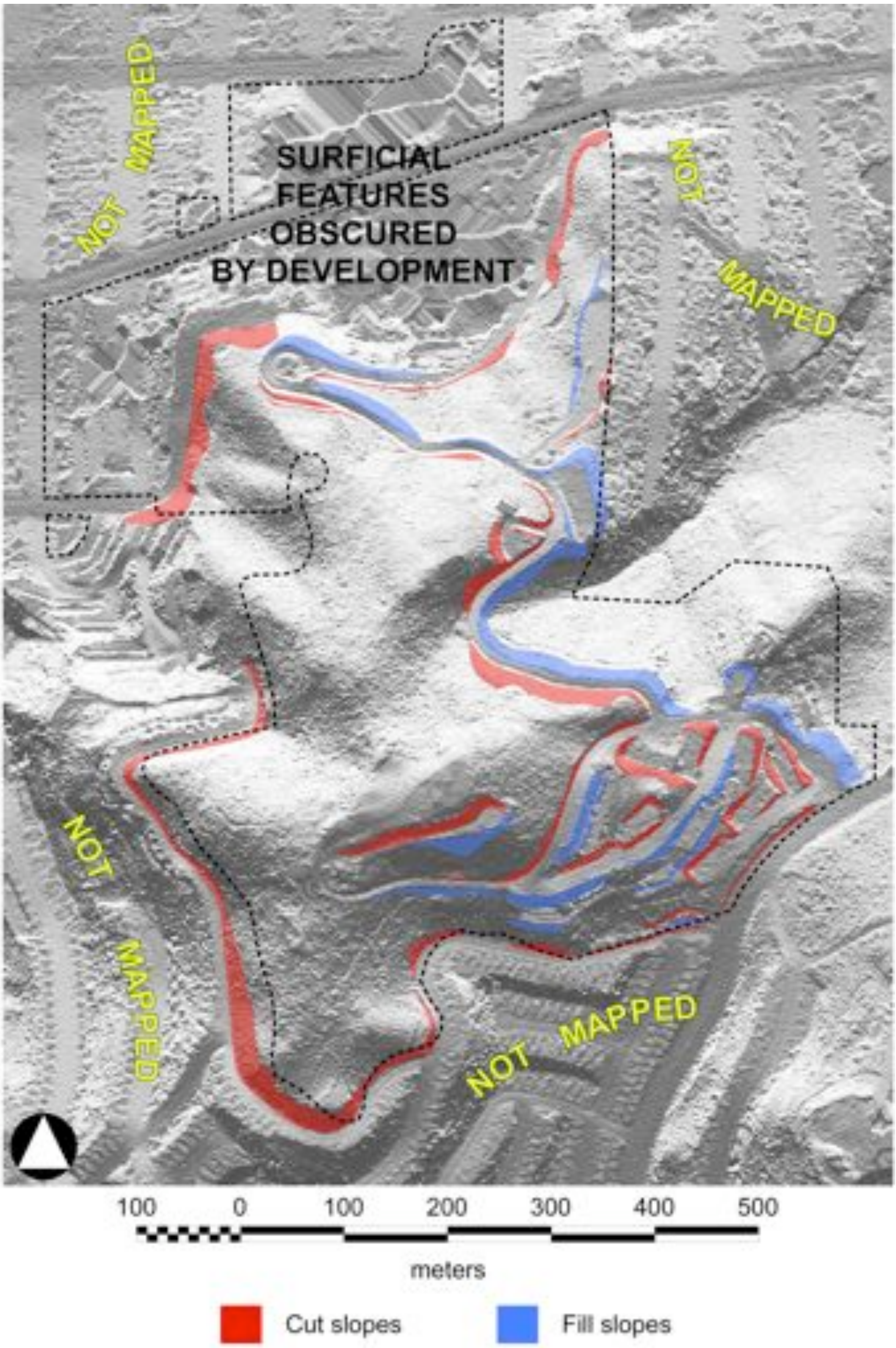

SURFICIAL FEATURES OBSCURED BY DEVELOPMENT
NOT MAPPED
NOT MAPPED
NOT MAPPED
NOT MAPPED
100 0 100 200 300 400 500
meters
Cut slopes
Fill slopes

Figure 7

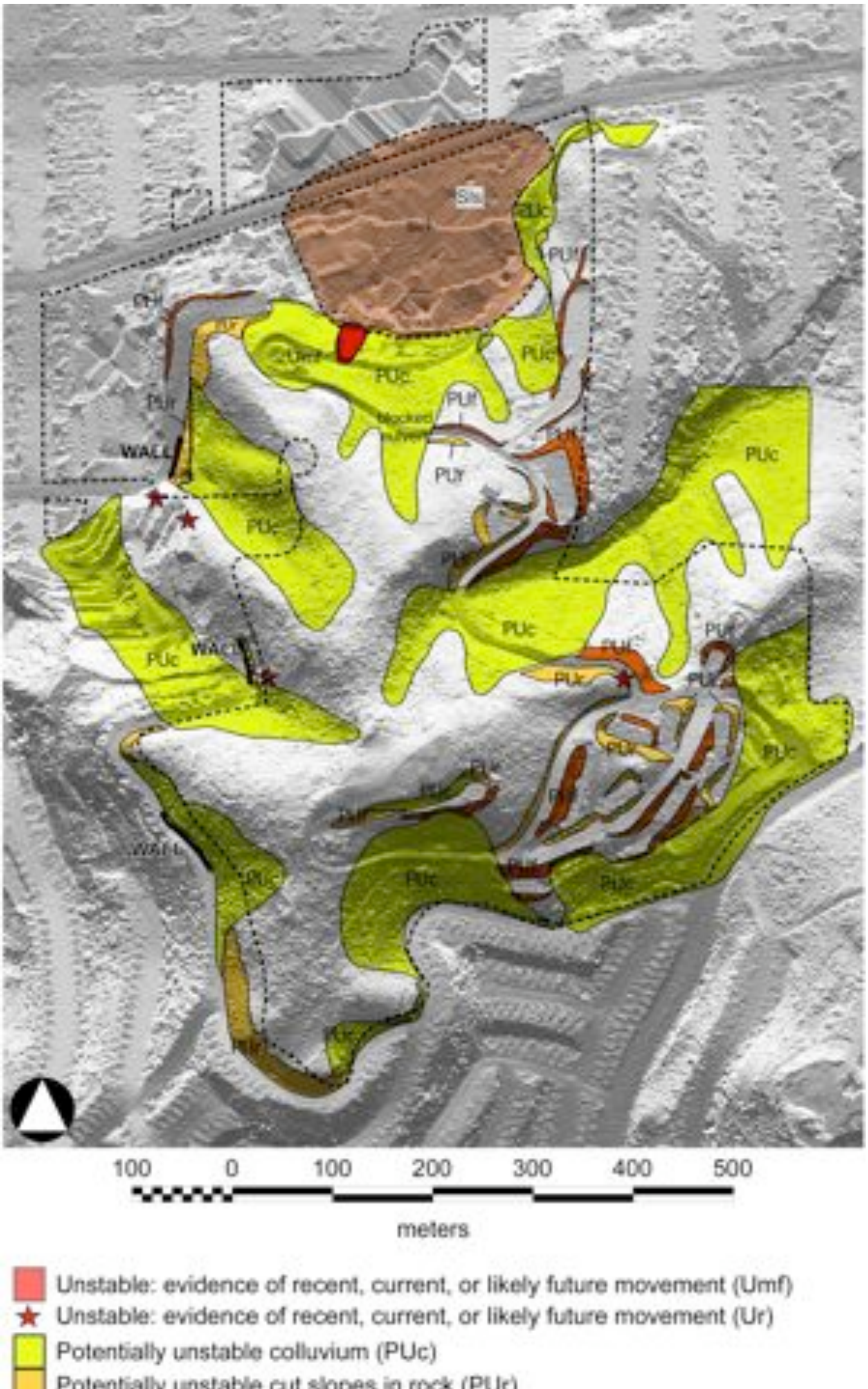

Sls
PUc
PUf
PUr
Umf
WALL
100 0 100 200 300 400 500
meters
Unstable: evidence of recent, current, or likely future movement (Umf)
Unstable: evidence of recent, current, or likely future movement (Ur)
Potentially unstable colluvium (PUc)
Potentially unstable cut slopes in rock (PUr)
Potentially unstable fill slopes (PUf)
Possible dormant landslide (Sls)

Figure 8

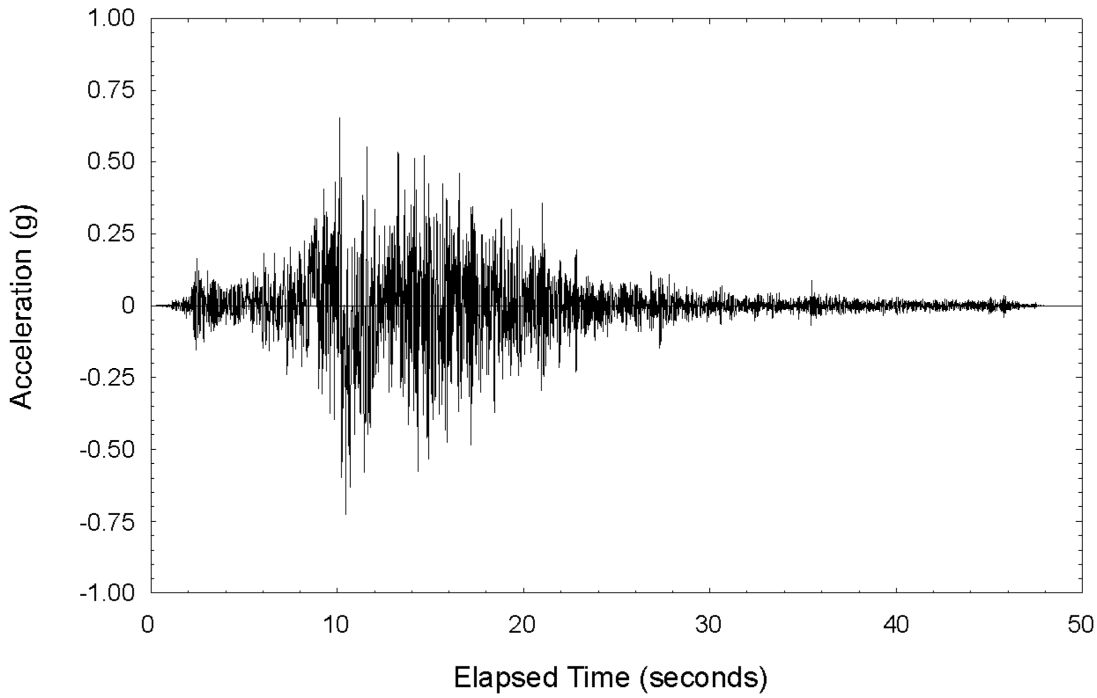

1.00
0.75
0.50
0.25
0
-0.25
-0.50
-0.75
-1.00
Acceleration (g)
0
10
20
30
40
50
Elapsed Time (seconds)

Figure 9

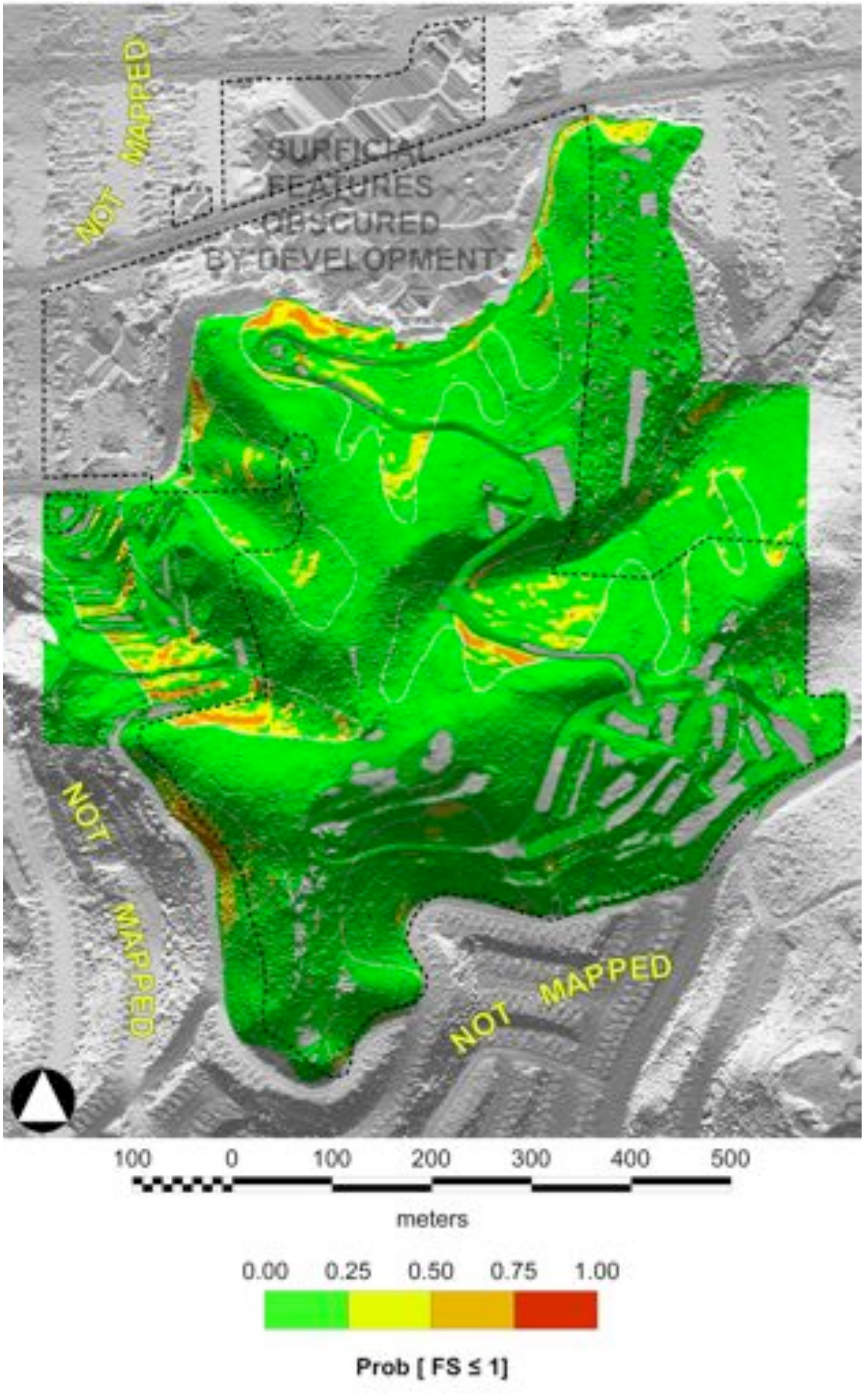

NOT MAPPED
SURFICIAL FEATURES OBSCURED BY DEVELOPMENT
NOT MAPPED
NOT MAPPED
100 0 100 200 300 400 500
meters
0.00 0.25 0.50 0.75 1.00
Prob [FS ≤ 1]

Figure 10

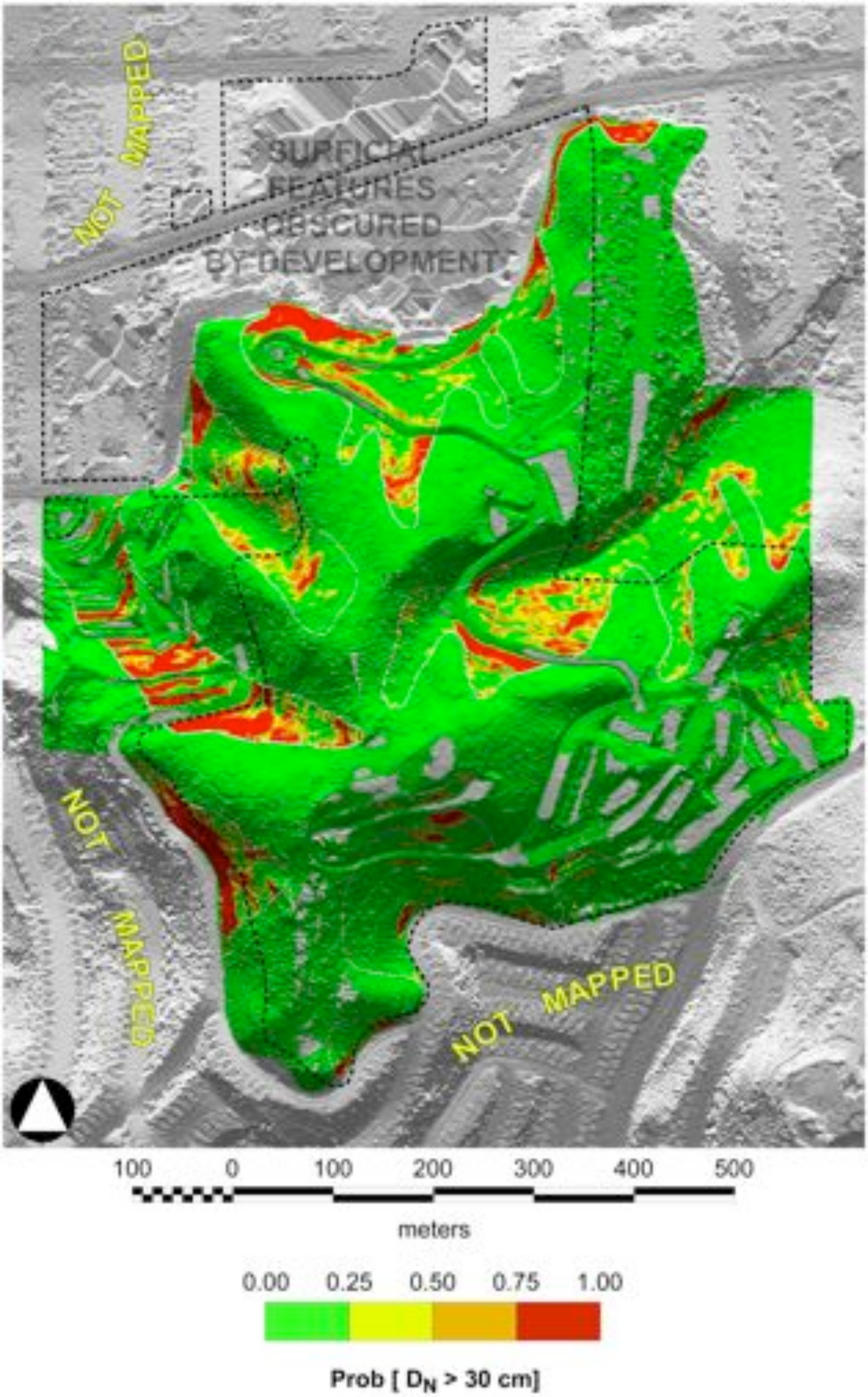

NOT MAPPED
SURFICIAL FEATURES OBSCURED BY DEVELOPMENT
NOT MAPPED
NOT MAPPED
100 0 100 200 300 400 500
meters
0.00 0.25 0.50 0.75 1.00
Prob [D_N > 30 cm]

Figure 11

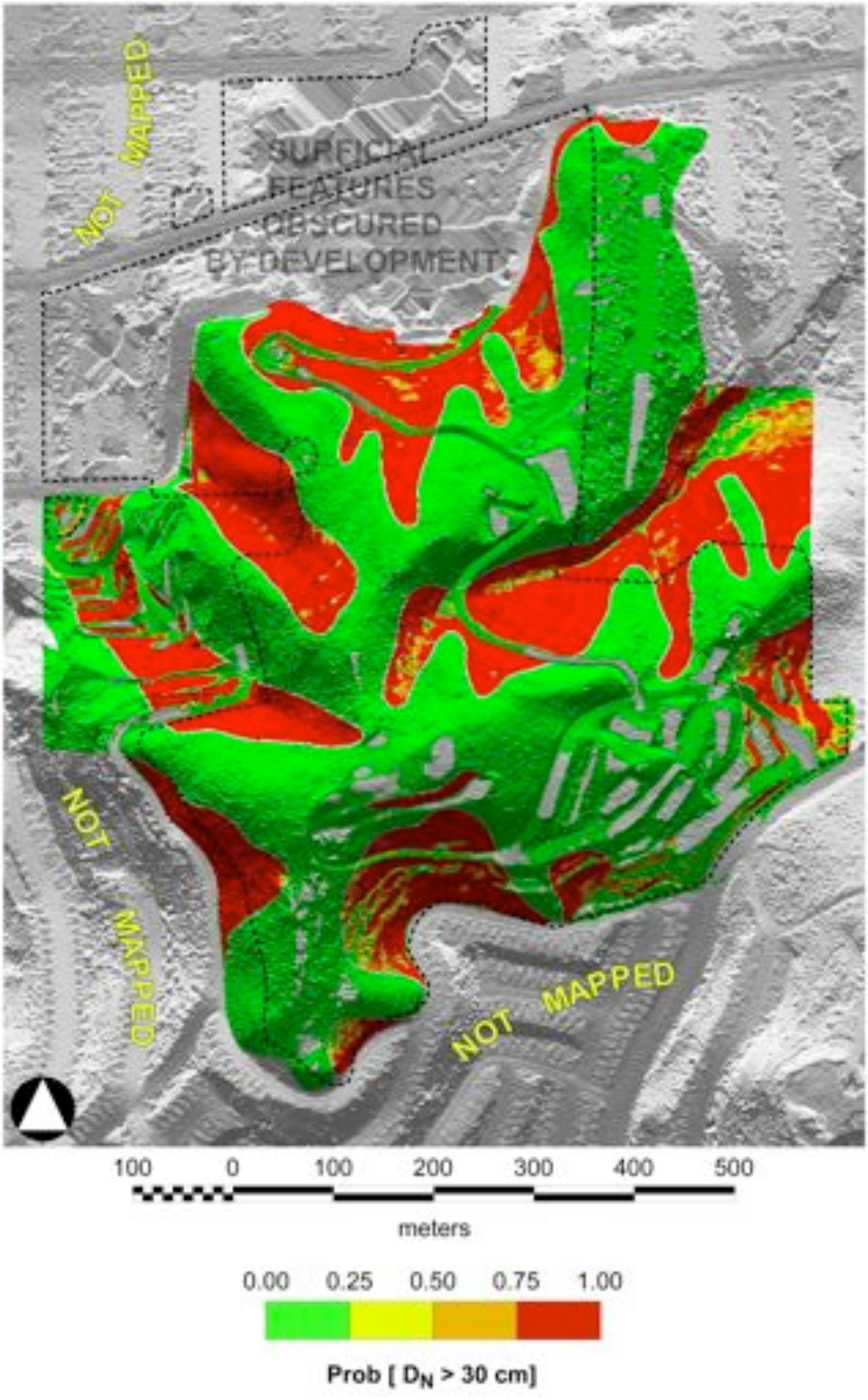

NOT MAPPED
SURFICIAL FEATURES OBSCURED BY DEVELOPMENT
NOT MAPPED
NOT MAPPED
100 0 100 200 300 400 500
meters
0.00 0.25 0.50 0.75 1.00
Prob [D_N > 30 cm]

Figure 12

From:	Linda
To:	Campus Planning - EIR
Subject:	NOP/Initial Study
Date:	Friday, February 7, 2020 3:08:20 PM

Mrs Wong,

As a property owner on 5th Avenue and Parnassus, I feel the expansion UCSF Campus in the Mt Sutro area will bring a major impact to the residents living directly across from the campus on 5th Avenue and surrounding area. Not only will the on going construction of a new dental building squeezed into the corner of Parnassus & 5th Avenue have an impact with construction, noise and delays; but, also all the underground work that will need to take place as well. This will have an adverse affect on peoples daily lives and their right to quiet enjoyment of their space.

Furthermore, with the expansion of the "opportunity sites" on the Mount Sutro hillside there will be even more traffic. The creation of 4th avenue on the campus side which currently does not go all the way through to 5th avenue will increase traffic and be a hazard to the neighborhood.

I would like to see a much smaller attempt to modernize this campus without jeopardizing all who live close by. The traffic be it foot or vehicle will for sure increase with the doubling of the Parnassus on campus residents. The local public transportation will also suffer with the increase population.

In conclusion, I am not in favor of this scale of an expansion and hope that my concerns are heard and considered.

Thank you,

Linda H Rich

Karl H. Lutkemuller trust
1411 5th Avenue, San Francisco, Ca 4122

From:	Vincent Cardillo
To:	Campus Planning - EIR; Norman.Yee@sfgov.org
Subject:	UCSF Development Plan
Date:	Saturday, February 8, 2020 2:44:18 PM

To Whom It May Concern:

1. How are you planning to mitigate air quality impact?
2. https://48hills.org/2019/10/ucsfs-secret-plans-to-expand-dramatically-in-parnassus-heights/

You need to slow down the planning process, and allow for more community input. Please let me know if you have any questions, and how you will be slowing down this process to involve the community.

Sincerely,
Vincent Cardillo
Kirkham Heights Resident

Scoping Meeting for the Proposed Comprehensive Parnassus Heights Plan Environmental Impact Report

Public Comment Form

2/10/2020

Thank you for coming tonight. UCSF values your input, and we welcome your comments on the Initial Study for the proposed Comprehensive Parnassus Heights Plan. This comment form is provided for your convenience. Please return this card to UCSF staff at the end of the meeting, or if you prefer to send it to us at a later date, please email to EIR@planning.UCSF.edu or mail to Diane Wong, UCSF Campus Planning, Box 0286, San Francisco, CA 94143. Comments must be received by 5 p.m. on February ~~14~~ 21, 2020.

1) the hospital Bldg is Too big & too close to Edgewood residents.
2) It needs to be lower! We do not want to look out our windows & back yards & see hospital lights on 24 HRS. in patient rooms
3) Greenspace is very impt & should NOT be encroached upon. the Sutro Forest hiking trails need to remain
4) Red cert soil is very fragile & will collapse w/ huge bldg.

Name LOU ANN BAUER

Address 83 FARNSWORTH LN SF 94117
Street Zip

Email LOUANN@BAUERDESIGN.COM

From:	Pam Hofmann
To:	Campus Planning - EIR
Subject:	EIR scoping comment on HIPPA, containment facilities, individual offices
Date:	Tuesday, February 11, 2020 10:53:52 PM

Dear Ms. Wong,

Thank you for including the following comment in the EIR.

Pam Hofmann

Please analyze your plans with respect to current HIPPA requirements, containment facilities, and individual office spaces.

UCSF's mission is education, research and patient care. Yet your plans appear to emphasize style and social interaction. UCSF has labs, containment units, and yes, a morgue.

The facility needs to be designed with regard to patient privacy and HIPPA requirements. There need to be containment facilities, and there need to be offices, not cube farms. UCSF a hospital, not a convention center!

From:	Pam Hofmann
To:	Campus Planning - EIR
Subject:	EIR scoping comment on HSIR bldgs. shear strength
Date:	Tuesday, February 11, 2020 11:01:41 PM

Dear Ms. Wong,

Thank you for including the following comment in the EIR.

Pam Hofmann

Please analyze the susceptibility to landslide impact on the HSIR buildings and the buildings' ability to withstand these shear forces.What is the shear strength of these buildings?

The Parnassus property is riddled with landslide risks. See the Haneberg Lidar study for more details.

The HSIR buildings appear to be located in a large swale on the foot of an old landside. It is proposed that these buildings be renovated.

In an earthquake these buildings will be shaken by vertical and horizontal forces through their foundations, but they may likely be subject to lateral forces from Mt. Sutro landslides.

From:	Pam Hofmann
To:	Campus Planning - EIR
Subject:	EIR scoping comment on seismic forces on Med. Bldg 1, Millberry, and the library
Date:	Tuesday, February 11, 2020 11:10:20 PM

Dear Ms. Wong,

Thank you for including the following comment in the EIR.

Pam Hofmann

On the north side of Parnassus there are three structures: Medical Building 1, Millberry Union, and the library.

Please analyze the vertical and lateral seismic forces from both the ground and from the side of the hill (Mt. Sutro) on the three current structures: Medical Building 1, Millberry Union, and the library.

The library, Millberry, and Medical Building 1 lean up against the mountain. This means that in the event of an earthquake these buildings will be subject to two sets of forces. There will be vertical and lateral forces on their footing, AND at the same time these buildings would also be subject to different vertical and lateral forces coming from the hill.

Remember that the Northridge quakes demonstrated the risk to parking garages. They pancaked. Garages similar in construction to UCSF's are susceptible.
Putting a skin over the parking structures will do nothing. It's lipstick on a pig. Putting more weight on top only increases the risk.

A lot of recently built large structures look beautiful, but are unsound. Consider the Trans Bay Terminal, The Bay Bridge, the Oroville Dam Spillway. And let's not forget the Millennium Tower.

From:	Pam Hofmann
To:	Campus Planning - EIR
Subject:	EIR scoping comment on contaminated soil
Date:	Tuesday, February 11, 2020 11:18:33 PM

Dear Ms. Wong,

Thank you for including the following comment in the EIR.

Pam Hofmann

Please analyze where the dump trucks of soil from the site will be unloaded.

Please analyze where the dump trucks will be unloaded if it is determined that the soil has been contaminated.

It is probable that UCSF has a significant amount of contaminated soil. As an example of the difficulty of getting rid of this soil, there have been cases where no one locally would take such loads, and the soil had to be trucked as far as Utah before it was unloaded.

Disposal of contaminated soil is a significant issue.

From: Pam Hofmann
To: Campus Planning - EIR
Subject: EIR scoping comment on dewatering tanks, pumps, and filtration tanks
Date: Tuesday, February 11, 2020 11:21:27 PM

Dear Ms. Wong,

Thank you for including the following comment in the EIR.

Pam Hofmann

Please analyze the number of dewatering tanks, pumps, and filtration tanks necessary for these projects. Please include the plans for excavation and use (duration and lay down area (where they will be located).

Please give an acoustical analysis for the use of the dewatering equipment ("Baker Pumps") which will be going 24/7 for the duration until foundations are dug and pored approximately a year and a half for each project.

Please analyze the use of sound enclosures tested to meet Contractors Pump Bureau (CPB) Standards.

From:	Pam Hofmann
To:	Campus Planning - EIR
Subject:	EIR scoping comment on water resources, pump stations, reservoirs
Date:	Tuesday, February 11, 2020 11:28:22 PM

Dear Ms. Wong,

Thank you for including the following comment in the EIR.

Pam Hofmann

Please analyze the impact that the proposed expansion will have on existing water resources, including pump stations and reservoirs.

From:	Pam Hofmann
To:	Campus Planning - EIR
Subject:	EIR scoping comment on the impact on parking and traffic, include during peak usage
Date:	Tuesday, February 11, 2020 11:35:38 PM

Dear Ms. Wong,

Thank you for including the following comment in the EIR.

Pam Hofmann

Please analyze the impact that the proposed increase in pedestrian, bicycle, and vehicle traffic will have on existing parking, both street parking and UCSF garage parking.

Please analyze parking with respect to peak usage during the work week, on weekends, and during major events in Golden Gate Park.

From:	Pam Hofmann
To:	Campus Planning - EIR
Subject:	EIR scoping comment on structural vulnerability to damage from ground motion
Date:	Wednesday, February 12, 2020 12:07:48 AM

Dear Ms. Wong,

Thank you for including the following comment in the EIR.

Pam Hofmann

Please analyze the effect of ground motion on each of the UC Parnassus structures.

Please list in order which structures are most vulnerable.

Please list the damage to individual buildings from the Loma Prieta quake and from the 1957 Daly City quake.

The 1957 San Francisco earthquake (also known as the Daly City earthquake of 1957) occurred on March 22 at 11:44:22 local time with a moment magnitude of 5.7 and a maximum Mercalli Intensity of VII (Very strong). This was the largest earthquake on the Peninsula since 1906.

From:	Pam Hofmann
To:	Campus Planning - EIR
Subject:	EIR scoping comment on wildfire in the WUI
Date:	Wednesday, February 12, 2020 12:19:53 AM

Dear Ms. Wong,

Thank you for including the following comment in the EIR.

Pam Hofmann

The 1899 wildfire on Mt. Sutro fire stopped just short of the Affiliated Colleges. The 1934 wildfire was fought by 400 firemen. Fire on Mt. Sutro is a serious issue in this urban environment. What are the UCSF plans for detecting a wildfire and for fighting such a fire when it breaks out?

Despite the decrease in fire hazard by Vegetation Management Plan for the Mount Sutro Open Space Reserve fire hazard will still exist. A few years ago I told a UCSF forester about the 1899 and the 1934 wildfires on Mt. Sutro. He thought about it and responded, “Then we are about 20 years overdue for a massive fire.”

The Mt. Sutro Open Space Reserve and the UCSF campus are a "WUI" ("woo ee")(Wildland Urban Interface). When a wildfire breaks out in the Mt. Sutro Open Space Reserve, it will affect many San Francisco buildings, not just UCSF. The embers from exploding trees will travel through the air and start fires elsewhere.

From:	Pam Hofmann
To:	Campus Planning - EIR
Subject:	EIR scoping comment on cut and fill risks, necessary tests
Date:	Wednesday, February 12, 2020 12:54:17 AM

Dear Ms. Wong,

Thank you for including the following comment in the EIR.

Pam Hofmann

Please analyze the increased probability of landslide caused by use of cut and fill in the proposed projects.

Please include a detailed analysis of the effect of tunneling, and cut and fill operations on the proposed new service roads from Medical Center way to Fourth Avenue.

Please include which fill material is proposed.

Please consider: soil classification, Atterberg limits, California bearing ratio, Direct shear test, Hydrometer, Proctor compaction test, R-value, Sieve analysis, Triavial shear test, Oedometer test, Hydraulic conductivity tests, Water content tests.

It is likely that the projects will significantly exacerbate an existing environmental condition, ground stability. The proposal to put in three service roads from Medical Center Way to Fourth Avenue is particularly concerning.

Cuts can also intercept zones of groundwater, which can cause problems ranging from nuisance seepage to slope instability. The construction of fills without proper subgrade preparation, drainage, keying, benching, moisture conditioning, and compaction can result in fill settlement or slope failures. Heavy trucks put an extra burden on cut and fills.

There are underground, seasonal rivers that flow off Mt. Sutro. The rock outcropping has red chert which has been labeled highly fractured.

Just the act of cut and fill is a recognized landslide hazard, and tunneling, if it is even possible, is very expensive.

From: Karen Goodkin
To: Campus Planning - EIR
Subject: input for UC expansion
Date: Wednesday, February 12, 2020 5:55:27 PM

I’m a neighbor living on 2nd Ave. in the shadow of UC.

As it stands now, crossing both Irving and Lincoln can be tricky and confusing. With more people being brought into the neighborhood, it can only get worse. I hope you address this and actually have a plan to reduce traffic movement and congestion.

There is also a lot of trash on my street from people walking and driving through. More people equals more trash. I would assume that UC would take on increased street cleaning duties because the areas around the campus are going to need more vigilance and attention.
I have lived at this address for 38 years. I care deeply about the safety, cleanliness and walkability of this neighborhood.

Thank you. Sincerely,

Karen Goodkin
1232 Second Avenue

From:	Marta Lindsey
To:	Campus Planning - EIR
Subject:	Comment on EIR initial study.
Date:	Thursday, February 13, 2020 8:48:42 PM

Dear Ms. Wong,

I'm a parent of two young children and live right down the block from UCSF Parnassus. I'm a UCSF patient (our whole family is) and my husband has a membership to the gym. We have lived near UCSF Parnassus for almost 15 years and appreciate our proximity to the hospital and consider it a neighbor of sorts!

In learning more about the proposed long-term plan for UCSF Parnassus, I have two concerns.

First, there is nothing in the plan re: improving pedestrian safety at Irving. I walk through the Irving/Arguello intersection 2-4 times every single day, and this intersection is a crash waiting to happen --- and the parking ramp is a big part of this. People drive in and out very quickly, and without regard for all the parts of the complicated intersection. For those approaching from Arguello, many do not even stop at the stop sign before going into the parking lot. I am an extremely cautious pedestrian, and have been almost hit while pushing a stroller twice.

This intersection, as well as the area where people get on/off the trains, needs serious help. I really hope this can be planned for, and ideally addressed much sooner than the timeline of the plan. There are pedestrian improvements mentioned for Parnassus, but I don't understand why this wouldn't happen for Irving, too.

Secondly, the initial study acknowledges that vehicle traffic to the area will increase -- it's unclear by how much, but it could be a lot. This is worrisome considering how much traffic there already is on the streets right around UCSF as people who work at the hospital circle for parking spots and others are dropping off/picking up. This plan needs to include proactive steps to address and reduce traffic, with policies to support alternatives to driving to the hospital.

Thank you for your time.

Sincerely,

Marta Lindsey
1242 2nd Ave.
SF CA 94122
617.833.7654

--

From:	Sarah Price
To:	Campus Planning - EIR
Subject:	UCSF Proposed Expansion and Pedestrian/Neighborhood Safety on Irving
Date:	Thursday, February 13, 2020 1:11:43 PM

Hello!
My family and I are neighbors to UCSF, on Second Avenue near Hugo Street. We are also patients of UCSF, and have received medical care at the Parnassus ED, Mt Zion Pediatrics, and Mission Bay Labor and Delivery and Pediatrics, with another Parnassus specialist visit scheduled soon. We are excited to hear of all the new proposed plans to grow and develop the UCSF Parnassus campus over the next 20 years!

We are excited to see that there are plans including pedestrian safety improvements on Parnassus, there are no plans to do any on Irving, which is currently a highly frequented and frequently dangerous area. The plan states that the plan expansions of the campus will increase traffic to the neighborhood, and yet there is no plan in place to deal with this.

The current intersection of Irving/Carl and Arguello is the highest risk area, and my three children and I have almost been hit by cars on numerous occasions. Cars coming from all directions speeding over the speed limit, blowing past stop signs, no clear right of way with several directions of flow coming together, muni trains that limit view, and especially UCSF employees speeding through and making dangerous turns into the employee parking lot, are some of the most dangerous/frustrating parts.

Please include some strategies and plans to increase pedestrian safety on the Irving side of the UCSF campus. UCSF is a member of a very special neighborhood, and one that also prides itself on its high walkability. As UCSF plans to grow in this neighborhood, please plan to also take care of the residents who live here every single minute.

Thank you for your consideration!!

Sarah, David, Juliana, Violet, and William Price
1229 2nd Avenue

From:	Hans Baldauf
To:	Campus Planning - EIR
Cc:	Sarah Jones; Marian Baldauf; Jim Sandler
Subject:	Items to be considered
Date:	Friday, February 14, 2020 6:29:39 PM

To the University of California San Francisco regarding scope items that need to be studied on the Master Plan.

These in addition and augmenting the requests made by me at the meeting this past Monday evening.

First, I have not received official communication that the comment period has been extended. At the meeting we were told that it would be extended to the 21st. This is still woefully inadequate as the plans that have been shared with us are incomplete and the University acknowledged at the meeting on Monday are evolving. How can we know what the right questions to ask are. There should be a complete plan presented for us to consider our questions and a new scoping meeting.

Second the plan is assuming a massive increase of the cap in square feet that the University agreed to in the 1970s. Any plan studied must include an alternative that does not violate this cap. This alternative must study all the other locations that the University owns or could acquire in San Francisco. The rational for the Mission Bay Campus was based in part on the need to honor the cap.

Third
The physical construct of the existing campus provides low scale buffer zones of forest and low scale buildings to transition taller buildings to the neighboring residential fabric. A design alternative that studies how these transition zones must be studied.

Fourth
The firm preparing the EIR said they planed on using portions of the past EIR in this EIR. The very fact that the University is proposing a massive new master plan so soon after the last one suggests that everything has changed so no old studies should be used and every study must be new.

Fifth
Transportation impacts need to be fully analyzed. Any additional traffic impacts that cut through the forest preserve must be studied for their environmental impacts as well as their other impacts.

I will continue to review the materials which I fear are very incomplete and try to provide additional requests for study.

Thank you.

HANS BALDAUF
FAIA / LEED AP
Principal

BCV ARCHITECTS
1527 Stockton St. 4th Fl
San Francisco, CA 94133

333 Hudson St. #407
New York, NY 10013

T: 415.398.6538 x 102
M: 415.385.8777
E: Baldauf@bcvarch.com
W: https://urldefense.proofpoint.com/v2/url?u=http-3A__www.bcvarch.com&d=DwIFAg&c=iORugZls2LlYyCAZRB3XLg&r=JhM_VvzmFctdNSixk-ai5_fpjYPf2Oy-UaxjdYkmkxk&m=i8KM6uJkR0YdzEu3W0VnQQGfwd52t3CZLMlz5Qd7cjg&s=zlx1spnY9394bxwcWwSWImzcMymjyslqTuogid9hh5Q&e=

From:	Roger Hofmann
To:	Campus Planning - EIR
Subject:	EIR comment: Drought availability of water for the Parnassus Heights campus
Date:	Friday, February 14, 2020 3:56:08 PM

Dear Ms. Wong,

In the most recent drought San Francisco instituted a mandatory 25% reduction in water use. SF PUC projections suggest that a 40% reduction in water use may be required in a future drought. The State of California seeks to reduce our use of Hetch Hetchy water. It may be challenging to fully replace this water supply source.

In light of the necessity of water for all UCSF activity, it is important to analyze UCSF's water needs and water availability in conjunction with planned expansions.

1. Please analyze the Parnassus Heights campus' ongoing water requirements in conjunction with construction and new development.

2. If at all possible, a memo of understanding with the SF PUC that guarantees UCSF priority delivery of water during drought conditions would be optimal. As part of the EIR process, please engage in discussions with the SF PUC regarding water delivery guarantees, most particularly in the event of drought.

3. Should the campus' water requirements exceed delivery guarantees, please analyze how the campus will obtain sufficient water to operate, or how insufficient water would degrade operations.

Best regards,

Roger Hofmann

From:	Sunil Paul
To:	Campus Planning - EIR
Cc:	Mera Granberg
Subject:	Comment on the UCSF development plan
Date:	Sunday, February 16, 2020 12:04:25 PM

Hi - We are neighbors at 150 Edgewood Ave. We attended the public comment meeting and have additional input.

We believe more, denser housing helps the major problems of our day: climate, equity, homelessness, and distribution of wealth. We are happy to stand up publicly to support these beliefs at future meetings (we had to leave early from the last one).

We would very much encourage two changes:

1. Make the housing more dense, higher, more expansive and find a way to make it affordable for workers at the hospital, not just students. For example, why add higher cost units up top with the amazing views and balance it with more affordable units in the same building?

2. Consider moving the housing (or the open walkways) to earlier in the process to provide a win for the community sooner than later.

Thanks for your consideration of these things -- also, if the EIR is not the right place to consider them, please forward this email to whoever the right person would be.

best,

Sunil and Mera Paul
150 Edgewood Ave

Sunil Paul sp@sunilpaul.com I aspire to check email once a day - text if urgent
Linkedin Blog Twitter ... what I'm up to ... subscribe to occasional emails

From:	Roger Hofmann
To:	Campus Planning - EIR
Subject:	EIR comments regarding ride sharing
Date:	Sunday, February 16, 2020 2:51:40 PM
Attachments:	Comments ride sharing.pdf

Dear Ms. Wong,

At the scoping meeting Uber and Lyft were mentioned by name as beneficiaries of space that the CPHP will reserve for their use. In the attached document I request analysis of several issues raised by this plan.

Best regards.

Roger Hofmann

CPHP comments regarding ride sharing

During the scoping meeting for the Comprehensive Parnassus Heights Plan, private ride sharing companies Uber and Lyft were mentioned by name. We have been informed by your architect's comments that the CPHP will include pick-up and drop-off locations for use by these ride-sharing companies.

This strongly suggests that the CPHP assumes service from these companies will remain available in the long term and their level of service will be comparable to the services available today. If, for some reason, these companies falter, there is an implicit assumption that comparable replacements can be found.

These assumptions need careful analysis in light of the following facts:

Neither company has achieved financial success. Uber lost at least $3 billion EACH YEAR for the past four years, including a stunning $8.5 billion in 2019 as cash received from its initial public offering was showered on insiders. Uber's current balance sheet shows "Current Assets" (assets that can be converted to cash in a reasonable time frame) at $14 billion. At its current financial trajectory **Uber will run out of cash before Phase One of the CPHP is complete**.

Lyft offers a similar cautionary tale. Each year in the past four it lost more money than the year before. In its "best" year, 2016, it lost "only" $682 million. Like Uber, money from its initial public offering was sprayed at insiders – last year Lyft lost $2.6 billion in part due to its largesse with insiders. On Lyft's balance sheet "Current Assets" are shown as $3.2 billion. Like Uber, **Lyft must make changes within the next few years to survive**.

Neither company has a stellar record of corporate ethics. Uber in particular has a sorry history, including **sexual harassment in the workplace, flouting local authorities and active deception of regulatory attempts**. Web search "Uber greyball" for details of one such effort.

The drivers from both companies may refuse rides. It has come to light recently that this policy results in a high refusal rate in minority neighborhoods. **This is a form of redlining**.

In consideration of these facts, the explicit mention of these companies by name at the scoping meeting and their presumed role in the CPHP, please analyze the following:

1. Please analyze whether in the long term private company ride sharing will exist as a viable transit option for the UCSF community. Please take into account that under new California law drivers will likely be converted from contractors to employees.

2. As part of this analysis, please estimate ride prices that will allow Uber and Lyft to remain as "going concerns" in San Francisco in the long term and the impact these prices will have on potential UCSF users – will higher ride share prices convert some users back to private automobile use? If so, how many additional automobiles could be expected, and what is this impact on traffic and parking?

3. Considering that many ride share drivers do not live in San Francisco, but drive many miles to provide service here, please analyze vehicle miles traveled (VMT) under two scenarios: (A) Your baseline assumptions of ride sharing by the UCSF Parnassus Heights community; and (B) The ride sharing users in scenario (A) use private automobiles instead. In other words, do the ride sharing companies increase or reduce VMT compared to private automobiles, by how much, and what is UCSF's impact on VMT in both scenarios?

4. Please analyze whether the corporate ethics and behavior of Uber and Lyft are compatible with UCSF's ethical standards and whether even an indirect association with these companies is an acceptable affiliation for UCSF.

Thank you for considering these comments.

Best regards,

Roger Hofmann

From:	Maria Wabl
To:	Campus Planning - EIR
Subject:	EIR comments
Date:	Sunday, February 16, 2020 1:35:55 PM

Hello Diane,

Please include the following comments into the EIR analysis:

EIR comment 1:
Please analyze the parking situation on the newly planned Parnassus Campus:

- At least one parking deck is going to be removed from the parking garage for the "grand terrace" (about 50 spaces?)
- The Surge parking lot is supposed to be given back to the Mount Sutro Reserve, 20 parking spaces will be eliminated
- The Dental School will be torn down and 4th Ave will be created. All parking spaces in the Dental School parking lot will be eliminated

Where will be new parking spaces created. Even if the vision of UCSF is to get rid of all cars in the near future, UCSF has a lot of faculty and employees with parking permits who come from the suburbs and from further away who are still dependent on cars. UCSF is a hospital with patients coming from as far as Fresno and so on. Especially it should be kept in mind that even if there are less cars in the city of SF, patients come from rural areas and are sick and they will for sure come by car.
How is USCF mitigating the huge growth of the Campus and daily population with decreased Parking?

EIR comment 2:
Please analyze the wildfire Issues in the area around Mount Sutro:

- I recently talked to my home owners' insurance and they notified me that we are in a Fire Zone 2. We live right next to Mount Sutro on 1515 5th Ave.
- After devastating fires in the wider Bay Area last year and the year before….
- This should be reason enough to seriously look at wildfire responses and plans and mitigation!

EIR comment 3:
Please analyze the wind impacts created by the demolition of the School of Nursing:

- Having lived in the immediate area for 30+ years, having walked Koret Way on a weekly basis, having spent hours in Sanders Court I am appalled by the fact that the nursing school, which was not even mentioned in the LRDP2014 that it doesn't meet earthquake requirements anymore, is going to be demolished now.
- The nursing school serves as a wind breaker so that Sanders Court can be enjoyed every now and then when the weather allows
- Now UCSF is going by aesthetics and is creating a "wonderful promenade" parallel to Parnassus Ave, which is the windiest street in all our neighborhood.

EIR comment 4:
Please analyze the 40% overage of square footage of the UCSF campus compared to the planned square footage use in the LRDP 2014

- Why are the buildings that were deemed for demolition in the 2014 LRDP no longer being torn down in the time frame given in 2014. This was to mitigate the overage in square feet even then.
- How will transportation be mitigated with 4000 more people on campus and the same neighborhood streets
- How will parking be mitigated if parking spaces are taken away and there is no plan for new UCSF parking spaces?
- How will the neighborhood be able to protect the street parking places which are diminished also by the city with bike racks and color?
- How can UCSF go over the space ceiling this much with a legally binding document in place to stick by the space ceiling?

EIR comment 5:
Please analyze the impact of UCSF not building any housing on campus as it was planned for in the 2014LRDP:

- How can UCSF justify not to build housing on campus as planned in the 2014 LRDP when San Francisco is in a housing crisis and UCSF is planning to add a lot more people on this campus, but does not help to improve transit or parking?
- What impact will more housing needs have on the immediate neighborhood.
- How many extra people on coaches will the neighborhood have to swallow? How does UCSF plan to mitigate this?
- Why is housing not built first on campus and then the campus is being overhault?

EIR comment 6:
Please analyze how the noise of construction planned will impact the neighbors and their sleep patterns:

- How is UCSF planning to mitigate the construction noise in the different areas of campus?
- How does UCSF plan to keep the number of trucks under control and the times they are coming to the construction areas?
- Will UCSF with this construction follow work hour guidelines without having something going on almost every weekend and in the early morning hours?

EIR comment 7:
Please analyze the noise of construction traffic on the immediate neighborhood?

- How is UCSF planning to mitigate the extra traffic from workers and construction vehicles and their noise?
- How can the immediate neighborhood keep their life quality with constant nuisances?
- How can you mitigate neighbors not getting sick over not getting any rest during construction especially concerning noise?

EIR comment 8:
Please analyze the impact of deep drilling and demolition of buildings on the housing stock in the immediate vicinity of UCSF:

- How is UCSF going to mitigate the vibration from drilling deep into bedrock for the housing stock around the construction sites?
- How is UCSF going to mitigate the construction impacts concerning falling debris and construction material on the surrounding housing stock?
- Is UCSF going to accept claims after houses in the neighborhood are damaged?

EIR comment 9:
Please analyze the Air quality problem arising from demolishing the proposed buildings:

- How is UCSF planning to protect the neighbors, patients and workers from all the dust and hazardous materials in the older buildings being demolished especially with wind patterns and changing weather conditions?
- How is UCSF going to make sure that hazardous materials are discovered beforehand and not during demolition as a surprise?

EIR comment 10:
Please analyze the noise levels (meaning constant levels) with all new roof utilities and generators being installed

- How is UCSF planning to mitigate the extra new constant noise levels being created by all kinds of utilities and roof installations as heating devices …….
- How is UCSF planning to mitigate those noise creating background noises that will be increasing….

Please do not suggest to the neighbors to invest millions into projects for the community rather mitigate the project so that it allows us neighbors to continue to live in this neighborhood with a decent life quality!

Thank you for adding my comments onto the record and analyzing them.

With best regards,
Maria Wabl
1515 5th Ave

From: Denis Mosgofian
To: Campus Planning - EIR
Cc: Dean Preston; Norman Yee
Subject: 2 Comments on Notice of Preparation of ER
Date: Monday, February 17, 2020 8:05:35 PM

February 18, 2020 **Comment 1**

Diane Wong

UCSF Campus Planning

re: January 14, 2020 Notice of Preparation of Environmental Report and Initial Study for UCSF's Comprehensive Parnassus Heights Plan

Population:

Please stop using the misleading 2050 as the date of the net population increase, when 74% of the estimated 7,900 (= **5,846**) in population is expected to occur in 2030 (p. 13)

Please confirm that the projected daily population increase of **5,846** above 17,400 (2018) by 2030 includes all expected daily personnel and typical outside contractors, as well as expected visitors, and the 7,900 by 2050 above 17,400 also includes all daily personnel and typical contractors.

Please analyze the cumulative impacts from the 5,846 projected 2030 population increase on affordability and availability of nearby Inner Sunset & Cole Valley housing and analyze the displacement pressures on the existing residents in those areas during the decade 2020-2030.

February 18, 2020 Comment 2

Diane Wong

UCSF Campus Planning

re: January 14, 2020 Notice of Preparation of Environmental Report and Initial Study for UCSF's Comprehensive Parnassus Heights Plan

Population and Housing:

Cease and desist: The document conceals the real growth rate from 17,400 to 23,246 by 2030 by continually using the population increase to 25,300 by 2050. And this in turn obscures the much more immediate cumulative impacts in this decade on housing, local residential population, VMT, congestion, transportation and public services. **The devil is always in the details!**

Please identify and analyze all possible “alternative campus housing locations for the duration of construction” to which students could be relocated. (p. 41)

Given that the CPHP anticipates displacing Aldea Housing residents without having sufficient other housing for them, **please analyze** just how and where UCSF will be able to move people both on campus and elsewhere, and just where it would seek “construction of replacement housing elsewhere in the City.” (p. 41)

Please analyze exactly why housing could not be built prior to demolition to preclude disruptive and expensive displacement.

Denis Mosgofian
1227 - 10th avenue, 94122

From:	Denis Mosgofian
To:	Campus Planning - EIR
Cc:	Dean Preston; Norman Yee
Subject:	4 Comments on Notice of Preparation of ER
Date:	Monday, February 17, 2020 8:05:36 PM

February 18, 2020 **Comment 3**

Diane Wong

UCSF Campus Planning

re: January 14, 2020 Notice of Preparation of Environmental Report and Initial Study for UCSF's Comprehensive Parnassus Heights Plan

Please analyze the cumulative impacts due to the population increase on public transportation availability, and the increased public costs to the City & County of San Francisco for the decade of 2020-2030, and what financial mitigation UCSF would provide.

February 18, 2020 **Comment 4**

Diane Wong

UCSF Campus Planning

re: January 14, 2020 Notice of Preparation of Environmental Report and Initial Study for UCSF's Comprehensive Parnassus Heights Plan

Transportation, VMT and congestion on Parnassus Avenue:

Please analyze how Vehicle Miles Traveled by staff, faculty, patients and visitors (aka congestion) will be reduced with the **5,846** net increase in daily population by 2030 as articulated on page 13. (5,846 = 74% of 7,900 total projected net increase in daily population which would occur in the Initial Phase to 2030)

February 18, 2020 **Comment 5**

Diane Wong

UCSF Campus Planning

re: January 14, 2020 Notice of Preparation of Environmental Report and Initial Study for UCSF's Comprehensive Parnassus Heights Plan

Please analyze the practicability and safety of proposed drop-off and pick-up area proposed for the new child care facility at the site of the Proctor Building located at the southeast corner of two very steep streets, Kirkham going east and 5th Avenue going south?

February 18, 2020 **Comment 6**

Diane Wong

UCSF Campus Planning

Please confirm that there will be a School of Nursing and identify where the new School of Nursing Building is to be?

Denis Mosgofian

1227 - 10th Avenue, 94122

Dennis Antenore—Comments on Initial Study Comprehensive Parnassus Heights Plan

Please analyze and compare the environmental impacts of the proposed project to a project modified to provide for converting UC Hall to housing as completed in the current LRDP and for the conversion of Moffitt Hospital to housing. Such a modified project would likely greatly reduce the negative impacts of the Plan.

Please analyze the impacts of the project on the New Deal Murals in Toland Hall, in UC Hall. As an important historical resource the demolition of UC Hall threatens the integrity of Toland Hall and particularly the murals.

Please analyze the Wild Fire risks and possible responses regarding the Sutro Forest. In 2015 the San Francisco Fire Marshall concluded that: "Due to the **EXTRA HAZARDOUS** fire conditions identified during the on-site inspection a 100 foot defensible space work in the Mount Sutro Open Space Reserve is recommended." This is especially important as the Plan contemplates locating a portion of the new hospital as well as other buildings in or adjacent to the forest.

From:	John Caldwell
To:	Campus Planning - EIR; Zane Blaney
Subject:	EIR comments
Date:	Thursday, February 20, 2020 10:54:44 PM

We support UCSF’s presence in our neighborhood and its thoughtful expansion to accommodate future needs, but want to voice concerns about negative impacts of the current proposal.

A a new hospital building at the extreme east end of the campus is problematic. Removal of green-space buffer to fit a high-rise building in place of a low-rise one would degrade quality of life in nearby homes. Visual intrusion and shadows are likely but impossible to judge without dimensional renderings. Added noise from roof equipment and deliveries are certain.

UCSF's vehicle traffic is already a neighborhood negative. A particular cause is single-occupant drivers seeking free parking. Your data suggest that two thirds of visitors arrive by car, and that you will be increasing campus space by 30-40%. Transportation-specific plans including reduction of SOV trips--preferably from current levels--need to be part of any expansion.

Thank you for addressing these concerns.

John Caldwell & Zane Blaney
1460 Willard Street

From:	Scott Jacobs
To:	Campus Planning - EIR
Subject:	UCSF Parnassus Campus Initial Study, Notice of Preparation of Environmental Impact Report, and EIR Comments and Concerns
Date:	Thursday, February 20, 2020 2:09:33 PM

To UCSF,

My family has lived at 122 Edgewood Ave in San Francisco since 2008. We have four young children – Skyler (6), Jazper (9), Justin (12), and Jaxon (13). Our home is located adjacent to the UCSF Parnassus campus – our kids can see the campus buildings and hear the noise from the campus power plant through their bedroom windows.

We are extremely concerned that UCSF may have acted in bad faith by initially proposing a project description for new structures/alterations to the UCSF Parnassus Campus, and then making significant/material changes to the project description, height, square footage, density, location, and mass of these structures/alterations at the last second.

Based on these changes, the Initial Study is obsolete, inaccurate, and improperly structured to fully study all of the additional/increased impacts associated with this new, expanded project. The Initial Study was based on UCSFs original project description and scope of work in which the construction of the new hospital building would have been contained within the existing footprint of the University and would only extend to, but not beyond, Medical Center Way. The project documents specifically state on page 9 that, "The proposed New Hospital would be located on the site of LPPI on the south side of Parnassus Avenue between Medical Center Way and Moffitt Hospital." (The related drawings show this same boundary.)

However, the most recent version of the project scope and description proposes a new, radically different plan in which the new hospital building would extend far beyond Medical Center Way, almost to the backyards of the homes on lower Edgewood Ave. This new plan also appears to clear cut a significant portion of the forest to make way for new structures, as well as construction vehicles and parking. The Initial Study clearly doesn't take into consideration these last second, significant changes to the project scope and description (eg. height, square footage, density, location, mass, occupant count, etc) of the new proposed structures/alterations.

If UCSF wants to expand/increase the scope of work and project description as it has recently been presented, then the current Initial Study and Notice of Preparation of Environmental Impact Report need to be redone to accurately reflect the additional/increased potential impacts associated with this project. UCSF needs to redo the Initial Study and run this process in a more transparent and inclusive manner.

Additionally, UCSF hasn't shown the Edgewood Ave residents or community any specific plans, elevations, studies, or renderings for the new proposed UCSF buildings/alterations in relation to the homes on Edgewood Ave, the surrounding community, or the broader city, making it impossible for us to understand the magnitude and severity of the impacts associated with these proposed buildings.

Our concerns about these new proposed buildings/alterations include, but are not limited to, the following impacts:

Air Quality Impacts

- Air quality and human health impacts on the adjacent Edgewood neighbors and community resulting from the construction vehicles traveling to and from the surge lot and project site.
- Air quality and human health impacts from hazardous materials (e.g. asbestos), specifically associated with the demolition of older structures
- Air quality and human health impacts from disrupted hazardous materials located in the soil (e.g. asbestos)
- Air quality and human health impacts from hazardous materials and environmental contamination located in the soil and groundwater, if any, that will be disrupted during demolition and construction
- Air quality and human health impacts related to chronic downwind exposure from ongoing demolition and construction activity
- Air quality and human health impacts related to the removal of trees from the section of Sutro Forest in-between Medical Center Way and Edgewood Ave

Noise Impacts

- Noise impacts from ongoing demolition and construction activities
- Noise impacts from hospital generators, power plants, and other mechanical devices moving closer to residential areas
- Noise impacts from Medical Center Way being transformed into an active street for cars, shuttles, trucks, ambulances, and facility support vehicles
- Noise impacts from the Surge Parking Lot becoming a staging ground for construction vehicles
- Noise impacts from increased ambulance traffic
- Noise impacts from helicopters, if any

Traffic Impacts

- Increased neighborhood-level traffic impacts around the Parnassus Campus as well as city-wide traffic impacts resulting from the increase in cross-town vehicular travel to and from the Parnassus campus (during peak and non-peak hours) and the increased occupant count at the Parnassus Campus.
- Increased impact on neighborhood-level parking supply resulting from the increase in vehicular travel to and from the Parnassus campus

Housing Impacts

- Housing-related impacts (affordable and otherwise) resulting from increased occupant count at the Parnassus Campus.

Infrastructure Impacts

- Water, sewer, power and other impacts resulting from inadequate, undersized city and utility infrastructure

Geological and Natural Resource Impacts

- Geological impacts from demolition and construction activities (eg. increased erosion,

landslides, flooding, water runoff, etc) from the disruption and alteration of the hillside
- Geological impacts to natural resources (eg. Serpentine rock formations)

Neighborhood Character Impacts

- The height, square footage, density, and mass of the new proposed UCSF buildings are totally incongruous with the character, height, square footage, density, and mass of the structures in the surrounding neighborhood. This will permanently alter, impact, and scar the character of the surrounding neighborhood.

Cushioning Impacts

- Impacts associated with UCSFs potential violation of its 2014 neighborhood agreement, in which UCSF agreed to implement “cushioning” actions to offset the intensification of use of existing property.

While I recognize the need for additional hospital capacity in San Francisco, this project scope and process as currently conceived is extremely flawed, in violation of CEQA goals and requirements, and needs to start over from the beginning. UCSF should also seriously consider alternative sites/locations for this new hospital.

Sincerely,
Scott and Jing Jacobs

122 Edgewood Ave.
San Francisco

From:	Sarah Jones
To:	Campus Planning - EIR
Subject:	Comments on Environmental Impact study of UCSF Parnassus Campus expansion
Date:	Thursday, February 20, 2020 9:25:30 PM

Dear UCSF,

I live at 190 Edgewood Ave. and have recently become aware of the extent of the plans to expand the UCSF Parnassus Campus. While I have been aware of the planned construction, I did not realize the extent to which it would transform the Parnassus Campus, nor that UCSF is considering altering the current footprint of the existing campus.

My major concerns are mainly clustered around

Transportation/Traffic/Parking: Parnassus Avenue is one of three roads that run from Stanyan to the Inner Sunset. We rely on it daily, as do many bus lines, and its closure, permanent or temporary, will reroute a huge amount of traffic to the remaining two roads, rendering them congested and therefore more dangerous.

Also, after the construction is finished, UCSF expects an additional 4,000 to 7,000 additional people to be on campus on a daily basis. This will greatly affect traffic, transportation and parking in the area, not to mention the pressure this new population will put on the surrounding streets and highways of San Francisco. It is disingenuous to believe public transportation will bear the burden of these new workers and patients. I don't see how whatever additional parking UCSF builds will make up for the new needs.

Noise: Again, my concerns are about both construction noise, and the noise of the hospital after construction. We have heard from neighbors on 5th Ave. that the construction vehicles for previous UCSF building projects have begun as early as 3am. If UCSF builds the new hospital on the east side of the Parnassus campus, and uses the Surge Lot for construction parking, I am very worried the construction noise will be waking up our neighborhood at 3am for the (decades-long) duration of the project.

Likewise, after the hospital is built so close to, and perhaps across, Medical Center Way, I worry that the noise of the hospital's generators and HVAC will be much louder than the current system. We on Edgewood are lucky to have the barrier of the mountain and the trees of Sutro Forest to somewhat mitigate the noise from UCSF, but with the Hospital moving to the outer edge of Medical Center Way, and rising significantly higher into the air, these noises will become much louder and harder to ignore.

Massing on Parnassus: The current UCSF Parnassus Campus begins mostly low at both 5th Avenue, and Medical Center Way and grows higher towards the center of the campus. With the current design, huge new buildings will be built on the extreme ends of the Parnassus Campus, looming as you come west and east on Parnassus. The new construction's impact on the neighborhood will be much greater than if the construction took place in the heart of the campus instead of on the edges.

Geologic stability: There have been multiple instances over the past several decades of rockslides and mudslides in Sutro Forest. A little more than a decade ago, one side of the Surge Parking Lot slid down the hill. When the added weight of 1.5 Million square feet of new buildings, not to mention construction vehicles, are added, I am worried that the stress on the geologic substrata will lead to further and increased instability of the hillside. The current EIR has not adequately addressed that potential instability. In addition, the potential widening of Medical Center Way will put added stress on the hillside to the west of Edgewood Avenue, potentially contributing to instability of houses on the street.

Destruction of part of Sutro Forest: The EIR does not adequately address the impact of widening Medical Center Way into Sutro Forest. The proposed EIR posits that because forest torn out of the hill to the east of Medical Center Way will be replaced (decades later) in a different place, that the impact of the planned deforestation for the widening of Medical Center Way is negligible. This is absolutely ridiculous, as the forest contains several native species that will be destroyed, and is used heavily for recreation by neighbors and visitors to the area. In addition, the forest to the east of Medical Center Way contributes profoundly to the mitigation of noise and air pollution from UCSF to the neighbors of Edgewood. (Also see Geologic Stability.)

Thank you,
Sarah Jones

From:	Irene Lee
To:	Campus Planning - EIR
Cc:	Sarah Smith Jones
Subject:	concerns regarding UCSF expansion from Edgewood Avenue resident
Date:	Thursday, February 20, 2020 3:41:05 PM

To the University of California San Francisco regarding the recent EIR meeting:

I am a resident and homeowner on 235 Edgewood Avenue. Last week our neighbors on Edgewood attended a meeting to review the latest EIR, and found that the EIR was not entirely relevant as the Master Plan for the campus expansion has been altered to expand the square footage significantly. My understanding is that this expansion will have a direct impact to the neighborhood due to noise, shading, traffic and alteration of the forest/greenbelt areas. As a resident, I am quite concerned, and would like to see a study of how the new plan affects each of these factors.

My questions include the following:

1. How much of the greenbelt/trees between Medical Center Way and Edgewood plan to be altered, and what would the affect on air quality and noise be by removing this buffer?
2. With construction occurring so close by, what old (and potentially hazardous) materials will be removed, and how do you plan to address protecting air quality to our neighborhood?
3. How close and large will hospital generators and other noise-producing sources be to the neighborhood? How will this affect us?
4. Will you be updating surrounding water, sewage and power lines and other infrastructure to support the increased demands of the hospital?
5. What will the increased height of the buildings do to shade the neighborhood?
6. What are the plans for the current surge parking lot that is adjacent to our backyard?
7. What other studies have been done regarding impact to existing housing, not just regarding the issues I have outlined?

My understanding is that the deadline for the EIR commenting period is tomorrow, and I do not feel there has been enough time or communication to properly address my and the neighborhood's concerns. My hope is that a full master plan can be shared and a full study done to understand and possibly alter any of these issues.

Sincerely,
Irene Lee
235 Edgewood Ave.

From: Ed Leonard
To: Campus Planning - EIR
Subject: Parnassus Heights Plan EIR
Date: Thursday, February 20, 2020 4:51:32 PM

Ladies and Gentlemen,

I attended the February 10 meeting and am submitting my comments on the scoping for the EIR for the above referenced plan:

I agree with the speakers at the February 10 meeting who voiced their distress at the rushed process. I am glad I was not the only one who got the impression that the University was not intending to take comments from the neighborhood seriously and would push ahead with its plan notwithstanding the devastating effects on the neighborhood. I won't repeat the comments made at the meeting except to note that I agree that the following need to be addressed in the EIR:

- **earthquake** (will the excavation and construction increase the likelihood and magnitude of earthquake damage to existing structures, particularly on the hill to the southeast of Medical Center Way and Parnassus?)
- **toxic emissions and diminished air quality generally** (during the demolition/construction period, from traffic congestion and from ongoing hospital operations)**,**
- **traffic congestion** (the idea that public transportation and the widespread use of autonomous vehicles is capable of reducing the number of cars traveling to the hospital is a misguided illusion and if the University is basing its plan on this, please furnish the studies supporting this belief),
- **noise** (arising from (i) construction, hospital generators moving closer to residential areas, (ii) Medical Center Way becoming an active street for trucks and facility support vehicles, (iii) Surge Parking Lot becoming staging ground for construction vehicles, (iv) ambulances), and
- **housing** for the massive increases in the number of people coming into the neighborhood need to be addressed as do the **deleterious effects of vibration, wind, and the length of the construction period**. In particular, the location of the hospital and its height and scale are completely objectionable and the University should consider relocating it entirely, perhaps to Mission Bay, or to Johnstone Drive where the University has plenty of space and some housing already exists, or perhaps to another county.

It is certainly ironic that a medical organization supposedly concerned with people's health should propose a plan which will have, as two of its principal effects, increasing the risk of injury to its neighbors and making them sick.

In addition, I have three other comments which were not presented at the meeting. There is a steep hill descending from the west end of Farnsworth Lane to Medical Center Way and Parnassus Avenue. There are currently signs posted there by the University warning of the danger to pedestrians traversing the hill. A fence was also placed there several years ago. In general the signs and the fence have reduced the number of people accessing the hospital that way, but with an additional 4,000 people a day going to the hospital and campus, the signs and the fence will almost certainly be ignored, probably resulting in injuries as well as to erosion to the hillside. A chain fence at the entrance of the trail from Farnsworth was ignored and moved so often in the past, it was finally removed by the University. In addition, we have seen people taking smoke breaks on Medical Center Way and there would be a significant risk of fire if people would smoke, or dispose of their cigarettes, on or anywhere close to the hill.

Is the city of San Francisco going to pay for the sewer and water improvements required to service the new hospital and buildings? If not, existing water and sewer services in the neighborhoods may no longer be adequate. And when in the process will the City will make a binding legal commitment to make these and other necessary improvements?

Finally our neighborhood (Edgewood/Farnsworth) will object strongly to the increased foot traffic ascending the Farnsworth steps and accessing the hospital by way of Farnsworth Lane as well as to the increased number of vehicles looking for parking in our already stressed neighborhood.

Very truly yours, Edward Leonard

--

Edward M. Leonard I ed.leonard@gmail.com

UCSF CPHP
Comments on Initial Study for Preparation of DEIR

Dear Ms. Wong:

Thank you for identifying a number of Environmental Effects as categorized under CEQA that must be evaluated in preparing the EIR for the proposed CPHP.

There is a paramount question as to whether a valid DEIR can be prepared based on the limited information in the project description that has been provided to the public to date. The lack of detail makes any analysis subject to revisiting once actual structures; their locations, shapes, sizes and uses are identified. Further the order of each distinct construction project in relation to the others is likely to warrant further study and environmental review at each step.

The 30-year Construction Period

Please analyze the following:

1. **Transportation and Circulation**
   During construction, please analyze the impacts on transportation and circulation caused by tens of thousands of haul trips in and out, removing demolition and excavation material, and delivering building materials and construction equipment. Hundreds of workers will travel to and from the site for the duration. Access to the site is limited. Parnassus and Irving are each on a major MUNI bus or rail route. Parnassus is the access road to the hospital for Emergency Vehicles.

   Please analyze:
   - Impacts on public transit including but not limited to delays;
   - During construction as population grows, and after completion, please analyze the impact of increased population including construction workers on public transit;
   - Potential life-threatening delays of emergency vehicles during construction;
   - Impacts on bicycle safety both within the UCSF footprint and within the impacted local neighborhoods, noting that Kirkham Street carries the primary east/west bike route for the entire Sunset District including the Inner Sunset;
   - Impacts on pedestrian safety. Noise from construction that interferes with the ability of pedestrians to discern where sound is originating and whether it is an approaching vehicle. This may be particularly hazardous for the visually impaired.
   - Impacts on vital access from Irving Street for transit riders and pedestrians, especially those with disabilities, during construction of the new Irving Street entrance'
   - Impact of Vehicle Miles Driven (VMT) by construction workers travelling to and from the site;
   - Impacts on children, parents and employees accessing the Child Development Center while it continues to operate prior to demolition.

- Will there be a staging area off campus? If so please analyze the impacts on transportation and circulation in and around the staging area;
- Impacts/damage on City streets due to continuous wear and tear from heavy vehicle and equipment movement and costs for maintenance and restoration during the 30 year construction period and after completion.
- The health impacts on neighbors enduring the constant rumble and vibration caused by heavy vehicles over an extended time period.
- Please analyze the cumulative impacts with other construction and transit projects in the vicinity.

2. **<u>Noise</u>**

Please analyze the following:

- Construction vehicle noise with specific attention to noise from braking or gearing down, or both, that will be required for heavy diesel vehicles exiting the site fully loaded, and travelling down hill. Will there be a prohibition on use of engine brakes?
- Construction noise is among the most troublesome impacts experienced by local residents, with very real health impacts. Please analyze and propose mitigations with respect to limited hours for heavy equipment operation that generates inescapable noise and vibration.
- Impacts on patients, both inpatient and outpatient who are by definition as a whole and individually, "sensitive receptors".
- Impacts on students and researchers for whom concentration and focus is essential.

3. **<u>Air Quality</u>**

As noted in the Initial Study, air quality during construction poses significant potential negative impacts on both the "sensitive receptors" who populate the Medical Center and Medical Office Building in concentrated numbers, and on the immediate neighborhoods. Due to the noteworthy winds primarily from the west and north that will drive through the construction site, the impact of expected pollutants is likely to travel beyond any definable boundaries. However concentrations of particulate matter (PM) may be particularly problematic as the mountain acts as a barrier creating circulating currents and causing PMs to accumulate.

Please analyze each of the following:

- Impact of PM generated by demolition of structures and roadway with attention to volatilized toxic materials from such sources as carpets, glues, varnishes, roadbed, roofing, sewage lines, plumbing, laboratory and medical residue, asbestos removal, concrete dust, etc;
- Diesel emissions from trucks and construction vehicles;
- Release of potentially toxic materials generated by intensive excavation;
- Release of airborne asbestos fibers should serpentine rock be disturbed during deep excavation. Serpentine is commonly found in the Franciscan

Assemblage, frequently mixing in with chert. It is known to contain asbestos and does release harmful fibers when disturbed;
- The release of hazardous particulates into the air should also be analyzed with respect to its **impact on soil and biological resources** in the area. As released PM settles into the mountain, please analyze the potential impacts on wildlife subsisting on local vegetation and on the vegetation itself.
- Impacts on volunteers doing trail work and plant restoration in the forest, tand o hikers and cyclists on the trails
- Any conflicts with City and State policies designed to reduce toxic run-off to the ocean.

4. **Greenhouse Gas Emissions**

The Initial Study acknowledges that construction will generate greenhouse gases that could result in a significant impact. However it fails to address the problem of greenhouse gas emissions generated by the demolition of structures that go to landfill where they continue to produce Green House Gases (methane) over a long period of decay.

Please analyze:

- Long-term generation of greenhouse gas emissions (GHG's) generated by the massive demolitions contemplated in the CPHP.
- Production of cement/concrete is a particularly potent contributor to CO_2. Please analyze the impact on GHG's not only those generated on-site, but also those generated by production of materials used on site, particularly cement.
- Please compare GHG emissions due to new construction with GHG emissions if, instead of demolition some existing buildings were refurbished and remodeled.

5. **Population and Housing**

The Initial Study anticipates producing significant additional pressures on existing housing stock but offers no mitigation. Further the construction of new housing at Aldea presumes displacement of current residents, without an actual plan for relocation. This will inevitably put additional pressure on the entire City but particularly the districts closest to the campus, with respect to affordable housing.

Please analyze:

- The Initial Study omits any reference to housing and impacts on support staff for whom the University does not generally provide shelter. These are the lowest paid, but essential workers who keep any institution functioning and who are needed in large numbers. Have these positions been considered in the population projections? The housing needs of lower paid staff are no-where addressed by UCSF. Please analyze the housing needs for current and future support staff, and the impacts of added pressures on existing housing

- stock for these workers and their counterparts who do not work at UCSF but are living in the greater area.
- Please analyze the cumulative impact of UCSF's planned population growth with city-wide projected population growth on housing, transit, Greenhouse Gas Emissions, and local infrastructure including but not limited to water and sewage.

6. **Mandatory Findings of Significance**

Please analyze the cumulative impacts of the CPHP with various private and public projects currently in Planning stages that will compound stresses on transportation and circulation, infrastructure, utilities and service systems, affordable housing needs, greenhouse gas emissions, air quality, noise and Land Use.

This brings me back to my initial concern, that in a 30-year plan UCSF cannot possibly assess cumulative impacts in advance. Even if UCSF has a long-term development vision, intervening projects initiated by others, which are as yet unforeseen will need to be considered by UCSF in conjunction with their own plans and the analysis of cumulative impacts may require changes and/or mitigations that cannot be foreseen at this time. Future EIR's will be necessary.

Lastly, I am also requesting that all studies relied upon in preparation of the Draft Environmental Impact Report be included with its publication.

Thank you in advance for your attention to these concerns.

Sincerely,

Lori Liederman
1227 10th Avenue
San Francisco, CA. 94122

From:	Pam Hofmann
To:	Campus Planning - EIR
Subject:	EIR Comment - Permeable Interlocking Concrete Pavement
Date:	Thursday, February 20, 2020 9:14:47 PM

Dear Ms. Wong,

Thank you for including the following comment in the EIR.

Pam Hofmann

Please analyze any planned usage of permeable interlocking concrete pavement (PICP) with regard to new pavements in the CPHP. Please include the new 4th Avenue and the new service roads. Please include information on PICP composition with a summary of benefits, limitations, and characteristics. Important considerations, such as hydrologic design, structural design, construction, and maintenance, are also important.

From:	Pam Hofmann
To:	Campus Planning - EIR
Subject:	EIR Comment - The Performance of New Pavement
Date:	Thursday, February 20, 2020 9:17:15 PM

Dear Ms. Wong,

Thank you for including the following comment in the EIR.

Pam Hofmann

EIR Comment - The Performance of New Pavement

Please identify and quantify the effects of environmental factors and pavement design on the performance of new pavement; establish what the environmental effects are and develop recommendations for mitigating these effects through effective designs, materials selection, and construction; estimate the portion of total pavement damage caused by environmental factors.

Please analyze for both flexible and ridged pavements.

Please include the new 4th Avenue and new service roads.

From:	Pam Hofmann
To:	Campus Planning - EIR
Subject:	EIR Comment - Subsurface Water
Date:	Thursday, February 20, 2020 9:19:22 PM

Dear Ms. Wong,

Thank you for including the following comment in the EIR.

Pam Hofmann

EIR Comment - Subsurface Water

Please analyze the adverse effects of subsurface water and how to control it.

Please give the data required for analysis and design. Please use appropriate borings done in wet years.

Include Pavement drainage; Control of groundwater; Construction and maintenance, run-off.

Will ground water need to be treated for contaminants?

There is a constant water flow under Saunders Court, and there are seasonal rivers off of Mt. Sutro in all directions which affect all of the Parnassus campus.

On Koret Way there is an art installation by Peter Nathan Wildvine titled "Elevated Creek" 8July 2000. Although this art work has now deteriorated, it used to carry water from a seasonal spring downhill to a drain.

Ground water needs to be observed by borings made during wet years. For example, borings taken in 2013 are inaccurate because 2013 was the year of the lowest rainfall since 1994. Further 2013 was proceeded by the two next lowest rainfall years, 2011 and 2012. (UCSF Draft management Plan (TAC Draft) Mr. Sutro Open Space Reserve.

Borings taken after years of severe drought cannot accurately show the water seepage of the area.

From:	Pam Hofmann
To:	Campus Planning - EIR
Subject:	EIR Comment - Usage of Saunders Court for Emergency Vehicles
Date:	Thursday, February 20, 2020 9:21:11 PM

Dear Ms. Wong,

Thank you for including the following comment in the EIR.

Pam Hofmann

EIR Comment - Usage of Saunders Court for Emergency Vehicles

Please analyze the new 4th Avenue and Saunders Court with respect to use as emergency vehicle access roads.

Please analyze whether your anticipated choices for pavement and greening amenities conform to requirements for emergency vehicle access. Will the pavement support heavy fire engines?

From:	Pam Hofmann
To:	Campus Planning - EIR
Subject:	EIR Comment - Ambulance access
Date:	Thursday, February 20, 2020 9:23:15 PM

Dear Ms. Wong,

Thank you for including the following comment in the EIR.

Pam Hofmann

Please analyze the access to ambulance bays from Medical Center Way vs. access from Parnassus. The AASHTO Green Book states, "A traditional rectilinear street grid provides direct connections and multiple routes and thus has high connectivity." "Emergency service providers have also expressed concern over low-connectivity networks, which may contribute to longer response times and limit the number of routes for emergency access or evacuation."

Please analyze the number of ambulance bays, parking spaces, and the traffic flow for the ER.

Every ambulance bay needs to be designed to get the patient into triage and the EMT personnel back on the street as quickly as possible.

From:	Pam Hofmann
To:	Campus Planning - EIR
Subject:	EIR Comment - Release of contaminated air
Date:	Thursday, February 20, 2020 9:25:01 PM

Dear Ms. Wong,

Thank you for including the following comment in the EIR.

Pam Hofmann

Please analyze the release of contaminated air, airborne pathogens, and particulates from laboratory and hospital ventilation systems into the surrounding community.

From: Pam Hofmann
To: Campus Planning - EIR
Subject: EIR Comment - turning encroachment
Date: Thursday, February 20, 2020 9:26:39 PM

Dear Ms. Wong,

Thank you for including the following comment in the EIR.

Pam Hofmann

Will larger vehicles encroach into other lanes or directions of traffic while making intersection-turning movements? Please analyze this turning encroachment for Parnassus, Medical Center Way, Irving, 4th Avenue, 5th Avenue, Koret Way, and all service roads.

Important elements of turning radii are the wheel paths, which define the needed width of the pavement and the front overhang, which is the zone beyond the pavement edge which must be clear of obstructions above curb heights.

From:	Pam Hofmann
To:	Campus Planning - EIR
Subject:	EIR Comment - Changes to the CPHP after final plan announcement
Date:	Thursday, February 20, 2020 9:28:23 PM

Dear Ms. Wong,

Thank you for including the following comment in the EIR.

Pam Hofmann

Please analyze possible changes to the CPHP after the final plan is announced.

Please analyze how the CPHP will keep up with changes in the FGI requirements over the many years of construction. Will these changes substantively change the agreed upon CPHP?

The Facility Guidelines Institute is part of the American Society of Health Care Engineering.

From:	Pam Hofmann
To:	Campus Planning - EIR
Subject:	EIR Comment - Ray and Dagmar Dolby Regeneration Medicine Building.
Date:	Thursday, February 20, 2020 9:30:00 PM

Dear Ms. Wong,

Thank you for including the following comment in the EIR.

Pam Hofmann

Please analyze the effects of the proposed new service roads and new construction on the Ray and Dagmar Dolby Regeneration Medicine Building.

The research center is tucked behind UCSF's hospital on a sliver of ground so steep that constructing anything on it seems like impossible folly. "It is a site that essentially doesn't exist," Rafael Viñoly, FAIA, says. The two tall Health Sciences buildings, several loading docks, and utility plants encroach on one side, and a winding road leading through the eucalyptus trees to the top of Mount Sutro edges the other. The location was chosen because it was the last piece of available land on the dense urban campus.

https://www.architectmagazine.com/design/buildings/ray-and-dagmar-dolby-regeneration-medicine-building_o

From:	Pam Hofmann
To:	Campus Planning - EIR
Subject:	EIR Comment - retaining walls and drainage systems
Date:	Thursday, February 20, 2020 10:49:11 PM

Dear Ms. Wong,

Thank you for including the following comment in the EIR.

Pam Hofmann

EIR Comment – Retaining walls and drainage systems

Please analyze the retaining walls that will be necessary for the following:

1) the slope in the Proctor/new childcare area;

2) the slope along Koret Way and 4th Avenue;

3) the slopes behind HSIR buildings,

4) the slope at Parnassus and 4th Avenue;

5) the slopes from Irving to Parnassus (north-south) and from 4th Avenue to Hillway (east-west).

Please state the proposed type of retaining wall for each area.

Please include the drainage system chosen to mitigate hydrostatic pressure in each case.

The campus is very steep. The elevation changes hundreds of feet in the short distance from Irving to the Ray and Dagmar Dolby Regeneration Medicine Building.

The CPHP indicates that there will probably be cut and fill for many areas. Note that cut *slopes* are rarely created greater than a *slope* of two to one (horizontal to vertical dimensions). Cut and fill slopes are prone to landslides.

The campus has colluvium rivers and known landslide areas. (See the Haneberg Lidar Study.) These areas will need retaining walls capable of sustaining both the hydrostatic pressures and the force of 400 feet of Mt. Sutro pressing down from above.

The campus is large. Efforts to control hydrostatic pressure will be difficult if not impossible. The top of the campus is the Mt. Sutro Open Space Reserve. Water will enter retaining walls systems through the Reserve. Methods to reduce water pressure through selective drain efforts seems hit or miss, i.e., unreliable.

The ability for a retaining wall to sustain the force from the hydrostatic pressure and the force of Mt. Sutro above will be key to campus reconstruction as put forth in the CPHP.

There is a constant water flow under Saunders Court, and there are seasonal rivers off of Mt. Sutro in all directions which affect all of the Parnassus campus.

On Koret Way there is an art installation by Peter Nathan Wildvine titled "Elevated Creek" 8 July 2000. Although this art work has now deteriorated, it used to carry water from a seasonal spring downhill to a drain.

Ground water needs to be observed by borings made during wet years. For example, borings taken in 2013 are inaccurate because 2013 was the year of the lowest rainfall since 1994. Further 2013 was proceeded by the two next lowest rainfall years, 2011 and 2012. (UCSF Draft management Plan (TAC Draft) Mr. Sutro Open Space Reserve.

Borings taken after years of severe drought cannot accurately show the water seepage of the area.

From:	Terry Boyer
To:	Campus Planning - EIR
Subject:	UCSF Parnassus Expansion
Date:	Friday, February 21, 2020 6:56:30 AM

To whom it may concern —

We understand from our neighbors that UCSF is considering expansion plans that will dramatically impact the hill upon which we live, commonly known as Edgewood Avenue, but also encompassing Farnsworth Avenue, Belmont Avenue, and a portion of Parnassus Avenue. While we support the hospital's upgrades and expansion into repurposed areas such as Mission Bay and in-filled into Pacific Heights and the Mission, we are alarmed by what we understand could be a major excavation and intrusion into a green belt area that, once gone, would be a loss of habitat and beauty not only for our neighborhood but for the city. Retaining forested areas creates habitat, reduces noise, mitigates pollution, and lends aesthetic integrity to the varied neighborhoods of this beautiful city. The Parnassus campus enjoys a great legacy as well, integrated into the site it has long occupied, even adding buildings that are light on the land and not intrusive such as the stem cell research facility that we financially supported through the Ayrshire Foundation. But expanding into the East across Medical Center Drive while raising the height limits on the building would feel like an assault on our neighbors. For this environmental review, we ask that the committee reconsider their plans to encroach into the air space and land buffer that has allowed neighbors and families to coexist with one of the great medical research institutions, UCSF.

Thank you for your consideration.

All best,

Terry Boyer
1 Belmont Avenue
San Francisco, CA. 94117
Sent from my iPad

From:	Jeanne Blamey
To:	Campus Planning - EIR
Subject:	EIR on proposed Parnassus campus building plan
Date:	Friday, February 21, 2020 3:14:57 PM

To Whom It May Concern,

I am writing on behalf of myself and my husband regarding the impact on our neighborhood of UCSF's proposed building plan. We request that UCSF revise the EIR that it has presented to the residents of Edgewood Avenue and other neighbors who will be impacted by UCSF's building plans.

My husband and I have lived on Edgewood Avenue for 28 years. While we appreciate and support the research, the patient care and the medical expertise of UCSF and its staff, through the years we have also had occasion to experience UCSF as an institution that is not a "good neighbor." The current plans under consideration and the EIR raise serious issues that reinforce this negative perspective once again.

Among the numerous concerns we have are issues of noise, air quality and environmental aesthetics if trees between Medical Center Way and Edgewood are removed and a large building is constructed on the hillside. The project would strain the water and sewer lines in the neighborhood, which, for the most part, are older and not adequate to service such a large number of new users.

Then there are considerations of additional traffic. Please visit Edgewood when UCSF staff arrive for work and see how many of our neighborhood spaces they already take even though they do not have residential parking stickers, or try to drive along Parnassus in front of the Medical Center during work hours and see the chaos that is part of our daily lives. I feel especially sorry for people already dealing with medical issues or sick loved ones having to navigate the stress of Parnassus Street. It can only get worse under your proposed plan.

We also have concerns about housing, construction, and moving people from one part of the UCSF campus to other parts. Each of these areas potentially has a significant and negative impact on the neighborhood, not adequately addressed by the University's EIR.

We support other concerns raised by our neighbors. We request a new EIR that adequately addresses all of our concerns.

Thank you.

Sincerely,

Jeanne Blamey and Robert Fram
114 Edgewood Avenue

From: Tish Brown
To: Campus Planning - EIR
Subject: Need fuller disclosure
Date: Friday, February 21, 2020 12:13:16 AM

I live at 109 Edgewood Ave and request that before any EIR is resolved we be allowed to see the proposed building adjacent to
our neighborhood in renderings that
reveal the scale, proportions, and 3D location of said development. To what extent are existing
houses dwarfed, is the whole neighborhood skewed by too close too large development?
Edgewood Ave. is one of San Francisco's most special neighborhoods and shame on UCSF if
it is ruined by insensitive site planning.

Letitia Upton Brown
109 Edgewood

Sent from my iPhone

From:	Brown, James
To:	Campus Planning - EIR
Subject:	Dear EIR planning at UCSF,
Date:	Friday, February 21, 2020 6:30:29 PM

I am a home owner on Edgewood Avenue. This neighborhood is one of the most pleasant well kept secrets in San Francisco. Now that it knows about the plan, the entire neighborhood feels that the planned building of a 20-story building adjacent to one edge of the neighborhood will vastly diminish the pleasantness of the atmosphere here and the value of our properties. I would urge UCSF to consider building the new hospital in the middle of the available space along Parnassus, leaving smaller outpatient facilities around the periphery. The Edgewood neighborhood will fight the current plan strongly, and there are a lot of heavy hitters that live within it.

From:	Jeff Cole
To:	Campus Planning - EIR
Subject:	Feedback on the NOP of an EIR for proposed expansion at Parnassus campus
Date:	Friday, February 21, 2020 12:48:03 PM

Pursuant to the NOP dated January 14, 2020, and the EIR scoping meeting held at UCSF on February 10, 2010, at which it was announced that the deadline for comments was extended until today, February 21, 2020, I submit these comments focusing on the proposal to construct a new hospital on Parnassus, and issues that the Environmental Impact study and report need to address.

My name is Jeffrey Cole and, with my wife Susan, I live at 277 Edgewood Avenue, San Francisco, in a home we have owned for over 30 years. Our property backs up to UCSF's forest, near the Surge Parking Lot.

Unfairness of the process to date and lack of due process:

At the time the proposed Comprehensive Parnassus Heights Plan was first revealed in the Fall of 2019, it was represented by UCSF that the proposed new hospital would sit West of the existing Medical Center Way. There was no suggestion of any impact on the hillside and forest East of Medical Center Way. That was the case until sometime within the last few weeks, when UCSF began hinting that the footprint of the new building might be expanded Eastward, and might actually cover and encroach into or beyond Medical Center Way. Moreover, it is now hinted that excavation of the forest hillside might be considered. The impact of such possible changes is of enormous significance, particularly to homes at the top of the hillside on Edgewood Avenue. Yet when questioned about these essential details at the scoping meeting on February 20, the UCSF representatives would say only that the "design" of the building had not yet been resolved. It is grossly unfair and premature for UCSF to rush the project into an EIR process before these essential details (footprint and location of the building and adjacent roadways, possible excavation and encroachment on a steep hillside forest) have been revealed. Presumably the experts commissioned to perform the EIR study will be given this information; we your adjacent neighbors should be informed to the same extent and at the same time as the EIR experts. Had that happened as it should, the comments herein would have been expanded. I hereby request that UCSF keep the period for comments on EIR scoping open until a reasonable time after these details have been specified and shared with the community and affected neighbors such as myself.

Subjects to be considered in EIR and related study:

1. All impacts being considered in the environmental impact study must be based on the actual contemplated footprint, boundary, size, height and location of the proposed new hospital, along with any adjacent or contemplated roadways.
2. Impacts on homes on Edgewood Avenue must be specifically considered, including impacts during the extended period of construction. Issues should include noise, light, shade, wind and traffic.
3. Impacts on the forest behind the homes on Edgewood Avenue, and between existing UCSF paved areas and structures and the back yards of Edgewood Avenue homes, must be

considered.

4. Impacts of any changes in roadways (e.g., Medical Center Way) and parking areas (e.g., Surge lot) must be specifically considered.
5. If the hillside forest East of Medical Center Way is to be changed, excavated or impacted at all, then all environmental effects of that must be studied, including all aesthetic effects.
6. Impacts during the extended construction period on the quiet enjoyment of homes on Edgewood Avenue must be specifically considered.
7. Practical effects on the broader Parnassus neighborhood, and Edgewood homes specifically, of building an enormous building within a congested area must be specifically considered. For example, anticipating a constant flow of heavy trucks for removal of demolition material and delivery of building materials, what is planned for when and where they will be staging (waiting their turn to drop off or pick up materials) and moving through the streets? What noise impacts will there be on homes on Edgewood or other nearby streets? How will traffic on Parnassus and other streets be impacted? With other recent construction activity at UCSF as a reference point, knowing the impact of trucks for that project on the neighborhood, how can it be reasonable to subject the neighborhood to a project X times as large? Neighbors are reasonably concerned it would be not just unpleasant but disabling.
8. Assuming the proposed hospital were built as proposed, how would the anticipated vehicular traffic (e.g., for delivery and removal) flow within the UCSF property, and how would it impact the broader neighborhood?
9. What use is contemplated for the Surge Parking Lot, and how will that affect the environment for homes on Edgewood Avenue?
10. The EIR should consider not only scientific and technical variables, but concepts from real property law and tort law such as the right to quiet enjoyment of one's home.
11. I understand that other Edgewood Avenue neighbors are submitting comments, and rather than duplicate them here, I want to go on record as joining in their concerns.

I request that you keep me apprised of any further details that UCSF reveals about the project, or provides to the experts commissioned to perform the environmental impact study and report. I also request to be apprised of any updates or changes in the status of the project, the EIR process, or applicable dates.

Thank you for your consideration.

Jeffrey Cole
277 Edgewood Avenue
San Francisco, CA 94117
jeffcolesf@gmail.com
phone: 415-238-7019

From:	Kathleen Conti
To:	Campus Planning - EIR
Cc:	sarahsmithjones@gmail.com
Subject:	UCSF Expansion Plans
Date:	Friday, February 21, 2020 4:05:25 PM

To the planning committee:

From an extended list of the problems with the UCSF planned expansion we bring to the attention of the committee that the Edgewood neighborhood is already affected by the high noise levels of the heating, ventilation and air conditioning system (HVAC) serving the hospital and university. Backyards of Edgewood properties facing the parking lot are most affected. The levels of noise affect the activities in these areas and sometimes increase significantly, possibly with maintenance cycles for the plant that seem to be occur preferentially during weekends. We have communicated this problem to the university several times in the past. Before the new plan is implemented a detailed study on the environmental impact should be done to determine how the large increase in volume associated with the new hospital would affect the current HVAC facility and the noise level generated. Will the increase in volume require an enlargement of the current HVAC facility? Will there be a different unit built to service the hospital tower?

In addition to the noise levels there is also concern for the air quality during demolition and construction that will also be a burden to our community, especially those of us with homes backing up on Surge parking lot. And further removal of trees will affect the wind, which is already considerable, at the edge of the hill. There are also geological concerns of excavating the hillside for the construction of the hospital. These need to be addressed in a new study.

UCSF should have to meet California Environmental Quality Act goals with each stage of construction and not create housing, traffic and construction issues that will only perhaps be mitigated by theoretical future solutions.

Finally, we have been unable to view the buildings in elevation against the landscape. There were no renderings showing how a massive 16-20 story building would look as you come west on Parnassus, or how it affects the skyline of the hill. UCSF should institute a new review that enables neighbors to actually see the effects of the proposed buildings on their neighborhoods.

Sincerely,
Marco and Kathleen Conti
211 Edgewood Ave
San Francisco, CA 94117

From:	Nettie Gardner
To:	Campus Planning - EIR
Subject:	UCSF Expansion Plans Concerns/EIR
Date:	Friday, February 21, 2020 2:01:43 PM

To Whom It May Concern:

The expansion plans of UCSF have increased since the last EIR study. Because of this new expansion, it is hard to know what the environmental impact will be.

I live on Edgewood and have not been able to see how the buildings will affect the neighborhood, UCSF needs to be transparent and show the effect of a 16-20 story building.

How will water and sewage lines support the expansion of the hospital and housing?

I have read that there are geological concerns of pulling down the hillside which do not appear on the 2014 report. Shouldn't there be a new study?

The trees of Sutro Forest on Medical Center Way create a buffer for houses on the west side of Edgewood. How will removal of the buffer affect noise and air quality?

In addition, any enormous construction project will impact you neighbors. How will the noise and dust of this massive project affect the neighborhood?

Could this project be studied further?

Thank you.
Nettie Gardner
278 Edgewood Ave
San Francisco, CA

From:	Charles Gardner
To:	Campus Planning - EIR
Subject:	EIR Report, et. al.
Date:	Friday, February 21, 2020 5:33:51 PM

Ladies & Gentlemen:
As a neighbor, I believe it is critical that your EIR report weighs the impact of the inevitable destruction of the forest area, it's well-established ecosystem, its vegetation, and its wildlife. I look forward to a report that measures these considerations in depth. Thank you,
Charles Gardner
278 Edgewood Ave.

Sent from my iPhone

From:	Eleanor Kaplan
To:	Campus Planning - EIR
Subject:	Amended Comments on UCSF Comprehensive Parnassus Heights Plan Initial Study (Study)
Date:	Friday, February 21, 2020 4:46:47 PM

Please disregard the comments I sent to you yesterday and replace them with the following:revision.

It is encouraging to note that two sections in the Study (sections 5.3 on air quality and section 5.9 on hazards and hazardous materials acknowledge that construction and development activities mentioned in the Plan could expose sensitive receptors on the campus site and in adjacent neighborhoods
to substantial pollutant concentrations. Both
these sections state that the CPHP EIR will include an evaluation of the air quality impacts on sensitive receptors. While studies and data gathering are important, we have a right to conclude that they should lead to some action particularly when public health issues are involved.

Another factor of concern is that the Study as part of its guidance
does not include mention of the California Environmental Quality Act (CEQA) that requires that “no projects which could cause significant environmental effects should be approved if there are feasible alternatives or mitigation measures that would lessen these effects.”

In summary, we need more information on why the CEQA requirements, particularly with regard to possible mitigation measures, are not included in the Study particularly when the Study acknowledges that pollution resulting from the demolition and construction activities need to be addressed since, unaddressed, so many people including the most vulnerable namely children and the elderly will be the most affected.

Sent from my

From:	Lisa Kessler
To:	Campus Planning - EIR
Subject:	Environmental Impact Review comments for Parnassus Expansion Project
Date:	Friday, February 21, 2020 2:23:38 PM

To Whom it May Concern:

Although UCSF justifies increasing the space ceiling that they agreed to in 1976 and 2014 because of institutional needs, the constraints of the Parnassus Heights site have not changed. If anything, the environmental, traffic, and housing constraints of the area have only worsened in the last several years. The level of intensification of usage that they are proposing for the small site is unreasonable and will severely stress the adjacent neighborhoods, the surrounding woodland reserve, and the city's infrastructure.

This current expansion project, which proposes an increase in square footage from 3.55 million square feet to over 5 million square feet, is dramatically bigger in scale than anything proposed in 2014 and the environment/housing/transportation issues have evolved significantly since then. It is therefore unreasonable to re-use data from an EIR of a different project from 6 years ago. UCSF cannot rely on old data from the prior EIR; they need to prepare a new EIR which accurately reflects the current iteration of the plan and the current situation.

Issues that I would like to see specifically addressed in the new EIR:

Air Quality:

- The air quality impacts on the adjacent Edgewood neighbors of having all the construction vehicles and staging in the surge lot
- Air quality impacts of the demolition of older buildings, analysis of what old/toxic materials (such as asbestos) are in the to-be-demolished structures and how UCSF plans to mitigate that safety issue both for neighbors and for UCSF employees/patients
- How the direction of the wind impacts air quality from ongoing construction projects and chronic exposure of different sides of the campus
- How much are the trees in the strip of Sutro Forest between Medical Center Way and Edgewood contributing to the air quality on Edgewood, and what would be the effect of removing this natural buffer given the expected increase in pollution from years of ongoing construction

Noise:

- Construction noise, especially trucks and vehicles coming and going from proposed surge parking lot behind Edgewood homes in the early morning/late evening
- Noise from hospital generators moving closer to residential areas, especially if any trees are removed
- Noise from Medical Center Way becoming an active street for trucks and facility support vehicles, during construction and in the proposed final plan
- Ambulance noise

Transportation:

- The EIR from 2014 states that 24% of people traveling to Parnassus campus use public transport and 12% use shuttles. With the proposed drastic daily increase in personnel and population served, based on those statistics, approximately 64% of people will be arriving by car and the concomitant increase in parking/traffic needs to be addressed.
- That said, the 2014 numbers do not accurately reflect current transportation demand (especially considering the huge addition of commuters to and from the Mission Bay campus), so they must be reassessed.
- Getting more people to and from Parnassus Heights each day won't just affect the traffic around the Parnassus campus, but also around Mission Bay and on commuter routes from outside the city into SF. As it is bordered by greenspace, UCSF has limited access, much of which is via residential neighborhoods and small local streets; UCSF needs to address the transportation and traffic impacts on neighboring streets and access points including (but not limited to) 19th Ave, Judah/Parnassus, 17th St, Fell St, etc.
- Ride sharing has also become an important factor since 2014 and many local patients/employees/construction workers will take Uber/Lyft in lieu of public transportation or shuttles. This has been a huge problem for other busy places like airports that cannot accommodate the flow of so many additional passenger vehicles. Parnassus Ave and Irving St are already jammed with stopped and waiting Lyfts and Ubers that block traffic and have nowhere to go. How does UCSF plan to address the impact of all the ride share vehicles coming and going and waiting within this limited space?

Housing:

- With the space and personnel increase UCSF is adding significant demand to the city's housing resources, but most of the housing proposals to accommodate the increase in population at Parnassus seem to be planned for years to decades after the initial construction phases. Is this reasonable considering the current housing crunch in SF and the fact that UCSF already fails to meet its existing housing needs/requirements?

Aesthetic:

- Even without having any detailed information about its design, the proposed height and scale of the new hospital building at the eastern edge of the campus makes no architectural sense given the adjacent structures along Parnassus Ave which are almost all 2-story single family homes and multi-unit flats.
- In the Oct 2019 plan, UCSF prepared elevations showing the North-South scale from Irving St up to the Sutro Reserve (page 138), I would like to see similarly detailed elevations drawn that show the massing of the proposed new campus structures looking East-West along Parnassus in both directions, specifically the proposed new hospital building on the Langley Porter site. Drawings should clearly and accurately show the relative size of adjacent structures and properties on Parnassus Ave. I would also like to see before/after plans, aerial models, and elevation drawings of the existing LPPI site compared to the most current iteration of the proposed hospital building (and any planned adjacent structures - patios, plazas, bridges, etc.) with respect to the neighboring Sutro woods and the relationship to adjacent homes on Parnassus and Edgewood Aves.
- UCSF has released no definitive architectural or design information about the new hospital building. Without this information it is impossible to address the aesthetic or

environmental impact of having a massive building (proposed to be taller and larger than any other existing structure on the site) in this EIR.

- As an example of how the aesthetics of such a massive building have not been considered, the "future landscapes" illustration in UCSF's Oct 2019 plan highlighting its "Park-to-Peak" design *doesn't even show the proposed new hospital building* in the context of how the new campus would supposedly be integrated into the surrounding landscape (page 48.)

Greenspace:

- Although the Oct 2019 written plan shows a footprint (page 116) that stays within the existing campus boundaries that UCSF committed to in 1976 and again in 2014, in subsequent meetings an updated plan was presented that dramatically exceeded the original footprint for the new hospital, extending the building across the previously agreed-to campus boundary of Medical Center Way and into the Sutro Reserve space.
- The Agriculture/Forestry section of the EIR proposal was checked off as "does not require study"; seeing as the campus is surrounded by a forest reserve, it is imperative that UCSF look at the land use impacts of the plan
- I feel strongly that UCSF should uphold its promise to the neighborhood to respect existing campus boundaries and not infringe on any part of the Sutro Reserve. This is a valuable asset for both the neighborhood and the environment and UCSF must keep its commitment to preserving this important community greenspace.
- For UCSF to break its commitment to the space cap/campus boundary that it promised sets a dangerous precedent. UCSF should not annex and take over such a limited urban resource as community greenspace for its development/institutional growth and new construction.

UCSF in 2014 had agreed to "cushioning" actions to offset the intensification of use of existing property: https://www.ucsf.edu/sites/default/files/fields/field_insert_file/CAG%20Meeting%20Handout%206.4.14.pdf Instead, the new proposed project further intensifies the use of the Parnassus Heights campus significantly. I would like to know what concrete actions UCSF plans to take to offset this unprecedented demand on the site and increase in usage - specifically addressing housing, traffic, parking, personnel, and construction. Although I agree that UCSF needs to address its aging facilities, meet seismic safety regulations, and build a new modern hospital, the proposed Parnassus plan far exceeds those goals, breaks longstanding commitments to the neighborhood, and in doing so, threatens the future relationship of the University with the community.

Thank you for taking the time to read my comments,

Lisa Kessler

From:	Roger M Low
To:	Campus Planning - EIR
Subject:	Concerns about Parnassus projects
Date:	Friday, February 21, 2020 6:31:14 AM

Dear UCSF,

While I have enjoyed being your neighbor for ten years, I am very concerned about the status of study done thus far. I do not believe there has been sufficient consideration as to impact on:

- Construction being done so close to a hill where there have been mud slides before.
    - Impact on environment of trucks, dust and noise during construction.
    - Sufficient upgrade to water and sewage.
- Long term impact of noise and pollution from such added density of people and activity.
- Impact on transportation and parking in a neighborhood that is already over congested.

I look forward to seeing how you address these questions nad concerns.

Thank You,
Roger M Low
125 Edgewood Ave
SF, CA 94117

From:	Mike OCallaghan
To:	Campus Planning - EIR
Cc:	Sarah Jones
Subject:	USCF Expansion
Date:	Friday, February 21, 2020 12:34:17 PM

Dear UCSF,

I am writing in response to UCSF's proposed expansion of the Parnassus Campus and draft EIR response. I request UCSF further study the project information I have presented below.

UCSF has generally been a respectful neighbor. I am proud to have the best and the brightest medical professionals work and many live in close proximity to my home.

I have lived in the Cole Valley area for 65 years and at 123 Edgewood Ave for 33 years.

My home is one of the closest homes to the proposed hospital replacement at the corner of Parnassus and Medical Center Way.

I spent many days in the meeting with UCSF prior to the construction of the power plant that is located approximately 600' from my home. After negotiations were completed, UCSF promised Edgewood Ave residents that USCF would never come to them with another expansion. This was due to the immense scope and capacity of the Mission Bay project that was commencing. This promise to the community must be kept.

UCSF claims it has reached out to neighborhood groups and held meetings with the effected groups for many months. This is not entirely accurate. The Edgewood Ave Neighborhood Association, arguably the most impacted by this expansion, was not apprised or invited to these meetings up until recent weeks. This process cannot continue absent Edgewood Ave Neighborhood Association at the table. I do not feel adequately prepare to make this reply to the EIR as I have not been allowed to attend all the prior community meetings due to lack of notice. The project explanations that I have been presented have not been well prepared, are confusing and inconsistent. There is not enough accurate information currently available to properly respond. The short EIR response period of several weeks is not adequate. As the Edgewood Ave Neighborhood Association was not notified of the meetings until several weeks ago, the EIR response period should have been extended for several months, not one week.

The current project is ill conceived and should be substantially modified and resubmitted to the community for consideration.

My primary concern is the construction of this hospital at the very edge of the campus. The plan calls for a 296 foot tall building bordering on Medical Center Way. This is an unacceptable location for such a building as it violates the intent of the 2014 UCSF neighborhood agreement, Appendix D OP3 Cushioning. It also violates a basic premise of urban planing by placing a large non residential building in close proximity to a 2 and 3 story residential neighborhood. There must be a larger buffer boundary than proposed. A building of this height and mass must be located closer to the center of the campus and not at the very edge adjacent to and impacting residential area. The edges of the campus must be lower and terrace back into the taller buildings of the campus. Additionally, a tall building at the edge of the campus may pave the way for future construction of even greater height adjacent to this new hospital the during a subsequent UCSF expansion.

UCSF has not shared visual perspectives from Edgewood Ave or from any other neighborhood locations of the proposed project. Perspectives must be provided and viewshed, light and air studies conducted showing the proposed massive 20 story building at the very edge of the campus. UCSF must institute a new review that enables neighbors to actually see the effects of the proposed buildings on their neighborhoods and homes. If this proposed hospital were to be allowed in the proposed location, my home and many others on Edgewood Ave, would have the sun blocked out in the afternoons.

In addition, there are many issues that I am concern about for the proposed new hospital and the project as a whole that I will list and explain:

Air Quality:
The prevailing wind patterns for approximately 8 months a year are westerly. My home is to the east of the campus and directly down wind. If this building were allowed to be built, the construction and foundation work will introduce large amounts of dirt and debris into the air. Due to the unusually high wind velocities experienced on campus in the summer months, it will be very difficult to mitigate this problem when building a building so close to the edge of the campus. My home and others down wind may well become unlivable during construction.
I am concerned about the impacts of the demolition of the Langley Porter building, asbestos must surely be present in that building and due to the high wind velocities mitigation will be very difficult.
The trees in the strip of Sutro Forest between Medical Center Way and Edgewood Ave offer a buffer to the existing campus. The location and close proximity of the new hospital will put many of the homes on Edgewood Ave directly downwind and in the path of the air from the hospital ventilation exhaust and cooling tower plume. The air quality on Edgewood Ave would be effected.
Noise:
If the hospital were to be constructed as per the current proposal, the close proximity of my home to construction site would render my home un-occupiable during portions of the construction due to the construction noise:
The daily coming and going of construction vehicles from Medical Center Way.

The Surge Parking Lot becoming staging ground for construction vehicles. This parking lot is in close
The project includes the emergency entrance to utilize Medical Center Way. This will introduce ambulance noise day and night closer to our homes.

The vibrations from the close proximity of the construction to my home are a real concern. My home was built in 1905 and will not tolerate the heavy vibrations of close by construction.

Transportation:

The additional 7,000 person daily increase to the campus on increase in personal vehicle or UCSF shuttle busses use due to this new project should be allowed.

No more car traffic can be accommodated in the neighborhood. Parking is fully impacted week days during the academic year by UCSF students, patients and employees using the campus. Cars are constantly roaming Edgewood Ave during the day looking for parking instead of using campus garages. More parking spaces on campus is not the answer as the street congestion is already dangerously high and not more vehicles may be brought into the neighborhood.

Housing:
This proposed expansion cannot be allowed absent providing more housing. The amount of additional housing in the current proposal is not adequate for the additional number of daily people projected to be in the campus. To accommodate this, UCSF should place housing along Medical Center Way at Parnassus rather than the proposed hospital.

Sincerely,
.
Michael O'Callaghan

mocallaghan123@me.com
415-238-2114
123 Edgewood Ave

From:	Maryann Rainey
To:	Campus Planning - EIR
Subject:	The Environmental Impact Report (EIR) scoping meeting on February 10, for UCSF"s proposed Comprehensive Parnassus Heights Plan (CPHP)". Comments focus on building for student/staff housing in the coming twenty to thirty years.
Date:	Friday, February 21, 2020 3:56:44 PM

February 21, 2020

Diane Wong,
UCSF Campus Planning, Box 0286,
San Francisco, CA 94143
EIR@planning.UCSF.edu

Dear Diane Wong,

Regarding "The Environmental Impact Report (EIR) scoping meeting on February 10, for UCSF's proposed Comprehensive Parnassus Heights Plan (CPHP)". Comments focus on building for student/staff housing in the coming twenty to thirty years.

Thank you for the opportunity to respond to the documents presented at the Environmental Impact Report (EIR) scoping meeting on February 10, for UCSF's proposed Comprehensive Parnassus Heights Plan (CPHP). Thank you for extending the date for "input on environmental topics to be studied further" to today, February 21, from February 14.

It is with great pride that I am associated with UCSF and it is my fondest hope that UCSF is successful as an institution of learning, of health care delivery, as a steward of land and as a member of the neighboring community.

It is clear that UCSF wants to make thirty year plans for the development of the Parnassus Heights campus, prioritizing research, teaching, patient health care, student life and housing needs while being a good neighbor.

Now the lack of available housing for students and staff is constricting the ability of UCSF to function optimally. Times have changed.

My standing to give pertinent comment on the Scoping EIR is based on these characteristics:

> As a person who has lived on Fourth Avenue between Parnassus and Irving, north of the proposed extension of Fourth Avenue through the current dental school. I have had the good pleasure to live in this home for over thirty years and to have lived in the greater neighborhood for forty-five years.
>
> As a person who provides rental housing to UCSF students who reside in a flat over my home on Fourth Avenue
>
> As a member of the Advisory Board of the Sutro Stewards and a person who works in the Sutro Stewards Nursery as a volunteer
>
> As a prior staff nurse for ten years in Moffitt Hospital and as an alum of the UCSF School of Nursing Graduate school, graduating with a Master of Science in Nursing, practicing as an advanced practice nurse for decades.

On February 10, I attended the meeting where UCSF presented the initial study of the environmental impact and UCSF's plan to re-envision the historic Parnassus Heights campus. I found that studying the maps and information presented was very informative and provided food for thought. I am familiar with both the current Aldea Housing and with the area called "Fourth Avenue Extension" in the Scoping EIR presentation.

(I am not so familiar with the prior long-term planning agreements have been made. I know that student housing was provided in the Mulberry Towers within the past decades, but not now. Now that housing in the City has become tight, UCSF might consider returning these towers to provide student housing. Also related to housing, I had understood that the renovations of buildings on Parnassus Avenue were intended to provide housing, and now I find that is no longer the case.)

I propose that it is important to provide housing for students/staff now. As a person with standing, I respond to the Scoping EIR with the following statement.

A detailed assessment of the environmental impact is needed to assess the relative benefits of building student/staff housing at the Fourth Avenue Extension location and to assess the relative benefits of building housing at the Aldea location. This assessment needs to address the questions; should the timeline and details of building student/staff housing be reordered? Should the housing on the Fourth Avenue Extension be build first, before Aldea housing?

It is important to develop student housing in an area that is rich with amenities that are necessary for student/staff life. I propose <u>re</u>ordering the planned of the development of buildings discussed in the Comprehensive Parnassus Heights Plan / scoping EIR such that student/staff housing is built now on the "Fourth Avenue Extension", and the building of Aldea student/staff housing in an area that is far away from neighborhood amenities be delayed. It is reasonable to build student/staff housing without parking for cars on the Fourth Avenue Extension because the location is close to restaurants, to transit, to the groceries. The Fourth Avenue Extension is located where it is reasonable to not provide for cars and parking. It is likely to prove <u>un</u>reasonable to build student/staff housing on the Aldea site where shuttle service ceases on weekends and during the wee hours; where MUNI transit does not have a nearby, dedicated stop; and where there is not the richness of community amenities that exist in within walking distance of the Fourth Avenue Extension location. Principles of long-term visioning that outline organizing concepts and smart urban planning principles for reshaping the campus over the next several decades will guide final decision making.

It is my expectation that an assessment will show that there are potential issues with the Environmental Impact Report (EIR) scoping for UCSF's proposed Comprehensive Parnassus Heights Plan (CPHP) as presented, related to student/staff housing. It is my expectation that smart urban planning principles will show that there will be many more benefits enjoyed if the Scoping EIR timeline is altered such that UCSF student/staff housing on the Fourth Avenue Extension is built now and that Aldea Housing is delayed.

Thank you for your time and attention.

Sincerely,

Maryann Rainey

1318 4th Ave
San Francisco, CA 94122
(415) 225-7814

From:	GRETCHEN SANDLER
To:	Campus Planning - EIR
Subject:	UCSF EIR for Parnassus build out
Date:	Friday, February 21, 2020 4:40:29 PM

To Whom it May Concern,

As a long time Edgewood resident, I have concerns about the proposed new buildings on the Parnassus campus. From what I understand, it is the intention of the UCSF to add 1.5 million square feet to this primarily residential neighborhood. This seems quite extreme for a neighborhood that has many single family homes and small apartments as well as small businesses. This 42% jump in size blows past the agreement reached with the Regents to maintain the square footage at 3.55 million square feet, utterly reshaping the campus and neighborhood.

These are concerns that I have for the proposed building.

Location:
Locating the hospital, the largest and tallest of the new buildings on the outer most corner of the campus seems incredibly invasive to the neighbors. Currently the largest buildings are near the center, with a gradual lessening in height as the campus moves outward. This design helps integrate the campus, whereas the proposed building is a shock to the neighborhood.

Air Quality:

- What will the air quality impacts of the demolition projects be specifically?
- What old materials (like asbestos) are in the old construction and how do you plan to address that in regards to many residents in the area?
- What will the air quality impacts be on the adjacent Edgewood neighbors of having all the construction vehicles in the Surge Lot, coming and going? My house directly abuts the Surge Lot, so this is a big concern for me.
- How much are the trees in the strip of Sutro Forest between Medical Center Way and Edgewood affecting the air quality on Edgewood and what would be the effect of removing this buffer?

Housing:
Every other project in the city is required to pay attention to housing before they build. How will UCSF address this? How will UCSF add this much square footage and put a big demand on existing resources without first addressing housing issues.

Traffic/Transportation:

- Currently, traffic impacts our neighborhood as visitors and employees drive around our neighborhood streets looking for parking. What will UCSF do about the increased traffic to the new Parnassus Campus?

- Is it really sufficient to say that public transportation will fix this when we know that San Francisco's public transportation is quite poor and needs a massive reconfiguration. There is no guarantee that this will happen any time soon if at all.
- In the previous EIR, you say that 24% of people traveling to Parnassus campus use public transport and 12% use shuttles. So if you are going to increase the personnel and population of people served so drastically, what will you do to mitigate this with an anticipation that around 64% of all those people will be arriving by car?
- More people won't just affect the traffic around Parnassus, but also around Mission Bay and people commuting from outside the city into SF. It is not just a neighborhood issue, but a citywide issue.

Noise:

- We know that construction makes a lot of noise. How will the project mitigate that for us neighbors who directly abut the Surge lot, not to mention all of Edgewood/Farnsworth.
- We already get plenty of noise from hospital generators at weird hours and once they move closer to our homes, then what?
- What about the increased noise from Medical Center Way becoming an active street for trucks and facility support vehicles?

Surge Parking Lot:

Many of our homes abut the Surge parking lot. There are concerns that this lot will become a staging area for construction. This would be quite disturbing. On a personal note, my children's bedroom windows overlook this lot.

Stability of the hillside:

Many of us are concerned about the proximity of the proposed hospital to the hillside that our homes rest upon. Has there been a study of how such a large project next to, and perhaps even encroaching upon the hillside will have on its stability. Will the vibrations of this work travel under and into our homes?

Proposed Building Elevations:

Finally, we have not been able to see the elevations of the buildings. There are no renderings showing how a massive 16-20 story building would look as you come west on Parnassus, or how it affects the skyline of the hill. UCSF should institute a new review that enables neighbors to actually see the effects of the proposed buildings on their neighborhoods.

I understand there is a need to upgrade some of the buildings on campus, but upgrades should not be seen as an opportunity to reshape the neighborhood by greatly increasing the size of the campus. We would appreciate more communication and more listening to what it is like to be neighbors with UCSF. This is not just a NIMBY issue. I love having the hospital so close as I am a UCSF patient, but the way in which UCSF is working or more like not working with one of their closest neighbors, is appalling. As mentioned above, there already exists an agreement with the Regents on the size of the Parnassus campus. This proposal undoes an agreement made in good faith and will create a great deal of tension with the surrounding neighbors. We are willing to work with the University to end up with a plan that both enhances the campus and maintains the neighborhood as a safe, livable place to raise families.

Sincerely,
Gretchen Sandler

From:	Sandler, Jim
To:	Campus Planning - EIR
Subject:	UCSF EIR for Parnassus build out
Date:	Friday, February 21, 2020 2:45:27 PM

To whom it may concern,

As an Edgewood neighbor I have grave concerns about the proposed build out of the Parnassus campus. From what I understand, it is the intention of the University to add 1.5 million square feet to this primarily residential neighborhood. That is equivalent to adding 3 Tranamerica buildings, a massive footprint no matter where it is located, let alone adjacent to single family homes and small apartments. This 42% jump in size blows past the agreement reached with the Regents to maintain the square footage at 3.55 million square feet, utterly reshaping the campus and neighborhood.

Below I list other issues of concern:

1) Location of the new hospital - Locating the hospital, the largest and tallest of the new buildings on the outer most corner of the campus seems incredibly invasive to the neighbors. Currently the largest buildings are near the center, with a gradual lessening in height as the campus moves outward. This design helps integrate the campus, whereas the proposed building is a shock to the neighborhood.

2). Traffic - The increase in size of the campus begs the question about traffic impacts to the neighborhood. We already have large numbers of people driving around our streets looking for parking. It is easy to imagine the increased traffic of having a much larger campus, let alone the construction vehicles needed for such an undertaking. It is easy to just say that public transportation will fix this, but San Francisco’s public transportation is quite poor and needs a massive reconfiguration. There is no guarantee that this will happen any time soon if at all.

3). Noise - There is great concern about the noise level produced for such a large undertaking, especially for the hospital building at the edge of our neighborhood. Will the construction be taking place only during “normal” work times. Loud noises already travel up to our neighborhood from the campus during odd hours. We already know what the noise is like when a neighbor is remodeling their home. I can only imagine the noise produced from this scale of a project.

4). Air Quality - Again, there are concerns about the dust and other pollution created by construction and construction equipment. Although our neighborhood is up the hill, we are downwind of the campus. Air flows from the campus right into our yards and homes.

5). Surge Parking Lot - Many of our homes abut the Surge parking lot. There are concerns that this lot will become a staging area for construction. This would be quite disturbing. On a personal note, my children’s bedroom windows overlook this lot.

6). Stability of the hillside - Many of us are concerned about the proximity of the proposed hospital to the hillside that our homes rest upon. Has there been a study of how such a large project next to, and perhaps even encroaching upon the hillside will have on its stability. Will the vibrations of this work travel under and into our homes?

7). Water and sewage - What are the impacts on the water and sewage infrastructure of the neighborhood of this project?

8). Finally, we have not been able to see the elevations of the buildings. There are no renderings showing how a massive 16-20 story building would look as you came west on Parnassus, or how it affects the skyline of the hill. UCSF should institute a new review that enables neighbors to actually see the effects of the proposed buildings on their neighborhoods.

I will stop here as I am sure many of my neighbors have brought up other issues of concern. We understand there is a need to upgrade some of the buildings on campus, but upgrades should not be seen as an opportunity to reshape the neighborhood by greatly increasing the size of the campus. As mentioned above, there already exists an agreement with the Regents on the size of the Parnassus campus. This proposal undoes an agreement made in good faith and will create a great deal of tension with the surrounding neighbors. We are willing to work with the University to end up with a plan that both enhances the campus and maintains the neighborhood as a safe, livable place to raise families.

With regards,

James Sandler

From:	Barbara Smith
To:	Campus Planning - EIR
Subject:	Comments on Notice of Preparation of EIR and Initial Study
Date:	Friday, February 21, 2020 5:12:10 PM

TO: Diane Wong, Environmental Coordinator, UCSF Campus Planning

CC: Francesca Vega, Vice Chancellor, Community and Government Relations, UCSF Staff, and Members of the Community Advisory Committee

FROM: Barbara Smith, Inner Sunset Resident
1473 6th Avenue, SF 94122

IN RE: Comments on Notice of Preparation of Environmental Impact Report and Initial Study Notice of a Public Scoping Meeting regarding the UCSF Comprehensive Parnassus Heights Plan

DATE: February 21, 2020

Background

My husband and I have been residents of the Inner Sunset for 48 years and neighbors on 6th Avenue between Kirkham and Judah for 34 years. We love the neighborhood and our neighbors. We also appreciate the importance of UCSF as a world-renowned institution and asset to the neighborhood and San Francisco. We recognize the need for modernizing, replacing and adding to the facilities. At the same time, since any changes to the campus will impact the surrounding neighborhood, they must be carefully planned and evaluated with meaningful community input based on clear, transparent and detailed information.

Comments

Even as a "scoping" report, I found it to be much too conceptual and the presentation of proposed changes fails to provide clear comparisons to previous plans and agreements. Without additional detail it is impossible to assess even preliminary impacts. I urge you to revise and reissue the Initial Study and at a minimum include the following to provide a clearer picture of the proposed changes for the community to review:

Provide detailed maps clearly indicating the changes between the existing, previously approved and proposed site plan, including building footprints, open space, parking and traffic flows within and around the site.

Provide tables to compare by use, the current gross square footage with previously approved and proposed gross square footages and clearly indicate the changes.

Provide tables with historic housing units/square footages on the campus and compare these numbers with current, previously approved and proposed housing units/square footages. Some of the overall gross square footage numbers include housing and others do not making it very difficult to assess the proposed changes.

Tables should be included to show the student, staff and patient populations will increase.

Where buildings are proposed with a wide range of heights, clarify where the additional height would be built. The West Side Housing structures are proposed for six to ten stories – up to 120 feet. A 120-foot façade along Kirkham at 5th would overwhelm the existing residential structures already impacted by the UCSF campus.

How will a hotel replacing the Lucia Child Care center impact the adjacent residential housing and traffic flow along Parnassus?

Traffic and parking changes should be clearly presented.

Provide a detailed schedule for the EIR report preparation and review process.

Again, I urge you to revise the Initial Study and incorporate into it these requested changes. Without providing additional information at this stage of the process, it will not be possible for the community to provide meaningful input and support for the proposed UCSF improvements.

From: Lisa Sporri
To: Campus Planning - EIR
Subject: UCSF EIR Comments
Date: Friday, February 21, 2020 10:42:45 PM

To Whom It May Concern,

I am writing in response to the Notice of Preparation of an Environmental Impact Report for the UCSF Comprehensive Parnassus Heights Plan.

The current new plan has been recently altered to include the opportunity site as crossing Medical Center Way and included opportunity site that extends up the hill (East of Medical Way) and next to the Edgewood Neighborhood.

As indicated in UCSF reports, … "Although parameters for the New Hospital project (location, size, projected population) are accounted for in the CPHP and will be analyzed at a program level in the draft EIR, the new hospital represents a major project for UCSF and many details of the New Hospital are still being developed. Therefore, the New Hospital will be the subject of a subsequent project-specific environmental review separately from the CPHP when more details become available." page 3

However, per your new report, the location was recently altered to cross Medical Center Way.

As described…"If the CPHP is approved by the Regents and the 2014 LRDP is amended, the CPHP would become the primary planning document for Parnassus Heights and would be used by UCSF to guide the development of the campus site through the next 30 years, or an approximate horizon year of 2050. " page 5

If, as you stated that the new hospital represents a major project and is likely the main portion of the new development, it does not make sense to approve a plan without the details of the New Hospital, specially crossing Medical Center Way. As indicated by UCSF, this will be the primary planning document and a major portion of the project. The current EIR does fully assess the New Hospital as the details are not available with a significant one that it crosses Medical Center Way onto a new hillside.

The new EIR should study with the details of the New Hospital, specifically studying the impact of crossing over Medical Center Way as is substantially changes impact on many levels including:

<!--[if !supportLists]-->**1) <!--[endif]-->Footprint of UCSF at it currently stands and changes the Edgewood neighborhood. Previous agreements indicated that UCSF would work to keep the feel of Edgewood neighborhood. By crossing Medical Center Way, significantly alters neighborhood. By crossing Medical Way, it will significant impact the neighborhood that residents from surrounding areas access and enjoy for recreation. Please study how the area will be impacted as a local sanctuary, dog walking area, and place children play.**

<!--[if !supportLists]-->**2) <!--[endif]-->Please study illumination at night. Multiple houses may be impacted by the lighting. Currently the distance (not crossing Medical Way) creates a buffer for both illumination at night and noise.**

<!--[if !supportLists]-->**3) <!--[endif]-->Please study the impact of shade from the building onto the neighborhood, especially Edgewood and Farnsworth.**

<!--[if !supportLists]-->**4) <!--[endif]-->Farnsworth steps is a community area in which many people access, study the lighting changes especially in the afternoon when people walk dogs, families play and take walks. Mt. Sutro is a recreation site that is used by the surrounding community.**

<!--[if !supportLists]-->**5) <!--[endif]-->If the hospital crosses over Medical Way, it will impact an entire new hill. The previous EIR did not study the new location extension of the opportunity site. Please study the geological effects on the Edgewood/Farnsworth Hill, including vibrations from construction, and impact of changing hill side. There are multiple houses on Farnsworth and Parnassus that may be impacted by geological shifts due to construction.**

Lastly, The city of San Francisco with its 7 x 7 footprint has a finite amount of green space for the rest of time, it is just not practical in a congested urban environment to cultivate new green lands and this problem only exacerbates with time. And therefore incomprehensible that an advance city such as ours would even consider chopping down trees and encroaching on our green spaces to build anything.

Development should adhere to clear guidelines that all new buildings should stay within the current footprint. Furthermore UCSF should put safe guards in place so such ridiculous plans can nevermore be entertained.

Green spaces are the endangered species in an urban environment, such a plan is none less ridiculous than one to build an airport in GG Park. Detroit should be an object lesson in building anything, no building however noble it's intentions can be a substitute for green spaces full stop.

Thanks you forth these considerations,
Lisa Sporri

TO: Diane Wong, Environmental Coordinator, UCSF Campus Planning

CC: Francesca Vega, Vice Chancellor, Community and Government Relations,
Brian Newman, Senior Associate Vice Chancellor, Real Estate,
UCSF Staff, and Members of the Community Advisory Committee

FROM: Maria Wabl and Susan Maerki. Members of the Future of UCSF Parnassus Heights Advisory Committee

IN RE: Comments on Notice of Preparation of Environmental Impact Report and Initial Study Notice of a Public Scoping Meeting regarding the UCSF Comprehensive Parnassus Heights Plan

DATE: Revised February 20, 2020

VIA EMAIL: EIR@planning.ucsf.edu

Background
As two members of the Community Advisory Committee, we met to discuss the Notice of Preparation (NOP) of the Environmental Impact Report (EIR) for the proposed UCSF Comprehensive Parnassus Heights Plan (CPHP) issued January 14, 2020. The CPHP is the university's plan to meet projected space needs for research, patient care and education over the period 2020 to 2050.

The comments, questions, and requests represent observations by one or both of us. This has been supplemented by additional discussion that incorporates comments offered by members of the community at the public scoping meeting held Monday. February 10, 2020.

General Comments
While we recognize that it is impossible to provide details and precise estimates over a 30-year planning period, the CPHP EIR must incorporate more detailed information, broaden the discussion of environmental effects, and increase community commitments and touchpoints beyond those that are included in the draft scoping document.

1. **We request that UCSF extend the CPHP EIR development and approval process period.**
   - Although the UCSF community, in conjunction with community working groups and the current Advisory Committee have been discussing the proposed CPHP for nearly two years, the university is not allowing time for sufficient community input and review.
     - The CPHP proposes 2.9m gsf of new construction and nearly 2.0m gsf net increase over the current footprint. The current footprint already exceeds the "space ceiling" limitation in the UC Regents resolution.
     - The current schedule proposes review and approval at the Board of Regents meeting in November 2020. This should be moved out to the January or March 2021 meetings to allow for more extended community review of the Draft and Final CPHP EIR that will be prepared.

2. **Relationship of CPHP to 2014 LRDP must be clarified and be made more specific.**
    - In general, there is a sense that UCSF has not made a compelling case for all components of the CPHP and the proposed space increases. As a first step, it is necessary to clarify how the estimated increased space is allocated across areas and functions.
    - Incorporate tables that compare statistics and estimates in the 2014 LRDP to similar statistics and estimates for the CPHP, as well as incorporate best current condition estimates. The document is written primarily as a "stand-alone", with numbers and statistics embedded within the text and limited reference to comparable numbers presented in the 2014 LRDP or to current conditions on the campus.
        - For example, the 2014 LRDP proposed a new hospital with approximately 308,000 gsf and less than 200 beds. The CPHP increases this to 955,000 gsf and 384 beds. This also needs to be discussed in conjunction with the maintenance, renovation, and any new uses proposed for Moffitt hospital.
        - Comparisons need to be presented for building height and square footage, population, transportation, housing, and other sections of the CPHP EIR. Tables need to be clearly annotated to indicate how/if the proposed additional housing and that resident population is included/excluded.
        - A separate table is needed to clarify how the approximately 2.9m gsf of new building development, with a net increase of approximately 2.0m gsf to 6.0 m gsf after incorporating other approved development and planned demolition, is allocated across the functional districts. That is, how much of the increase is for the new hospital and clinical east end, the academic and research buildings, housing and other?
    - Enhance maps to clarify overlay of existing and proposed buildings and footprints.

3. **CPHP Environmental Impact Report must include a UCSF commitment to more project specific scoping over the time period.**
    - The draft proposes project level analysis for the projects in the Initial Phase – Irving Street entrance, RAB, and Aldea – but only commits to "determine the appropriate level of additional review, *if any (emphasis added*), needed" for additional projects.
    - The new hospital is the only project that the draft scoping document identifies for a project specific EIR. At minimum, the proposal for proposed housing on the Fourth Avenue extension appears to warrant a project specific EIR.
    - We request a UCSF commitment to additional project specific review that will provide touchpoints to reassess changes to "baseline" conditions over the timeframe and permit identification of cumulative effects.

4. **CPHP impact timeline must be clarified to quantify the expected "front loading" of impacts.**
    - It appears that a large proportion of the population and transportation growth is expected within the Initial phase. This is obscured by presenting the current or 2020

estimates and then a 2050 number. At minimum, the EIR should present both Initial Phase (2030 or to 2035, the end of the 2014 LRDP) and 2050 estimates for the CPHP.

- Include timeline of proposed demolitions and replacement buildings. This should include discussion of changes relative to the 2014 LRDP.
    - For example, the 2014 LRDP proposed demolition of Woods and Surge in the 2014-2019 timeframe and demolition of Proctor and Langley Porter in the 2020-2024 timeframe. Obviously, the Surge and Woods buildings are still standing. How will the demolition and construction timelines differ?
- Incorporate timeline of expected concurrent renovations/upgrades to buildings included in the 2014 LRDP but not addressed in CPHP.
    - For example, the 2014 LRDP proposed renovation of the Faculty Alumni House and Moffitt Hospital, as well as smaller projects (medical gas storage tanks, retaining wall) by 2035. Where will these occur in the CHCP timeline?

Specific Comments and Questions

This section follows the Table of Contents for the UCSF CPHP Initial Study and references questions and comments on sections.

2. Project Description

2.2 Campus Site Location and Existing Site Characteristics

- Confirm that average daily population includes estimate of contract service staff (e.g., custodial workers) that are regularly on campus and temporary contractors, such as construction workers. Confirm that visitors are a broad definition that includes patient families, consultants, delivery, and community use of UCSF facilities. Add such estimates if these populations are not included in your measure of average daily population.

2.3 Relationship of CPHP to 2014 LRDP

- Specifically identify and reference the UCSF campus sites addressed by the 2014 that would continue to have an approximate horizon year of 2035.

2.4 CPHP

Initial Phase

- See general comments on project specific review.
- Identify and reference the UCSF campus sites addressed by the 2014 LRDP that would continue to have an approximate time horizon of 2035.
- Opportunity Sites
    - This is the first time it is clear that UCSF wants both a tunnel and a bridge across Parnassus
    - Provide a map and more details to indicate how the service and utility corridor is proposed to connect from Medical Center Way to Koret Way and Fourth Ave. (mid-block on Fourth or onto Kirkham?). Is this envisioned as a one-way or two-way street?
    - It appears that the first phase of Aldea Housing Densification will result in substantially less housing than was envisioned in the 2014 LRDP in a comparable

timeframe. The Initial Phase proposes an increase of about 140 units at Aldea. The 2014 LRDP, with UC Hall, Millberry Towers and Proctor/5th Avenue would have added over 300 units by 2035. What can be done to accelerate some of the housing projects? (Reconsider Millberry Tower for housing?)

2.5 Revisions to the 2014 LRDP

- See general comments on tables and maps to compare 2014 LRDP and CPHP statistics and estimates.
- Confirm that updated population estimates and average daily census include a broad definition of staff (e.g., outside contract employees) and of visitors (construction, delivery. Provide breakdown of estimate for 2020-2030 and 2030 to 2050.

5. Evaluation of Environmental Effects - General Comments

- Provide list of projects approved in 2014 LRDP that are excluded from CPHP. (p 15)
- Construction effects must be addresses more broadly. It is not limited to Air Quality, but must be included in population and traffic estimates and the noise impacts. Include more detail regarding construction impacts, parking and staging.

5.1 Aesthetics

- In addition to the proposed evaluation of building location and massing, nighttime illumination, and shadows:
    - Commit to comprehensive shadow analysis of areas on all the edges of the campus, and impacts to sunlight/shadows both over annual and daily periods.
    - The shadow study must include impacts to campus areas that currently exist, such as Saunders Court, Parnassus Avenue, and both the Kirkham and Lucia Child Care Centers and their play yards, and Fifth Avenue housing, both during and after the proposed CPHP construction.
    - The shadow study must include impacts to recreational areas that currently exist, such as schoolyards, Kezar Triangle, and Golden Gate Park, both during and after the proposed CPHP construction.
    - Commit to street level wind analysis that includes the planned Saunders Court promenade, all proposed outside decks (Millberry Terrace, new hospital, other), and the extension of Fourth Avenue
    - For public safety and aesthetic reasons, all new development, including, but not exclusive to Aldea and West end housing, commit to undergrounding utilities and, in the case of the West end, be compatible with street lights installed as part of the Inner Sunset Utility Undergrounding District.

5.2 Agriculture and Forestry

- Provide additional detail on incursion and proposed replacement of Sutro Forest area expected to be impacted by new hospital construction.
- Comment on commitment to implement Mount Sutro Open Space Plan in conjunction with activities associated with the CPHP and/or anticipated impacts and changes.
- Comment on expected impact of new Academic Research Building and demolition of Dental School building on redwood grove along Parnassus and adjacent to the Faculty Alumni House.

5.3 Air Quality

- In addition to air quality concerns associated with the construction period, include evaluation of estimated air quality changes associated with the expected increase in building size and energy use, campus population, housing, and car/shuttle traffic.
- The CPHP EIRB NOP does not mention building material or naturally occurring asbestos that is likely to be encountered during demolition and excavation activities. This should

be studied and mitigation measures should be identified in the EIR to protect employees, residents, patients, children, and the construction workers.

- Describe expected mitigation measures to reduce/contain construction traffic and debris that affect air quality.
- Describe expected mitigation measures to reduce/contain changes associated with the expected increase in building size and energy use, campus population, housing, and car/shuttle traffic that affect air quality.

5.6 Energy

- In addition to energy concerns associated with the construction period, include evaluation of estimated energy use associated with the expected increase in building size and energy use, campus population, housing, and car/shuttle traffic.
- Provide additional detail on UC sustainability practices that are expected to be implemented/incorporated into building and streetscape design.

5.7 Geology and Soils

- Numerous neighbors have raised concerns about wildfire, landslide, water drainage, and earthquake activity. The CPHP plan proposes to evaluate these risks, as well as the additional risks that may arise due to construction and the ongoing operation of the proposed buildings.
- This evaluation should include potential impacts on the surrounding neighborhood and not be limited to the UCSF campus.

5.8 Greenhouse Gas Emissions
5.9 Hazards and Hazardous Materials
5.10 Hydrology and Water Quality

- Comments are similar to those related to air quality and energy. In addition to emissions and hazardous materials concerns associated with the construction period, include evaluation of estimated changes associated with the expected increase in building size and energy use, campus population, housing, and car/shuttle traffic.
- Describe expected mitigation measures to reduce/contain construction traffic and debris that affect emissions, hazardous materials, and water quality.
- Note: 5.10 Hydrology: item e – both boxes checked

5.11 Land Use and Planning

Although no development outside of the established campus boundary is proposed, new buildings, such as the Long Hospital Replacement, will exceed height and density of current buildings on the campus. The proposed West Side housing, at six to eight stories, significantly exceeds the neighboring R-2 residential 40-foot height limit.

- Comparisons of the CPHP estimates to current buildings need to be presented for building height, footprint and square footage. Tables need to be clearly annotated to indicate how/if the proposed additional housing is included/excluded.

- Enhance maps to clarify overlay of existing and proposed buildings and footprints. Prepare maps to clarify changes over time, such as 1) current buildings, 2) in 2030 after hospital construction, and 3) other selected estimated time frames between 2030 and 2050.

5.13 Noise

- Comments are similar to those related to other categories. In addition to emissions and hazardous materials concerns associated with the construction period, include evaluation of estimated changes associated with the expected increase in building size and energy use, campus population, housing, and car/shuttle traffic.
- Describe expected mitigation measures to reduce/contain traffic, excavation, delivery and staging, and construction that affect noise.
- Describe expected mitigation measures to reduce/contain changes associated with the expected increase in campus population, housing, and car/shuttle traffic that affect noise.

5.14 Population and Housing

- Prepare a separate housing table that compare statistics and estimates in the 2014 LRDP to similar statistics and estimates for the CPHP, as well as incorporate best current condition estimates
- Prepare separate <u>housing and population</u> timelines that compare statistics and estimates in the 2014 LRDP to similar statistics and estimates for the CPHP, and the projections to 2050.
- We request a UCSF commitment to additional project specific review, including a stand-alone housing EIR, that will provide touchpoints to reassess changes to "baseline" conditions over the timeframe and permit identification of cumulative effects.

5.15 Public Services

- Add EIR consideration of Other Public Facilities to incorporate evaluation of the impact on public infrastructure, such as city rainwater and sewer lines, that would be anticipated as a result of increased campus population and housing under the CPHP.

5.16 Recreation

- See comment on potential shadow impact under Aesthetics.

5.17 Transportation

- Include an analysis of parking availability and expected changes due to proposed construction and housing. This includes reductions due to proposed removal of parking at Millberry Union, the amount of parking associated with new housing, accommodating expected population growth, and construction parking and staging.
- Although not a requirement under CEQA and SF Planning Department guidelines, we request a level-of-service (LOS) analysis of traffic impacts. This is similar to the request

that UCSF made to the developers of the Kirkham Heights Project proposed in 2016-2017.

- We request that traffic analyses be reviewed and updated over the time period of the CPHP to assess changes to baseline and cumulative effects.
- The analyses should be comprehensive, to include the major streets and intersections (e.g., Irving, Parnassus, Medical Center Way Service corridor, Fifth Avenue at Kirkham) and be flexibly designed to monitor all vehicle (personal car, shuttle, ride-hailing, delivery truck, construction) and other modes of transportation such as pedestrian, bicycle, and scooters.
- Describe expected mitigation measures to reduce/contain transportation changes associated with the expected increase in campus population and housing. Include changes to UCSF faculty and employee parking passes and access, shuttle service, programs to encourage and promote use of public transportation (e.g., increase use of Federal pre-tax commuter benefits, additional transportation subsidies to low income workers, taxi/voucher programs for patients or employees who work late hours) and other programs under consideration

5.19 Utilities and Service Systems

- Expand analysis of utilities and services systems on campus to include impact on public infrastructure, particularly rain and waste water systems. See comment under Public Facilities.
- Expand description and discussion of proposed service corridor to include proposed route, and impacts of construction, delivery, traffic, parking, management of Mt. Sutro Reserve, and other potential issues.

5.20 Wildfire

- The Mt Sutro Reserve is a Fire Zone 2 risk. Wildfire risk, including incorporating relevant elements of the Mt Sutro Open Reserve Management Plan, should be included in the CPHP EIR.

5.21 Mandatory Findings of Significance

- This section should include a summary of major mitigation and potential voluntary community benefits to offset expected impacts associated with increases in increased building mass and density, population, transportation and other impacts identified in the EIR development process.

Comments on the proposed Parnassus Heights Plan and EIR

From Tes Welborn 2-21-2020
Community Advisory Group member
Advisory Committee member

Initial Comments

The overall Parnassus Heights Plan is still more of a vision, not quite in the planning stage, and is not ready for an EIR.

For example, at either the February 6 meeting of the Advisory Committee or at the February 10 Scoping Meeting, the idea of some passage under or over Parnassus had suddenly become both a bridge and tunnel. Such changes require extensive consultation with the City of San Francisco.

Overall, the changes contemplated in the Parnassus Heights vision would constitute hugh impacts on the City of San Francisco as well as adjacent neighborhoods. No one arrives at the Parnassus campus by parachute!

1. **Transportation.** Transportation, public bus and rail service, private shuttle and private car all run on public streets and would be vastly impacted by Parnassus Heights vision. The City as a whole and neighbors have a vested interest in traffic and road management.

2. **Utiltities.** Under these public streets run water lines, common sewers and other underground utilities, in some areas including electric power and internet fiber. Bridging over and tunneling under Parnassus Avenue require City involvement. The City and neighbors have a vested interest in subsurface construction, and in right-sizing utilities, as well as planning for and making appropriate utility enlargements, and sequencing these changes into the City's overall planning cycles.

3. **Population.** Campus daily population is projected to increase about 8,000 persons per day, with roughly half of them as workers supporting professional staff and patients. UCSF has already had a major impact on San Francisco for housing professional staff, students, and patient families. UCSF has made and is making some improvements in housing these three populations. The 2014 LRDP, designed to cover campus planning through 2035, included the addition of ---- housing units for professional staff and students. The Parnassus Heights vision has *reduced* – not increased – housing for professional staff and students in the 2020-2030 time frame while projecting an increased campus population.

In addition, as of this date, the Parnassus Heights vision has not yet included any housing for support workers or the construction workers needed over at least the next ten years. There are known guidelines for support workers and professional staff needed per hospital and related gsf.

Nexus studies have shown that for about every 100 new market rate housing units, about 45 low and moderate income housing units are needed, just to stay even with housing needs – not even addressing the backlog of city low and moderate income housing units needed. I expect that UCSF students probably need fewer restaurant workers, local shops' employees, childcare providers per 100 units than average income city residents, but just as many MUNI drivers, safety personnel, etc.

Also, the City has a March 3 ballot measure addressing workforce housing for office buildings. The subject will not go away. The City and neighbors have a vested interest in workforce, professional staff, and student housing, such that the City and neighborhoods do not have residents displaced for UCSF projects.

4. **MOU and Space Ceiling.** The City and neighbors have a vested interest in UCSF's working with the City and neighbors to develop a Memorandum of Understanding to cover transportation, housing, utilities and other subjects, such that UCSF pays its fair share for all needed improvements. **This MOU should include ALL of UCSF's San Francisco facilities.**

? **Space Ceiling**. UCSF entered into an agreement with the City of San Francisco?? To limit both the total gsf and average daily population on the Parnassus Heights campus. UCSF cannot unilaterally terminate this agreement.

EIR Scoping Comments

While I believe that this EIR as currently proposed exceeds its remit, that the hospital and any other major building on campus requires its own EIR, and note that the MOU between the City and UCSF is yet to be developed, for the EIR focusing on the 2020-2030 ten-year period, please study the following subjects:

?Lighting 5.1 d Consider also the night time light impacts on birds, both local and migratory, on [human] neighbors, and on other animal and insect life
5.1 f Consider also bicycle transportation and alternate transportation modes including scooters and skate boards. Also consider the impacts of TNCs such as Uber and Lyft.

Air Quality 5.3 c, e I don't understand the term “sensitive receptors.” It should be better defined. If it is some people and for some things, or other animal life, that should be clarified, and how it would be measured.

Biological 5.4 f Include the state of Sutro Reserve and impacts of construction and additional traffic on its plants, trees, and life forms

Energy 5.6 a Study whether all new energy uses should be all electric, versus some “natural” gas or renewables.

Geological 5.7 a iii-iv Slides hav occurred adjacent to Sutro Reserve. Please study those sites and identify other potential sites. How can slides be avoided or impact reduced?

Hazards 5.9 including f and g This area should include the impact of UC construction and operations during “normal” times and during/post a “seismic event.” This area of study should also include impacts to normal operations of major power outages and various types of disasters, including fire and seismic. For example, how will prospective patients arrive at Parnassus campus from the west if Parnassus Avenue and Irving Street entrance are blocked ? The City has relatively few ambulances [last I heard, about 17], and I don't think they are 4-wheel drive capable [let alone cross-county capable – likely necessary in a major disaster, due to downed power lines, collapsed buildings, etc.].

- In a July 2019 report, new fire maps are expected in 2020. Take them into account.

- Take into account that high winds, such as experienced in the Paradise fire, can turn “moderate risk” into “disaster.”

predicted fire hazards.

- Take into account an Evacuation Plan for Parnassus campus, and segments thereof.
- Take into account that Sutro Reserve vegetation should be studied, too, and could vary considerably over the 10-year, or even 30-year period.

Water 5.10 a Increased water usage needs to be in MOU with the City, as under climate catastrophe, San Francisco's water supplies from snow melt may or disapear.
b Study the impact of non-permiable surfaces and run-off, and of replacing certain areas with permiable surfaces, for ground water recharging and reducing run-off of rain, and perhaps toxic-contaminated fluids.
c iii This also needs to be part of the MOU with the City.

Land Use 5.11 b Sutro Reserve land swaps need to be studied for impacts on Reserve and on adjacent neighbors. I'd include **shadow, noise, and wind impacts** on campus users and on neighbors in studies here.

Noise 5.13 a Noise impacts on staff, patients, their families, construction workers, hospital workers, and neighbors during construction, and during normal operations. A separate EIR for the proposed hosptial must be performed.
d “Doubling traffic”is not acceptable. It needs more than mitigations: it must be addressed in the MOU with the City.

Population/Housing 5.14 More jobs are proposed for addition, without commenserate housing. Ditto more patints with families for longer stays without sufficient accomodations.
a The number, location, and populations served of housing units in the 2014 LRDP, and actual production, need to be compared to the proposed production. It appears the there is an actual reduction of housing in the next 10 years, compared to the LRDP. The addition of jobs, staff, patients, and construction workforce in the near term, next 10 years, is not satisfactorily met by possible additional housing at least ten years out. See my initial comments.
The possibility of UCSF constructing replacement housing elsewhere in San Francisco [or elsewhere?] while displacing currrently housed people should be studied. If done, it will have shorter term [3-10 year] noise, traffic, etc. impacts on adjacent neighbors. It could have long-term positive impacts by increasing the housing supply in San Francisco.

Public Services 5.15 a i Again, the likely need for more nearby fire services by the City must be addressed in the MOU.
a ii Ditto, additional City police and other emergency services, in the MOU.
a iii Ditto, the need for additional City schools in MOU.

Recreation 5.16 a and b Please study the needs for additional recreation services for those on campus, medical and other staff, students, patients, and for neighbors. Recreation/physical therapy for patients may overlap. Some neighbors will want to use UCSF recreation facilities.

Transportation 5.17 I've addressed this in my opening remarks. It is one of the two major points for the MOU with the City.

Utilities 5.19 This includes water and waste disposal. I've addressed this in my opening remarks. It is another significant point for the MOU with the City.

Fire 5.20 b Study also how slope, normal winds, and high winds can spread fires. There is a need for evacuation plans.

c Ditto

d Also study potential slides and impacts of broken water mains.

From:	Maury Zeff
To:	Campus Planning - EIR
Subject:	EIR comments related to Parnassus redevelopment
Date:	Friday, February 21, 2020 10:00:05 PM

Dear UCSF,

As one of the Edgewood Avenue homeowners who would be most impacted by some of the proposed plans we've seen for the UCSF Parnassus redevelopment, I would like to add my voice to those of my fellow neighbors about the EIR. Here are my concerns:

- Regarding the proposed new hospital where Langley-Porter currently is, building a 296-foot tall building (according to one of the concepts we have seen) next to a residential neighborhood consisting of 2-3 story homes would have significant and permanent detrimental impacts on your residential neighbors and the homes that have stood here for over a hundred years. My specific concerns are:

1. Dust and Particulates - For much of the year, the wind in our neighborhood blows eastward from the direction of UCSF. I am concerned that a massive construction project would put dust and particulates into the air and be harmful to residents, particularly the many children who live in our neighborhood. I could see a situation in which our homes would be uninhabitable during construction.
2. Asbestos - Razing the current structure would likely put asbestos and possibly other toxic materials into the air. Again, this would present a health hazard.
3. Noise - The construction noise from a building of this size several hundred feet from our homes would likely make sleeping (or even inhabiting) our homes challenging during the entire construction.
4. Post-construction noise - The noise from such a structure once built would be considerable and would impact our daily quality of life forever. Also, if it's a hospital, the proximity to our homes of ambulances and other emergency vehicles arriving at all hours of the night would be deeply impactful.
5. Post-construction light - The shadow from a building this tall would significantly darken our homes and our street in the afternoon forever.
6. Urban planning - The lopsidedness of a campus in which the tallest building is at the perimeter seems to violate every principal of urban planning. My understanding is that urban campuses such as UCSF would typically have the largest buildings in the center of campus with a gentle lowering of building heights toward the edges as the campus approaches residential areas. It's unfathomable to me why UCSF would be considering violating this reasonable approach to putting major institutions into residential neighborhoods so that the residential and commercial can coexist harmoniously.
7. Staging - How would staging of a construction project like this be done? It's hard to imagine that it wouldn't impact the green space across Medical Center Drive, which is near or next to our backyards, or the overflow parking lot.
8. Transportation & Parking - Have there been studies done to gauge how this overall development would impact traffic on and around Parnassus? As it is, there is not nearly enough parking for UCSF visitors. Many park on Edgewood. What provisions are being made to mitigate this impact?
9. Housing - What provisions are being made to house the larger campus population?

- Regarding one of the concepts we've seen which involves developing into the green space on the east side of Medical Center and digging into the hill on which our 115-year-old houses sit, can any seismologist, structural engineer, or geologist reliably predict what the structural impact on our homes would be--at the time of construction or in the event of a future earthquake? The possibility that our homes' structural integrity might be compromised by this project is deeply alarming. Such construction would cause the same issues I raised above with regard to the hospital where Langley-Porter currently is.

This is not a case of NIMBY. In general, my neighbors and I are happy and proud to have a world-class medical institution in our community. And we understand UCSF needs to grow as the city and its medical needs grow. Furthermore, many of my neighbors have built their careers at UCSF and have made significant contributions there. But the impact of some of the proposals we've seen would severely impact our quality of day-to-day life. In thinking about our position, I'd ask you to consider how you would feel if such a massive construction project was proposed near your homes. As a starting point, I ask you to consider keeping the major construction in the center of campus, away from your residential neighbors.

Finally, the planning we've so far has been surprisingly opaque. The Edgewood Neighborhood Association has only recently been made aware of this project, yet we are one of the most impacted constituencies. We have not seen specific plans that spell out what exactly the proposed project is. (How can an EIR be done without a firm project plan?) Before we can weigh in, we would like to see plans and models of what exactly is being proposed. Otherwise, it's creating a climate of distrust and concern that UCSF is forging ahead with a project that might make our homes a lot less--and maybe completely--unlivable. I hope and trust that this is not the case. But without more firm plans and transparency from UCSF, it's hard for us not to be concerned.

Thanks for considering my input. I hope that this is the opening of a larger dialogue.

Regards,
Maury Zeff, 119 Edgewood Avenue
(415) 307-5989

Scoping Meeting

Scoping Meeting for the Proposed Comprehensive Parnassus Heights Plan Environmental Impact Report

Public Comment Form

2/10/2020

Thank you for coming tonight. UCSF values your input, and we welcome your comments on the Initial Study for the proposed Comprehensive Parnassus Heights Plan. This comment form is provided for your convenience. Please return this card to UCSF staff at the end of the meeting, or if you prefer to send it to us at a later date, please email to EIR@planning.UCSF.edu or mail to Diane Wong, UCSF Campus Planning, Box 0286, San Francisco, CA 94143. Comments must be received by 5 p.m. on February 14, 2020.

Concerns of proximal neighbors:

1) traffic congestion
2) housing for the vast # of increased workforce
3) earthquake hazard increase for surrounding neighborhoods
4) landslide hazard evaluation
5) noise concern of this vastly increased campus
6) air quality during demolition/construction etc a big concern

Primary concern for immediate neighbors is infringement on our beloved, historic open green space (which mitigates noise, wind, airborne particulates related to research/waste, light etc) PLEASE respect the current footprint of the med center perimeter. Medical Center Way is absolutely critical to respect as a line of demarcation between the med center and the open green space separating this immense building cluster from historically ~~quiet surrounding~~ neighborhoods on the East

Name

Address Edgewood ave 94117
Street Zip

Email irene. b?lcor @ gmail.com

Scoping Meeting for the Proposed Comprehensive Parnassus Heights Plan Environmental Impact Report

Public Comment Form

2/10/2020

Thank you for coming tonight. UCSF values your input, and we welcome your comments on the Initial Study for the proposed Comprehensive Parnassus Heights Plan. This comment form is provided for your convenience. Please return this card to UCSF staff at the end of the meeting, or if you prefer to send it to us at a later date, please email to EIR@planning.UCSF.edu or mail to Diane Wong, UCSF Campus Planning, Box 0286, San Francisco, CA 94143. Comments must be received by 5 p.m. on February 14, 2020.

Please study / mitigate

1. Noise + Traffic at 5th Avenue + Parnassus Ave
2. ↑ing noise for neighbors
3. Study alternative decentralization possibilities (St Marys, East Bay, Marin + South Bay options to decrease commutes for workers + patients

Name: Wm P Dillon, MD

Address: 240 Edgewood Ave SF 94117

Street / Zip

Email: WPD240@gmail.com

Scoping Meeting for the Proposed Comprehensive Parnassus Heights Plan Environmental Impact Report

Public Comment Form

2/10/2020

Thank you for coming tonight. UCSF values your input, and we welcome your comments on the Initial Study for the proposed Comprehensive Parnassus Heights Plan. This comment form is provided for your convenience. Please return this card to UCSF staff at the end of the meeting, or if you prefer to send it to us at a later date, please email to EIR@planning.UCSF.edu or mail to Diane Wong, UCSF Campus Planning, Box 0286, San Francisco, CA 94143. Comments must be received by 5 p.m. on February 14, 2020.

How tall is the proposed new hospital? what would the impact of that building be on the Edgewood neighborhood? Shading? etc?.
~~What~~ Will The EIR ~~should~~ use the map in the "Comprehensive Parnassus Heights Plan"? (we're freaked out about protecting the forest, green space)

We want to have the changes to airborne effluent evaluted. We wonder what new levels of ~~hazardous or &~~ emissions will occur due to the hospital both from the hospital and other supporting infrastructure like the power plant and gasses, etc. also we support dense housing and walkable streets!

Name: Mera and Sunil Paul

Address: 150 Edgewood Ave (Street) 94117 (Zip)

Email: Mera.granberg@gmail.com

Scoping Meeting for the Proposed Comprehensive Parnassus Heights Plan Environmental Impact Report

Public Comment Form

2/10/2020

Thank you for coming tonight. UCSF values your input, and we welcome your comments on the Initial Study for the proposed Comprehensive Parnassus Heights Plan. This comment form is provided for your convenience. Please return this card to UCSF staff at the end of the meeting, or if you prefer to send it to us at a later date, please email to EIR@planning.UCSF.edu or mail to Diane Wong, UCSF Campus Planning, Box 0286, San Francisco, CA 94143. Comments must be received by 5 p.m. on February 14, 2020.

While we appreciate UCSF's many contributions to the medical field & to patient health, & UCSF's changing needs:
~~$.~~ Increasing the campus size by @1.5 million s.f.:

1. Breaks the space ceiling agreement with the city that limits growth & daily campus population;
2. Proposes a vast impact on adjacent/nearby neighborhoods without: A. providing money for public transportation - it doubles traffic & adds @ 4,000 workers daily as well as some 4,000 more ~~staff~~ faculty/students/patients
B. without providing workforce housing for both current workers & the new thousands of future workers, (as well as much more faculty & student housing) [Note: Prop. E]
3. This plan, while worthy in many ways, follows UC's huge expansion at Mission Bay, also @ 1.5 million s.f.
4. At a time when many hospitals are closing, & outpatient ~~work~~ services are increasing, ~~it appears that a~~ and the two new hospitals at Mission Bay, ~~it~~ reducing the proposed 1 m s.f. new hospital here seems sound.

Name: Tes Welborn

Address: 2001 Oak St. 94117

Street / Zip

Email: tes @ @aol.com

5. The EIR is too big & is more "desire" than real plans. Please do smaller chunks

Scoping Meeting for the Proposed Comprehensive Parnassus Heights Plan Environmental Impact Report

Public Comment Form

2/10/2020

Thank you for coming tonight. UCSF values your input, and we welcome your comments on the Initial Study for the proposed Comprehensive Parnassus Heights Plan. This comment form is provided for your convenience. Please return this card to UCSF staff at the end of the meeting, or if you prefer to send it to us at a later date, please email to EIR@planning.UCSF.edu or mail to Diane Wong, UCSF Campus Planning, Box 0286, San Francisco, CA 94143. Comments must be received by 5 p.m. on February 14, 2020.

PLEASE ADDRESS THE EFFECTS OF CUT & FILL ACTIVITIES ON SURROUNDING NEIGHBORHOODS.

I REALIZE THAT THE PROPERTY IS STATE PROPERTY AND THEREFORE NOT SUBJECT TO S.F. REGULATION, BUT IT WOULD BE INTERESTING TO SEE HOW THE PROPOSED PROJECT FITS W/ THE S.F. PLANNING DEPT'S CITY-WIDE PLAN.

PLEASE CONSIDER EXTENDING THE TIME LINE FOR EIR APPROVAL.

Name PETER ROCKWELL

Address 130 MIRALOMA DR., S.F., CA 94127
Street Zip

Email ALFA_PETE@MAC.COM

1

SPEAKER CARD
Scoping Meeting for the Environmental Impact Report for the proposed Comprehensive Parnassus Heights Plan

UCSF

2/10/2020

If you wish to comment on the Initial Study, please fill out this card and submit to staff.

Name ROGER HOFMANN

Address 1550 5TH AVE #402 SF 94122

2

SPEAKER CARD
Scoping Meeting for the Environmental Impact Report for the proposed Comprehensive Parnassus Heights Plan

UCSF

2/10/2020

If you wish to comment on the Initial Study, please fill out this card and submit to staff.

Name Pam Hofmann

Address 1550 5th Ave. #102

4

SPEAKER CARD
Scoping Meeting for the Environmental Impact Report for the proposed Comprehensive Parnassus Heights Plan

UCSF

2/10/2020

If you wish to comment on the Initial Study, please fill out this card and submit to staff.

Name Michael OCallaghan

Address 123 Edgewood Ave

5

SPEAKER CARD
Scoping Meeting for the Environmental Impact Report for the proposed Comprehensive Parnassus Heights Plan

UCSF

2/10/2020

If you wish to comment on the Initial Study, please fill out this card and submit to staff.

Name Tes Welborn

Address

(6)

SPEAKER CARD
Scoping Meeting for the Environmental Impact Report for the proposed Comprehensive Parnassus Heights Plan

UCSF

2/10/2020

If you wish to comment on the Initial Study, please fill out this card and submit to staff.

Name Barbara Smith

Address 1473 - 6th Ave, SF.

(7)

SPEAKER CARD
Scoping Meeting for the Environmental Impact Report for the proposed Comprehensive Parnassus Heights Plan

UCSF

2/10/2020

If you wish to comment on the Initial Study, please fill out this card and submit to staff.

Name Maria Wabl

Address 1515 5th Ave

(8)

SPEAKER CARD
Scoping Meeting for the Environmental Impact Report for the proposed Comprehensive Parnassus Heights Plan

UCSF

2/10/2020

If you wish to comment on the Initial Study, please fill out this card and submit to staff.

Name Lisa Kessler

Address 161 Edgewood Ave

(9)

SPEAKER CARD
Scoping Meeting for the Environmental Impact Report for the proposed Comprehensive Parnassus Heights Plan

UCSF

2/10/2020

If you wish to comment on the Initial Study, please fill out this card and submit to staff.

Name HANS BAUDAUF

Address 165 EDGEWOOD AVE

10

SPEAKER CARD
Scoping Meeting for the Environmental Impact Report for the proposed Comprehensive Parnassus Heights Plan

2/10/2020

If you wish to comment on the Initial Study, please fill out this card and submit to staff.

Name Maryann Rainey

Address 1318 - 4th avenue

The school of Nursing Comes down
Where will it be rebuilt?

11

SPEAKER CARD
Scoping Meeting for the Environmental Impact Report for the proposed Comprehensive Parnassus Heights Plan

2/10/2020

If you wish to comment on the Initial Study, please fill out this card and submit to staff.

Name KEN EISEN

Address 70 Clarendon Ave (See over)

12

SPEAKER CARD
Scoping Meeting for the Environmental Impact Report for the proposed Comprehensive Parnassus Heights Plan

2/10/2020

If you wish to comment on the Initial Study, please fill out this card and submit to staff.

Name SUNIL PAUL

Address 150 Edgewood Ave

13

SPEAKER CARD
Scoping Meeting for the Environmental Impact Report for the proposed Comprehensive Parnassus Heights Plan

2/10/2020

If you wish to comment on the Initial Study, please fill out this card and submit to staff.

Name Denis Mosgofian

Address 1227 - 10th Ave

(10)

SPEAKER CARD
Scoping Meeting for the Environmental Impact Report for the proposed Comprehensive Parnassus Heights Plan

UCSF

2/10/2020

If you wish to comment on the Initial Study, please fill out this card and submit to staff.

Name Maryann Rainey

Address 1318 - 4th avenue

The School of Nursing Comes down Where will it be rebuilt?

What infrastructure, especially sewer lines would support the planned expansion of Aldea Student Housing near Clarendon Ave?

(12)

SPEAKER CARD
Scoping Meeting for the Environmental Impact Report for the proposed Comprehensive Parnassus Heights Plan

UCSF

2/10/2020

If you wish to comment on the Initial Study, please fill out this card and submit to staff.

Name SUNIL PAUL

Address 150 Edgewood Ave

(13)

SPEAKER CARD
Scoping Meeting for the Environmental Impact Report for the proposed Comprehensive Parnassus Heights Plan

UCSF

2/10/2020

If you wish to comment on the Initial Study, please fill out this card and submit to staff.

Name Denis Mosgofian

Address 1227 - 10th Ave

14

SPEAKER CARD
Scoping Meeting for the Environmental Impact Report for the proposed Comprehensive Parnassus Heights Plan

UCSF

2/10/2020

If you wish to comment on the Initial Study, please fill out this card and submit to staff.

Name Kevin Siegel

Address 3761 17th St

15

SPEAKER CARD
Scoping Meeting for the Environmental Impact Report for the proposed Comprehensive Parnassus Heights Plan

UCSF

2/10/2020

If you wish to comment on the Initial Study, please fill out this card and submit to staff.

Name LORI LIEDERMAN

Address 1227 10th AVE 94122

16

SPEAKER CARD
Scoping Meeting for the Environmental Impact Report for the proposed Comprehensive Parnassus Heights Plan

UCSF

2/10/2020

If you wish to comment on the Initial Study, please fill out this card and submit to staff.

Name Maury Zeff

Address 119 Edgewood Ave

16

SPEAKER CARD
Scoping Meeting for the Environmental Impact Report for the proposed Comprehensive Parnassus Heights Plan

UCSF

2/10/2020

If you wish to comment on the Initial Study, please fill out this card and submit to staff.

Name JEFF COLE

Address 277 EDGEWOOD AVE.

17

SPEAKER CARD
Scoping Meeting for the Environmental Impact Report for the proposed Comprehensive Parnassus Heights Plan

UCSF

2/10/2020

If you wish to comment on the Initial Study, please fill out this card and submit to staff.

Name MIKE GRADE

Address 828 ANZA ST., #3

18

SPEAKER CARD
Scoping Meeting for the Environmental Impact Report for the proposed Comprehensive Parnassus Heights Plan

UCSF

2/10/2020

If you wish to comment on the Initial Study, please fill out this card and submit to staff.

Name Lisa Kessler

Address 161 Edgewood.

---o0o--

ENVIRONMENTAL IMPACT REPORT

SCOPING MEETING

UNIVERSITY OF CALIFORNIA SAN FRANCISCO

COMPREHENSIVE PARNASSUS HEIGHTS PLAN

Monday, February 10, 2020

6:30 p.m.

Millberry Union Event & Meeting Center

City Lights Room

500 Parnassus Avenue

REPORTED BY: JANA OSATO, STENOGRAPHIC REPORTER

APPEARANCES

---o0o---

ALICE MURASAKI, Assistant Vice Chancellor, Campus Planning, UCSF Real Estate

DIANE WONG, Principal Planner, UCSF Real Estate

CHRISTINE GASPARAC, Senior Director, Community Relations, Office of Community & Government Relations

ERICH BURKHART, Principal, Perkins Eastman

HILLARY GITELMAN, Director, Environmental Science Associates

---o0o---

I N D E X

---o0o---

INFORMAL COMMENTS - Pages 4 through 39

---o0o---

FORMAL PUBLIC COMMENTS

Monday, February 10, 2020 6:32 p.m.

---o0o---

INFORMAL COMMENTS

---o0o---

(Presentation and comments)

UNIDENTIFIED SPEAKER: This is called "The Plan For The Future." Is that defined by 5 years? 20 years?

CHRISTINE GASPARAC: It's a 20-year plan.

UNIDENTIFIED SPEAKER: 30 years.

CHRISTINE GASPARAC: 30 years, sorry. Anybody else? Erich's going to talk some more about that.

ERICH BURKHART: So with this plan, we think we can alleviate a bit of the connect -- the congestion that occurs because right now we're basing all outpatients and all inpatients, ambulances, and whatnot all up and down that side of Parnassus Avenue.

UNIDENTIFIED SPEAKER: How are folks coming from Irving? Are they coming on public transit or --

ERICH BURKHART: Yes.

UNIDENTIFIED SPEAKER: By car?

ERICH BURKHART: Yes. Now -- now, I'm glad you asked that question because one of the other things we want to do with this whole campus plan was to discourage cars and -- and to have fewer of them and encourage the use of transit and encourage pedestrian access, the walkability of the campus, for example.

So we're actually -- I'll come to this -- some housing in a moment. We're trying to make the campus much more attractive to not have to depend upon cars.

UNIDENTIFIED SPEAKER: Another question on that.

ERICH BURKHART: Yeah?

UNIDENTIFIED SPEAKER: I understand that, but how does that relate to patients who are acutely ill or pregnant or whatever getting to the campus? They're not going to ride bicycles and watch a --

ERICH BURKHART: No, no, no, you're right.

UNIDENTIFIED SPEAKER: I mean, realistically, it's nice to say no cars, you know, more or less cars.

ERICH BURKHART: Yeah.

UNIDENTIFIED SPEAKER: I understand.

ERICH BURKHART: Well, let's see. Now one of the other -- is a pointer. Okay. This is the new hospital. And the idea behind the new hospital is the main entrance, inpatient, would be up there on Parnassus. In a similar vein, we are -- the master plan imagines a new, what we call our -- our "new, unified lobby" which would thread -- which would pull people, the ambulatory traffic from Irving down here, up into this unifying lobby. We're talking about having these great big glass elevators going to come up the outside of the parking garage out here [indicating], then bring you into this new integrated lobby.

And in that lobby space, we're talking about creating this -- for the few people that do have to do -- do have to use a car, having this interior patient pickup and drop-off spot so that we're not clogging up Parnassus, also having an interior Uber and Lyft pickup and drop-off space. That's all part of this new, integrated lobby. And -- and that would be just off Parnassus on the --

UNIDENTIFIED SPEAKER: What about folks who are coming from -- away from -- not San Francisco because I know there are folks coming to your facilities from all over the state. And they come here with their vehicles. How is that going to work with drop-off, pickup spots?

ERICH BURKHART: You know, we -- those are all great, detailed questions that we -- we did a whole mobility study which looked at all the transit options on the car options, whether people were coming from across town or across the state. And we've got a lot of information about that. But I would have to ask that we get into that a little bit later with you and -- and address -- those are real important questions and very key to the success of a plan. But there's a lot of detail associated with that.

UNIDENTIFIED SPEAKER: Just on the arrival thing, if that's also -- where are the ER and ambulance bays?

ERICH BURKHART: Oh, I don't know just yet. What's happening -- see, remember, these are opportunity sites. We haven't -- that -- that blue bit there where it says "Clinical East," that hospital has not yet been designed. Now, this group and other community groups are -- when that design occurs, there will be lots of public hearings associated with that. So all we're saying --

UNIDENTIFIED SPEAKER: I was just thinking, if it's part of the transportation flow, because the ambulance coming in and out and parking, that's a big deal as far as flow.

ERICH BURKHART: Yeah, yeah. I -- I -- our notion is that it would not be -- the entrance is not going to be on Parnassus. There -- the --

UNIDENTIFIED SPEAKER: How are they going to get there?

ERICH BURKHART: Well, you see the back -- across the back side there is Medical Center Way.

UNIDENTIFIED SPEAKER: Yeah, I know. I live there.

ERICH BURKHART: Yeah, okay. Well, the -- the idea is that the ambulance entrance would not -- right now, the ambulance entrance is sort of cheek by jowl with the front door. Right? And that's awkward. And so by pulling the ambulances around to the back side, we -- we can hopefully alleviate some of that street congestion.

Now, they've still got to get here from around town, but that's -- that's the idea, to have access from -- instead of having access all from one side, having access from a different side of the hospital. But that has to be designed. That's something --

ALICE MURASAKI: So I appreciate the questions, but how about we let Erich finish.

ERICH BURKHART: Let me just take that because some of these -- yeah, let me keep going here just a little bit. Since you're asking about access, one of the big ideas about the master plan -- see that thing, the service corridor? One of the things that we wanted to do here is have Medical Center Way come all the way around and connect back into Fourth Avenue here as an under, partly undergrade, underground service core so that all of our service vehicles would be accessing not just the hospital but all the various campuses.

This is the way Disneyland works, for example. There's a -- an underground utility level below. So all of that, we want to get all of the service vehicles off Parnassus if we can.

Then the next big bit here is the academic -- the green bit is the academic and research --

UNIDENTIFIED SPEAKER: But does the purple cross over -- that road, does it cross over? The purple side, does it cross it cross over to the green spot?

ERICH BURKHART: Does the -- which one?

UNIDENTIFIED SPEAKER: The Clinical East end --

UNIDENTIFIED SPEAKER: Cross over the existing Medical Way?

UNIDENTIFIED SPEAKER: Does it cross over the road?

ERICH BURKHART: Not in this plan.

UNIDENTIFIED SPEAKER: Okay.

ERICH BURKHART: Yeah.

UNIDENTIFIED SPEAKER: Because the one that distributed with that neighborhood, it crosses over into the park.

ERICH BURKHART: Well, again, I am -- we're talking here about a master plan. You're talking about something that may be designed in the future. I -- I -- we would have to defer on that because that's not -- that's not what this plan is -- that's another question.

UNIDENTIFIED SPEAKER: It's already drawn. We looked at it.

LISA KESSLER: They put it on the last meeting.

UNIDENTIFIED SPEAKER: Yeah. Now they have it burrow into the hillside.

UNIDENTIFIED SPEAKER: Yes. It comes into the --

ALICIA MURASAKI: Hi. So just maybe to clarify a little bit. We're looking at a master plan, and none of these buildings have yet been designed. But you are right. We have been doing some programming and master planning specifically for the hospital, the new hospital, which is the -- where it says "Clinical East End" and there's an arrow coming to it.

UNIDENTIFIED SPEAKER: Yeah.

ALICIA MURASAKI: So since this was published in October. There's been continuing work on the hospital. So the shape of that and how it might touch the road and that edge there, just along where the -- the current Medical Way is is being looked at.

But all of these questions are really great and the purpose of the master plan is not to answer all the questions of what the future design of the hospital would be, but we would love for you to write or put in a speaker card to include in the scoping bit because these -- this is your chance to tell us what is important to you so we make sure we study that in the environmental impact report.

So if the transportation or Medical Center Way or the shape there of -- of the hospital does not -- when it gets designed, please, that's what we really want to make sure we capture tonight.

LISA KESSLER: The reason we're concerned about this is because the existing --

UNIDENTIFIED SPEAKER: Can I ask a question?

LISA KESSLER: -- environmental proposal shows this. And if you're going to use a new footprint and a new master plan, the existing environmental proposal doesn't address the environmental issues of going into the woods.

ALICIA MURASAKI: Yes, and there will be another public process as -- as we were just talking about, when the hospital design gets a little bit further developed. But we don't have enough information to do a -- an environmental impact report on the new hospital today.

LISA KESSLER: Okay. But so --

ALICIA MURASAKI: So the plan --

LISA KESSLER: -- your existing one is not accurate. Right? We can't vote on proceeding with it if the footprint is not clear.

ALICIA MURASAKI: So tonight, we're talking about the whole master plan.

ERICH BURKHART: Just the master plan tonight.

LISA KESSLER: So what's being approved in -- what's being passed on the 14th? What is the comments that we have to submit?

ALICIA MURASAKI: So we would like your comments on the plan, not an individual building --

ERICH BURKHART: This plan.

ALICIA MURASAKI: But this plan. Not an individual building. So --

LISA KESSLER: So this is the plan you're proposing, not the one that goes into the woods?

ALICIA MURASAKI: So in the Comprehensive Parnassus Heights Master Plan, the idea of these building sites as opportunities for the future and approximately this -- these massings in these locations -- so you can see there's more on the clinical side, and we've added things on the housing in the west end. So we'd like your comments to us on what we need to make sure we study over this 30-year --

ERICH BURKHART: Let's comment on --

LISA KESSLER: Okay. Keep going.

ERICH BURKHART: Let's comment on the master plan --

LISA KESSLER: Well, because we don't know which plan we're commenting on.

(Simultaneous speakers; unintelligible)

UNIDENTIFIED SPEAKER: I don't understand what the plan is.

UNIDENTIFIED SPEAKER: Well, give them a chance to explain it.

UNIDENTIFIED SPEAKER: Yeah, I think we cannot judge on opportunity site if we don't have specific. That was my problem when I read the whole thing. I don't have specifics, so how can I guide or ask the right questions because we don't know what to ask because we don't know what's going to be there?

Just because it's an opportunity site doesn't help us as neighbors to be clear what's going to happen.

UNIDENTIFIED SPEAKER: It's really vague. And then you can do the bait and switch where you say "you guys approved this" and then later on, you go into --

(Simultaneous speakers; unintelligible)

LISA KESSLER: Specifically, it's an environmental impact plan. So the idea of going into the woods as opposed to staying on the existing approved-by-the-Regents-in-2014 campus footprint changes the environmental impact plan. So you kind of have to start over.

ALICIA MURASAKI: So we'll --

(Simultaneous speakers; unintelligible)

LISA KESSLER: The list of things that you're addressing in the EIR where you check off the boxes of what you think is relevant changes if you go into the forest. The relevance is difference.

ALICIA MURASAKI: So -- so we are trying to take this in two -- at least two phases. So there is an environmental impact of this overall plan, and you're right. We do not have specific buildings designed, but we would like to envision what Parnassus Heights will be over a 30-year development.

Then when we come back and we have information about the hospital building, we will come back and we will do it an environmental --

LISA KESSLER: What's the order of the hospital building?

UNIDENTIFIED SPEAKER: That's different.

ALICIA MURASAKI: We will do an environmental impact report with the duly required public process about the hospital building. So we have an idea that, because of the way clinical services are provided today at the sizes required to provide the best clinical care, that we need a bigger footprint at the base of the hospital building. And there is some indication of that in the -- in the documents that we will be preparing. But it is not the full design or plan of the hospital.

We will come back for the hospital.

(Simultaneous speakers; unintelligible)

ALICIA MURASAKI: I'm sorry. So I can't comment when everyone is talking. So it would be really nice if we could let the -- our guest finish telling you about the overall plan and then --

UNIDENTIFIED SPEAKER: Well, we want to comment on the overall plan before he tells us more. The hospital is the most central place east of this thing. And so if we don't like where it is, we should comment now so that you can redesign this whole thing, put the hospital somewhere else, and then they could vote on that.

ALICIA MURASAKI: So the purpose of tonight is to gather the things that are important to you so we can study them. So in --

(Simultaneous speakers; unintelligible)

UNIDENTIFIED SPEAKER: There's something represented here on a map. And while I understand that the individual building design has not been resolved, it is represented that the boundary within which each of these opportunity sites exists has been resolved; is that correct or not?

LISA KESSLER: And it's been resolved by the university, right?

ALICIA MURASAKI: So we have some ideas of the direction that is heading. We have not made any plans as to the exact size and shape of the hospital. We have been studying that. And so we -- it's a very complicated thing, and we have to give the team the time to actually do and design that. So we're not --

UNIDENTIFIED SPEAKER: What about the roads? Are the roads --

ALICIA MURASAKI: But we are not --

UNIDENTIFIED SPEAKER: -- subject to change?
ALICIA MURASAKI: We are not coming to you with a fully baked plan and saying approve this plan for the hospital.
UNIDENTIFIED SPEAKER: You have a date already to submit the EIR to the Regents in November.
LISA KESSLER: And the EIR gives --
(Simultaneous speakers; unintelligible)
LISA KESSLER: But does the EIR include that pie-shaped piece of the forest or not?
UNIDENTIFIED SPEAKER: Right.
LISA KESSLER: Does it cover that? Because the EIR was drafted for this footprint, and you're asking for a different footprint that changes the environmental impact dramatically.
ALICIA MURASAKI: So this is a plan that was published from a very robust community process in October.
LISA KESSLER: Okay.
ALICIA MURASAKI: Since October, the hospital team has continued to study what is required for a world-class hospital. And, yes, things have changed. And, yes, we do talk about that in the documents.
But what you're approving on the 14th is not an approval of anything. It is --

LISA KESSLER: We're approving the scope of the EIR.

ALICIA MURASAKI: We are asking for your input into what we should study.

LISA KESSLER: So what I'm saying is what you offer to study is based on a different footprint than what you're going to do. So you need to study different things if you make a different footprint.

ALICIA MURASAKI: So, yes. If you let us continue with the presentation, you'll get to see more information specifically about that.

LISA KESSLER: The EIR?

ALICIA MURASAKI: Yes, yes.

LISA KESSLER: Okay. Go for it.

DIANE WONG: And I'd like to ask that folks who want to speak if you can give me your comment cards so we can just respect kind of the process and allow everybody can get a chance to ask.

(Simultaneous speakers; unintelligible)

ALICIA MURASAKI: You don't want to speak? If we could let our speaker --

ERICH BURKHART: I just --

ALICIA MURASAKI: -- finish.

ERICH BURKHART: -- I'm almost done, actually.

(Presentation continues)

ERICH BURKHART: And the buildings all have little slots, and they're separated so that we can maintain access points and have this connection, this park to peak. And you can see in some of the little gaps here that, where we're trying to --

LISA KESSLER: What about the gaps in the clinical east end?

ERICH BURKHART: I'm sorry?

LISA KESSLER: What -- are there gaps in the clinical end as well as to connect it?

ERICH BURKHART: Not as much, but that's up on a upper level, not at the base. But -- but we'll come -- let me come back to that in just a moment.

(Presentation continues)

ERICH BURKHART: We're trying to concentrate the service traffic on that back side and leave Parnassus Avenue and Irving for visitors and patients and students.

UNIDENTIFIED SPEAKER: Is that one-way traffic or two?

ERICH BURKHART: Yeah, it's a one-way.

And it's multilevel. It would be vehicles down at the base and utilities down below and then some vehicles above that. And then above that, it's covered, and we have this park connection to the -- to the, you know, over it, up to Mount Sutro.

UNIDENTIFIED SPEAKER: Are you suggesting parking underneath that?

ERICH BURKHART: No, no. Not parking because remember --

UNIDENTIFIED SPEAKER: It's a very large parking lot that you're now getting rid of, right?

ERICH BURKHART: Oh, which one? Around the School of Dentistry?

LISA KESSLER: No, the north side gateway.

UNIDENTIFIED SPEAKER: The Kirkham Street parking lot.

ERICH BURKHART: No, I'm not talking about the north side gate one just yet.

UNIDENTIFIED SPEAKER: They're talking about the west side next to Fifth.

ERICH BURKHART: Next to Fifth.

UNIDENTIFIED SPEAKER: Multilevel parking structure.

ERICH BURKHART: Yeah, now again, I have -- I got to defer to our mobility segment. We did a whole parking projection on -- on the use of vehicles here at Parnassus as well as in San Francisco in general. And at the -- how many people are going to be using their cars 30 years from now and how these alternative methods of transit are -- are reducing the demand on cars.

So we can get -- in fact, the EIR will specifically, I think, get into that in quite a bit of detail. So that's the green bits and the yellow bits.

(Presentation continues)

ERICH BURKHART: It will also be part of the public realm because what we're talking about here is having a thing called Science on Display that will celebrate the discoveries -- the great discoveries that are made here but also to engage the community in the work that's going on here.

UNIDENTIFIED SPEAKER: Now does Park Way, does that go down between the buildings, that's what -- what we're seeing there?

ERICH BURKHART: What, this?

UNIDENTIFIED SPEAKER: Yes.

ERICH BURKHART: Yeah, it -- it's, yeah, it's a -- it's a big, public park if you will.

LISA KESSLER: It's going to be at quite an angle, right?

ERICH BURKHART: Well, and that's another thing. That is another thing that the EIR studies. But we're very worried about the wind. It gets a little chilly out here.

UNIDENTIFIED SPEAKER: And it's very steep as far as mobility. I know that it's like --

ERICH BURKHART: No, no, no, no. I -- yeah, but no, no, no, no. The parking garage is still under -- this thing is sitting on top of a plinth of parking, you guys. We're not -- we're not going all the way down.

LISA KESSLER: It's on top of the parking garage.

ERICH BURKHART: Yeah, that's right. That's right.

UNIDENTIFIED SPEAKER: So where does the replacement for the building we're in, for the gym and the meeting rooms and --

ERICH BURKHART: Yeah, all of that stuff is -- well, that remains to be -- it -- part of that square footage, those assignments. Some of that would be here. If it's more student related, some of it might be up in the green parts. But those are all the details that would be worked out as projects are imagined over the next 30 years.

UNIDENTIFIED SPEAKER: I think what would have been really helpful -- and -- and now it would be if we could get sort of timelines related to these different things.

ERICH BURKHART: I'm glad you brought that up.

UNIDENTIFIED SPEAKER: I know this is a concept --

ERICH BURKHART: Yeah.

UNIDENTIFIED SPEAKER: -- but it just seems to be such a fuzzy concept. I really can't understand much of this.

(Simultaneous speakers; unintelligible)

ERICH BURKHART: I'm glad you brought this up because one of the problems here at Parnassus is everything is built. There is no play. You -- you can't turn around without bumping into something. So we have to create -- we have to very carefully phase this so we begin to create -- we have to tear something down to build something new. And we have to put those people that are in that thing that we'd be tearing down somewhere.

So this plan imagines four different projects in the next 10, 15 years or so. One is the hospital there that we were just talking about. Another is a new research building where -- more or less where UC Hall sits today. And that would be -- I'm sorry. It's not -- be research and academic classrooms and the like. And then number three is to enhance that Irving Street entrance, you know, how we could -- remember, part of this plan is to encourage outpatients to come and everyone who's coming from Irving to have a much better experience as they come up and pass over to Parnassus. And number four, on the other side of Mount Sutro, is some additional housing at Aldea.

(Presentation continues)

ERICH BURKHART: This is standing on Fourth Street [sic], that new Fourth Street, looking up at these series of steps up to that promenade that runs from the west here all the way to Saunders Court on the east side.

I'm sorry?

UNIDENTIFIED SPEAKER: Right parallel to Parnassus Street, right?

ERICH BURKHART: Yes, yes.

UNIDENTIFIED SPEAKER: And I mean, I don't understand how we can plan a street parallel to Parnassus with -- when we know we can barely sometimes make it up the hill or down the hill because of the wind. This is not how it will look.

ERICH BURKHART: Yeah.

UNIDENTIFIED SPEAKER: There will be not one person out there.

(Simultaneous speakers; unintelligible)

ERICH BURKHART: Hold on. We are very concerned about the wind. And I'll show you this here. But that's not a reason to build everything over. It is very important that we have public outdoor space. And yes, it might be a little bit windy sometimes, but -- but that's something --

LISA KESSLER: But the people in coats (unintelligible)

ERICH BURKHART: Yeah.

(Simultaneous speakers; unintelligible)

ERICH BURKHART: Yes, we have wind studies that are part of the EIR. And we -- we found a whole series --

UNIDENTIFIED SPEAKER: Wait. I thought you hadn't started the EIR.

ERICH BURKHART: No, no, no, no. We did a wind study to do this part of the plan. The EIR, I believe --

UNIDENTIFIED SPEAKER: Yes.

ERICH BURKHART: -- it does address more specifically wind.

LISA KESSLER: How can you do a wind study without knowing the height of the building?

UNIDENTIFIED SPEAKER: You haven't scoped it yet.

ERICH BURKHART: Well, what we did -- I'll show you.

LISA KESSLER: Isn't that relevant to the wind?

ERICH BURKHART: Yes. So what we do is we build a model of this, and you test it. You test it within -- in wind tunnels. And -- and you -- you under -- we have a --

(Simultaneous speakers; unintelligible)

UNIDENTIFIED SPEAKER: It's an iterative process. And you have to start with a -- with a precept and test that and modify it according to what you find.

ERICH BURKHART: Yeah.

UNIDENTIFIED SPEAKER: You can't just come up with a final design.

ERICH BURKHART: Yeah, yeah. And that -- I'm glad you raised that point because see, like -- like that Number 2 building, for example. The absolute -- the shape of that, the way the edges are handled, if there's a little covered promenade along its base, if there are little fins in the building, all of that will come out of further study because a wind tunnel will say, well, you've got, you know, 30-mile-an-hour winds coming down here. So we have to figure out how to handle that.

This, we're not -- these are not designed yet. But we were concerned about wind nevertheless because we want to shape the building so that we -- so that the shape of the building wasn't intensifying the wind problem. In fact, that -- the wind -- the wind studies that we did do led us to some of these shapes that you see here.

Yes, sir.

UNIDENTIFIED SPEAKER: My understanding of the EIR process is that alternatives need to be studied. Is -- and I would like to specifically request that an alternative be studied that does not locate a -- a -- a building that is greater in size than the historic relationship of the Langley Porter buildings to the Edgewood neighborhood.

That's a historic set of relationships. Langley Porter might, in fact, even be a historic building from an architectural point of view. And I think that requires a study that envisions a different location for the hospital because, as you say, the hospital -- you need to replace the hospital as your first move.

And I don't think it is fair to necessarily assume from an environmental point of view that that is the only right place for hospital. Will you, in fact, study a no-impact of changing to the neighbors on that site?

HILLARY GITELMAN: We're starting to get into the comments that we want to get on the EIR. We can transition to the --

(Simultaneous speakers; unintelligible)

UNIDENTIFIED SPEAKER: There you go. Okay. I'll shut up for a while.

HILLARY GITELMAN: Okay. Super. We're starting to get to the good stuff, so I wanted to cut to the chase and give you just a quick overview of the CEQA process, and then we'll get to your comments.

First, let me reintroduce myself. My name is Hillary Gitelman. I work for ESA, Environmental Science Associates. I'm here with my colleague Paul Mitchell. We basically do EIRs for a living. And we are supporting UCSF in the preparation of the EIR on this project.

So let me just briefly talk about the CEQA process. You guys have probably all lived in California for a long time and you know all this already. But we are doing this because of the state law which requires us to look at the physical environmental effects of a project before a decision is made to carry out that project.

So in this case, UCSF has determined that an EIR is required in order for the Regents to consider the adoption of the plan you've been hearing about. So the EIR has to be done before they can make that decision.

The EIR is not going to make a recommendation, but it's going to consider impacts, alternatives, mitigation measures. And we're going to try and get it done with some efficiency, but it depends largely on public input.

So here we are at the public scoping process. The idea here is that we want to get your questions and comments on what the EIR should look at. We've already heard some great questions this evening about the project description, what is the project going to be; we've heard a suggestion about alternatives; we've heard questions about traffic and how that's going to be analyzed; how much parking is going to be assumed and what does that mean. All those are issues that we have to consider in the EIR, and they'll end up determining the impacts as we lay them out in the EIR.

SO --

UNIDENTIFIED SPEAKER: You've done a Draft EIR based on a draft plan.

HILLARY GITELMAN: Well, we -- we haven't done a Draft EIR yet.

LISA KESSLER: You've done a scope of work --

HILLARY GITELMAN: We're going to hear comments today.

LISA KESSLER: -- a proposed scope of work --

HILLARY GITELMAN: No.

LISA KESSLER: -- based on a --

HILLARY GITELMAN: No, no. What we're doing tonight is scoping the EIR. So we're asking for your comments. And if you feel you don't have enough information on the project, you should make that as a comment because we, as the authors of the EIR and preparing the EIR, we are going to have to take your -- your comments into consideration as we move forward.

And then the beauty of the CEQA process, in my humble opinion, is that once we prepare a Draft EIR, we circulate it as a draft. So if we don't get it right, if there's something missing, if there are issues you think haven't been adequately addressed, you will have an opportunity to comment on the draft before it's finalized. Then every comment we get on the Draft EIR, we have an obligation to respond to, in writing, before the Final EIR is prepared and presented for Regents.

UNIDENTIFIED SPEAKER: So this isn't the Draft EIR?

HILLARY GITELMAN: It is not.

UNIDENTIFIED SPEAKER: Okay.

HILLARY GITELMAN: What you have before you is an initial study that was circulated with a Notice of Preparation.

The notice says we are preparing an EIR. And the initial study tries to lay out which issues we're going to look at in depth and which we think are really not that important. And if you got a chance to read through that initial study, there are very few of those issues that we said we're not going to analyze in detail. Most of them, we're going to give a lot of attention to and focus in our draft.

So tonight, we want your comments orally. But if you want to talk or if you have more to say than you can do in your three minutes or this evening, we would look forward to getting your written comments by the end of the week. And all of the comments we get are going to help us prepare that Draft EIR.

Now, we've already heard folks raise some questions about issues that we'll have to consider. Wind has been brought up. Traffic has been brought up. Also, the reserve, sort of penetrating into the reserve and that kind of land use issue, or maybe it's a resource issue. These are the topics under state law that we're going to look at in the EIR.

So we want to hear from you if there's any particular way we should be looking at these issues, aspects of the project you don't understand as it relates to these issues or things we should make sure to look at as we study the project in this -- the alternatives to the project, any one of those issues.

Yeah?

UNIDENTIFIED SPEAKER: A couple of questions. Normally, I'm used to city planning departments or city governments actually contracting for the EIR. How does it work with the State of California being the client? There's sort an inherent conflict of interest for you, as a professional, because the very body that is hiring you wants a certain outcome.

HILLARY GITELMAN: Well, it's the same as if a city would hire us to analyze a general plan or a specific plan that they're doing. I mean, our job is to be objective, to follow the state law and to come up with an analysis that we can stand behind and that you will have a chance to weigh in on.

UNIDENTIFIED SPEAKER: I guess one of the things that's confusing us is as a neighborhood --

HILLARY GITELMAN: Yeah?

UNIDENTIFIED SPEAKER: -- is that a design is being done on a hospital prior to an approved plan. And I think it's creating a culture of resentment and distrust.

HILLARY GITELMAN: Okay.

UNIDENTIFIED SPEAKER: And I have to ask a question, because my grandparents grew up, lived on the same street -- not same house that I did -- and I remember that there was a very serious blow-back in this neighborhood. And -- and I think that how this is handled is very important to the outcome of all of this.

And I'm curious, there was a square foot limit that was agreed to --

UNIDENTIFIED SPEAKER: (Unintelligible)

UNIDENTIFIED SPEAKER: -- and that I -- and I'm curious where that square foot limit now stands in the analysis of this.

(Simultaneous speakers; unintelligible)

HILLARY GITELMAN: Let's get to one or two more slides, and we'll get to that, yeah.

UNIDENTIFIED SPEAKER: Okay. But -- but if you were going to modify that limit, will the full analysis be done which also analyzes the impact on UC of a neighborhood lawsuit stopping the project?

LISA KESSLER: Or a social media campaign at UCSF and how they are fighting the community.

HILLARY GITELMAN: Understood. Let me just go a little further. Okay? Okay. So this is an important part of the answer to your question and -- and the easier to answer your first question was yes, we're going to analyze the project and its impacts. So but --

UNIDENTIFIED SPEAKER: But that sounds like jargon. I don't -- you will analyze the -- increasing the square feet?

HILLARY GITELMAN: Yes.

UNIDENTIFIED SPEAKER: Okay. But that has been -- is that agreement actually not legally binding?

LISA KESSLER: That was addressed in 2014, right? That was already --

HILLARY GITELMAN: Great segue. Let me just get through this leg. Okay?

So 2014, the university did another EIR, the LRDP --

LISA KESSLER: Going to 2035.

HILLARY GITELMAN: -- looked at all of their campus sites. And we are going to make use of that EIR to the extent that we can in our EIR. So any information and analysis that hasn't changed, doesn't need to be updated, we're going to try and make use of that.

LISA KESSLER: Does this include the expansion of the campus into Mission Bay and the removal of the pediatric hospital?

HILLARY GITELMAN: We are focusing on this campus to the --

LISA KESSLER: But it changes your square footage, right?

HILLARY GITELMAN: -- to the extent that the LRDP information can be reused, we will reuse it or reference it.

UNIDENTIFIED SPEAKER: Yes, but --

HILLARY GITELMAN: But we are preparing -- okay. Let me -- let me talk.

UNIDENTIFIED SPEAKER: There is some legal document from way before 2000 --

(Simultaneous speakers; unintelligible)

HILLARY GITELMAN: I understand. I understand it's legal and it's binding.

UNIDENTIFIED SPEAKER: But I don't understand what you just said, if I may just go to that.

HILLARY GITELMAN: Okay.

UNIDENTIFIED SPEAKER: I think you cannot reuse anything out of the LRDP 2014 because the connecting our -- the heights, the vault, the everything is changing. And so I don't see how you can use any of the EIR from 2014 in your analysis.

HILLARY GITELMAN: Okay. Thank you.

You've reached your conclusion before I have, but we may get there. We think right now there may be things that we can reuse, but we are preparing a new EIR. To the extent we need to do additional analysis, that's the forum for the additional analysis. We are going to analyze the impacts of the proposed plan at the detail we have. Okay?

We're trying to get from UCSF and from you your questions about what the definition of this plan and we're trying to analyze it at the level of detail we have.

We're going to have some more detail about some of the early-phase buildings. And that's going to help us do more in-depth review of that early phase.

Erich mentioned the Irving Street arrival, the RAB or the research and academic building, the new hospital and the first phase of the Aldea densification. So those kind of near-term projects -- and there may be a few more -- will be analyzed at a greater level of detail than some of the rest of the plan that's way out there in the future.

Then let me explain how an EIR is used. So let's say we get to the end, we have a certified EIR. Let's say the Regents adopt the plan. And then someone comes to -- or the University decides, "We're going to do the first implementation project." Then the EIR is used throughout the planning project to assess that project and whether its impacts have been adequately addressed. We hope we are writing an EIR so that we will not have to do another environmental review on the Irving Street arrival; so we've analyzed it at sufficient level of detail that it will not require subsequent environmental review.

Now, one of the early phase projects we know already will require subsequent environmental review, and that's the hospital -- because we hopefully will know at the time we're drafting this EIR and based on your comments, what the height and the mass and all that is. And so we can analyze it at a -- you know, we can analyze it in this EIR; we're going to do a wind study; we're going to look at shading; we're going to look at this footprint, et cetera.

But we already know we don't have a detailed design, so we're anticipating having to do a second EIR after this one on the hospital itself.

LISA KESSLER: But this EIR specifically says "The proposed hospital between Medical Center Way and Moffitt Hospital." So this EIR is irrelevant if the footprint extends beyond that.

HILLARY GITELMAN: You know what, I want you to make -- when we get to the comments, please, it would be really useful for you to say --

LISA KESSLER: Okay. Well, I guess I -- I'm trying to see is this EIR proposal even worth talking about at this point if we're going to not --

HILLARY GITELMAN: We want to add -- we want to analyze the hospital, the impacts of the hospital to the extent the hospital design is defined.

UNIDENTIFIED SPEAKER: So what is the height of the hospital that you're going to be using?

HILLARY GITELMAN: I don't know.

(Simultaneous speakers; unintelligible)

HILLARY GITELMAN: The best thing I can say is please request that we use the design that you have seen that is causing you --

LISA KESSLER: Then you need to redo this because that doesn't reference that design at all. Thank you.

UNIDENTIFIED SPEAKER: Would it have been somehow more prudent, since this is a really large plan over a number of years, to take it in smaller bites and say I'm going to do the EIR for something that I hope to get built in the next three years or five years.

UNIDENTIFIED SPEAKER: Look, they can't do that. They have to do the whole thing because -- but the hospital is the main spot. And it needs to -- they need to find a place for the hospital.

The first rule needs to be you cannot touch any green spaces. We only have a finite amount of green space in the city. So do not get into the woods. That should be out of that.

HILLARY GITELMAN: Okay. Then, you guys, let's get to the end because we want to have -- we want to have the kind of process that we anticipated here. We've heard a lot of screaming from the audience, but what we really want to do is have an orderly listening session where we get the comments and make them relate to the EIR. I mean, you guys have great input. I mean, this is all working and telling us how to craft the EIR and its analysis. But it would be really helpful to -- to put it in -- you had it -- you had a suggestion about alternatives. Let's put it in the record so our court reporter can get it down. I'm going to hand over the microphone to UCSF, and we'll move on to the public comments.

---OOO---

FORMAL PUBLIC COMMENTS

ALICIA MURASAKI: Thank you. This is really the meat of the meeting. This is us trying to listen. So I do ask that, if we could respectfully make our comments so the court reporter can record them so that we can make sure that we respond to each and every one of them -- I understand this is our community and there's a lot of passion. But I am asking that we do this in a respectful and orderly way so we can get everyone's comments and suggestions recorded.

So on that note, I'd like to introduce my colleague, Diane Wong. She's going to facilitate this next section where we will be listening to your comments and we will take them in many forms.

DIANE WONG: Thank you. All right. So if you would like to speak and you have not yet filled out a speaker card, please do so right now. So there will be speaker cards available.

We're going to -- as Alicia mentioned, we have a court reporter so that we can accurately record all of your comments. We are going to institute a time limit of three minutes. And if everyone -- just so that everyone has a chance to speak. And once everyone has spoken, if you would like to speak again, you are allowed to do so.

So I'm going to call up the first three speakers. And if you could line up at the microphone, that would be terrific. So the first --

UNIDENTIFIED SPEAKER: (Unintelligible)

DIANE WONG: You want to turn the microphone around in the front. Okay? The front.

UNIDENTIFIED SPEAKER: This should face the court reporter here.

UNIDENTIFIED SPEAKER: If you struggle with mobility, just let me know. I have another microphone. I can walk over to you.

UNIDENTIFIED SPEAKER: Okay. Thank you.

DIANE WONG: And before each of you speaks, if you could please indicate your name. And if you belong to an organization, if you could please cite that organization. Thank you.

So the first three speakers: Roger Hofmann, Pam Hofmann and Michael O'Callaghan.

ROGER HOFMANN: Hi. My name is Roger Hofmann. I live on Fifth Avenue south of Kirkham. My requests: First, please analyze the sheer stress on buildings from landslides that may occur under wet seismic conditions. It is well established that landslides occur during earthquakes. It is also well established that landslides occur when the ground is wet. Please consider the worst case: What happens to the campus if both occur at the same time?

Second, please hold yourselves to the development standards San Francisco requires of properties located in landslide hazard zones per guidelines given in the San Francisco Slope Protection Act. Please engage an independent -- independent third party for peer review of landslide hazard and create an independent structural advisory committee for the project.

The San Francisco Department of Building Inspection's Slope Protection page shows two maps: a seismic hazard zone map and a slope map. Inclusion in either map requires developers to comply with San Francisco's Slope Protection Act. The Parnassus Heights campus is in -- is within the hazard zone of both maps.

The Parnassus Heights campus is adjacent to an area covered by an additional City ordinance: The Northwest Mount Sutro Slope Protection Act. This ordinance was passed in recognition of the particular geologic hazards of development on Mount Sutro.

Here's where it gets real personal. My

requests are based on personal experience. For context, from my driveway, I have a view to the north of the parking lot behind the dental clinics building. You can see Koret Way to the east. Twenty-two years ago, we were in an El Nino year. At about 2:00 a.m. one rainy night in February, 1998, first responders banged on my door and shouted, "Get out. Get out. Get out now."

We were evacuated. A portion of Mount Sutro had fallen into Koret Way at Kirkham Street. UCSF's service vehicles parked in the parking lot below were buried by the slide. If there was an additional land movement, our building was -- would be the next to go. For weeks afterward, mud flowed down Kirkham Street and into the intersection of Fifth and Kirkham. Effectively, it was Franciscan red chert, but it sure looked like mud.

That made -- that night made an impression. It's 22 years later, and I still remember the night clearly. I remember my heart racing and my fear for the safety of my wife and our two small children.

Memory of that night is why, when UCSF commissioned geologist William Haneberg to lead a high-tech, in-depth study of landslide risk at the Parnassus Heights Campus, I studied the report. I saved it, and I've submitted it for inclusion in the EIR. Unlike most reports which consider earth -- earthquake risks and landslide risks separately, this report looks at the worst case of landslide risk in an earthquake that occurs after heavy rain.

The computer simulations arrived at a result that did not surprise me. Under these conditions, the probabilities of landslides engulfing the campus are so high that this outcome is near certainty. Please consider carefully this within your EIR as you move forward.

One other point. You did not check the box for fire risk. This -- Mount Sutro is considered by the State of California for moderate fire risk. Historically, there have been two fires on Mount Sutro in 1934 and 1990 and 1899. The San Francisco Fire Marshal did an audit in 2015 found that the situation during a drought in -- on Mount Sutro was considered extra hazardous and made some recommendations. Please adhere to those as well. Thank you.

PAM HOFMANN: Pam Hofmann. Your artist's conception of UC Hall shows glass panels on the first floor. The foundation work has been stripped away. In the late 1940s, the famous civil engineer and foundations expert, Henry L. Marchand, was hired to shore up UC Hall. Since then, we have had not only the Loma Prieta quake, but also the 1957 Daly City quake, which was the largest quake in that location since the 1906 quake.

UC Hall and Marchand's other buildings survived these quakes. UC Hall survived despite that the ground in the area is difficult and has landslide hazards like the rest of the Parnassus campus.

Now, let's look up the street. Ray Booth, an architect who worked on the library, told me they had no idea how it would hold up in an earthquake. The library, Millberry, and Medical Building 1 lean up against the mountain. This means that, in the event of an earthquake, these buildings will be subject to two sets of forces. There will be the vertical and lateral forces on their footing, and at the same time, these buildings would also be subject to different vertical and lateral forces coming from the hill.

Remember that the Northridge quakes demonstrated the risk to parking garages. They pancaked. Garages similar in construction to UCSF's are susceptible. Putting a skin over the parking structures will do nothing. It's lipstick on a pig. Putting more weight on top only increases the risk.

There's also the HSIR Towers in the back that are nestled in the swale of an old landslide. You're proposing a cut-and-fill roadway, and this is also an increased risk of a landslide.

A lot of the recently built large structure -- structures look beautiful, but they are unsound. Consider the Transbay Terminal, the Bay Bridge, the Oroville Dam spillway, and let's not forget, the Millennium Tower.

UCSF's mission is education, research, and patient care, yet your plans appear to emphasize style and social interaction.

UCSF has labs, containment units and, yes, a morgue. The facility needs to be designed with regard to patient privacy and HIPAA requirements. There need to be containment facilities, and there need to be offices, not cube farms.

UCSF is a hospital, not a convention center. Keep in mind that while some of the patients are not ambulatory, some of the diseases are more than ambulatory. They are airborne.

Finally, please consider the following issues: the difficulty of building on this landslide-prone site; the need to comply with HIPAA requirements; and the need for containment facilities. Thank you.

MICHAEL O'CALLAGHAN: My name's Mike O'Callaghan. I live on Edgewood Avenue, and I started attending these meetings a couple weeks ago for whatever reason, I'm not sure. I think it's something to do with my wife telling me to show up. And I -- I realized what was going on, and I notified some of my friends on Edgewood Avenue which is one of the reasons they're here tonight.

We were a little disturbed, confused, and perplexed as why we're just getting into it now, even though this planning process has been going on for months and years, and we're arguably one of the closest and most impacted neighborhood associations. And we are not listed as stakeholders in this. And that's going to be rectified promptly.

Most of us here don't really understand the process because we haven't been involved in the process long enough. We've just been here for a couple of meetings, myself, and I've heard a lot of conversations about things that were conceptual and they were, you know, this is the -- what the long-range plan is.

And -- and I still don't understand the process, so I'm a little confused. But to make sure that some of my needs are addressed via EIR, I would consider that UC embrace the concept that no development outside of the existing boundaries of the campus that we're talking about --

UNIDENTIFIED SPEAKER: Yes.

MICHAEL O'CALLAGHAN: -- not crossing over Medical Center Way.

The other big concern I have is that building that new hospital at that corner of the campus -- we're talking about the -- the southwest corner of the campus, I -- I happen to live in a 1905 house that is -- is the closest house to that new construction. And it's all rock there. And that rock has been set to the construction. Vibrations are going to go right through -- into my old house. I don't know what my house is going to look like after the construction.

So I'm very concerned about that, all the noise and -- and ground-borne vibrations -- borne vibrations are going to be an issue.

The other big concern is -- a lot of conversation about it. I know a lot of smart people are looking at the wind. We had some experts here in the room about who -- what -- what the wind's going to do and what the -- how it's going to be affected by this new building. But north of the end of the campus, you're building a large, large structure. The wind's going to funnel through there and expand out that nozzle right over the top of the hill at Edgewood Avenue.

We have -- you know, right now, the hill works as a great wind block. I'm unsure what this building's going to do. We're interested in finding out. But I know one thing it's going to do is it's going to block out the afternoon sun. You're talking about a very tall building, you know, much taller than what's there. The Langley Porter, it was a, you know, modest structure. And this monolithic structure, as proposed is, you know, a great concern.

We, you know, live in a neighborhood that, you know, gets a lot of morning light. It doesn't get a lot of afternoon light because of the eucalyptus forest and some of the existing structures. But if you're already -- what's proposed here, what we heard about is far beyond anything we have right now, and it will turn the street, you know, very, very dark for months and months a year. And that's disturbing to me. Thank you.

DIANE WONG: The next three speakers are Tes Welborn, Barbara Smith, and Maria Wabl.

TES WELBORN: Hi, I'm Tes Welborn with the Haight Ashbury Neighborhood Council and also a member of the Community Advisory Group. While we appreciate

UCSF's many contributions to the medical field and to patient health and that UCSF has changing needs, increasing the campus size by a million-and-a-half square feet puts an incredible burden and impact on adjacent nearby neighborhoods because we're all connected here in San Francisco; aren't we?

And in the plan so far as it -- it's a plan, there's no provision for providing money for public transportation when in the plan, in the document we've got tonight, traffic would be doubled. It's adding about 4,000 new workers on this campus daily and about 4,000 more faculty, students, and patients.

The plan does not provide workforce housing. Right now, there is housing for some faculty and some students. But with maybe 4,000 additional workers, you know, the -- the Prop E on the ballot in March calls for no more office space in San Francisco without our meeting affordable housing goals. So maybe UC -- UC should try out that shoe, too.

And this plan also, while it's worthy in many ways, follows the huge expansion at Mission Bay which was also a few years ago about a million-and-a-half square feet. Maybe institutions have a certain metastacism (sic) or growth syndrome. At a time when many hospitals are closing and increasingly patients are being seen at outpatient facilities or even some people talk about being seen at home, a reduction in size of the proposed million-square-foot hospital may be appropriate. Thank you.

BARBARA SMITH: Good evening, everyone. I'm Barbara Smith, a neighbor. I've actually lived in the Inner Sunset for 48 years, at my current residence for 34 years which is just a couple of blocks from the campus. And I found the report to be very hard to follow. It's sketchy. It is, as you said, conceptual and flexible to the point where it's really hard to get a handle on what is being proposed.

And I would suggest a number of changes and amendments to it and then reissuing it and allowing more time to review it. There's not enough information on the plan really, I think, to start off on a full EIR.

There should be more detailed maps indicating the changes between the existing and the proposed site plan really clearly indicating those changes, including the building footprints, open space, parking, and traffic flows within and around the site. Even though they're preliminary and conceptual, I think there could be more detail on those important, really important elements that will impact the surrounding area.

There should be clarifications on the buildings. On the west side, the housing is proposed to be six to ten stories. Ten stories would really overwhelm the area. And while housing is really important and the plan does call for, I think, over 700 additional housing units, which is very important, the population is going to go up by over 7,900 individuals which is really, again, going to impact the surrounding areas with traffic and parking.

I think that there should be tables that really clearly compare what's existing now, what's proposed, and what the additional elements are. Whether it's parking, housing, square footage of the hospital and the other buildings, those should be really clearly laid out so it's very easy for us to see what the changes are.

And also, how will the campus connect to the surrounding neighborhood? There's a lot of talk about what's happening internally in the campus. So I think that internal area, although it will be probably very busy, is great because I think it's -- would be good to have it feel more like a campus and have a lot more interactions within the campus. But also, there should be more focus on how the campus interacts with the rest of the neighborhood.

And thank you. I look forward to -- I hope that you are able to extend the period of time for comment on this and after providing more clarification on what's being proposed. Thank you.

MARIA WABL: My name is Maria Wabl. I live on Fifth Avenue right behind the UCSF campus. I was wondering if we are supporting the corporation here with 6 billion in revenue over the last year. So I'm wondering is -- is that why we need this world-class, huge campus in our neighborhood? That's one thing.

And the other thing is I have to agree with you. It would be great to have tables from the LRDP 2014, what was proposed there and what you are proposing now. And the next thing, one more thing is in the 2014 LRDP, housing on-campus was proposed. There was housing proposed at UC Hall. There was housing proposed in the Millberry Towers. That's all gone.

All of a sudden, we are building housing on Fourth Avenue in the second half of this cycle, more towards the end. And in Aldea, we are adding some, I think, 142 units. I am not sure anymore. And the rest is also happening towards 2050. So we have a housing crisis now, and basically it was proposed that, by 2035, we would have, I don't know, 400 more units on-campus. And all of a sudden, nothing there. Thank you.

DIANE WONG: The next three speakers; Lisa Kessler, Hans Baldauf, and Maryann Rainey.

LISA KESSLER: Hi everybody. My name's Lisa. I'm a neighbor on Edgewood Avenue. I live on the side adjacent to the new proposed stuff. I'd also like to add I was a medical student here, and I was also someone who worked in research labs, so I feel like I actually worked in the same hub as that.

UNIDENTIFIED SPEAKER: As a junior researcher.

LISA KESSLER: I've been on all sides of this.

UNIDENTIFIED SPEAKER: (Unintelligible)

LISA KESSLER: No, I've been on various --

UNIDENTIFIED SPEAKER: Up to your mouth.

LISA KESSLER: To my mouth. Okay.

So anyways, I'm a neighbor. I was meant to -- I worked in the research lab. I am going to specifically refer to the EIR because I feel like that's why we're here. And we'll have a lot of time to comment on the other stuff.

I just want to say that I got involved in this because I saw the new proposal for the footprint, and this EIR doesn't refer to that new proposal. It says specifically between Medical Center Way and Moffitt Hospital. So as far as I'm concerned, this proposal in scope is irrelevant. It's a different scope of work entirely. And the new proposed area impacts existing greenland adjacent.

So I'd like to propose some changes to the scope of work that's outlined here since the scope of work is really different.

So under "Aesthetics," you have said no additional analysis required. Substantially damaging scenic resources including but not limited to trees, rock outcroppings, historic buildings, with a distinct scenic highway." There's no scenic highway but there's a lot of -- it's not limited to that, and it is examining different aesthetics. So I'd like to see that addressed.

There's nothing addressing any agriculture or forestry resources. This is an existing forest. And although it's got some non-native eucalyptus, if you actually go back there -- I took a bunch of pictures back there if anyone would like to see them. They started to plant a stead of -- of trees that are originally supposed to be there. And it's beautiful back there.

You're not just act- -- in the existing footprint. If you go over Medical Center Road, you're -- you're addressing all these different -- will result in a loss of forest land or the conversion of forest land to non-forest use. If you say "no additional analysis" required, I think there's additional analysis required because you're taking down trees.

UNIDENTIFIED SPEAKERS: Yes.

LISA KESSLER: ". . .involve other changes in the existing environment which, due to their location or nature, could result in a conversion of non-agricultural use or conversion of forest land to non-forest use."

And the way you address this is to say, hey, we're going to move that forest to another part of the woods and add in some forest.

That's right. That's like saying we're going to take Yosemite, because it's inconvenient, and we're going to move it to Death Valley.

It's unrelated. This -- this is strip of forest next to our homes is important. It buffers the sound. It buffers the -- the smoke or fog or whatever it is that comes out of the back of the hospital. And it's a -- it's an access space for people who come up the Farnsworth Steps, which are historic, and into the

Sutro Forest. It's a really important strip of land. It's small, but it's important. And you're proposing not to study it because it's not in this scope of work.

And so I think this is sort of an irrelevant document. And I think you need to start over.

Yeah, I hear it.

HILLARY GITELMAN: Why don't you wait until the last speaker, and then you can come back up.

LISA KESSLER: Go ahead.

HANS BALDAUF: Hi, Hans Baldauf, 165 Edgewood Avenue. I want to say for the record we do not have enough information. If you're going to be using study plans of other parts that are being developed right now for the hospital, for other housing, we should be having those plans. We should be having all the information that's going to be dumped on your desk now, and we should not be being asked to comment on it until we do have that.

I think that, as I said, we need a -- a -- a study on an option that does not change the historic relationship of the neighborhood to the campus. And I include in that building massing, light, air, the works. I believe -- then, I think we need a complete and thorough study of construction impacts on -- and very detailed from noise, geology, the works.

The entire side of the Surge parking lot collapsed seven or eight years ago due to rain and the water situation and had to be hurriedly reconstructed. The University doesn't have the best record on these topics.

I think that there -- Lisa mentioned the connection of the Farnsworth Steps. A little known fact is that Ishi lived in these buildings. The original university anthropology department was over here. The whole back of the forest has a cultural geography that I don't think you can just mess with without a full thorough historic study of that -- that cultural resource.

And so -- and then this issue of the square footage cap. I -- I really -- I do believe and I -- I think -- I guess -- do we have to hire an attorney to talk with you about this in terms of the binding nature, the idea that somehow this document can be abrogated?

And I think there's a big issue about -- I think there was willingness in the neighborhood to allow for housing, and that that's why the renovation of these buildings was looked upon favorably. I think it can be felt a little bit of a bait and switch to renovate those buildings which could have been the site of a hospital alternative location and was originally shown in documents from 15 years ago as a hospital site and that now that's been taken off the table because we were generous in our notion of providing housing.

And so I think the notion of sincerely studying alternative hospital sites -- that feels like an uphill battle to me right now, but it feels like on the University should seriously endeavor if they want to gain the goodwill of this community.

MARYANN RAINEY: Hello, I'm Maryann Rainey. I've lived on -- I live on Fourth Avenue. I've lived in this neighborhood for about 45 years. And I do want UCSF to be a -- continue to be a very successful, thriving university and hospital. I've worked in the hospital, and I've been a student at UC.

My concern -- and I -- I think it's appropriate to bring it up now. One of the plans on the first page for project description is discussing candidate buildings for demolition. And the School of Nursing is listed as a building to be demolished right near the Saunders Court. I don't see where it's going to be rebuilt.

And nursing is vital to the operation of the -- the hospital, to the intellectual development of nursing that serves the hospital and the community, visiting nurses, primary care. So I'm concerned about -- I -- I hope this is an appropriate time to talk about the School of Nursing being rebuilt and where. How does that build go into the plan?

My second point is related to the fact that I live on Fourth Avenue, and I have some idea of the flow of traffic. Well, actually, my concern is related on the back as proposed where the Fourth Avenue extension is happening. That appears to be a sharp turn for trucks to make as they come from Medical Center Way through the extension and down. I'd like to think it would work well, but I have a question. It looks pretty sharp on the map.

Those are my comments.

DIANE WONG: Okay. Next three speakers are Ken Eisen, Sunil Paul, and Denis Mosgofian.

UNIDENTIFIED SPEAKER: Sunil had to leave. Sunil had to leave.

KEN EISEN: Hello, I'm Ken Eisen and my wife and I live on Clarendon Avenue very close to the Aldea student housing. We had a personal experience with sewer backups and antiquated infrastructure of the sewer system running down Clarendon. It's the turn-of-the-century sewer pipe, and it's eight inches -- only eight inches. And it was built before there was housing brought into the community and never really reflected the amount of increased development that's occurred in the last 30 years.

I think as I understand it, there's plans to expand on Aldea by as much as 500 units, I believe, in the Environmental Impact Report. And that's significant. I'm not sure how many is there now, but it's a significant increase. What are the plans? What are -- what people don't think about that much is sewer infrastructure, things that are under the ground that you don't see visibly besides the landslide issue, which people had touched upon, as you develop areas that are currently forested.

How is that infrastructure going to be provided for it? How is it going to be funded because typically, in private sector development, the cost of infrastructure is funded by the increased assessed values as the area gets developed. So here you have attached it to the community.

In the city of San Francisco, we've had Clarendon torn up for years now. I don't know if you go down Clarendon. There's always roadwork going on because re-sewer -- a lot of ad hoc enhancements on the sewer, the water mains. And all the pipes and everything is right above each other. Makes it very difficult to work on.

So unless there's a collaboration with the City, which is striving to keep up with this antiquated infrastructure, we -- we see concerns about how that would feed into with the community and potentially impact us.

So that's at least one area on -- because when we -- I do want to say we do appreciate UCSF, the work that it does and the enhancements to the communities. I don't want to totally criticize UCSF. You do things important for the community. So that's one area.

The other -- so that's our main personal focus is how the infrastructure will be provided for. But I mean secondarily, it seems to be that we can't rely on the N Judah to feed into to address the amount of increased activity and density that's going to take place as the level of activity is going to intensify at UCSF.

And my only -- no matter how you slice it, there's going to need -- there are going to be increased vehicles. And hopefully at the same time, Parnassus is going to be closed to vehicular traffic except for buses -- I mean, Uber and ambulances. And I don't want to open up a new can of worms, but the only area I can think about that might provide for it -- the increased vehicles, will be to build a parking structure by Kezar, near where the McDonalds was is now going to be turned into housing.

And I don't know what kind of a can of worms that would open up, but the only thing I can think about would be to have a parking structure there, people being shuttled into -- into the hospital from -- from that area. At least it would -- it's against the police station. It's not up against too many other people that are interested in opposing it.

So those are the main areas I am personally concerned about. Thank you.

DIANE WONG: Next three speakers, Kevin Siegel, Lori Liederman, and Maury Zeff.

KEVIN SIEGEL: I thought there was somebody else who needed to --

UNIDENTIFIED SPEAKER: I think he left.

UNIDENTIFIED SPEAKER: Is it you?

(Simultaneous speakers; unintelligible)

KEVIN SIEGEL: I'm Kevin Siegel. Okay.

DIANE WONG: I'm sorry.

DENIS MOSGOFIAN: Hi. My name is Denis Mosgofian. I've lived in the Inner Sunset for 45 years. Born in San Francisco and raised in the Haight.

I just have a series of brief things that I think that the EIR has to assess, and I'm not certain that every one of these is at this point in the EIR process, but I'll read them.

I'd like -- like to assess the impact of the -- to the surrounding community of the projected planned increase of at least 4,000 employees, 4,000 patients and faculty and, I expect, over a period of 30 years possibly far greater population increase than that. And it will have, for example, a tremendous impact on local housing. I don't know how that's supposed -- going to be handled, but it will undoubtedly put the kind of pressure on the housing. Unless there's more housing built here, that will cause a lot of competition, and there'll be an increasing cost of housing costs. And that will be both difficult for the folks on the campus as well as for the folks in the community.

I -- I was very concerned about the proposed 40 percent increase in the -- in the ceiling. And so I think that the cumulative impacts of increasing the size of the campus and -- and over the ceiling of about 4 million square feet to a another million and a half should be carefully assessed including, for example, on the transit, on congestion, even though CEQA doesn't like to talk about congestion. They like to talk about miles traveled.

But the reality is that there will be tremendous congestion here in the same way as, despite MTA's work in the city to clear the streets and -- and allow Uber and Lyft to do what they do, they've actually created a tremendous amount of congestion. So it really hasn't worked. And I'm concerned that, at least at this point, the plans don't appear to be any better than MTA's, at least in my expectation.

I was -- I'm concerned about how patients traveling from a distance -- well, actually, especially acutely sick or pregnant women and so will be able to access their doctors and their care in the plan as described in the general picture so that it's easy for them, not difficult.

And I was wondering how the amount of planned -- housing planned will be sufficient to meet the needs of the quantity of folks and the affordability requirements for the folks that will be here in -- over the coming future.

And I think Tes mentioned, but I'll say it. I'll repeat it, anyway, that I think, given the large scope of the plan, it needs -- the -- the plan -- the EIR needs to assess how much additional funding is going to be needed for all the additional public services that will absolutely be required to support the campus.

And I had -- I had two thoughts. One is, I felt like a lot of what I heard and what I've read wasn't very clear and I didn't get a very clear picture. And I heard other people say a similar thing. And it occurred to me that this is a stellar and brilliant campus, full of very bright and knowledgeable people. And I cannot believe that such an institution could produce something that isn't very clear. And I think that's kind of odd.

And finally, I think that --

UNIDENTIFIED SPEAKER: Potential.

DENIS MOSGOFIAN: -- there -- there's a rush to judgment. I noticed that there's a proposal that they push this thing to the -- to the Regents by November of this year. I've been around a long time and have been involved in various production, construction projects, and community development projects. Pushing something of this size to the Regents by November says they want to hurry this before people get a -- get a handhold on what's really going on. And I think that's a mistake.

It's a mistake not only for what -- what the gentleman over here said about a possible lawsuit or a probable lawsuit, but it's also an insult to the whole community. We're all part of this. We're not enemies. And I know at one point when I interacted with the University back when they wanted to take over the Poly [phonetic] site, I was considered an enemy. I wasn't an enemy, I was just a commoner.

But in any case, I think it's important that -- that there not be a rush to judgment and that the time necessary to do this properly and cover the issues that people care about be done properly. And I know that I've heard people here say it brilliantly better than I'm saying it.

Finally, I have one question. And I raised it with the provost, and I'll raise it here. Because I've heard about all of the brilliant medical work that's done here -- and I know, I had a lot of my teeth worked on here when I was a kid when my folks didn't have any money. And it was good work. It lasted all my life.

There's a lot of good work here that's produced and a lot of brilliant, bright people here, very smart. And I -- I asked them. I said do you know, the University, instead of developing anathema, an institution that's like a silo, it should take that information that they've developed here and share it with the whole Bay Area, the community hospitals and the hospitals in working-class areas, middle-class areas that don't have all of this kind of resource and share it with them so that, one, people can get that medical help and that advice closer to where they live. They don't have to travel so far. And it makes not so many people have to come here for their care just to get such good care.

And I just thought that that's something that, I don't know, it needn't be raised in the EIR but I think it's worth thinking about. Thank you.

KEVIN SIEGEL: Hello. My name is Kevin Siegel. I'm a resident of Eureka Valley on the other side of the hill. I'm a patient here, and I'm a frequent user of the trails. I participate with the Sutro Stewards in the forest on actually constructing the trails, rehabbing the trails. I'm also an advisory board member for Sutro Stewards.

And in my private life, I'm a -- in my work life, I'm a lawyer, land use lawyer representing cities. Actually, I specialize -- one of my specialties is CEQA. And in fact, I've done work with ESA on helping prepare final review documents and helping defend them successfully in court at the time.

I've done that.

So I -- I'm not that familiar with the master plan here or the notice of preparation which a lot of people are complaining about here. But I have some general familiarity. And it's kind of disappointing, actually, because I feel like there's a lot of confusion and misunderstanding about what's going on here.

And I'll just say a little bit about what to basically expect and ask that everybody sort of participate in the process but not prejudge, not say we're going to have a lawsuit because that doesn't actually make any sense at the stage that we're at right now. All this is is a notice of preparation based upon a basic plan that says there's an interest in UCSF in studying.

And it's a different process. And you come up at this stage with a basic diagram about here's conceptually what might happen. You don't make any decisions at this point at all. All this document says that they're going to prepare an EIR. So the initial study and notice of preparation didn't have any decision --

UNIDENTIFIED SPEAKER: But they've come so far, a long way to this point now --

KEVIN SIEGEL: No.

UNIDENTIFIED SPEAKER: -- without any commenting.

KEVIN SIEGEL: Can I finish?

UNIDENTIFIED SPEAKER: Go ahead.

KEVIN SIEGEL: So the -- it doesn't make any decision whether there isn't any environmental impact or whether there is any environmental impact. It says it needs to be studied. And what matters is what's in the Draft EIR. And the point of the scoping session is to provide comments -- which a lot of people have done. There's a lot of good comments here: concerned about traffic; concerned about the impact of forest resources; concerned about safety and utilities and all of that. There was a long list that was put up here.

What matters is paying attention to what's in the EIR. It doesn't make any sense to say let's do a big notice of preparation because that's not going to get you anywhere. All that's going to do is delay, and there's not even any reason for -- for delaying at this point.

So participate, engage in the process, and pay attention to what the Draft Environmental Impact Report says. That report will have the proposed project that UC has -- is preparing. And there'll be iterations of it. There'll be more details. There'll be maps. There'll be tables. There'll be all sorts of information in there.

And will also have to include a no project alternative, what would happen if they don't do anything. They'll have to include an environmentally superior alternative which is typically, for a development project, scaled down plans. It would be less development in -- up in the hill. There would be less housing. Maybe they won't build it at an -- an Aldea Center or housing, but they would come up with environmentally superior alternatives that will have fewer impacts than the master plan.

And then they will look -- they'll probably -- I don't know how many alternatives are planned, but typically you have at least four. I'm working on a case right now where we have eight. So those get studied. The Draft EIR gets circulated. Comments are made -- at least for a 45-day period. So that is the time to really engage.

And to come in and say, "This isn't going to work. You don't know what you're doing," is partially perhaps from a faulty rollout of explaining what this is about.

UNIDENTIFIED SPEAKER: Well, the history, but is there --

KEVIN SIEGEL: It's also a lack of -- it's a lack of participation actually in the process and paying attention to what they're doing. So I hope that the -- the ultimate plan, that people participate in it. I'm sure Sutro Stewards, that I'm engaged in, will be looking at it and engaging members for environmental impact. But to -- to prejudge what's happening now is just a mistake.

UNIDENTIFIED SPEAKER: This is a moment we need some of the lawyer. But I know that the map that showed there and the one we just got distributed in the e-mail were different. Something is not --

KEVIN SIEGEL: Because that's what they will -- in the EIR, they will -- Erich, they will look at what the most current method is, and then they'll go --

UNIDENTIFIED SPEAKER: They didn't -- they said they didn't --

KEVIN SIEGEL: All this notice of preparation --

UNIDENTIFIED SPEAKER: -- need to study a bunch of stuff because --

KEVIN SIEGEL: No, that's not what it said.

ALICE MURASAKI: We need an orderly process to this. If people would like to speak, please fill out a speaker card.

(Simultaneous speakers; unintelligible)

KEVIN SIEGEL: This is a decision -- that is a checklist where you determine whether or not you do an EIR. If you do the EIR, all of the impacts have to be studied based upon what the plan showed.

This does not say anything that is controlling about impacts not being studied. That's not what this is.

UNIDENTIFIED SPEAKER: Next speaker.

UNIDENTIFIED SPEAKER: Now, listen here. He knows what he's talking about. It's worth hearing this information.

KEVIN SIEGEL: All I'm -- I'm not saying you're -- the process is going to be satisfying to you.

UNIDENTIFIED SPEAKER: He knows what he's talking about.

KEVIN SIEGEL: But to prejudge the process now --

DIANE WONG: We need to move on.

(Simultaneous speaker; unintelligible)

DIANE WONG: Can we please be respectful of the time and the speaker. So if you would like to have another turn, simply see Lily, and we can do that. So please, let's be respectful.

KEVIN SIEGEL: All I'm saying is participate in the process.

DIANE WONG: Okay.

KEVIN SIEGEL: The Stewards will be participating in the process. Pay attention to what happened. Don't decide now.

DIANE WONG: Thank you. The next speaker is Lori Leiderman.

MAURY ZEFF: Hi, Maury Zeff, 119 Edgewood. I'm new to the neighborhood, which, when I moved, means I've been there fewer than 20 years. It makes me extremely new. And I was just planning to come here and sit and listen tonight. But something Hans said, the little known fact, made me realize something I had heard that I want to add to the record tonight.

I'm new to the neighborhood but my friend, Ruth Kirschner [phonetic], who lives on Willard, has been there since 1980. And you mentioned Ishi. So what she told me was Ishi was the last of his tribe in the early 20th century. And UCSF kept him in its buildings for I don't even know -- want to know what purpose is. And apparently, he roamed that trail. And that trail that went about crossing Medical Center Drive, that greenbelt we're talking about is known as the Ishi Trail.

And Ruth told me that in the 1980s they were still finding Native American arrowheads and artifacts there. So -- I know for reasons not worth going into that other context -- if development were to kind of infringe on Native American land, that's significant because Native Americans, there would have to be all kinds of studies and involvement of different groups. And that may be the case with what's known as the Ishi Trail so I just want to add that.

And while I'm up here, I just want to say you guys are talking about a lot of consideration for the surrounding neighborhoods, you know, not just impacting them but in some cases, it sounds like mitigating impacts that already exist like the Fourth Street corridor, for instance. I guess I just want to say I would ask for the same consideration for your neighbors on Farnsworth and Edgewood. Thanks.

LORI LIEDERMAN: Hi, so, um, I just want to say that -- oh, my name is Lori Liederman. I live on Tenth Avenue, so I live far away from here. And maybe I shouldn't even care what's happening up here, but I do. I just want to comment to the -- not the immediately previous speaker but the -- the person before him.

I've been through a lot of hearings at the Planning Department and some work with Draft EIRs. And I have to agree with Denis Mosgofian that this is a very tight timeline for a DEIR to prepare all the things that various people here have already raised that need to be addressed.

And there is legitimate reason for skepticism and mistrust because this is an incredibly opaque presentation, very difficult to understand, and it's already changed.

And even before it changed with respect to the location of the hospital, it started with an excessive increase in the space ceiling, a violation of a longstanding agreement with the community. So skepticism and distrust has a basis in experience.

So what I want to focus on, though, is that I would like to see a lot of focus in the DEIR of -- on the construction process. We're talking about 30 years of construction. We know -- I live on Tenth Ave. We know how much impact there was from a year and a half to two years of construction around the N Judah changes. Okay? I mean, the impacts of this are going to be enormous. So noise, air quality --

(Simultaneous speakers; unintelligible)

LORI LIEDERMAN: Absolutely. Population.

UNIDENTIFIED SPEAKER: Working, trucks.

LORI LIEDERMAN: All the -- all the people who are going to come in here, all of the construction workers who will be here to work on these projects. And then, of course, the impacts, not just on the neighborhood but on the people who are going to school here and the people who are -- are in the hospital here and the people who are passing here and doing research here.

So those impacts are going to be huge. And the impacts on utilities in this area because presumably, they're all connected somehow. So all of these things needs to be addressed and -- and obviously have to be mitigated.

Very importantly, over the long term, the impact on housing stock. Housing -- housing should not be at the end of this process. Housing needs to come first. We're -- we're looking at legislation in the city to -- to make that happen because the impacts on all of us, on the existing residents of this city, are just too great. And frankly, I know UCSF wants to -- to continue to attract the best and the brightest. And we want that, too.

But you know what? Nobody's going to be able to afford to live here if you guys don't build some housing. So that's really critical, and it has to be at the front end of this process, not at the back end. I think that's all I have. Thanks.

Oh, I'd like to say this. I heard a commitment about an additional EIR with respect to the hospital. I heard not commitment about additional EIRs with respect to other aspects of this project. I think that that needs to happen because, frankly, the big thing that I don't think anybody has really mentioned is cumulative impacts have to be analyzed. You know, if everybody just does a one-off, then you don't really see the full impact. But the cumulative impacts are going to be enormous.

And I know you're required to look at that. Please look at that in great detail, and we will, too.

DIANE WONG: We have two speakers; Jeff Cole and Mike Grade.

JEFF COLE: Hi, my name's Jeff Cole. I live at 277 Edgewood, which backs up to the UCSF forest near the surg parking lot. Like others who have spoken, I'm a little confused about the process. But I have a request as it relates to the time table because I think the time table that was shown earlier, which we -- ends with presentation to the Regents sometime in 2020 has -- has earlier dates that seem completely unrealistic to me in light of what we know.

We're here -- well, what we know -- we were told that this is a scoping meeting in connection with a comprehensive Parnassus Heights plan to involve -- to evaluate the environmental impacts of that plan, this document labeled "Final Report, October 2019." I'm sure a lot of work and a lot of time went into this, which shows a map of the proposed site with the new hospital not extending east of Medical Center Way, not encroaching on the hillside, not encroaching on the forest.

And yet, apparently, it's now implied that it's being considered to do all those things, the particulars of which have not been revealed to any of us. Presumably, they'll be revealed to the people doing the environmental impact study. And if that's the case, then I think the time table should be changed to reveal to everybody who might have a comment what the footprint of the new hospital is going to be, what the impact, if any, on the roadway is going to be, on the hillside, on the forest and adjust the time table so that the environmental impact can be studied appropriately with the comments from people who've had an opportunity to see what's being discussed.

I understand that environmental impact

reports can be an iterative process. It's not clear to me that they're contemplating more than one environmental impact study. I guess they're contemplating one with some fluidity about what they're studying the impact of. But I think -- I don't know how you can study the impact of something before you identify what it is.

So I'd request that the -- the deadline for comments be extended from February 14th to some future date and the time table for doing a Draft Environmental Impact report not begin until after the amended plan, whatever it might be, has been published.

UNIDENTIFIED SPEAKER: Thank you.

UNIDENTIFIED SPEAKER: Here, here.

MIKE GRADE: Hi there. I'm Mike Grade. I'm a member of the Sutro Stewards, a longtime volunteer, crew leader, advisory board member. A comment on behalf of Craig -- he's right here.

One of the things for the EIR to consider is the additional movement of -- of folks that live -- the new number of folks that will live up at Aldea through the forest down to the hospital. So just another thing to consider. Thank you.

DIANE WONG: Okay. I have no other cards for new speakers. Has anyone not spoken who would like to speak?

Would you please state your name, sir?

BRUCE YURIAN [phonetic]: Sure. My name is Bruce Yurian [phonetic]. I'm a bit skeptical of what UC tells me. Maybe I'm wrong, but it -- what I remember is when they built the Mission Bay complex, they said if -- UC said if they were allowed to build there, they wouldn't expand the Parnassus campus any more. So I'm surprised by this, not only the expansion but at one-and-a-half million square foot expansion. That's really all.

UNIDENTIFIED SPEAKER: Can you speak closer to the mic, please?

BRUCE YURIAN [phonetic]: Yes, sorry.

Right now, it seems like this is just -- I'm supposed to think about the approval as a blank check. UC is going to build something somewhere at some time, but I have no idea what that really is. I hope that the young people in the audience are paying attention because I'm going to be dead before we find out if this is the Taj Mahal or a boondoggle.

One thing that I haven't heard addressed or -- I don't know if there's a representative from San Francisco City here? But as UC contemplates all these changes, it seems like the cost to the City is going to be enormous. That UC said, "We want this. Okay. If you guys at the City can figure out how to redesign the streets, the sewers, and the bus lines and all that."

So I think there's a lot more work needs to be done. And that's all I have to say. Thanks.

DIANE WONG: Is there anyone else who has not yet spoken who would like to make comments?

(No response)

DIANE WONG: Okay. I do have a card from someone who has already spoken. Lisa would like to speak again.

LISA KESSLER: But you know what? I appreciate you listening. This is our chance to get this on the record.

UNIDENTIFIED SPEAKER: Sure.

UNIDENTIFIED SPEAKER: Yes, go ahead.

LISA KESSLER: I almost didn't come.

(Simultaneous speakers; unintelligible)

LISA KESSLER: I already -- you know why.

I already addressed the issues that I saw specifically with the EIR that I want you guys to look at. But I agree -- I was actually going to bring that up about the City, which is I know UCSF wants a bigger hospital and a better campus. I don't know if the City of San Francisco needs another bigger hospital. I want a study looking at are your hospital beds full, or is this a "If we build it, they will come" mentality? Because there's a brand-new hospital on Van Ness where my husband is right now. There's a brand-new hospital down on Potrero. They've just redone the hospital -- the other one on Mission -- it's escaping me -- that's now Sutter.

(Simultaneous speakers; unintelligible)

LISA KESSLER: St. Luke's. You've got an entire campus, the entire pediatric department and a brand-new children's hospital at Mission Bay. I don't understand why you need a giant campus here. I want to know how you can justify to the City replacing forest land with tertiary care hospital beds.

UNIDENTIFIED SPEAKER: Yes. The city can't even get Van Ness Avenue fixed, let alone --

LISA KESSLER: I just want to know how many hospital beds we need on this tiny little strip of land, how many tertiary -- it's not even a trauma center. So you're not going to get trauma here. You can't. That goes to UCSF. You gave up your hospital at Mt. Zion because you couldn't fill it. Your cancer center's over there. You've got all your pediatrics down in Mission Bay as well as orthopedics. What do you need this giant building for? What are you trying to accomplish? Who's going to fill it except for workers and more traffic.

So I'd like to see a feasibility study on whether the city needs more tertiary care hospital beds and traffic. But you know, by all means, rebuild Moffitt. Rebuild Long. Have some -- some beds. But this is more about UCSF's ego than it seems to be about what the city needs.

UNIDENTIFIED SPEAKER: Thank you.

BILL DILLON: My name is Bill Dillon and I live on Edgewood Avenue, 240 Edgewood. And I'm also a faculty member here for the last 35 years. I trained here. My wife trained here. So I know kind of both sides of the coin.

Just to follow up on Lisa's point, this place is packed and full. Okay? There are not empty beds. Okay? And there are people waiting to come here, waiting very long times to come here. So it is a incredible resource. I'm not defending this. I'm just telling you that this is an unbelievable resource for our community and through Northern California and -- and beyond, number one.

I do think it's a bit ingenuous -- disingenuous to come to a meeting like this and not be more transparent with the plan that I know is moving ahead from my own discussions from within UCSF. And I think it's a -- very difficult for community members and people who will be impacted by this construction project not to have a little bit more of a transparent plan at this point.

Now, for the last year and a half, I lived with my wife on Fifth Avenue because we were renovating our house. So I lived both on the west side and I live on the east side of this campus. And I can tell you the project on Parnassus which is going right now was unbelievable for Fifth Avenue residents and, I felt, very, very bad for them. The -- the cars and the trucks start at 4:00 a.m.

UNIDENTIFIED SPEAKER: 3:00, 3:00 a.m.

BILL DILLON: At 3:00 a.m. At least I slept before.

(Simultaneous speakers; unintelligible)

UNIDENTIFIED SPEAKER: And it happens every -- almost every day.

BILL DILLON: Every day. And I even e-mailed Lily and I said, "You know, I'm only here for a year, but this is intolerable." And she put up a teeny little sign -- I think it was on cardboard or something -- saying "No construction trucks should come down Fifth Avenue." That never happens. Okay? It started at --

UNIDENTIFIED SPEAKER: 3:00, 4:00 a.m.

BILL DILLON: So just imagine for the next 30 years, an iterative process like this, the poor people who live on Fifth and on Sixth and Seventh Avenue, not to mention other interruption.

So I think there should be a study of the impact on traffic and noise and pollution.

UNIDENTIFIED SPEAKER: And sleep.

BILL DILLON: And sleep. Okay? That's fair enough -- and sleep because you can't sleep --

UNIDENTIFIED SPEAKER: Right.

BILL DILLON: -- when they -- when they're coming by. We were -- we had a big problem with that.

Furthermore, the housing that is planned for Fourth Avenue, it sounds like it's going to be quite -- quite tall. And for the people who live on Fifth Avenue, that's -- morning sun, that's all they get. Okay? And that would block sun at least for those people that live on Fifth Avenue. Most of the -- most of the -- that side of Fifth Avenue is owned by UCSF, but the other side would be affected as well.

So not only is it going to affect Edgewood Avenue in terms of light, today, I was walking -- I walk through the forest from -- from work. You all know that. I walk by your house every day. And I was looking at a beautiful sunset and the Pacific Ocean right in place where this hospital will be built. So I think some consideration has to be paid for not only the -- the views -- I know views aren't, you know, protected here in San Francisco. But it's a real big part of -- of the folks that live on Edgewood Avenue and travel up and down the forest. So thank you very much.

DIANE WONG: Okay. Any other speakers?

(No response)

DIANE WONG: Seeing none, then, we'll close this portion of the meeting.

So next steps are, again, we are looking for written comment as well. So if you'd like to send written comments to the EIR@planning.UCSF.edu then do so.

We are prepared to extend the comment period for the EIR scoping, so we will extend that for one week to February 21st instead of February 14th.

UNIDENTIFIED SPEAKER: Excuse me. Will you be releasing all of the other design work?

HILLARY GITELMAN: We're going to look at the new footprint.

UNIDENTIFIED SPEAKER: Well, not -- it's all the documents that the woman who's preparing EIR says she will be evaluating.

DIANE WONG: Right. If the plan is on launch --

UNIDENTIFIED SPEAKER: All the different parts? Does that mean -- there were several parts that she referred to having design work having been done on.

HILLARY GITELMAN: The design is in progress. There's --

LISA KESSLER: Can you put the new footprint of the proposed hospital online?

HILLARY GITELMAN: It's all being studied right now.

UNIDENTIFIED SPEAKER: That's not a good strategy. That is not a good strategy.

ALICE MURASAKI: So could we -- is the meeting over or just the discussion or are we --

LISA KESSLER: We're asking a request.

UNIDENTIFIED SPEAKER: I think -- I'm saying this as a request in the recorded meeting.

LISA KESSLER: Yes, we're requesting. In order to be able to do this, we need the new footprint, most recent.

ALICIA MURASAKI: So in the Draft EIR, all of the documents will be available.

LISA KESSLER: But we can't approve going forward to a Draft EIR and if --

(Simultaneous speakers; unintelligible)

ALICE MURASAKI: If you think -- excuse me. Excuse me, please. For those of you who need to leave, thank you for coming this evening. For -- if we can just give Diane 30 seconds of attention so she can finish the important information that we're trying to convey for all of us. And then if we need to have further conversation, we can do that. But could we please let Diane finish the information?

DIANE WONG: So just one last slide. Again, the initial study's available online, and you can give written feedback until February 21st on the EIR scoping. We expect to publish a Draft EIR and the information will be online.

Thank you for coming. And at the conclusion of this meeting, we can talk more about it if you have more requests. Thank you.

(Whereupon, the proceedings concluded at 8:28 p.m.)

STATE OF CALIFORNIA)
) ss.
COUNTY OF SAN FRANCISCO)

CERTIFICATE OF REPORTER

I, JANA OSATO, a duly authorized shorthand reporter, do hereby certify that on the date indicated herein the foregoing proceedings were reported stenographically by me and thereafter transcribed into typewriting by me, a disinterested person, and that this transcript is a true and correct record of said proceedings.

I further certify that I am not of counsel or attorney for either or any of the parties in the foregoing proceeding and caption named, nor in any way interested in the outcome of the cause named in said caption.

Dated the 24th day of February, 2020.

____
JANA OSATO

Appendix AIR
Air Quality Appendix

CalEEmod Outputs Construction

CalEEmod Outputs Existing Operation

CalEEmod Outputs Project Operation

UCSF – PCUP Emissions Future Phase

CalEEmod Outputs
Construction

UCSF Aldea Housing Initial Phase Construction

San Francisco County, Annual

1.0 Project Characteristics

1.1 Land Usage

Land Uses	Size	Metric	Lot Acreage	Floor Surface Area	Population
Apartments High Rise	184.00	Dwelling Unit	2.97	184,000.00	526

1.2 Other Project Characteristics

Urbanization	Urban	**Wind Speed (m/s)**	4.6	**Precipitation Freq (Days)**	64
Climate Zone	5			**Operational Year**	2031
Utility Company	City and County of San Francisco				
CO2 Intensity (lb/MWhr)	76.28	**CH4 Intensity (lb/MWhr)**	0.029	**N2O Intensity (lb/MWhr)**	0.006

1.3 User Entered Comments & Non-Default Data

Project Characteristics - Construction Only Run

Land Use -

Construction Phase -

Off-road Equipment -

Off-road Equipment - Default equipment hours scaled to match extended construction period.

Off-road Equipment - Default equipment hours scaled to match extended construction period

Off-road Equipment - Default equipment hours scaled to match extended construction period

Off-road Equipment - Default equipment hours scaled to match extended construction period.

Off-road Equipment - Default equipment hours scaled to match extended construction period

Trips and VMT -

Demolition -

Grading -

Vehicle Trips - Construction run only

Road Dust -

Woodstoves - Construction run only

Consumer Products - Construction run only

Area Coating - Construction run only

Landscape Equipment - Construction run only

Energy Use - Construction run only

Water And Wastewater - Construction run only

Solid Waste - Construction run only

Construction Off-road Equipment Mitigation - Tier 4 equipment as mitigation

Table Name	Column Name	Default Value	New Value
tblAreaCoating	ReapplicationRatePercent	10	0
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	1.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	1.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	1.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	1.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	2.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	1.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	2.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	1.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	1.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	2.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	2.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	1.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	8.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	3.00
tblConstEquipMitigation	Tier	No Change	Tier 4 Final

tblConstEquipMitigation	Tier	No Change	Tier 4 Final
tblConstEquipMitigation	Tier	No Change	Tier 4 Final
tblConstEquipMitigation	Tier	No Change	Tier 4 Final
tblConstEquipMitigation	Tier	No Change	Tier 4 Final
tblConstEquipMitigation	Tier	No Change	Tier 4 Final
tblConstEquipMitigation	Tier	No Change	Tier 4 Final
tblConstEquipMitigation	Tier	No Change	Tier 4 Final
tblConstEquipMitigation	Tier	No Change	Tier 4 Final
tblConstEquipMitigation	Tier	No Change	Tier 4 Final
tblConstEquipMitigation	Tier	No Change	Tier 4 Final
tblConstEquipMitigation	Tier	No Change	Tier 4 Final
tblConstEquipMitigation	Tier	No Change	Tier 4 Final
tblConstEquipMitigation	Tier	No Change	Tier 4 Final
tblConsumerProducts	ROG_EF	2.14E-05	0
tblEnergyUse	LightingElect	741.44	0.00
tblEnergyUse	NT24E	3,054.10	0.00
tblEnergyUse	NT24NG	2,615.00	0.00
tblEnergyUse	T24E	426.45	0.00
tblEnergyUse	T24NG	6,115.43	0.00
tblFireplaces	NumberGas	27.60	0.00
tblFireplaces	NumberWood	31.28	0.00
tblGrading	MaterialExported	0.00	2,500.00
tblGrading	MaterialExported	0.00	2,500.00
tblSolidWaste	SolidWasteGenerationRate	84.64	0.00
tblTripsAndVMT	HaulingTripNumber	313.00	312.00
tblVehicleTrips	ST_TR	4.98	0.00
tblVehicleTrips	SU_TR	3.65	0.00
tblVehicleTrips	WD_TR	4.20	0.00
tblWater	IndoorWaterUseRate	11,988,340.71	0.00
tblWater	OutdoorWaterUseRate	7,557,866.97	0.00

tblWoodstoves	NumberCatalytic	3.68	0.00
tblWoodstoves	NumberNoncatalytic	3.68	0.00

2.0 Emissions Summary

2.1 Overall Construction

Unmitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	tons/yr										MT/yr					
2028	0.3520	1.7937	2.0844	4.8500e-003	0.1719	0.0621	0.2340	0.0491	0.0591	0.1083	0.0000	430.0915	430.0915	0.0671	0.0000	431.7677
2029	1.1667	5.2600e-003	9.6200e-003	2.0000e-005	9.2000e-004	2.4000e-004	1.1600e-003	2.5000e-004	2.4000e-004	4.8000e-004	0.0000	1.7830	1.7830	7.0000e-005	0.0000	1.7848
Maximum	**1.1667**	**1.7937**	**2.0844**	**4.8500e-003**	**0.1719**	**0.0621**	**0.2340**	**0.0491**	**0.0591**	**0.1083**	**0.0000**	**430.0915**	**430.0915**	**0.0671**	**0.0000**	**431.7677**

Mitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	tons/yr										MT/yr					
2028	0.2068	0.6984	2.2185	4.8500e-003	0.1719	5.6200e-003	0.1775	0.0491	5.5500e-003	0.0547	0.0000	430.0912	430.0912	0.0671	0.0000	431.7674
2029	1.1661	6.9000e-004	9.7200e-003	2.0000e-005	9.2000e-004	2.0000e-005	9.5000e-004	2.5000e-004	2.0000e-005	2.7000e-004	0.0000	1.7830	1.7830	7.0000e-005	0.0000	1.7848
Maximum	**1.1661**	**0.6984**	**2.2185**	**4.8500e-003**	**0.1719**	**5.6200e-003**	**0.1775**	**0.0491**	**5.5500e-003**	**0.0547**	**0.0000**	**430.0912**	**430.0912**	**0.0671**	**0.0000**	**431.7674**

	ROG	**NOx**	**CO**	**SO2**	**Fugitive PM10**	**Exhaust PM10**	**PM10 Total**	**Fugitive PM2.5**	**Exhaust PM2.5**	**PM2.5 Total**	**Bio- CO2**	**NBio-CO2**	**Total CO2**	**CH4**	**N20**	**CO2e**

Percent Reduction	**9.60**	**61.14**	**-6.41**	**0.00**	**0.00**	**90.95**	**24.11**	**0.00**	**90.62**	**49.49**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**

Quarter	Start Date	End Date	Maximum Unmitigated ROG + NOX (tons/quarter)	Maximum Mitigated ROG + NOX (tons/quarter)
1	**1-3-2028**	**4-2-2028**	0.5474	0.2023
2	**4-3-2028**	**7-2-2028**	0.5041	0.2014
3	**7-3-2028**	**10-2-2028**	0.5097	0.2037
4	**10-3-2028**	**1-2-2029**	0.9129	0.6325
5	**1-3-2029**	**4-2-2029**	0.8372	0.8334
		Highest	0.9129	0.8334

2.2 Overall Operational

Unmitigated Operational

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Area	0.0408	0.0157	1.3626	7.0000e-005		7.5800e-003	7.5800e-003		7.5800e-003	7.5800e-003	0.0000	2.2317	2.2317	2.1300e-003	0.0000	2.2849
Energy	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Mobile	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Waste						0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Water						0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**0.0408**	**0.0157**	**1.3626**	**7.0000e-005**	**0.0000**	**7.5800e-003**	**7.5800e-003**	**0.0000**	**7.5800e-003**	**7.5800e-003**	**0.0000**	**2.2317**	**2.2317**	**2.1300e-003**	**0.0000**	**2.2849**

Mitigated Operational

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e

Category	tons/yr										MT/yr					
Area	0.0408	0.0157	1.3626	7.0000e-005		7.5800e-003	7.5800e-003		7.5800e-003	7.5800e-003	0.0000	2.2317	2.2317	2.1300e-003	0.0000	2.2849
Energy	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Mobile	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Waste						0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Water						0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**0.0408**	**0.0157**	**1.3626**	**7.0000e-005**	**0.0000**	**7.5800e-003**	**7.5800e-003**	**0.0000**	**7.5800e-003**	**7.5800e-003**	**0.0000**	**2.2317**	**2.2317**	**2.1300e-003**	**0.0000**	**2.2849**

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N20	CO2e
Percent Reduction	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**

3.0 Construction Detail

Construction Phase

Phase Number	Phase Name	Phase Type	Start Date	End Date	Num Days Week	Num Days	Phase Description
1	Demolition	Demolition	1/3/2028	1/28/2028	5	20	
2	Site Preparation	Site Preparation	1/29/2028	2/2/2028	5	3	
3	Grading	Grading	2/3/2028	2/10/2028	5	6	
4	Building Construction	Building Construction	2/11/2028	12/14/2028	5	220	
5	Paving	Paving	12/15/2028	12/28/2028	5	10	
6	Architectural Coating	Architectural Coating	12/29/2028	1/11/2029	5	10	

Acres of Grading (Site Preparation Phase): 4.5

Acres of Grading (Grading Phase): 3

Acres of Paving: 0

Residential Indoor: 372,600; Residential Outdoor: 124,200; Non-Residential Indoor: 0; Non-Residential Outdoor: 0; Striped Parking Area:

OffRoad Equipment

Phase Name	Offroad Equipment Type	Amount	Usage Hours	Horse Power	Load Factor
Demolition	Concrete/Industrial Saws	1	8.00	81	0.73
Demolition	Rubber Tired Dozers	1	8.00	247	0.40
Demolition	Tractors/Loaders/Backhoes	3	8.00	97	0.37
Site Preparation		0		0	
Site Preparation	Graders	1	8.00	187	0.41
Site Preparation	Scrapers	1	8.00	367	0.48
Site Preparation	Tractors/Loaders/Backhoes	1	7.00	97	0.37
Grading	Graders	1	8.00	187	0.41
Grading	Rubber Tired Dozers	1	8.00	247	0.40
Grading	Tractors/Loaders/Backhoes	2	7.00	97	0.37
Building Construction	Cranes	1	8.00	231	0.29
Building Construction	Forklifts	2	7.00	89	0.20
Building Construction	Generator Sets	1	8.00	84	0.74
Building Construction	Tractors/Loaders/Backhoes	1	6.00	97	0.37
Building Construction	Welders	3	8.00	46	0.45
Paving	Cement and Mortar Mixers	1	8.00	9	0.56
Paving	Pavers	1	8.00	130	0.42
Paving	Paving Equipment	1	8.00	132	0.36
Paving	Rollers	2	8.00	80	0.38
Paving	Tractors/Loaders/Backhoes	1	8.00	97	0.37
Architectural Coating	Air Compressors	1	6.00	78	0.48

Trips and VMT

Phase Name	Offroad Equipment Count	Worker Trip Number	Vendor Trip Number	Hauling Trip Number	Worker Trip Length	Vendor Trip Length	Hauling Trip Length	Worker Vehicle Class	Vendor Vehicle Class	Hauling Vehicle Class
Demolition	5	13.00	0.00	108.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT
Site Preparation	3	8.00	0.00	247.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT
Grading	4	10.00	0.00	312.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT

Building Construction	8	132.00	20.00	0.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT
Paving	6	15.00	0.00	0.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT
Architectural Coating	1	26.00	0.00	0.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT

3.1 Mitigation Measures Construction

Use Cleaner Engines for Construction Equipment

3.2 Demolition - 2028

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					0.0127	0.0000	0.0127	1.9200e-003	0.0000	1.9200e-003	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.0134	0.1291	0.1333	2.4000e-004		5.4500e-003	5.4500e-003		5.0900e-003	5.0900e-003	0.0000	21.0992	21.0992	5.3200e-003	0.0000	21.2323
Total	**0.0134**	**0.1291**	**0.1333**	**2.4000e-004**	**0.0127**	**5.4500e-003**	**0.0182**	**1.9200e-003**	**5.0900e-003**	**7.0100e-003**	**0.0000**	**21.0992**	**21.0992**	**5.3200e-003**	**0.0000**	**21.2323**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	2.7000e-004	9.7900e-003	6.7200e-003	4.0000e-005	9.1000e-004	2.0000e-005	9.3000e-004	2.5000e-004	2.0000e-005	2.7000e-004	0.0000	4.2430	4.2430	9.2000e-004	0.0000	4.2660
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	2.6000e-004	1.3000e-004	1.7300e-003	1.0000e-005	1.0300e-003	1.0000e-005	1.0300e-003	2.7000e-004	1.0000e-005	2.8000e-004	0.0000	0.7243	0.7243	1.0000e-005	0.0000	0.7245

Total	**5.3000e-004**	**9.9200e-003**	**8.4500e-003**	**5.0000e-005**	**1.9400e-003**	**3.0000e-005**	**1.9600e-003**	**5.2000e-004**	**3.0000e-005**	**5.5000e-004**	**0.0000**	**4.9673**	**4.9673**	**9.3000e-004**	**0.0000**	**4.9906**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					0.0127	0.0000	0.0127	1.9200e-003	0.0000	1.9200e-003	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	2.8100e-003	0.0122	0.1472	2.4000e-004		3.7000e-004	3.7000e-004		3.7000e-004	3.7000e-004	0.0000	21.0992	21.0992	5.3200e-003	0.0000	21.2323
Total	**2.8100e-003**	**0.0122**	**0.1472**	**2.4000e-004**	**0.0127**	**3.7000e-004**	**0.0131**	**1.9200e-003**	**3.7000e-004**	**2.2900e-003**	**0.0000**	**21.0992**	**21.0992**	**5.3200e-003**	**0.0000**	**21.2323**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	2.7000e-004	9.7900e-003	6.7200e-003	4.0000e-005	9.1000e-004	2.0000e-005	9.3000e-004	2.5000e-004	2.0000e-005	2.7000e-004	0.0000	4.2430	4.2430	9.2000e-004	0.0000	4.2660
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	2.6000e-004	1.3000e-004	1.7300e-003	1.0000e-005	1.0300e-003	1.0000e-005	1.0300e-003	2.7000e-004	1.0000e-005	2.8000e-004	0.0000	0.7243	0.7243	1.0000e-005	0.0000	0.7245
Total	**5.3000e-004**	**9.9200e-003**	**8.4500e-003**	**5.0000e-005**	**1.9400e-003**	**3.0000e-005**	**1.9600e-003**	**5.2000e-004**	**3.0000e-005**	**5.5000e-004**	**0.0000**	**4.9673**	**4.9673**	**9.3000e-004**	**0.0000**	**4.9906**

3.3 Site Preparation - 2028

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					2.3900e-003	0.0000	2.3900e-003	2.6000e-004	0.0000	2.6000e-004	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	1.6500e-003	0.0165	0.0134	4.0000e-005		6.1000e-004	6.1000e-004		5.6000e-004	5.6000e-004	0.0000	3.2287	3.2287	1.0400e-003	0.0000	3.2548
Total	**1.6500e-003**	**0.0165**	**0.0134**	**4.0000e-005**	**2.3900e-003**	**6.1000e-004**	**3.0000e-003**	**2.6000e-004**	**5.6000e-004**	**8.2000e-004**	**0.0000**	**3.2287**	**3.2287**	**1.0400e-003**	**0.0000**	**3.2548**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	6.3000e-004	0.0224	0.0154	9.0000e-005	2.0700e-003	4.0000e-005	2.1200e-003	5.7000e-004	4.0000e-005	6.1000e-004	0.0000	9.7040	9.7040	2.1000e-003	0.0000	9.7566
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	2.0000e-005	1.0000e-005	1.6000e-004	0.0000	9.0000e-005	0.0000	1.0000e-004	3.0000e-005	0.0000	3.0000e-005	0.0000	0.0669	0.0669	0.0000	0.0000	0.0669
Total	**6.5000e-004**	**0.0224**	**0.0155**	**9.0000e-005**	**2.1600e-003**	**4.0000e-005**	**2.2200e-003**	**6.0000e-004**	**4.0000e-005**	**6.4000e-004**	**0.0000**	**9.7708**	**9.7708**	**2.1000e-003**	**0.0000**	**9.8234**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					

Fugitive Dust					2.3900e-003	0.0000	2.3900e-003	2.6000e-004	0.0000	2.6000e-004	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	4.5000e-004	1.9600e-003	0.0178	4.0000e-005		6.0000e-005	6.0000e-005		6.0000e-005	6.0000e-005	0.0000	3.2287	3.2287	1.0400e-003	0.0000	3.2548
Total	**4.5000e-004**	**1.9600e-003**	**0.0178**	**4.0000e-005**	**2.3900e-003**	**6.0000e-005**	**2.4500e-003**	**2.6000e-004**	**6.0000e-005**	**3.2000e-004**	**0.0000**	**3.2287**	**3.2287**	**1.0400e-003**	**0.0000**	**3.2548**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	6.3000e-004	0.0224	0.0154	9.0000e-005	2.0700e-003	4.0000e-005	2.1200e-003	5.7000e-004	4.0000e-005	6.1000e-004	0.0000	9.7040	9.7040	2.1000e-003	0.0000	9.7566
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	2.0000e-005	1.0000e-005	1.6000e-004	0.0000	9.0000e-005	0.0000	1.0000e-004	3.0000e-005	0.0000	3.0000e-005	0.0000	0.0669	0.0669	0.0000	0.0000	0.0669
Total	**6.5000e-004**	**0.0224**	**0.0155**	**9.0000e-005**	**2.1600e-003**	**4.0000e-005**	**2.2200e-003**	**6.0000e-004**	**4.0000e-005**	**6.4000e-004**	**0.0000**	**9.7708**	**9.7708**	**2.1000e-003**	**0.0000**	**9.8234**

3.4 Grading - 2028

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					0.0200	0.0000	0.0200	0.0102	0.0000	0.0102	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	3.5700e-003	0.0373	0.0255	6.0000e-005		1.4900e-003	1.4900e-003		1.3700e-003	1.3700e-003	0.0000	5.4317	5.4317	1.7600e-003	0.0000	5.4756
Total	**3.5700e-003**	**0.0373**	**0.0255**	**6.0000e-005**	**0.0200**	**1.4900e-003**	**0.0215**	**0.0102**	**1.3700e-003**	**0.0115**	**0.0000**	**5.4317**	**5.4317**	**1.7600e-003**	**0.0000**	**5.4756**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	7.9000e-004	0.0283	0.0194	1.1000e-004	2.6200e-003	6.0000e-005	2.6700e-003	7.2000e-004	5.0000e-005	7.7000e-004	0.0000	12.2577	12.2577	2.6600e-003	0.0000	12.3241
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	6.0000e-005	3.0000e-005	4.0000e-004	0.0000	2.4000e-004	0.0000	2.4000e-004	6.0000e-005	0.0000	6.0000e-005	0.0000	0.1671	0.1671	0.0000	0.0000	0.1672
Total	**8.5000e-004**	**0.0283**	**0.0198**	**1.1000e-004**	**2.8600e-003**	**6.0000e-005**	**2.9100e-003**	**7.8000e-004**	**5.0000e-005**	**8.3000e-004**	**0.0000**	**12.4248**	**12.4248**	**2.6600e-003**	**0.0000**	**12.4913**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					0.0200	0.0000	0.0200	0.0102	0.0000	0.0102	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	7.6000e-004	3.2800e-003	0.0327	6.0000e-005		1.0000e-004	1.0000e-004		1.0000e-004	1.0000e-004	0.0000	5.4317	5.4317	1.7600e-003	0.0000	5.4756
Total	**7.6000e-004**	**3.2800e-003**	**0.0327**	**6.0000e-005**	**0.0200**	**1.0000e-004**	**0.0201**	**0.0102**	**1.0000e-004**	**0.0103**	**0.0000**	**5.4317**	**5.4317**	**1.7600e-003**	**0.0000**	**5.4756**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e

Category	tons/yr										MT/yr					
Hauling	7.9000e-004	0.0283	0.0194	1.1000e-004	2.6200e-003	6.0000e-005	2.6700e-003	7.2000e-004	5.0000e-005	7.7000e-004	0.0000	12.2577	12.2577	2.6600e-003	0.0000	12.3241
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	6.0000e-005	3.0000e-005	4.0000e-004	0.0000	2.4000e-004	0.0000	2.4000e-004	6.0000e-005	0.0000	6.0000e-005	0.0000	0.1671	0.1671	0.0000	0.0000	0.1672
Total	**8.5000e-004**	**0.0283**	**0.0198**	**1.1000e-004**	**2.8600e-003**	**6.0000e-005**	**2.9100e-003**	**7.8000e-004**	**5.0000e-005**	**8.3000e-004**	**0.0000**	**12.4248**	**12.4248**	**2.6600e-003**	**0.0000**	**12.4913**

3.5 Building Construction - 2028

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.1639	1.3226	1.5408	2.7500e-003		0.0517	0.0517		0.0495	0.0495	0.0000	228.5088	228.5088	0.0419	0.0000	229.5565
Total	**0.1639**	**1.3226**	**1.5408**	**2.7500e-003**		**0.0517**	**0.0517**		**0.0495**	**0.0495**	**0.0000**	**228.5088**	**228.5088**	**0.0419**	**0.0000**	**229.5565**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	4.3100e-003	0.1756	0.0741	5.3000e-004	0.0144	2.3000e-004	0.0146	4.1600e-003	2.2000e-004	4.3800e-003	0.0000	55.3913	55.3913	7.7100e-003	0.0000	55.5841
Worker	0.0294	0.0143	0.1931	8.9000e-004	0.1147	7.1000e-004	0.1154	0.0305	6.5000e-004	0.0312	0.0000	80.8944	80.8944	1.1500e-003	0.0000	80.9230

Total	**0.0337**	**0.1899**	**0.2672**	**1.4200e-003**	**0.1291**	**9.4000e-004**	**0.1301**	**0.0347**	**8.7000e-004**	**0.0356**	**0.0000**	**136.2857**	**136.2857**	**8.8600e-003**	**0.0000**	**136.5071**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.0363	0.4258	1.6429	2.7500e-003		3.8700e-003	3.8700e-003		3.8700e-003	3.8700e-003	0.0000	228.5086	228.5086	0.0419	0.0000	229.5563
Total	**0.0363**	**0.4258**	**1.6429**	**2.7500e-003**		**3.8700e-003**	**3.8700e-003**		**3.8700e-003**	**3.8700e-003**	**0.0000**	**228.5086**	**228.5086**	**0.0419**	**0.0000**	**229.5563**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	4.3100e-003	0.1756	0.0741	5.3000e-004	0.0144	2.3000e-004	0.0146	4.1600e-003	2.2000e-004	4.3800e-003	0.0000	55.3913	55.3913	7.7100e-003	0.0000	55.5841
Worker	0.0294	0.0143	0.1931	8.9000e-004	0.1147	7.1000e-004	0.1154	0.0305	6.5000e-004	0.0312	0.0000	80.8944	80.8944	1.1500e-003	0.0000	80.9230
Total	**0.0337**	**0.1899**	**0.2672**	**1.4200e-003**	**0.1291**	**9.4000e-004**	**0.1301**	**0.0347**	**8.7000e-004**	**0.0356**	**0.0000**	**136.2857**	**136.2857**	**8.8600e-003**	**0.0000**	**136.5071**

3.6 Paving - 2028

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	3.9300e-003	0.0372	0.0584	9.0000e-005		1.7500e-003	1.7500e-003		1.6200e-003	1.6200e-003	0.0000	7.7565	7.7565	2.4600e-003	0.0000	7.8179
Paving	0.0000					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**3.9300e-003**	**0.0372**	**0.0584**	**9.0000e-005**		**1.7500e-003**	**1.7500e-003**		**1.6200e-003**	**1.6200e-003**	**0.0000**	**7.7565**	**7.7565**	**2.4600e-003**	**0.0000**	**7.8179**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	1.5000e-004	7.0000e-005	1.0000e-003	0.0000	5.9000e-004	0.0000	6.0000e-004	1.6000e-004	0.0000	1.6000e-004	0.0000	0.4178	0.4178	1.0000e-005	0.0000	0.4180
Total	**1.5000e-004**	**7.0000e-005**	**1.0000e-003**	**0.0000**	**5.9000e-004**	**0.0000**	**6.0000e-004**	**1.6000e-004**	**0.0000**	**1.6000e-004**	**0.0000**	**0.4178**	**0.4178**	**1.0000e-005**	**0.0000**	**0.4180**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Off-Road	1.0500e-003	4.5600e-003	0.0649	9.0000e-005		1.4000e-004	1.4000e-004		1.4000e-004	1.4000e-004	0.0000	7.7565	7.7565	2.4600e-003	0.0000	7.8179
Paving	0.0000					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**1.0500e-003**	**4.5600e-003**	**0.0649**	**9.0000e-005**		**1.4000e-004**	**1.4000e-004**		**1.4000e-004**	**1.4000e-004**	**0.0000**	**7.7565**	**7.7565**	**2.4600e-003**	**0.0000**	**7.8179**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	1.5000e-004	7.0000e-005	1.0000e-003	0.0000	5.9000e-004	0.0000	6.0000e-004	1.6000e-004	0.0000	1.6000e-004	0.0000	0.4178	0.4178	1.0000e-005	0.0000	0.4180
Total	**1.5000e-004**	**7.0000e-005**	**1.0000e-003**	**0.0000**	**5.9000e-004**	**0.0000**	**6.0000e-004**	**1.6000e-004**	**0.0000**	**1.6000e-004**	**0.0000**	**0.4178**	**0.4178**	**1.0000e-005**	**0.0000**	**0.4180**

3.7 Architectural Coating - 2028

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Archit. Coating	0.1295					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	9.0000e-005	5.7000e-004	9.0000e-004	0.0000		3.0000e-005	3.0000e-005		3.0000e-005	3.0000e-005	0.0000	0.1277	0.1277	1.0000e-005	0.0000	0.1278
Total	**0.1296**	**5.7000e-004**	**9.0000e-004**	**0.0000**		**3.0000e-005**	**3.0000e-005**		**3.0000e-005**	**3.0000e-005**	**0.0000**	**0.1277**	**0.1277**	**1.0000e-005**	**0.0000**	**0.1278**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	3.0000e-005	1.0000e-005	1.7000e-004	0.0000	1.0000e-004	0.0000	1.0000e-004	3.0000e-005	0.0000	3.0000e-005	0.0000	0.0724	0.0724	0.0000	0.0000	0.0725
Total	**3.0000e-005**	**1.0000e-005**	**1.7000e-004**	**0.0000**	**1.0000e-004**	**0.0000**	**1.0000e-004**	**3.0000e-005**	**0.0000**	**3.0000e-005**	**0.0000**	**0.0724**	**0.0724**	**0.0000**	**0.0000**	**0.0725**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Archit. Coating	0.1295					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	1.0000e-005	6.0000e-005	9.2000e-004	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.1277	0.1277	1.0000e-005	0.0000	0.1278
Total	**0.1295**	**6.0000e-005**	**9.2000e-004**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**	**0.0000**	**0.1277**	**0.1277**	**1.0000e-005**	**0.0000**	**0.1278**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e

Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	3.0000e-005	1.0000e-005	1.7000e-004	0.0000	1.0000e-004	0.0000	1.0000e-004	3.0000e-005	0.0000	3.0000e-005	0.0000	0.0724	0.0724	0.0000	0.0000	0.0725
Total	**3.0000e-005**	**1.0000e-005**	**1.7000e-004**	**0.0000**	**1.0000e-004**	**0.0000**	**1.0000e-004**	**3.0000e-005**	**0.0000**	**3.0000e-005**	**0.0000**	**0.0724**	**0.0724**	**0.0000**	**0.0000**	**0.0725**

3.7 Architectural Coating - 2029

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Archit. Coating	1.1657					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	7.7000e-004	5.1500e-003	8.1400e-003	1.0000e-005		2.3000e-004	2.3000e-004		2.3000e-004	2.3000e-004	0.0000	1.1490	1.1490	6.0000e-005	0.0000	1.1505
Total	**1.1665**	**5.1500e-003**	**8.1400e-003**	**1.0000e-005**		**2.3000e-004**	**2.3000e-004**		**2.3000e-004**	**2.3000e-004**	**0.0000**	**1.1490**	**1.1490**	**6.0000e-005**	**0.0000**	**1.1505**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	2.3000e-004	1.1000e-004	1.4800e-003	1.0000e-005	9.2000e-004	1.0000e-005	9.3000e-004	2.5000e-004	0.0000	2.5000e-004	0.0000	0.6341	0.6341	1.0000e-005	0.0000	0.6343

Total	2.3000e-004	1.1000e-004	1.4800e-003	1.0000e-005	9.2000e-004	1.0000e-005	9.3000e-004	2.5000e-004	0.0000	2.5000e-004	0.0000	0.6341	0.6341	1.0000e-005	0.0000	0.6343

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Archit. Coating	1.1657					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	1.3000e-004	5.8000e-004	8.2500e-003	1.0000e-005		2.0000e-005	2.0000e-005		2.0000e-005	2.0000e-005	0.0000	1.1490	1.1490	6.0000e-005	0.0000	1.1505
Total	**1.1659**	**5.8000e-004**	**8.2500e-003**	**1.0000e-005**		**2.0000e-005**	**2.0000e-005**		**2.0000e-005**	**2.0000e-005**	**0.0000**	**1.1490**	**1.1490**	**6.0000e-005**	**0.0000**	**1.1505**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	2.3000e-004	1.1000e-004	1.4800e-003	1.0000e-005	9.2000e-004	1.0000e-005	9.3000e-004	2.5000e-004	0.0000	2.5000e-004	0.0000	0.6341	0.6341	1.0000e-005	0.0000	0.6343
Total	**2.3000e-004**	**1.1000e-004**	**1.4800e-003**	**1.0000e-005**	**9.2000e-004**	**1.0000e-005**	**9.3000e-004**	**2.5000e-004**	**0.0000**	**2.5000e-004**	**0.0000**	**0.6341**	**0.6341**	**1.0000e-005**	**0.0000**	**0.6343**

4.0 Operational Detail - Mobile

4.1 Mitigation Measures Mobile

Category	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
	tons/yr										MT/yr					
Mitigated	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Unmitigated	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

4.2 Trip Summary Information

	Average Daily Trip Rate			Unmitigated	Mitigated
Land Use	Weekday	Saturday	Sunday	Annual VMT	Annual VMT
Apartments High Rise	0.00	0.00	0.00		
Total	0.00	0.00	0.00		

4.3 Trip Type Information

	Miles			Trip %			Trip Purpose %		
Land Use	H-W or C-W	H-S or C-C	H-O or C-NW	H-W or C-W	H-S or C-C	H-O or C-NW	Primary	Diverted	Pass-by
Apartments High Rise	10.80	4.80	5.70	31.00	15.00	54.00	86	11	3

4.4 Fleet Mix

Land Use	LDA	LDT1	LDT2	MDV	LHD1	LHD2	MHD	HHD	OBUS	UBUS	MCY	SBUS	MH
Apartments High Rise	0.601973	0.036168	0.193150	0.092307	0.012222	0.005292	0.035273	0.009746	0.004298	0.002300	0.005708	0.000958	0.000606

5.0 Energy Detail

Historical Energy Use: N

5.1 Mitigation Measures Energy

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Electricity Mitigated						0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Electricity Unmitigated						0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
NaturalGas Mitigated	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
NaturalGas Unmitigated	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

5.2 Energy by Land Use - NaturalGas

Unmitigated

	NaturalGas Use	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Land Use	kBTU/yr	tons/yr										MT/yr					
Apartments High Rise	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total		**0.0000**	**0.0000**	**0.0000**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**

Mitigated

	NaturalGas Use	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Land Use	kBTU/yr	tons/yr										MT/yr					
Apartments High Rise	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total		**0.0000**	**0.0000**	**0.0000**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**

5.3 Energy by Land Use - Electricity

Unmitigated

	Electricity Use	Total CO2	CH4	N2O	CO2e
Land Use	kWh/yr	MT/yr			
Apartments High Rise	0	0.0000	0.0000	0.0000	0.0000
Total		**0.0000**	**0.0000**	**0.0000**	**0.0000**

Mitigated

	Electricity Use	Total CO2	CH4	N2O	CO2e
Land Use	kWh/yr	MT/yr			
Apartments High Rise	0	0.0000	0.0000	0.0000	0.0000
Total		**0.0000**	**0.0000**	**0.0000**	**0.0000**

6.0 Area Detail

6.1 Mitigation Measures Area

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Mitigated	0.0408	0.0157	1.3626	7.0000e-005		7.5800e-003	7.5800e-003		7.5800e-003	7.5800e-003	0.0000	2.2317	2.2317	2.1300e-003	0.0000	2.2849
Unmitigated	0.0408	0.0157	1.3626	7.0000e-005		7.5800e-003	7.5800e-003		7.5800e-003	7.5800e-003	0.0000	2.2317	2.2317	2.1300e-003	0.0000	2.2849

6.2 Area by SubCategory

Unmitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
SubCategory	tons/yr										MT/yr					
Architectural Coating	0.0000					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Consumer Products	0.0000					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Hearth	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Landscaping	0.0408	0.0157	1.3626	7.0000e-005		7.5800e-003	7.5800e-003		7.5800e-003	7.5800e-003	0.0000	2.2317	2.2317	2.1300e-003	0.0000	2.2849

Total	**0.0408**	**0.0157**	**1.3626**	**7.0000e-005**		**7.5800e-003**	**7.5800e-003**		**7.5800e-003**	**7.5800e-003**	**0.0000**	**2.2317**	**2.2317**	**2.1300e-003**	**0.0000**	**2.2849**

Mitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
SubCategory	tons/yr										MT/yr					
Architectural Coating	0.0000					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Consumer Products	0.0000					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Hearth	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Landscaping	0.0408	0.0157	1.3626	7.0000e-005		7.5800e-003	7.5800e-003		7.5800e-003	7.5800e-003	0.0000	2.2317	2.2317	2.1300e-003	0.0000	2.2849
Total	**0.0408**	**0.0157**	**1.3626**	**7.0000e-005**		**7.5800e-003**	**7.5800e-003**		**7.5800e-003**	**7.5800e-003**	**0.0000**	**2.2317**	**2.2317**	**2.1300e-003**	**0.0000**	**2.2849**

7.0 Water Detail

7.1 Mitigation Measures Water

	Total CO2	CH4	N2O	CO2e
Category	MT/yr			
Mitigated	0.0000	0.0000	0.0000	0.0000
Unmitigated	0.0000	0.0000	0.0000	0.0000

7.2 Water by Land Use

Unmitigated

	Indoor/Outdoor Use	Total CO2	CH4	N2O	CO2e
Land Use	Mgal	MT/yr			
Apartments High Rise	0 / 0	0.0000	0.0000	0.0000	0.0000
Total		**0.0000**	**0.0000**	**0.0000**	**0.0000**

Mitigated

	Indoor/Outdoor Use	Total CO2	CH4	N2O	CO2e
Land Use	Mgal	MT/yr			
Apartments High Rise	0 / 0	0.0000	0.0000	0.0000	0.0000
Total		**0.0000**	**0.0000**	**0.0000**	**0.0000**

8.0 Waste Detail

8.1 Mitigation Measures Waste

Category/Year

	Total CO2	CH4	N2O	CO2e
	MT/yr			
Mitigated	0.0000	0.0000	0.0000	0.0000
Unmitigated	0.0000	0.0000	0.0000	0.0000

8.2 Waste by Land Use

Unmitigated

	Waste Disposed	Total CO2	CH4	N2O	CO2e
Land Use	tons	MT/yr			
Apartments High Rise	0	0.0000	0.0000	0.0000	0.0000
Total		**0.0000**	**0.0000**	**0.0000**	**0.0000**

Mitigated

	Waste Disposed	Total CO2	CH4	N2O	CO2e
Land Use	tons	MT/yr			
Apartments High Rise	0	0.0000	0.0000	0.0000	0.0000

Total		0.0000	0.0000	0.0000	0.0000

9.0 Operational Offroad

Equipment Type	Number	Hours/Day	Days/Year	Horse Power	Load Factor	Fuel Type

10.0 Stationary Equipment

Fire Pumps and Emergency Generators

Equipment Type	Number	Hours/Day	Hours/Year	Horse Power	Load Factor	Fuel Type

Boilers

Equipment Type	Number	Heat Input/Day	Heat Input/Year	Boiler Rating	Fuel Type

User Defined Equipment

Equipment Type	Number

11.0 Vegetation

New Hospital Construction

San Francisco County, Annual

1.0 Project Characteristics

1.1 Land Usage

Land Uses	Size	Metric	Lot Acreage	Floor Surface Area	Population
Hospital	955.00	1000sqft	2.00	955,000.00	0

1.2 Other Project Characteristics

Urbanization	Urban	**Wind Speed (m/s)**	4.6	**Precipitation Freq (Days)**	64
Climate Zone	5			**Operational Year**	2031
Utility Company	City and County of San Francisco				
CO2 Intensity (lb/MWhr)	76.28	**CH4 Intensity (lb/MWhr)**	0.029	**N2O Intensity (lb/MWhr)**	0.006

1.3 User Entered Comments & Non-Default Data

Project Characteristics - UCSF is its own electricity provider

Land Use - Acreage per applicants RFI response.

Construction Phase - Construction Schedule per applicants RFI response. LPPI Demo in 2014 LRDP

Off-road Equipment - For trenching equipment use URBEMS default as CalEEMod has no assumption.

Trips and VMT -

Grading - Project site is two acres

Vehicle Trips - Construction Run Only

Consumer Products - Construction Run Only

Area Coating - Construction Run Only

Landscape Equipment - Construction Run Only

Energy Use - Construction Run Only

Water And Wastewater - Construction Run Only

Solid Waste - Construction Run Only

Construction Off-road Equipment Mitigation - Tier 4 equipment as mitigation

Table Name	Column Name	Default Value	New Value
tblAreaCoating	ReapplicationRatePercent	10	0
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	1.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	2.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	2.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	4.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	2.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	2.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	1.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	2.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	1.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	9.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	6.00
tblConstEquipMitigation	Tier	No Change	Tier 4 Final
tblConstEquipMitigation	Tier	No Change	Tier 4 Final
tblConstEquipMitigation	Tier	No Change	Tier 4 Final
tblConstEquipMitigation	Tier	No Change	Tier 4 Final
tblConstEquipMitigation	Tier	No Change	Tier 4 Final
tblConstEquipMitigation	Tier	No Change	Tier 4 Final
tblConstEquipMitigation	Tier	No Change	Tier 4 Final
tblConstEquipMitigation	Tier	No Change	Tier 4 Final
tblConstEquipMitigation	Tier	No Change	Tier 4 Final
tblConstEquipMitigation	Tier	No Change	Tier 4 Final
tblConstEquipMitigation	Tier	No Change	Tier 4 Final
tblConstructionPhase	NumDays	10.00	521.00

tblConstructionPhase	NumDays	200.00	522.00
tblConstructionPhase	NumDays	200.00	1,043.00
tblConstructionPhase	NumDays	4.00	152.00
tblConstructionPhase	NumDays	2.00	152.00
tblConsumerProducts	ROG_EF	2.14E-05	0
tblEnergyUse	LightingElect	4.23	0.00
tblEnergyUse	NT24E	5.52	0.00
tblEnergyUse	NT24NG	15.80	0.00
tblEnergyUse	T24E	6.47	0.00
tblEnergyUse	T24NG	84.89	0.00
tblGrading	AcresOfGrading	76.00	2.00
tblGrading	AcresOfGrading	228.00	3.00
tblGrading	MaterialExported	0.00	170,385.00
tblLandUse	LotAcreage	21.92	2.00
tblSolidWaste	SolidWasteGenerationRate	10,314.00	0.00
tblVehicleTrips	ST_TR	10.18	0.00
tblVehicleTrips	SU_TR	8.91	0.00
tblVehicleTrips	WD_TR	13.22	0.00
tblWater	IndoorWaterUseRate	119,833,913.37	0.00
tblWater	OutdoorWaterUseRate	22,825,507.31	0.00

2.0 Emissions Summary

2.1 Overall Construction

Unmitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	tons/yr										MT/yr					

2024	0.2932	4.2909	3.1774	0.0111	0.6185	0.1064	0.7249	0.2951	0.0981	0.3932	0.0000	1,114.1701	1,114.17	0.2699	0.0000	1,120.92
2025	0.3301	3.3730	3.1337	0.0111	0.4495	0.0660	0.5155	0.1227	0.0631	0.1858	0.0000	1,046.5361	1,046.54	0.1253	0.0000	1,049.6677
2026	0.6503	6.6532	6.2030	0.0218	0.8989	0.1317	1.0307	0.2453	0.1259	0.3712	0.0000	2,065.5642	2,065.56	0.2500	0.0000	2,071.8144
2027	0.3203	3.2825	3.0733	0.0107	0.4495	0.0657	0.5151	0.1227	0.0628	0.1854	0.0000	1,020.3680	1,020.37	0.1248	0.0000	1,023.4883
2028	2.8376	3.3881	3.3782	0.0115	0.5104	0.0722	0.5827	0.1389	0.0693	0.2082	0.0000	1,082.9324	1,082.93	0.1266	0.0000	1,086.0979
2029	2.8428	3.3630	3.3622	0.0114	0.5124	0.0723	0.5846	0.1394	0.0694	0.2088	0.0000	1,076.0456	1,076.05	0.1270	0.0000	1,079.2207
Maximum	**2.8428**	**6.6532**	**6.2030**	**0.0218**	**0.8989**	**0.1317**	**1.0307**	**0.2951**	**0.1259**	**0.3932**	**0.0000**	**2,065.5642**	**2,065.5642**	**0.2699**	**0.0000**	**2,071.8144**

Mitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	tons/yr										MT/yr					
2024	0.0477	1.3746	3.6963	0.0111	0.6185	-0.0205	0.5980	0.2951	-0.0179	0.2772	0.0000	1,114.1696	1,114.1696	0.2699	0.0000	1,120.9175
2025	0.1741	2.2518	3.2603	0.0111	0.4495	6.9000e-003	0.4564	0.1227	6.8200e-003	0.1295	0.0000	1,046.5358	1,046.5358	0.1253	0.0000	1,049.6674
2026	0.3383	4.4107	6.4563	0.0218	0.8989	0.0135	0.9124	0.2453	0.0133	0.2586	0.0000	2,065.5635	2,065.5635	0.2500	0.0000	2,071.8137
2027	0.1643	2.1613	3.1999	0.0107	0.4495	6.5200e-003	0.4560	0.1227	6.4600e-003	0.1291	0.0000	1,020.3677	1,020.3677	0.1248	0.0000	1,023.4880
2028	2.6639	2.1390	3.5074	0.0115	0.5104	7.1500e-003	0.5176	0.1389	7.0800e-003	0.1459	0.0000	1,082.9320	1,082.9320	0.1266	0.0000	1,086.0976
2029	2.6684	2.1091	3.4919	0.0114	0.5124	6.9200e-003	0.5193	0.1394	6.8700e-003	0.1463	0.0000	1,076.0452	1,076.0452	0.1270	0.0000	1,079.2203
Maximum	**2.6684**	**4.4107**	**6.4563**	**0.0218**	**0.8989**	**0.0135**	**0.9124**	**0.2951**	**0.0133**	**0.2772**	**0.0000**	**2,065.5635**	**2,065.5635**	**0.2699**	**0.0000**	**2,071.8137**

	ROG	**NOx**	**CO**	**SO2**	**Fugitive PM10**	**Exhaust PM10**	**PM10 Total**	**Fugitive PM2.5**	**Exhaust PM2.5**	**PM2.5 Total**	**Bio- CO2**	**NBio-CO2**	**Total CO2**	**CH4**	**N20**	**CO2e**
Percent Reduction	**16.74**	**40.67**	**-5.75**	**0.00**	**0.00**	**96.02**	**12.49**	**0.00**	**95.37**	**30.01**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**

Quarter	Start Date	End Date	Maximum Unmitigated ROG + NOX (tons/quarter)	Maximum Mitigated ROG + NOX (tons/quarter)
5	6-1-2024	8-31-2024	1.9653	0.5983
6	9-1-2024	11-30-2024	1.9563	0.6042
7	12-1-2024	2-28-2025	1.2683	0.6015
8	3-1-2025	5-31-2025	0.9291	0.6075
9	6-1-2025	8-31-2025	0.9260	0.6044
10	9-1-2025	11-30-2025	0.9221	0.6040
11	12-1-2025	2-28-2026	1.4981	0.9773
12	3-1-2026	5-31-2026	1.8326	1.1895
13	6-1-2026	8-31-2026	1.8266	1.1834
14	9-1-2026	11-30-2026	1.8187	1.1825
15	12-1-2026	2-28-2027	1.2051	0.7821
16	3-1-2027	5-31-2027	0.9041	0.5826
17	6-1-2027	8-31-2027	0.9012	0.5796
18	9-1-2027	11-30-2027	0.8972	0.5791
19	12-1-2027	2-29-2028	1.3351	0.9922
20	3-1-2028	5-31-2028	1.5707	1.2111
21	6-1-2028	8-31-2028	1.5675	1.2079
22	9-1-2028	11-30-2028	1.5568	1.2010
23	12-1-2028	2-28-2029	1.5355	1.1837
24	3-1-2029	5-31-2029	1.5597	1.2001
25	6-1-2029	8-31-2029	1.5566	1.1970
26	9-1-2029	9-30-2029	0.5076	0.3903
		Highest	1.9653	1.2111

2.2 Overall Operational

Unmitigated Operational

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e

Category	tons/yr										MT/yr					
Area	8.0000e-004	8.0000e-005	8.7300e-003	0.0000		3.0000e-005	3.0000e-005		3.0000e-005	3.0000e-005	0.0000	0.0171	0.0171	4.0000e-005	0.0000	0.0182
Energy	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Mobile	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Waste						0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Water						0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**8.0000e-004**	**8.0000e-005**	**8.7300e-003**	**0.0000**	**0.0000**	**3.0000e-005**	**3.0000e-005**	**0.0000**	**3.0000e-005**	**3.0000e-005**	**0.0000**	**0.0171**	**0.0171**	**4.0000e-005**	**0.0000**	**0.0182**

Mitigated Operational

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Area	8.0000e-004	8.0000e-005	8.7300e-003	0.0000		3.0000e-005	3.0000e-005		3.0000e-005	3.0000e-005	0.0000	0.0171	0.0171	4.0000e-005	0.0000	0.0182
Energy	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Mobile	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Waste						0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Water						0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**8.0000e-004**	**8.0000e-005**	**8.7300e-003**	**0.0000**	**0.0000**	**3.0000e-005**	**3.0000e-005**	**0.0000**	**3.0000e-005**	**3.0000e-005**	**0.0000**	**0.0171**	**0.0171**	**4.0000e-005**	**0.0000**	**0.0182**

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N20	CO2e
Percent Reduction	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**

3.0 Construction Detail

Construction Phase

Phase Number	Phase Name	Phase Type	Start Date	End Date	Num Days Week	Num Days	Phase Description
1	Site Preparation	Site Preparation	6/1/2024	12/31/2024	5	152	
2	Grading	Grading	6/1/2024	12/31/2024	5	152	
3	Drainage/Utilities/Subgrade	Trenching	6/1/2024	12/31/2024	5	152	
4	Foundations/Concrete Pour	Building Construction	1/1/2025	12/31/2026	5	522	
5	Building Construction	Building Construction	1/1/2026	12/31/2029	5	1043	
6	Architectural Coating	Architectural Coating	1/1/2028	12/31/2029	5	521	

Acres of Grading (Site Preparation Phase): 3

Acres of Grading (Grading Phase): 2

Acres of Paving: 0

Residential Indoor: 0; Residential Outdoor: 0; Non-Residential Indoor: 1,432,500; Non-Residential Outdoor: 477,500; Striped Parking

OffRoad Equipment

Phase Name	Offroad Equipment Type	Amount	Usage Hours	Horse Power	Load Factor
Site Preparation	Graders	1	8.00	187	0.41
Site Preparation	Scrapers	1	8.00	367	0.48
Site Preparation	Tractors/Loaders/Backhoes	1	7.00	97	0.37
Grading	Graders	1	8.00	187	0.41
Grading	Rubber Tired Dozers	1	8.00	247	0.40
Grading	Tractors/Loaders/Backhoes	2	7.00	97	0.37
Building Construction	Cranes	1	8.00	231	0.29
Building Construction	Forklifts	2	7.00	89	0.20
Building Construction	Generator Sets	1	8.00	84	0.74
Building Construction	Tractors/Loaders/Backhoes	1	6.00	97	0.37
Building Construction	Welders	3	8.00	46	0.45
Architectural Coating	Air Compressors	1	6.00	78	0.48
Drainage/Utilities/Subgrade	Excavators	2	8.00	158	0.38

Drainage/Utilities/Subgrade	Other General Industrial Equipment	1	8.00	88	0.34
Drainage/Utilities/Subgrade	Tractors/Loaders/Backhoes	1	8.00	97	0.37
Foundations/Concrete Pour	Cranes	1	8.00	231	0.29
Foundations/Concrete Pour	Forklifts	2	7.00	89	0.20
Foundations/Concrete Pour	Generator Sets	1	8.00	84	0.74
Foundations/Concrete Pour	Tractors/Loaders/Backhoes	1	6.00	97	0.37
Foundations/Concrete Pour	Welders	3	8.00	46	0.45

Trips and VMT

Phase Name	Offroad Equipment Count	Worker Trip Number	Vendor Trip Number	Hauling Trip Number	Worker Trip Length	Vendor Trip Length	Hauling Trip Length	Worker Vehicle Class	Vendor Vehicle Class	Hauling Vehicle Class
Site Preparation	3	8.00	0.00	0.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT
Grading	4	10.00	0.00	16,847.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT
Building Construction	8	306.00	157.00	0.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT
Architectural Coating	1	61.00	0.00	0.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT
Drainage/Utilities/Subgrade	4	10.00	0.00	0.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT
Foundations/Concrete Pour	8	306.00	157.00	0.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT

3.1 Mitigation Measures Construction

Use Cleaner Engines for Construction Equipment

3.2 Site Preparation - 2024

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					1.5900e-003	0.0000	1.5900e-003	1.7000e-004	0.0000	1.7000e-004	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

Off-Road	0.0943	0.9970	0.7281	1.8600e-003		0.0378	0.0378		0.0348	0.0348	0.0000	163.6539	163.6539	0.0529	0.0000	164.9771
Total	**0.0943**	**0.9970**	**0.7281**	**1.8600e-003**	**1.5900e-003**	**0.0378**	**0.0394**	**1.7000e-004**	**0.0348**	**0.0349**	**0.0000**	**163.6539**	**163.6539**	**0.0529**	**0.0000**	**164.9771**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	1.4700e-003	8.2000e-004	0.0103	4.0000e-005	4.8000e-003	3.0000e-005	4.8400e-003	1.2800e-003	3.0000e-005	1.3100e-003	0.0000	3.9135	3.9135	7.0000e-005	0.0000	3.9152
Total	**1.4700e-003**	**8.2000e-004**	**0.0103**	**4.0000e-005**	**4.8000e-003**	**3.0000e-005**	**4.8400e-003**	**1.2800e-003**	**3.0000e-005**	**1.3100e-003**	**0.0000**	**3.9135**	**3.9135**	**7.0000e-005**	**0.0000**	**3.9152**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					1.5900e-003	0.0000	1.5900e-003	1.7000e-004	0.0000	1.7000e-004	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.0193	0.0564	0.9049	1.8600e-003		1.0100e-003	1.0100e-003		1.1800e-003	1.1800e-003	0.0000	163.6537	163.6537	0.0529	0.0000	164.9769
Total	**0.0193**	**0.0564**	**0.9049**	**1.8600e-003**	**1.5900e-003**	**1.0100e-003**	**2.6000e-003**	**1.7000e-004**	**1.1800e-003**	**1.3500e-003**	**0.0000**	**163.6537**	**163.6537**	**0.0529**	**0.0000**	**164.9769**

Mitigated Construction Off-Site

Category	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	1.4700e-003	8.2000e-004	0.0103	4.0000e-005	4.8000e-003	3.0000e-005	4.8400e-003	1.2800e-003	3.0000e-005	1.3100e-003	0.0000	3.9135	3.9135	7.0000e-005	0.0000	3.9152
Total	**1.4700e-003**	**8.2000e-004**	**0.0103**	**4.0000e-005**	**4.8000e-003**	**3.0000e-005**	**4.8400e-003**	**1.2800e-003**	**3.0000e-005**	**1.3100e-003**	**0.0000**	**3.9135**	**3.9135**	**7.0000e-005**	**0.0000**	**3.9152**

3.3 Grading - 2024

Unmitigated Construction On-Site

Category	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
	tons/yr										MT/yr					
Fugitive Dust					0.4587	0.0000	0.4587	0.2517	0.0000	0.2517	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.0989	1.0502	0.6612	1.5700e-003		0.0435	0.0435		0.0400	0.0400	0.0000	137.5874	137.5874	0.0445	0.0000	138.6998
Total	**0.0989**	**1.0502**	**0.6612**	**1.5700e-003**	**0.4587**	**0.0435**	**0.5022**	**0.2517**	**0.0400**	**0.2917**	**0.0000**	**137.5874**	**137.5874**	**0.0445**	**0.0000**	**138.6998**

Unmitigated Construction Off-Site

Category	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
	tons/yr										MT/yr					

Hauling	0.0450	1.8089	0.9400	6.3000e-003	0.1413	3.6300e-003	0.1449	0.0388	3.4700e-003	0.0423	0.0000	692.3435	692.3435	0.1377	0.0000	695.7857
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	1.8400e-003	1.0300e-003	0.0129	5.0000e-005	6.0100e-003	4.0000e-005	6.0500e-003	1.6000e-003	4.0000e-005	1.6400e-003	0.0000	4.8919	4.8919	8.0000e-005	0.0000	4.8940
Total	**0.0469**	**1.8100**	**0.9528**	**6.3500e-003**	**0.1473**	**3.6700e-003**	**0.1510**	**0.0404**	**3.5100e-003**	**0.0439**	**0.0000**	**697.2354**	**697.2354**	**0.1378**	**0.0000**	**700.6796**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					0.4587	0.0000	0.4587	0.2517	0.0000	0.2517	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	-0.0328	-0.5096	0.8894	1.5700e-003		-0.0249	-0.0249		-0.0226	-0.0226	0.0000	137.5872	137.5872	0.0445	0.0000	138.6997
Total	**-0.0328**	**-0.5096**	**0.8894**	**1.5700e-003**	**0.4587**	**-0.0249**	**0.4339**	**0.2517**	**-0.0226**	**0.2291**	**0.0000**	**137.5872**	**137.5872**	**0.0445**	**0.0000**	**138.6997**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0450	1.8089	0.9400	6.3000e-003	0.1413	3.6300e-003	0.1449	0.0388	3.4700e-003	0.0423	0.0000	692.3435	692.3435	0.1377	0.0000	695.7857
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	1.8400e-003	1.0300e-003	0.0129	5.0000e-005	6.0100e-003	4.0000e-005	6.0500e-003	1.6000e-003	4.0000e-005	1.6400e-003	0.0000	4.8919	4.8919	8.0000e-005	0.0000	4.8940
Total	**0.0469**	**1.8100**	**0.9528**	**6.3500e-003**	**0.1473**	**3.6700e-003**	**0.1510**	**0.0404**	**3.5100e-003**	**0.0439**	**0.0000**	**697.2354**	**697.2354**	**0.1378**	**0.0000**	**700.6796**

3.4 Drainage/Utilities/Subgrade - 2024

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.0499	0.4319	0.8122	1.2200e-003		0.0214	0.0214		0.0197	0.0197	0.0000	106.8881	106.8881	0.0346	0.0000	107.7524
Total	**0.0499**	**0.4319**	**0.8122**	**1.2200e-003**		**0.0214**	**0.0214**		**0.0197**	**0.0197**	**0.0000**	**106.8881**	**106.8881**	**0.0346**	**0.0000**	**107.7524**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	1.8400e-003	1.0300e-003	0.0129	5.0000e-005	6.0100e-003	4.0000e-005	6.0500e-003	1.6000e-003	4.0000e-005	1.6400e-003	0.0000	4.8919	4.8919	8.0000e-005	0.0000	4.8940
Total	**1.8400e-003**	**1.0300e-003**	**0.0129**	**5.0000e-005**	**6.0100e-003**	**4.0000e-005**	**6.0500e-003**	**1.6000e-003**	**4.0000e-005**	**1.6400e-003**	**0.0000**	**4.8919**	**4.8919**	**8.0000e-005**	**0.0000**	**4.8940**

Mitigated Construction On-Site

Category	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
	tons/yr										MT/yr					
Off-Road	0.0109	0.0160	0.9260	1.2200e-003		-0.0003	-0.0003		-0.0001	-0.0001	0.0000	106.8880	106.8880	0.0346	0.0000	107.7522
Total	**0.0109**	**0.0160**	**0.9260**	**1.2200e-003**		**-0.0003**	**-0.0003**		**-0.0001**	**-0.0001**	**0.0000**	**106.8880**	**106.8880**	**0.0346**	**0.0000**	**107.7522**

Mitigated Construction Off-Site

Category	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	1.8400e-003	1.0300e-003	0.0129	5.0000e-005	6.0100e-003	4.0000e-005	6.0500e-003	1.6000e-003	4.0000e-005	1.6400e-003	0.0000	4.8919	4.8919	8.0000e-005	0.0000	4.8940
Total	**1.8400e-003**	**1.0300e-003**	**0.0129**	**5.0000e-005**	**6.0100e-003**	**4.0000e-005**	**6.0500e-003**	**1.6000e-003**	**4.0000e-005**	**1.6400e-003**	**0.0000**	**4.8919**	**4.8919**	**8.0000e-005**	**0.0000**	**4.8940**

3.5 Foundations/Concrete Pour - 2025

Unmitigated Construction On-Site

Category	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
	tons/yr										MT/yr					
Off-Road	0.1944	1.5690	1.8279	3.2700e-003		0.0613	0.0613		0.0587	0.0587	0.0000	271.0946	271.0946	0.0497	0.0000	272.3375

Total	**0.1944**	**1.5690**	**1.8279**	**3.2700e-003**		**0.0613**	**0.0613**		**0.0587**	**0.0587**	**0.0000**	**271.0946**	**271.0946**	**0.0497**	**0.0000**	**272.3375**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0436	1.7544	0.6732	5.0700e-003	0.1339	2.4300e-003	0.1364	0.0387	2.3300e-003	0.0410	0.0000	528.9201	528.9201	0.0715	0.0000	530.7080
Worker	0.0922	0.0495	0.6326	2.7200e-003	0.3155	2.2800e-003	0.3178	0.0839	2.1000e-003	0.0860	0.0000	246.5214	246.5214	4.0300e-003	0.0000	246.6222
Total	**0.1357**	**1.8039**	**1.3057**	**7.7900e-003**	**0.4495**	**4.7100e-003**	**0.4542**	**0.1227**	**4.4300e-003**	**0.1271**	**0.0000**	**775.4415**	**775.4415**	**0.0755**	**0.0000**	**777.3302**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.0384	0.4478	1.9546	3.2700e-003		2.1900e-003	2.1900e-003		2.4000e-003	2.4000e-003	0.0000	271.0943	271.0943	0.0497	0.0000	272.3372
Total	**0.0384**	**0.4478**	**1.9546**	**3.2700e-003**		**2.1900e-003**	**2.1900e-003**		**2.4000e-003**	**2.4000e-003**	**0.0000**	**271.0943**	**271.0943**	**0.0497**	**0.0000**	**272.3372**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0436	1.7544	0.6732	5.0700e-003	0.1339	2.4300e-003	0.1364	0.0387	2.3300e-003	0.0410	0.0000	528.9201	528.9201	0.0715	0.0000	530.7080
Worker	0.0922	0.0495	0.6326	2.7200e-003	0.3155	2.2800e-003	0.3178	0.0839	2.1000e-003	0.0860	0.0000	246.5214	246.5214	4.0300e-003	0.0000	246.6222
Total	**0.1357**	**1.8039**	**1.3057**	**7.7900e-003**	**0.4495**	**4.7100e-003**	**0.4542**	**0.1227**	**4.4300e-003**	**0.1271**	**0.0000**	**775.4415**	**775.4415**	**0.0755**	**0.0000**	**777.3302**

3.5 Foundations/Concrete Pour - 2026

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.1944	1.5690	1.8279	3.2700e-003		0.0613	0.0613		0.0587	0.0587	0.0000	271.0946	271.0946	0.0497	0.0000	272.3375
Total	**0.1944**	**1.5690**	**1.8279**	**3.2700e-003**		**0.0613**	**0.0613**		**0.0587**	**0.0587**	**0.0000**	**271.0946**	**271.0946**	**0.0497**	**0.0000**	**272.3375**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					

Category	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0423	1.7119	0.6792	5.0000e-003	0.1339	2.3200e-003	0.1362	0.0387	2.2200e-003	0.0409	0.0000	524.2767	524.2767	0.0716	0.0000	526.0664
Worker	0.0884	0.0456	0.5944	2.6200e-003	0.3155	2.2200e-003	0.3178	0.0839	2.0400e-003	0.0860	0.0000	237.4108	237.4108	3.7000e-003	0.0000	237.5033
Total	**0.1307**	**1.7575**	**1.2736**	**7.6200e-003**	**0.4495**	**4.5400e-003**	**0.4540**	**0.1227**	**4.2600e-003**	**0.1269**	**0.0000**	**761.6875**	**761.6875**	**0.0753**	**0.0000**	**763.5697**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.0384	0.4478	1.9546	3.2700e-003		2.1900e-003	2.1900e-003		2.4000e-003	2.4000e-003	0.0000	271.0943	271.0943	0.0497	0.0000	272.3372
Total	**0.0384**	**0.4478**	**1.9546**	**3.2700e-003**		**2.1900e-003**	**2.1900e-003**		**2.4000e-003**	**2.4000e-003**	**0.0000**	**271.0943**	**271.0943**	**0.0497**	**0.0000**	**272.3372**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0423	1.7119	0.6792	5.0000e-003	0.1339	2.3200e-003	0.1362	0.0387	2.2200e-003	0.0409	0.0000	524.2767	524.2767	0.0716	0.0000	526.0664
Worker	0.0884	0.0456	0.5944	2.6200e-003	0.3155	2.2200e-003	0.3178	0.0839	2.0400e-003	0.0860	0.0000	237.4108	237.4108	3.7000e-003	0.0000	237.5033
Total	**0.1307**	**1.7575**	**1.2736**	**7.6200e-003**	**0.4495**	**4.5400e-003**	**0.4540**	**0.1227**	**4.2600e-003**	**0.1269**	**0.0000**	**761.6875**	**761.6875**	**0.0753**	**0.0000**	**763.5697**

3.6 Building Construction - 2026

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.1944	1.5690	1.8279	3.2700e-003		0.0613	0.0613		0.0587	0.0587	0.0000	271.0946	271.0946	0.0497	0.0000	272.3375
Total	**0.1944**	**1.5690**	**1.8279**	**3.2700e-003**		**0.0613**	**0.0613**		**0.0587**	**0.0587**	**0.0000**	**271.0946**	**271.0946**	**0.0497**	**0.0000**	**272.3375**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0423	1.7119	0.6792	5.0000e-003	0.1339	2.3200e-003	0.1362	0.0387	2.2200e-003	0.0409	0.0000	524.2767	524.2767	0.0716	0.0000	526.0664
Worker	0.0884	0.0456	0.5944	2.6200e-003	0.3155	2.2200e-003	0.3178	0.0839	2.0400e-003	0.0860	0.0000	237.4108	237.4108	3.7000e-003	0.0000	237.5033
Total	**0.1307**	**1.7575**	**1.2736**	**7.6200e-003**	**0.4495**	**4.5400e-003**	**0.4540**	**0.1227**	**4.2600e-003**	**0.1269**	**0.0000**	**761.6875**	**761.6875**	**0.0753**	**0.0000**	**763.5697**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.0384	0.4478	1.9546	3.2700e-003		2.1900e-003	2.1900e-003		2.4000e-003	2.4000e-003	0.0000	271.0943	271.0943	0.0497	0.0000	272.3372
Total	**0.0384**	**0.4478**	**1.9546**	**3.2700e-003**		**2.1900e-003**	**2.1900e-003**		**2.4000e-003**	**2.4000e-003**	**0.0000**	**271.0943**	**271.0943**	**0.0497**	**0.0000**	**272.3372**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0423	1.7119	0.6792	5.0000e-003	0.1339	2.3200e-003	0.1362	0.0387	2.2200e-003	0.0409	0.0000	524.2767	524.2767	0.0716	0.0000	526.0664
Worker	0.0884	0.0456	0.5944	2.6200e-003	0.3155	2.2200e-003	0.3178	0.0839	2.0400e-003	0.0860	0.0000	237.4108	237.4108	3.7000e-003	0.0000	237.5033
Total	**0.1307**	**1.7575**	**1.2736**	**7.6200e-003**	**0.4495**	**4.5400e-003**	**0.4540**	**0.1227**	**4.2600e-003**	**0.1269**	**0.0000**	**761.6875**	**761.6875**	**0.0753**	**0.0000**	**763.5697**

3.6 Building Construction - 2027

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.1944	1.5690	1.8279	3.2700e-003		0.0613	0.0613		0.0587	0.0587	0.0000	271.0946	271.0946	0.0497	0.0000	272.3375

Total	**0.1944**	**1.5690**	**1.8279**	**3.2700e-003**		**0.0613**	**0.0613**		**0.0587**	**0.0587**	**0.0000**	**271.0946**	**271.0946**	**0.0497**	**0.0000**	**272.3375**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0412	1.6713	0.6846	4.9400e-003	0.1339	2.2200e-003	0.1361	0.0387	2.1200e-003	0.0408	0.0000	519.8406	519.8406	0.0717	0.0000	521.6327
Worker	0.0848	0.0422	0.5608	2.5300e-003	0.3155	2.1100e-003	0.3177	0.0839	1.9400e-003	0.0859	0.0000	229.4329	229.4329	3.4100e-003	0.0000	229.5181
Total	**0.1259**	**1.7135**	**1.2454**	**7.4700e-003**	**0.4495**	**4.3300e-003**	**0.4538**	**0.1227**	**4.0600e-003**	**0.1267**	**0.0000**	**749.2735**	**749.2735**	**0.0751**	**0.0000**	**751.1508**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.0384	0.4478	1.9546	3.2700e-003		2.1900e-003	2.1900e-003		2.4000e-003	2.4000e-003	0.0000	271.0943	271.0943	0.0497	0.0000	272.3372
Total	**0.0384**	**0.4478**	**1.9546**	**3.2700e-003**		**2.1900e-003**	**2.1900e-003**		**2.4000e-003**	**2.4000e-003**	**0.0000**	**271.0943**	**271.0943**	**0.0497**	**0.0000**	**272.3372**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0412	1.6713	0.6846	4.9400e-003	0.1339	2.2200e-003	0.1361	0.0387	2.1200e-003	0.0408	0.0000	519.8406	519.8406	0.0717	0.0000	521.6327
Worker	0.0848	0.0422	0.5608	2.5300e-003	0.3155	2.1100e-003	0.3177	0.0839	1.9400e-003	0.0859	0.0000	229.4329	229.4329	3.4100e-003	0.0000	229.5181
Total	**0.1259**	**1.7135**	**1.2454**	**7.4700e-003**	**0.4495**	**4.3300e-003**	**0.4538**	**0.1227**	**4.0600e-003**	**0.1267**	**0.0000**	**749.2735**	**749.2735**	**0.0751**	**0.0000**	**751.1508**

3.6 Building Construction - 2028

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.1937	1.5630	1.8209	3.2500e-003		0.0611	0.0611		0.0585	0.0585	0.0000	270.0559	270.0559	0.0495	0.0000	271.2941
Total	**0.1937**	**1.5630**	**1.8209**	**3.2500e-003**		**0.0611**	**0.0611**		**0.0585**	**0.0585**	**0.0000**	**270.0559**	**270.0559**	**0.0495**	**0.0000**	**271.2941**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0400	1.6293	0.6878	4.8700e-003	0.1334	2.1200e-003	0.1355	0.0386	2.0300e-003	0.0406	0.0000	513.8804	513.8804	0.0715	0.0000	515.6685
Worker	0.0806	0.0391	0.5289	2.4500e-003	0.3143	1.9400e-003	0.3163	0.0836	1.7900e-003	0.0854	0.0000	221.6239	221.6239	3.1400e-003	0.0000	221.7023
Total	**0.1206**	**1.6684**	**1.2167**	**7.3200e-003**	**0.4478**	**4.0600e-003**	**0.4518**	**0.1222**	**3.8200e-003**	**0.1260**	**0.0000**	**735.5043**	**735.5043**	**0.0747**	**0.0000**	**737.3708**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.0383	0.4461	1.9471	3.2500e-003		2.1800e-003	2.1800e-003		2.3900e-003	2.3900e-003	0.0000	270.0556	270.0556	0.0495	0.0000	271.2938
Total	**0.0383**	**0.4461**	**1.9471**	**3.2500e-003**		**2.1800e-003**	**2.1800e-003**		**2.3900e-003**	**2.3900e-003**	**0.0000**	**270.0556**	**270.0556**	**0.0495**	**0.0000**	**271.2938**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0400	1.6293	0.6878	4.8700e-003	0.1334	2.1200e-003	0.1355	0.0386	2.0300e-003	0.0406	0.0000	513.8804	513.8804	0.0715	0.0000	515.6685
Worker	0.0806	0.0391	0.5289	2.4500e-003	0.3143	1.9400e-003	0.3163	0.0836	1.7900e-003	0.0854	0.0000	221.6239	221.6239	3.1400e-003	0.0000	221.7023
Total	**0.1206**	**1.6684**	**1.2167**	**7.3200e-003**	**0.4478**	**4.0600e-003**	**0.4518**	**0.1222**	**3.8200e-003**	**0.1260**	**0.0000**	**735.5043**	**735.5043**	**0.0747**	**0.0000**	**737.3708**

3.6 Building Construction - 2029

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.1944	1.5690	1.8279	3.2700e-003		0.0613	0.0613		0.0587	0.0587	0.0000	271.0946	271.0946	0.0497	0.0000	272.3375
Total	**0.1944**	**1.5690**	**1.8279**	**3.2700e-003**		**0.0613**	**0.0613**		**0.0587**	**0.0587**	**0.0000**	**271.0946**	**271.0946**	**0.0497**	**0.0000**	**272.3375**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0392	1.6006	0.6943	4.8400e-003	0.1339	2.0400e-003	0.1360	0.0387	1.9500e-003	0.0407	0.0000	512.0827	512.0827	0.0720	0.0000	513.8820
Worker	0.0769	0.0366	0.5035	2.3900e-003	0.3155	1.8100e-003	0.3174	0.0839	1.6700e-003	0.0856	0.0000	216.4081	216.4081	2.9200e-003	0.0000	216.4811
Total	**0.1161**	**1.6371**	**1.1978**	**7.2300e-003**	**0.4495**	**3.8500e-003**	**0.4533**	**0.1227**	**3.6200e-003**	**0.1263**	**0.0000**	**728.4908**	**728.4908**	**0.0749**	**0.0000**	**730.3630**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.0384	0.4478	1.9546	3.2700e-003		2.1900e-003	2.1900e-003		2.4000e-003	2.4000e-003	0.0000	271.0943	271.0943	0.0497	0.0000	272.3372
Total	**0.0384**	**0.4478**	**1.9546**	**3.2700e-003**		**2.1900e-003**	**2.1900e-003**		**2.4000e-003**	**2.4000e-003**	**0.0000**	**271.0943**	**271.0943**	**0.0497**	**0.0000**	**272.3372**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0392	1.6006	0.6943	4.8400e-003	0.1339	2.0400e-003	0.1360	0.0387	1.9500e-003	0.0407	0.0000	512.0827	512.0827	0.0720	0.0000	513.8820
Worker	0.0769	0.0366	0.5035	2.3900e-003	0.3155	1.8100e-003	0.3174	0.0839	1.6700e-003	0.0856	0.0000	216.4081	216.4081	2.9200e-003	0.0000	216.4811
Total	**0.1161**	**1.6371**	**1.1978**	**7.2300e-003**	**0.4495**	**3.8500e-003**	**0.4533**	**0.1227**	**3.6200e-003**	**0.1263**	**0.0000**	**728.4908**	**728.4908**	**0.0749**	**0.0000**	**730.3630**

3.7 Architectural Coating - 2028

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Archit. Coating	2.4851					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Off-Road	0.0222	0.1489	0.2352	3.9000e-004		6.7000e-003	6.7000e-003		6.7000e-003	6.7000e-003	0.0000	33.1923	33.1923	1.8100e-003	0.0000	33.2376
Total	**2.5073**	**0.1489**	**0.2352**	**3.9000e-004**		**6.7000e-003**	**6.7000e-003**		**6.7000e-003**	**6.7000e-003**	**0.0000**	**33.1923**	**33.1923**	**1.8100e-003**	**0.0000**	**33.2376**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	0.0161	7.7900e-003	0.1054	4.9000e-004	0.0627	3.9000e-004	0.0631	0.0167	3.6000e-004	0.0170	0.0000	44.1799	44.1799	6.3000e-004	0.0000	44.1956
Total	**0.0161**	**7.7900e-003**	**0.1054**	**4.9000e-004**	**0.0627**	**3.9000e-004**	**0.0631**	**0.0167**	**3.6000e-004**	**0.0170**	**0.0000**	**44.1799**	**44.1799**	**6.3000e-004**	**0.0000**	**44.1956**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Archit. Coating	2.4851					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	3.8600e-003	0.0167	0.2382	3.9000e-004		5.2000e-004	5.2000e-004		5.2000e-004	5.2000e-004	0.0000	33.1923	33.1923	1.8100e-003	0.0000	33.2375
Total	**2.4890**	**0.0167**	**0.2382**	**3.9000e-004**		**5.2000e-004**	**5.2000e-004**		**5.2000e-004**	**5.2000e-004**	**0.0000**	**33.1923**	**33.1923**	**1.8100e-003**	**0.0000**	**33.2375**

Mitigated Construction Off-Site

Category	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	0.0161	7.7900e-003	0.1054	4.9000e-004	0.0627	3.9000e-004	0.0631	0.0167	3.6000e-004	0.0170	0.0000	44.1799	44.1799	6.3000e-004	0.0000	44.1956
Total	**0.0161**	**7.7900e-003**	**0.1054**	**4.9000e-004**	**0.0627**	**3.9000e-004**	**0.0631**	**0.0167**	**3.6000e-004**	**0.0170**	**0.0000**	**44.1799**	**44.1799**	**6.3000e-004**	**0.0000**	**44.1956**

3.7 Architectural Coating - 2029

Unmitigated Construction On-Site

Category	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
	tons/yr										MT/yr					
Archit. Coating	2.4946					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.0223	0.1495	0.2361	3.9000e-004		6.7200e-003	6.7200e-003		6.7200e-003	6.7200e-003	0.0000	33.3200	33.3200	1.8200e-003	0.0000	33.3654
Total	**2.5169**	**0.1495**	**0.2361**	**3.9000e-004**		**6.7200e-003**	**6.7200e-003**		**6.7200e-003**	**6.7200e-003**	**0.0000**	**33.3200**	**33.3200**	**1.8200e-003**	**0.0000**	**33.3654**

Unmitigated Construction Off-Site

Category	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
	tons/yr										MT/yr					

Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	0.0153	7.2900e-003	0.1004	4.8000e-004	0.0629	3.6000e-004	0.0633	0.0167	3.3000e-004	0.0171	0.0000	43.1402	43.1402	5.8000e-004	0.0000	43.1547
Total	**0.0153**	**7.2900e-003**	**0.1004**	**4.8000e-004**	**0.0629**	**3.6000e-004**	**0.0633**	**0.0167**	**3.3000e-004**	**0.0171**	**0.0000**	**43.1402**	**43.1402**	**5.8000e-004**	**0.0000**	**43.1547**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Archit. Coating	2.4946					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	3.8800e-003	0.0168	0.2391	3.9000e-004		5.2000e-004	5.2000e-004		5.2000e-004	5.2000e-004	0.0000	33.3199	33.3199	1.8200e-003	0.0000	33.3654
Total	**2.4985**	**0.0168**	**0.2391**	**3.9000e-004**		**5.2000e-004**	**5.2000e-004**		**5.2000e-004**	**5.2000e-004**	**0.0000**	**33.3199**	**33.3199**	**1.8200e-003**	**0.0000**	**33.3654**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	0.0153	7.2900e-003	0.1004	4.8000e-004	0.0629	3.6000e-004	0.0633	0.0167	3.3000e-004	0.0171	0.0000	43.1402	43.1402	5.8000e-004	0.0000	43.1547
Total	**0.0153**	**7.2900e-003**	**0.1004**	**4.8000e-004**	**0.0629**	**3.6000e-004**	**0.0633**	**0.0167**	**3.3000e-004**	**0.0171**	**0.0000**	**43.1402**	**43.1402**	**5.8000e-004**	**0.0000**	**43.1547**

4.0 Operational Detail - Mobile

4.1 Mitigation Measures Mobile

Category	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
	tons/yr										MT/yr					
Mitigated	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Unmitigated	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

4.2 Trip Summary Information

	Average Daily Trip Rate			Unmitigated	Mitigated
Land Use	Weekday	Saturday	Sunday	Annual VMT	Annual VMT
Hospital	0.00	0.00	0.00		
Total	0.00	0.00	0.00		

4.3 Trip Type Information

	Miles			Trip %			Trip Purpose %		
Land Use	H-W or C-W	H-S or C-C	H-O or C-NW	H-W or C-W	H-S or C-C	H-O or C-NW	Primary	Diverted	Pass-by
Hospital	9.50	7.30	7.30	64.90	16.10	19.00	73	25	2

4.4 Fleet Mix

Land Use	LDA	LDT1	LDT2	MDV	LHD1	LHD2	MHD	HHD	OBUS	UBUS	MCY	SBUS	MH
Hospital	0.601973	0.036168	0.193150	0.092307	0.012222	0.005292	0.035273	0.009746	0.004298	0.002300	0.005708	0.000958	0.000606

5.0 Energy Detail

Historical Energy Use: N

5.1 Mitigation Measures Energy

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Electricity Mitigated						0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Electricity Unmitigated						0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
NaturalGas Mitigated	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
NaturalGas Unmitigated	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

5.2 Energy by Land Use - NaturalGas

Unmitigated

	NaturalGas Use	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Land Use	kBTU/yr	tons/yr										MT/yr					
Hospital	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total		**0.0000**	**0.0000**	**0.0000**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**

Mitigated

	NaturalGas Use	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Land Use	kBTU/yr	tons/yr										MT/yr					
Hospital	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total		**0.0000**	**0.0000**	**0.0000**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**

5.3 Energy by Land Use - Electricity

Unmitigated

	Electricity Use	Total CO2	CH4	N2O	CO2e
Land Use	kWh/yr	MT/yr			
Hospital	0	0.0000	0.0000	0.0000	0.0000
Total		**0.0000**	**0.0000**	**0.0000**	**0.0000**

Mitigated

	Electricity Use	Total CO2	CH4	N2O	CO2e

Land Use	kWh/yr	MT/yr			
Hospital	0	0.0000	0.0000	0.0000	0.0000
Total		**0.0000**	**0.0000**	**0.0000**	**0.0000**

6.0 Area Detail

6.1 Mitigation Measures Area

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Mitigated	8.0000e-004	8.0000e-005	8.7300e-003	0.0000		3.0000e-005	3.0000e-005		3.0000e-005	3.0000e-005	0.0000	0.0171	0.0171	4.0000e-005	0.0000	0.0182
Unmitigated	8.0000e-004	8.0000e-005	8.7300e-003	0.0000		3.0000e-005	3.0000e-005		3.0000e-005	3.0000e-005	0.0000	0.0171	0.0171	4.0000e-005	0.0000	0.0182

6.2 Area by SubCategory

Unmitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
SubCategory	tons/yr										MT/yr					
Architectural Coating	0.0000					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

Consumer Products	0.0000					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Landscaping	8.0000e-004	8.0000e-005	8.7300e-003	0.0000		3.0000e-005	3.0000e-005		3.0000e-005	3.0000e-005	0.0000	0.0171	0.0171	4.0000e-005	0.0000	0.0182
Total	**8.0000e-004**	**8.0000e-005**	**8.7300e-003**	**0.0000**		**3.0000e-005**	**3.0000e-005**		**3.0000e-005**	**3.0000e-005**	**0.0000**	**0.0171**	**0.0171**	**4.0000e-005**	**0.0000**	**0.0182**

Mitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
SubCategory	tons/yr										MT/yr					
Architectural Coating	0.0000					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Consumer Products	0.0000					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Landscaping	8.0000e-004	8.0000e-005	8.7300e-003	0.0000		3.0000e-005	3.0000e-005		3.0000e-005	3.0000e-005	0.0000	0.0171	0.0171	4.0000e-005	0.0000	0.0182
Total	**8.0000e-004**	**8.0000e-005**	**8.7300e-003**	**0.0000**		**3.0000e-005**	**3.0000e-005**		**3.0000e-005**	**3.0000e-005**	**0.0000**	**0.0171**	**0.0171**	**4.0000e-005**	**0.0000**	**0.0182**

7.0 Water Detail

7.1 Mitigation Measures Water

	Total CO2	CH4	N2O	CO2e
Category	MT/yr			
Mitigated	0.0000	0.0000	0.0000	0.0000
Unmitigated	0.0000	0.0000	0.0000	0.0000

7.2 Water by Land Use

Unmitigated

	Indoor/Outdoor Use	Total CO2	CH4	N2O	CO2e
Land Use	Mgal	MT/yr			
Hospital	0 / 0	0.0000	0.0000	0.0000	0.0000
Total		**0.0000**	**0.0000**	**0.0000**	**0.0000**

Mitigated

	Indoor/Outdoor Use	Total CO2	CH4	N2O	CO2e
Land Use	Mgal	MT/yr			
Hospital	0 / 0	0.0000	0.0000	0.0000	0.0000
Total		**0.0000**	**0.0000**	**0.0000**	**0.0000**

8.0 Waste Detail

8.1 Mitigation Measures Waste

Category/Year

	Total CO2	CH4	N2O	CO2e
	MT/yr			
Mitigated	0.0000	0.0000	0.0000	0.0000
Unmitigated	0.0000	0.0000	0.0000	0.0000

8.2 Waste by Land Use

Unmitigated

	Waste Disposed	Total CO2	CH4	N2O	CO2e
Land Use	tons	MT/yr			
Hospital	0	0.0000	0.0000	0.0000	0.0000
Total		**0.0000**	**0.0000**	**0.0000**	**0.0000**

Mitigated

	Waste Disposed	Total CO2	CH4	N2O	CO2e
Land Use	tons	MT/yr			

Hospital	0	0.0000	0.0000	0.0000	0.0000
Total		**0.0000**	**0.0000**	**0.0000**	**0.0000**

9.0 Operational Offroad

Equipment Type	Number	Hours/Day	Days/Year	Horse Power	Load Factor	Fuel Type

10.0 Stationary Equipment

Fire Pumps and Emergency Generators

Equipment Type	Number	Hours/Day	Hours/Year	Horse Power	Load Factor	Fuel Type

Boilers

Equipment Type	Number	Heat Input/Day	Heat Input/Year	Boiler Rating	Fuel Type

User Defined Equipment

Equipment Type	Number

11.0 Vegetation

UCSF Irving Street Arrival Construction Only

San Francisco County, Annual

1.0 Project Characteristics

1.1 Land Usage

Land Uses	Size	Metric	Lot Acreage	Floor Surface Area	Population
Enclosed Parking with Elevator	25.00	1000sqft	0.57	25,000.00	0

1.2 Other Project Characteristics

Urbanization	Urban	**Wind Speed (m/s)**	4.6	**Precipitation Freq (Days)**	64
Climate Zone	5			**Operational Year**	2024
Utility Company	City and County of San Francisco				
CO2 Intensity (lb/MWhr)	76.28	**CH4 Intensity (lb/MWhr)**	0.029	**N2O Intensity (lb/MWhr)**	0.006

1.3 User Entered Comments & Non-Default Data

Project Characteristics - UCSF is its own electricity provider

Land Use -

Construction Phase - Construction schedule per applicant RFI response.

Trips and VMT - Haul trips for 1,000 cy

Demolition -

Grading -

Consumer Products - Constrution run only

Area Coating - Constrution run only

Landscape Equipment - Constrution run only

Energy Use - Constrution run only

Water And Wastewater -

Construction Off-road Equipment Mitigation - Tier 4 final as mitigation

Table Name	Column Name	Default Value	New Value
tblAreaCoating	ReapplicationRatePercent	10	0
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	1.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	4.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	1.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	1.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	2.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	1.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	1.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	1.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	1.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	6.00
tblConstEquipMitigation	Tier	No Change	Tier 4 Final
tblConstEquipMitigation	Tier	No Change	Tier 4 Final
tblConstEquipMitigation	Tier	No Change	Tier 4 Final
tblConstEquipMitigation	Tier	No Change	Tier 4 Final
tblConstEquipMitigation	Tier	No Change	Tier 4 Final
tblConstEquipMitigation	Tier	No Change	Tier 4 Final
tblConstEquipMitigation	Tier	No Change	Tier 4 Final
tblConstEquipMitigation	Tier	No Change	Tier 4 Final
tblConstEquipMitigation	Tier	No Change	Tier 4 Final
tblConstEquipMitigation	Tier	No Change	Tier 4 Final
tblConstructionPhase	NumDays	10.00	66.00
tblConstructionPhase	NumDays	5.00	132.00
tblConstructionPhase	NumDays	1.00	66.00
tblConstructionPhase	NumDays	100.00	326.00

tblConstructionPhase	NumDays	5.00	152.00
tblEnergyUse	LightingElect	1.75	0.00
tblEnergyUse	NT24E	0.19	0.00
tblEnergyUse	T24E	3.92	0.00
tblGrading	MaterialExported	0.00	1,000.00

2.0 Emissions Summary

2.1 Overall Construction

Unmitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	tons/yr										MT/yr					
2022	0.0994	1.0016	0.9710	1.8500e-003	0.0493	0.0458	0.0952	8.5600e-003	0.0427	0.0512	0.0000	164.0171	164.0171	0.0415	0.0000	165.0555
2023	0.0807	0.8153	0.8923	1.5900e-003	0.0136	0.0386	0.0521	3.6800e-003	0.0355	0.0392	0.0000	141.8031	141.8031	0.0406	0.0000	142.8181
Maximum	**0.0994**	**1.0016**	**0.9710**	**1.8500e-003**	**0.0493**	**0.0458**	**0.0952**	**8.5600e-003**	**0.0427**	**0.0512**	**0.0000**	**164.0171**	**164.0171**	**0.0415**	**0.0000**	**165.0555**

Mitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	tons/yr										MT/yr					
2022	0.0237	0.1386	1.0489	1.8500e-003	0.0493	2.6500e-003	0.0520	8.5600e-003	2.6300e-003	0.0112	0.0000	164.0169	164.0169	0.0415	0.0000	165.0553
2023	0.0214	0.1176	0.9676	1.5900e-003	0.0136	2.3700e-003	0.0159	3.6800e-003	2.3600e-003	6.0400e-003	0.0000	141.8030	141.8030	0.0406	0.0000	142.8180

Maximum	**0.0237**	**0.1386**	**1.0489**	**1.8500e-003**	**0.0493**	**2.6500e-003**	**0.0520**	**8.5600e-003**	**2.6300e-003**	**0.0112**	**0.0000**	**164.0169**	**164.0169**	**0.0415**	**0.0000**	**165.0553**

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N20	CO2e
Percent Reduction	**74.95**	**85.90**	**-8.22**	**0.00**	**0.00**	**94.05**	**53.90**	**0.00**	**93.62**	**80.94**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**

Quarter	Start Date	End Date	Maximum Unmitigated ROG + NOX (tons/quarter)	Maximum Mitigated ROG + NOX (tons/quarter)
10	**1-9-2022**	**4-8-2022**	0.3142	0.0459
11	**4-9-2022**	**7-8-2022**	0.4261	0.0615
12	**7-9-2022**	**10-8-2022**	0.1113	0.0167
13	**10-9-2022**	**1-8-2023**	0.2676	0.0406
14	**1-9-2023**	**4-8-2023**	0.2400	0.0373
15	**4-9-2023**	**7-8-2023**	0.2463	0.0380
16	**7-9-2023**	**9-30-2023**	0.2238	0.0346
		Highest	0.4261	0.0615

2.2 Overall Operational

Unmitigated Operational

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Area	1.6400e-003	0.0000	2.3000e-004	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	4.5000e-004	4.5000e-004	0.0000	0.0000	4.8000e-004
Energy	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Mobile	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Waste						0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Water						0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

Total	**1.6400e-003**	**0.0000**	**2.3000e-004**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**4.5000e-004**	**4.5000e-004**	**0.0000**	**0.0000**	**4.8000e-004**

Mitigated Operational

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Area	1.6400e-003	0.0000	2.3000e-004	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	4.5000e-004	4.5000e-004	0.0000	0.0000	4.8000e-004
Energy	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Mobile	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Waste						0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Water						0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**1.6400e-003**	**0.0000**	**2.3000e-004**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**4.5000e-004**	**4.5000e-004**	**0.0000**	**0.0000**	**4.8000e-004**

	ROG	**NOx**	**CO**	**SO2**	**Fugitive PM10**	**Exhaust PM10**	**PM10 Total**	**Fugitive PM2.5**	**Exhaust PM2.5**	**PM2.5 Total**	**Bio- CO2**	**NBio-CO2**	**Total CO2**	**CH4**	**N20**	**CO2e**
Percent Reduction	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**

3.0 Construction Detail

Construction Phase

Phase Number	Phase Name	Phase Type	Start Date	End Date	Num Days Week	Num Days	Phase Description
1	Demolition	Demolition	3/1/2022	5/31/2022	5	66	
2	Excavation	Site Preparation	3/1/2022	5/31/2022	5	66	
3	Foundations Concrete Pour	Paving	3/1/2022	5/31/2022	5	132	
4	Building Construction	Building Construction	9/1/2022	11/30/2023	5	326	

5	Architectural Coating	Architectural Coating	6/1/2023	6/7/2023	5	152	

Acres of Grading (Site Preparation Phase): 0

Acres of Grading (Grading Phase): 0

Acres of Paving: 0.57

Residential Indoor: 0; Residential Outdoor: 0; Non-Residential Indoor: 0; Non-Residential Outdoor: 0; Striped Parking Area: 1,500

OffRoad Equipment

Phase Name	Offroad Equipment Type	Amount	Usage Hours	Horse Power	Load Factor
Demolition	Concrete/Industrial Saws	1	8.00	81	0.73
Demolition	Rubber Tired Dozers	1	1.00	247	0.40
Demolition	Tractors/Loaders/Backhoes	2	6.00	97	0.37
Foundations Concrete Pour	Cement and Mortar Mixers	4	6.00	9	0.56
Foundations Concrete Pour	Pavers	1	7.00	130	0.42
Foundations Concrete Pour	Rollers	1	7.00	80	0.38
Foundations Concrete Pour	Tractors/Loaders/Backhoes	1	7.00	97	0.37
Excavation	Graders	1	8.00	187	0.41
Excavation	Tractors/Loaders/Backhoes	1	8.00	97	0.37
Building Construction	Cranes	1	4.00	231	0.29
Building Construction	Forklifts	2	6.00	89	0.20
Building Construction	Tractors/Loaders/Backhoes	2	8.00	97	0.37
Architectural Coating	Air Compressors	1	6.00	78	0.48

Trips and VMT

Phase Name	Offroad Equipment Count	Worker Trip Number	Vendor Trip Number	Hauling Trip Number	Worker Trip Length	Vendor Trip Length	Hauling Trip Length	Worker Vehicle Class	Vendor Vehicle Class	Hauling Vehicle Class
Demolition	4	10.00	0.00	136.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT
Foundations Concrete Pour	7	18.00	0.00	0.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT
Excavation	2	5.00	0.00	125.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT

Building Construction	5	11.00	4.00	0.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT
Architectural Coating	1	2.00	0.00	0.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT

3.1 Mitigation Measures Construction

Use Cleaner Engines for Construction Equipment

3.2 Demolition - 2022

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					0.0160	0.0000	0.0160	2.4200e-003	0.0000	2.4200e-003	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.0234	0.2117	0.2465	4.0000e-004		0.0111	0.0111		0.0106	0.0106	0.0000	34.3649	34.3649	6.3400e-003	0.0000	34.5235
Total	**0.0234**	**0.2117**	**0.2465**	**4.0000e-004**	**0.0160**	**0.0111**	**0.0271**	**2.4200e-003**	**0.0106**	**0.0131**	**0.0000**	**34.3649**	**34.3649**	**6.3400e-003**	**0.0000**	**34.5235**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	4.9000e-004	0.0202	7.3800e-003	5.0000e-005	1.1400e-003	6.0000e-005	1.2000e-003	3.1000e-004	5.0000e-005	3.7000e-004	0.0000	5.8567	5.8567	1.1000e-003	0.0000	5.8842
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	8.9000e-004	5.4000e-004	6.3900e-003	3.0000e-005	2.6100e-003	2.0000e-005	2.6300e-003	6.9000e-004	2.0000e-005	7.1000e-004	0.0000	2.3010	2.3010	4.0000e-005	0.0000	2.3022

Total	**1.3800e-003**	**0.0207**	**0.0138**	**8.0000e-005**	**3.7500e-003**	**8.0000e-005**	**3.8300e-003**	**1.0000e-003**	**7.0000e-005**	**1.0800e-003**	**0.0000**	**8.1578**	**8.1578**	**1.1400e-003**	**0.0000**	**8.1864**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					0.0160	0.0000	0.0160	2.4200e-003	0.0000	2.4200e-003	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	4.3800e-003	0.0190	0.2591	4.0000e-004		5.8000e-004	5.8000e-004		5.8000e-004	5.8000e-004	0.0000	34.3648	34.3648	6.3400e-003	0.0000	34.5234
Total	**4.3800e-003**	**0.0190**	**0.2591**	**4.0000e-004**	**0.0160**	**5.8000e-004**	**0.0166**	**2.4200e-003**	**5.8000e-004**	**3.0000e-003**	**0.0000**	**34.3648**	**34.3648**	**6.3400e-003**	**0.0000**	**34.5234**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	4.9000e-004	0.0202	7.3800e-003	5.0000e-005	1.1400e-003	6.0000e-005	1.2000e-003	3.1000e-004	5.0000e-005	3.7000e-004	0.0000	5.8567	5.8567	1.1000e-003	0.0000	5.8842
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	8.9000e-004	5.4000e-004	6.3900e-003	3.0000e-005	2.6100e-003	2.0000e-005	2.6300e-003	6.9000e-004	2.0000e-005	7.1000e-004	0.0000	2.3010	2.3010	4.0000e-005	0.0000	2.3022
Total	**1.3800e-003**	**0.0207**	**0.0138**	**8.0000e-005**	**3.7500e-003**	**8.0000e-005**	**3.8300e-003**	**1.0000e-003**	**7.0000e-005**	**1.0800e-003**	**0.0000**	**8.1578**	**8.1578**	**1.1400e-003**	**0.0000**	**8.1864**

3.3 Excavation - 2022

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					0.0177	0.0000	0.0177	1.9100e-003	0.0000	1.9100e-003	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.0191	0.2288	0.1307	3.2000e-004		8.4900e-003	8.4900e-003		7.8100e-003	7.8100e-003	0.0000	28.2163	28.2163	9.1300e-003	0.0000	28.4444
Total	**0.0191**	**0.2288**	**0.1307**	**3.2000e-004**	**0.0177**	**8.4900e-003**	**0.0261**	**1.9100e-003**	**7.8100e-003**	**9.7200e-003**	**0.0000**	**28.2163**	**28.2163**	**9.1300e-003**	**0.0000**	**28.4444**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	4.5000e-004	0.0186	6.7800e-003	5.0000e-005	1.0500e-003	5.0000e-005	1.1000e-003	2.9000e-004	5.0000e-005	3.4000e-004	0.0000	5.3830	5.3830	1.0100e-003	0.0000	5.4083
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	4.4000e-004	2.7000e-004	3.2000e-003	1.0000e-005	1.3000e-003	1.0000e-005	1.3100e-003	3.5000e-004	1.0000e-005	3.6000e-004	0.0000	1.1505	1.1505	2.0000e-005	0.0000	1.1511
Total	**8.9000e-004**	**0.0188**	**9.9800e-003**	**6.0000e-005**	**2.3500e-003**	**6.0000e-005**	**2.4100e-003**	**6.4000e-004**	**6.0000e-005**	**7.0000e-004**	**0.0000**	**6.5336**	**6.5336**	**1.0300e-003**	**0.0000**	**6.5594**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					

Fugitive Dust					0.0177	0.0000	0.0177	1.9100e-003	0.0000	1.9100e-003	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	3.9300e-003	0.0170	0.1755	3.2000e-004		5.2000e-004	5.2000e-004		5.2000e-004	5.2000e-004	0.0000	28.2162	28.2162	9.1300e-003	0.0000	28.4444
Total	**3.9300e-003**	**0.0170**	**0.1755**	**3.2000e-004**	**0.0177**	**5.2000e-004**	**0.0182**	**1.9100e-003**	**5.2000e-004**	**2.4300e-003**	**0.0000**	**28.2162**	**28.2162**	**9.1300e-003**	**0.0000**	**28.4444**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	4.5000e-004	0.0186	6.7800e-003	5.0000e-005	1.0500e-003	5.0000e-005	1.1000e-003	2.9000e-004	5.0000e-005	3.4000e-004	0.0000	5.3830	5.3830	1.0100e-003	0.0000	5.4083
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	4.4000e-004	2.7000e-004	3.2000e-003	1.0000e-005	1.3000e-003	1.0000e-005	1.3100e-003	3.5000e-004	1.0000e-005	3.6000e-004	0.0000	1.1505	1.1505	2.0000e-005	0.0000	1.1511
Total	**8.9000e-004**	**0.0188**	**9.9800e-003**	**6.0000e-005**	**2.3500e-003**	**6.0000e-005**	**2.4100e-003**	**6.4000e-004**	**6.0000e-005**	**7.0000e-004**	**0.0000**	**6.5336**	**6.5336**	**1.0300e-003**	**0.0000**	**6.5594**

3.4 Foundations Concrete Pour - 2022

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.0214	0.1953	0.2322	3.7000e-004		9.7700e-003	9.7700e-003		9.1000e-003	9.1000e-003	0.0000	31.0096	31.0096	9.0300e-003	0.0000	31.2354
Paving	0.0000					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**0.0214**	**0.1953**	**0.2322**	**3.7000e-004**		**9.7700e-003**	**9.7700e-003**		**9.1000e-003**	**9.1000e-003**	**0.0000**	**31.0096**	**31.0096**	**9.0300e-003**	**0.0000**	**31.2354**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	1.5900e-003	9.8000e-004	0.0115	5.0000e-005	4.6900e-003	3.0000e-005	4.7300e-003	1.2500e-003	3.0000e-005	1.2800e-003	0.0000	4.1419	4.1419	8.0000e-005	0.0000	4.1439
Total	**1.5900e-003**	**9.8000e-004**	**0.0115**	**5.0000e-005**	**4.6900e-003**	**3.0000e-005**	**4.7300e-003**	**1.2500e-003**	**3.0000e-005**	**1.2800e-003**	**0.0000**	**4.1419**	**4.1419**	**8.0000e-005**	**0.0000**	**4.1439**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	3.6900e-003	0.0160	0.2278	3.7000e-004		4.9000e-004	4.9000e-004		4.9000e-004	4.9000e-004	0.0000	31.0095	31.0095	9.0300e-003	0.0000	31.2354
Paving	0.0000					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**3.6900e-003**	**0.0160**	**0.2278**	**3.7000e-004**		**4.9000e-004**	**4.9000e-004**		**4.9000e-004**	**4.9000e-004**	**0.0000**	**31.0095**	**31.0095**	**9.0300e-003**	**0.0000**	**31.2354**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	1.5900e-003	9.8000e-004	0.0115	5.0000e-005	4.6900e-003	3.0000e-005	4.7300e-003	1.2500e-003	3.0000e-005	1.2800e-003	0.0000	4.1419	4.1419	8.0000e-005	0.0000	4.1439
Total	**1.5900e-003**	**9.8000e-004**	**0.0115**	**5.0000e-005**	**4.6900e-003**	**3.0000e-005**	**4.7300e-003**	**1.2500e-003**	**3.0000e-005**	**1.2800e-003**	**0.0000**	**4.1419**	**4.1419**	**8.0000e-005**	**0.0000**	**4.1439**

3.5 Building Construction - 2022

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.0299	0.3056	0.3111	5.0000e-004		0.0162	0.0162		0.0149	0.0149	0.0000	43.5643	43.5643	0.0141	0.0000	43.9165
Total	**0.0299**	**0.3056**	**0.3111**	**5.0000e-004**		**0.0162**	**0.0162**		**0.0149**	**0.0149**	**0.0000**	**43.5643**	**43.5643**	**0.0141**	**0.0000**	**43.9165**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

Vendor	5.0000e-004	0.0189	5.9800e-003	5.0000e-005	1.1400e-003	4.0000e-005	1.1800e-003	3.3000e-004	4.0000e-005	3.7000e-004	0.0000	4.6924	4.6924	6.2000e-004	0.0000	4.7080
Worker	1.2800e-003	7.9000e-004	9.2700e-003	4.0000e-005	3.7800e-003	3.0000e-005	3.8100e-003	1.0100e-003	3.0000e-005	1.0300e-003	0.0000	3.3365	3.3365	6.0000e-005	0.0000	3.3381
Total	**1.7800e-003**	**0.0197**	**0.0153**	**9.0000e-005**	**4.9200e-003**	**7.0000e-005**	**4.9900e-003**	**1.3400e-003**	**7.0000e-005**	**1.4000e-003**	**0.0000**	**8.0290**	**8.0290**	**6.8000e-004**	**0.0000**	**8.0461**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	6.0800e-003	0.0263	0.3361	5.0000e-004		8.1000e-004	8.1000e-004		8.1000e-004	8.1000e-004	0.0000	43.5642	43.5642	0.0141	0.0000	43.9164
Total	**6.0800e-003**	**0.0263**	**0.3361**	**5.0000e-004**		**8.1000e-004**	**8.1000e-004**		**8.1000e-004**	**8.1000e-004**	**0.0000**	**43.5642**	**43.5642**	**0.0141**	**0.0000**	**43.9164**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	5.0000e-004	0.0189	5.9800e-003	5.0000e-005	1.1400e-003	4.0000e-005	1.1800e-003	3.3000e-004	4.0000e-005	3.7000e-004	0.0000	4.6924	4.6924	6.2000e-004	0.0000	4.7080
Worker	1.2800e-003	7.9000e-004	9.2700e-003	4.0000e-005	3.7800e-003	3.0000e-005	3.8100e-003	1.0100e-003	3.0000e-005	1.0300e-003	0.0000	3.3365	3.3365	6.0000e-005	0.0000	3.3381
Total	**1.7800e-003**	**0.0197**	**0.0153**	**9.0000e-005**	**4.9200e-003**	**7.0000e-005**	**4.9900e-003**	**1.3400e-003**	**7.0000e-005**	**1.4000e-003**	**0.0000**	**8.0290**	**8.0290**	**6.8000e-004**	**0.0000**	**8.0461**

3.5 Building Construction - 2023

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.0756	0.7670	0.8481	1.3600e-003		0.0383	0.0383		0.0352	0.0352	0.0000	119.7491	119.7491	0.0387	0.0000	120.7173
Total	**0.0756**	**0.7670**	**0.8481**	**1.3600e-003**		**0.0383**	**0.0383**		**0.0352**	**0.0352**	**0.0000**	**119.7491**	**119.7491**	**0.0387**	**0.0000**	**120.7173**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	1.1000e-003	0.0430	0.0159	1.2000e-004	3.1200e-003	6.0000e-005	3.1900e-003	9.0000e-004	6.0000e-005	9.6000e-004	0.0000	12.5704	12.5704	1.6700e-003	0.0000	12.6122
Worker	3.3400e-003	1.9600e-003	0.0238	1.0000e-004	0.0104	8.0000e-005	0.0105	2.7600e-003	7.0000e-005	2.8300e-003	0.0000	8.8118	8.8118	1.6000e-004	0.0000	8.8158
Total	**4.4400e-003**	**0.0450**	**0.0396**	**2.2000e-004**	**0.0135**	**1.4000e-004**	**0.0137**	**3.6600e-003**	**1.3000e-004**	**3.7900e-003**	**0.0000**	**21.3822**	**21.3822**	**1.8300e-003**	**0.0000**	**21.4280**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.0167	0.0723	0.9233	1.3600e-003		2.2300e-003	2.2300e-003		2.2300e-003	2.2300e-003	0.0000	119.7489	119.7489	0.0387	0.0000	120.7172
Total	**0.0167**	**0.0723**	**0.9233**	**1.3600e-003**		**2.2300e-003**	**2.2300e-003**		**2.2300e-003**	**2.2300e-003**	**0.0000**	**119.7489**	**119.7489**	**0.0387**	**0.0000**	**120.7172**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	1.1000e-003	0.0430	0.0159	1.2000e-004	3.1200e-003	6.0000e-005	3.1900e-003	9.0000e-004	6.0000e-005	9.6000e-004	0.0000	12.5704	12.5704	1.6700e-003	0.0000	12.6122
Worker	3.3400e-003	1.9600e-003	0.0238	1.0000e-004	0.0104	8.0000e-005	0.0105	2.7600e-003	7.0000e-005	2.8300e-003	0.0000	8.8118	8.8118	1.6000e-004	0.0000	8.8158
Total	**4.4400e-003**	**0.0450**	**0.0396**	**2.2000e-004**	**0.0135**	**1.4000e-004**	**0.0137**	**3.6600e-003**	**1.3000e-004**	**3.7900e-003**	**0.0000**	**21.3822**	**21.3822**	**1.8300e-003**	**0.0000**	**21.4280**

3.6 Architectural Coating - 2023

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Archit. Coating	1.7000e-004					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Off-Road	4.8000e-004	3.2600e-003	4.5300e-003	1.0000e-005		1.8000e-004	1.8000e-004		1.8000e-004	1.8000e-004	0.0000	0.6383	0.6383	4.0000e-005	0.0000	0.6393
Total	**6.5000e-004**	**3.2600e-003**	**4.5300e-003**	**1.0000e-005**		**1.8000e-004**	**1.8000e-004**		**1.8000e-004**	**1.8000e-004**	**0.0000**	**0.6383**	**0.6383**	**4.0000e-005**	**0.0000**	**0.6393**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	1.0000e-005	1.0000e-005	9.0000e-005	0.0000	4.0000e-005	0.0000	4.0000e-005	1.0000e-005	0.0000	1.0000e-005	0.0000	0.0335	0.0335	0.0000	0.0000	0.0335
Total	**1.0000e-005**	**1.0000e-005**	**9.0000e-005**	**0.0000**	**4.0000e-005**	**0.0000**	**4.0000e-005**	**1.0000e-005**	**0.0000**	**1.0000e-005**	**0.0000**	**0.0335**	**0.0335**	**0.0000**	**0.0000**	**0.0335**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Archit. Coating	1.7000e-004					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	7.0000e-005	3.2000e-004	4.5800e-003	1.0000e-005		1.0000e-005	1.0000e-005		1.0000e-005	1.0000e-005	0.0000	0.6383	0.6383	4.0000e-005	0.0000	0.6393
Total	**2.4000e-004**	**3.2000e-004**	**4.5800e-003**	**1.0000e-005**		**1.0000e-005**	**1.0000e-005**		**1.0000e-005**	**1.0000e-005**	**0.0000**	**0.6383**	**0.6383**	**4.0000e-005**	**0.0000**	**0.6393**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	1.0000e-005	1.0000e-005	9.0000e-005	0.0000	4.0000e-005	0.0000	4.0000e-005	1.0000e-005	0.0000	1.0000e-005	0.0000	0.0335	0.0335	0.0000	0.0000	0.0335
Total	**1.0000e-005**	**1.0000e-005**	**9.0000e-005**	**0.0000**	**4.0000e-005**	**0.0000**	**4.0000e-005**	**1.0000e-005**	**0.0000**	**1.0000e-005**	**0.0000**	**0.0335**	**0.0335**	**0.0000**	**0.0000**	**0.0335**

4.0 Operational Detail - Mobile

4.1 Mitigation Measures Mobile

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Mitigated	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Unmitigated	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

4.2 Trip Summary Information

	Average Daily Trip Rate	Unmitigated	Mitigated

Land Use	Weekday	Saturday	Sunday	Annual VMT	Annual VMT
Enclosed Parking with Elevator	0.00	0.00	0.00		
Total	0.00	0.00	0.00		

4.3 Trip Type Information

	Miles			Trip %			Trip Purpose %		
Land Use	H-W or C-W	H-S or C-C	H-O or C-NW	H-W or C-W	H-S or C-C	H-O or C-NW	Primary	Diverted	Pass-by
Enclosed Parking with Elevator	9.50	7.30	7.30	0.00	0.00	0.00	0	0	0

4.4 Fleet Mix

Land Use	LDA	LDT1	LDT2	MDV	LHD1	LHD2	MHD	HHD	OBUS	UBUS	MCY	SBUS	MH
Enclosed Parking with Elevator	0.604697	0.038136	0.192426	0.089922	0.013708	0.005077	0.031210	0.009257	0.004288	0.003553	0.006262	0.000945	0.000519

5.0 Energy Detail

Historical Energy Use: N

5.1 Mitigation Measures Energy

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Electricity Mitigated						0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Electricity Unmitigated						0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
NaturalGas Mitigated	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
NaturalGas Unmitigated	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

5.2 Energy by Land Use - NaturalGas

Unmitigated

	NaturalGas Use	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Land Use	kBTU/yr	tons/yr										MT/yr					
Enclosed Parking with Elevator	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total		**0.0000**	**0.0000**	**0.0000**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**

Mitigated

	NaturalGas Use	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Land Use	kBTU/yr	tons/yr										MT/yr					
Enclosed Parking with Elevator	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total		**0.0000**	**0.0000**	**0.0000**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**

5.3 Energy by Land Use - Electricity

Unmitigated

	Electricity Use	Total CO2	CH4	N2O	CO2e
Land Use	kWh/yr	MT/yr			

Enclosed Parking with Elevator	0	0.0000	0.0000	0.0000	0.0000
Total		**0.0000**	**0.0000**	**0.0000**	**0.0000**

Mitigated

	Electricity Use	Total CO2	CH4	N2O	CO2e
Land Use	kWh/yr	MT/yr			
Enclosed Parking with Elevator	0	0.0000	0.0000	0.0000	0.0000
Total		**0.0000**	**0.0000**	**0.0000**	**0.0000**

6.0 Area Detail

6.1 Mitigation Measures Area

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Mitigated	1.6400e-003	0.0000	2.3000e-004	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	4.5000e-004	4.5000e-004	0.0000	0.0000	4.8000e-004
Unmitigated	1.6400e-003	0.0000	2.3000e-004	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	4.5000e-004	4.5000e-004	0.0000	0.0000	4.8000e-004

6.2 Area by SubCategory

Unmitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
SubCategory	tons/yr										MT/yr					
Architectural Coating	0.0000					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Consumer Products	1.6200e-003					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Landscaping	2.0000e-005	0.0000	2.3000e-004	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	4.5000e-004	4.5000e-004	0.0000	0.0000	4.8000e-004
Total	**1.6400e-003**	**0.0000**	**2.3000e-004**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**	**0.0000**	**4.5000e-004**	**4.5000e-004**	**0.0000**	**0.0000**	**4.8000e-004**

Mitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
SubCategory	tons/yr										MT/yr					
Architectural Coating	0.0000					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Consumer Products	1.6200e-003					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Landscaping	2.0000e-005	0.0000	2.3000e-004	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	4.5000e-004	4.5000e-004	0.0000	0.0000	4.8000e-004
Total	**1.6400e-003**	**0.0000**	**2.3000e-004**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**	**0.0000**	**4.5000e-004**	**4.5000e-004**	**0.0000**	**0.0000**	**4.8000e-004**

7.0 Water Detail

7.1 Mitigation Measures Water

	Total CO2	CH4	N2O	CO2e
Category	MT/yr			
Mitigated	0.0000	0.0000	0.0000	0.0000
Unmitigated	0.0000	0.0000	0.0000	0.0000

7.2 Water by Land Use

Unmitigated

	Indoor/Outdoor Use	Total CO2	CH4	N2O	CO2e
Land Use	Mgal	MT/yr			
Enclosed Parking with Elevator	0 / 0	0.0000	0.0000	0.0000	0.0000
Total		**0.0000**	**0.0000**	**0.0000**	**0.0000**

Mitigated

	Indoor/Outdoor Use	Total CO2	CH4	N2O	CO2e
Land Use	Mgal	MT/yr			
Enclosed Parking with Elevator	0 / 0	0.0000	0.0000	0.0000	0.0000
Total		**0.0000**	**0.0000**	**0.0000**	**0.0000**

8.0 Waste Detail

8.1 Mitigation Measures Waste

Category/Year

	Total CO2	CH4	N2O	CO2e
	MT/yr			
Mitigated	0.0000	0.0000	0.0000	0.0000
Unmitigated	0.0000	0.0000	0.0000	0.0000

8.2 Waste by Land Use

Unmitigated

	Waste Disposed	Total CO2	CH4	N2O	CO2e
Land Use	tons	MT/yr			

Enclosed Parking with Elevator	0	0.0000	0.0000	0.0000	0.0000
Total		**0.0000**	**0.0000**	**0.0000**	**0.0000**

Mitigated

	Waste Disposed	Total CO2	CH4	N2O	CO2e
Land Use	tons	MT/yr			
Enclosed Parking with Elevator	0	0.0000	0.0000	0.0000	0.0000
Total		**0.0000**	**0.0000**	**0.0000**	**0.0000**

9.0 Operational Offroad

Equipment Type	Number	Hours/Day	Days/Year	Horse Power	Load Factor	Fuel Type

10.0 Stationary Equipment

Fire Pumps and Emergency Generators

Equipment Type	Number	Hours/Day	Hours/Year	Horse Power	Load Factor	Fuel Type

Boilers

Equipment Type	Number	Heat Input/Day	Heat Input/Year	Boiler Rating	Fuel Type

User Defined Equipment

Equipment Type	Number

11.0 Vegetation

Mitigated

	Waste Disposed	Total CO2	CH4	N2O	CO2e
Land Use	tons	MT/yr			
Enclosed Parking with Elevator	0	0.0000	0.0000	0.0000	0.0000
Total		**0.0000**	**0.0000**	**0.0000**	**0.0000**

9.0 Operational Offroad

Equipment Type	Number	Hours/Day	Days/Year	Horse Power	Load Factor	Fuel Type

10.0 Stationary Equipment

Fire Pumps and Emergency Generators

Equipment Type	Number	Hours/Day	Hours/Year	Horse Power	Load Factor	Fuel Type

Boilers

Equipment Type	Number	Heat Input/Day	Heat Input/Year	Boiler Rating	Fuel Type

User Defined Equipment

Equipment Type	Number

11.0 Vegetation

UCSF CPHP RAB Construction

San Francisco County, Annual

1.0 Project Characteristics

1.1 Land Usage

Land Uses	Size	Metric	Lot Acreage	Floor Surface Area	Population
Research & Development	270.00	1000sqft	2.50	270,000.00	0

1.2 Other Project Characteristics

Urbanization	Urban	**Wind Speed (m/s)**	4.6	**Precipitation Freq (Days)**	64
Climate Zone	5			**Operational Year**	2026
Utility Company					
CO2 Intensity (lb/MWhr)	605.78	**CH4 Intensity (lb/MWhr)**	0	**N2O Intensity (lb/MWhr)**	0

1.3 User Entered Comments & Non-Default Data

Project Characteristics - UCSF is it own ekectricity provider

Land Use - Adjust acreage to match project site.

Construction Phase - Construction schedule provided by applicant.

Trips and VMT -

Demolition - Includes 145.000 sf for UC Hall and 88,000 sf for School of nursing.

Grading - Excavation volume provided by applicant.

Vehicle Trips - Construction run only

Consumer Products - Construction run only. No operational emissions

Energy Use - Construction run only.

Water And Wastewater - Construction run only.

Solid Waste - Construction run only.

Construction Off-road Equipment Mitigation - Tier 4 final as mitigation

Table Name	Column Name	Default Value	New Value
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	1.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	1.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	2.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	4.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	2.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	2.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	2.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	1.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	8.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	6.00
tblConstEquipMitigation	Tier	No Change	Tier 4 Final
tblConstEquipMitigation	Tier	No Change	Tier 4 Final
tblConstEquipMitigation	Tier	No Change	Tier 4 Final
tblConstEquipMitigation	Tier	No Change	Tier 4 Final
tblConstEquipMitigation	Tier	No Change	Tier 4 Final
tblConstEquipMitigation	Tier	No Change	Tier 4 Final
tblConstEquipMitigation	Tier	No Change	Tier 4 Final
tblConstEquipMitigation	Tier	No Change	Tier 4 Final
tblConstEquipMitigation	Tier	No Change	Tier 4 Final
tblConstEquipMitigation	Tier	No Change	Tier 4 Final
tblConstructionPhase	NumDays	10.00	523.00
tblConstructionPhase	NumDays	220.00	130.00
tblConstructionPhase	NumDays	220.00	675.00
tblConstructionPhase	NumDays	20.00	66.00
tblConstructionPhase	NumDays	6.00	219.00

tblConstructionPhase	NumDays	3.00	66.00
tblConsumerProducts	ROG_EF	2.14E-05	0
tblConsumerProducts	ROG_EF_Degreaser	3.542E-07	0
tblEnergyUse	LightingElect	2.99	0.00
tblEnergyUse	NT24E	3.36	0.00
tblEnergyUse	NT24NG	6.90	0.00
tblEnergyUse	T24E	1.21	0.00
tblEnergyUse	T24NG	17.85	0.00
tblGrading	AcresOfGrading	109.50	3.00
tblGrading	AcresOfGrading	99.00	4.50
tblGrading	MaterialExported	0.00	27,363.00
tblGrading	MaterialExported	0.00	50,104.00
tblLandUse	LotAcreage	6.20	2.50
tblSolidWaste	SolidWasteGenerationRate	20.52	0.00
tblVehicleTrips	ST_TR	1.90	0.00
tblVehicleTrips	SU_TR	1.11	0.00
tblVehicleTrips	WD_TR	8.11	0.00
tblWater	AerobicPercent	87.46	100.00
tblWater	AnaerobicandFacultativeLagoonsPercent	2.21	0.00
tblWater	ElectricityIntensityFactorForWastewaterTreatment	1,911.00	0.00
tblWater	IndoorWaterUseRate	132,757,365.74	0.00
tblWater	SepticTankPercent	10.33	0.00

2.0 Emissions Summary

2.1 Overall Construction

Unmitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	tons/yr										MT/yr					
2022	0.3331	4.5442	2.5417	8.2300e-003	0.8955	0.1404	1.0359	0.4107	0.1300	0.5407	0.0000	800.1160	800.1160	0.1876	0.0000	804.8070
2023	0.2644	2.3024	2.2398	5.5300e-003	0.1257	0.0812	0.2069	0.0343	0.0778	0.1121	0.0000	495.3826	495.3826	0.0724	0.0000	497.1930
2024	0.9835	2.3637	2.5021	6.0700e-003	0.1443	0.0800	0.2243	0.0393	0.0769	0.1161	0.0000	542.5779	542.5779	0.0742	0.0000	544.4323
2025	0.9625	2.2269	2.4656	5.9900e-003	0.1437	0.0695	0.2132	0.0391	0.0668	0.1059	0.0000	535.6264	535.6264	0.0729	0.0000	537.4497
Maximum	**0.9835**	**4.5442**	**2.5417**	**8.2300e-003**	**0.8955**	**0.1404**	**1.0359**	**0.4107**	**0.1300**	**0.5407**	**0.0000**	**800.1160**	**800.1160**	**0.1876**	**0.0000**	**804.8070**

Mitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	tons/yr										MT/yr					
2022	0.0932	1.7037	2.8173	8.2300e-003	0.8955	0.0107	0.9062	0.4107	0.0105	0.4212	0.0000	800.1155	800.1155	0.1876	0.0000	804.8066
2023	0.0845	1.0345	2.3335	5.5300e-003	0.1257	5.9600e-003	0.1317	0.0343	5.8800e-003	0.0402	0.0000	495.3822	495.3822	0.0724	0.0000	497.1927
2024	0.7977	1.0481	2.6145	6.0700e-003	0.1443	6.6200e-003	0.1509	0.0393	6.5200e-003	0.0458	0.0000	542.5776	542.5776	0.0742	0.0000	544.4320
2025	0.7927	1.0303	2.5898	5.9900e-003	0.1437	6.5600e-003	0.1503	0.0391	6.4700e-003	0.0456	0.0000	535.6260	535.6260	0.0729	0.0000	537.4494
Maximum	**0.7977**	**1.7037**	**2.8173**	**8.2300e-003**	**0.8955**	**0.0107**	**0.9062**	**0.4107**	**0.0105**	**0.4212**	**0.0000**	**800.1155**	**800.1155**	**0.1876**	**0.0000**	**804.8066**

	ROG	**NOx**	**CO**	**SO2**	**Fugitive PM10**	**Exhaust PM10**	**PM10 Total**	**Fugitive PM2.5**	**Exhaust PM2.5**	**PM2.5 Total**	**Bio- CO2**	**NBio-CO2**	**Total CO2**	**CH4**	**N20**	**CO2e**
Percent Reduction	**30.49**	**57.89**	**-6.22**	**0.00**	**0.00**	**91.95**	**20.30**	**0.00**	**91.63**	**36.81**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**

Quarter	**Start Date**	**End Date**	**Maximum Unmitigated ROG + NOX (tons/quarter)**	**Maximum Mitigated ROG + NOX (tons/quarter)**
4	**3-1-2022**	**5-31-2022**	2.8268	1.2026

5	**6-1-2022**	**8-31-2022**	0.7625	0.1980
6	**9-1-2022**	**11-30-2022**	0.7571	0.1988
7	**12-1-2022**	**2-28-2023**	0.9160	0.3554
8	**3-1-2023**	**5-31-2023**	0.6478	0.2818
9	**6-1-2023**	**8-31-2023**	0.6468	0.2809
10	**9-1-2023**	**11-30-2023**	0.6416	0.2797
11	**12-1-2023**	**2-29-2024**	0.7671	0.3982
12	**3-1-2024**	**5-31-2024**	0.8386	0.4620
13	**6-1-2024**	**8-31-2024**	0.8376	0.4610
14	**9-1-2024**	**11-30-2024**	0.8305	0.4580
15	**12-1-2024**	**2-28-2025**	0.7989	0.4514
16	**3-1-2025**	**5-31-2025**	0.8021	0.4581
17	**6-1-2025**	**8-31-2025**	0.8011	0.4571
18	**9-1-2025**	**9-30-2025**	0.2612	0.1491
		Highest	2.8268	1.2026

2.2 Overall Operational

Unmitigated Operational

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Area	0.1410	2.0000e-005	2.4700e-003	0.0000		1.0000e-005	1.0000e-005		1.0000e-005	1.0000e-005	0.0000	4.8200e-003	4.8200e-003	1.0000e-005	0.0000	5.1400e-003
Energy	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Mobile	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Waste						0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Water						0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

Total	**0.1410**	**2.0000e-005**	**2.4700e-003**	**0.0000**	**0.0000**	**1.0000e-005**	**1.0000e-005**	**0.0000**	**1.0000e-005**	**1.0000e-005**	**0.0000**	**4.8200e-003**	**4.8200e-003**	**1.0000e-005**	**0.0000**	**5.1400e-003**

Mitigated Operational

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Area	0.1410	2.0000e-005	2.4700e-003	0.0000		1.0000e-005	1.0000e-005		1.0000e-005	1.0000e-005	0.0000	4.8200e-003	4.8200e-003	1.0000e-005	0.0000	5.1400e-003
Energy	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Mobile	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Waste						0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Water						0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**0.1410**	**2.0000e-005**	**2.4700e-003**	**0.0000**	**0.0000**	**1.0000e-005**	**1.0000e-005**	**0.0000**	**1.0000e-005**	**1.0000e-005**	**0.0000**	**4.8200e-003**	**4.8200e-003**	**1.0000e-005**	**0.0000**	**5.1400e-003**

	ROG	**NOx**	**CO**	**SO2**	**Fugitive PM10**	**Exhaust PM10**	**PM10 Total**	**Fugitive PM2.5**	**Exhaust PM2.5**	**PM2.5 Total**	**Bio- CO2**	**NBio-CO2**	**Total CO2**	**CH4**	**N20**	**CO2e**
Percent Reduction	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**

3.0 Construction Detail

Construction Phase

Phase Number	Phase Name	Phase Type	Start Date	End Date	Num Days Week	Num Days	Phase Description
1	Demolition	Demolition	3/1/2022	5/31/2022	5	66	
2	Site Preparation	Site Preparation	3/1/2022	5/31/2022	5	66	
3	Grading	Grading	3/1/2022	12/31/2022	5	219	
4	Draiange/Utilities/Subgrade	Trenching	3/1/2022	5/31/2022	5	66	

5	Foundations/Concrete Pour	Building Construction	12/1/2022	5/31/2023	5	130	
6	Building Construction	Building Construction	6/1/2023	12/31/2025	5	675	
7	Architectural Coating	Architectural Coating	1/1/2024	12/31/2025	5	523	

Acres of Grading (Site Preparation Phase): 4.5

Acres of Grading (Grading Phase): 3

Acres of Paving: 0

Residential Indoor: 0; Residential Outdoor: 0; Non-Residential Indoor: 405,000; Non-Residential Outdoor: 135,000; Striped Parking Area: 0

OffRoad Equipment

Phase Name	Offroad Equipment Type	Amount	Usage Hours	Horse Power	Load Factor
Demolition	Concrete/Industrial Saws	1	8.00	81	0.73
Demolition	Rubber Tired Dozers	1	8.00	247	0.40
Demolition	Tractors/Loaders/Backhoes	3	8.00	97	0.37
Site Preparation	Graders	1	8.00	187	0.41
Site Preparation	Scrapers	1	8.00	367	0.48
Site Preparation	Tractors/Loaders/Backhoes	1	7.00	97	0.37
Grading	Graders	1	8.00	187	0.41
Grading	Rubber Tired Dozers	1	8.00	247	0.40
Grading	Tractors/Loaders/Backhoes	2	7.00	97	0.37
Foundations/Concrete Pour	Cranes	1	8.00	231	0.29
Foundations/Concrete Pour	Forklifts	2	7.00	89	0.20
Foundations/Concrete Pour	Generator Sets	1	8.00	84	0.74
Foundations/Concrete Pour	Tractors/Loaders/Backhoes	1	6.00	97	0.37
Foundations/Concrete Pour	Welders	3	8.00	46	0.45
Building Construction	Cranes	1	8.00	231	0.29
Building Construction	Forklifts	2	7.00	89	0.20
Building Construction	Generator Sets	1	8.00	84	0.74
Building Construction	Tractors/Loaders/Backhoes	1	6.00	97	0.37
Building Construction	Welders	3	8.00	46	0.45

Architectural Coating	Air Compressors	1	6.00	78	0.48

Trips and VMT

Phase Name	Offroad Equipment Count	Worker Trip Number	Vendor Trip Number	Hauling Trip Number	Worker Trip Length	Vendor Trip Length	Hauling Trip Length	Worker Vehicle Class	Vendor Vehicle Class	Hauling Vehicle Class
Demolition	5	13.00	0.00	1,060.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT
Site Preparation	3	8.00	0.00	4,954.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT
Grading	4	10.00	0.00	3,420.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT
Draiange/Utilities/Subgrade			0.00	0.00	10.80	7.30				
Foundations/Concrete Pour	8	86.00	44.00	0.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT
Building Construction	8	86.00	44.00	0.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT
Architectural Coating	1	17.00	0.00	0.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT

3.1 Mitigation Measures Construction

Use Cleaner Engines for Construction Equipment

3.2 Demolition - 2022

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					0.1242	0.0000	0.1242	0.0188	0.0000	0.0188	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.0557	0.5485	0.4607	8.0000e-004		0.0277	0.0277		0.0258	0.0258	0.0000	69.5564	69.5564	0.0177	0.0000	69.9995
Total	**0.0557**	**0.5485**	**0.4607**	**8.0000e-004**	**0.1242**	**0.0277**	**0.1518**	**0.0188**	**0.0258**	**0.0446**	**0.0000**	**69.5564**	**69.5564**	**0.0177**	**0.0000**	**69.9995**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	3.8300e-003	0.1575	0.0575	4.2000e-004	8.8900e-003	4.3000e-004	9.3200e-003	2.4400e-003	4.1000e-004	2.8500e-003	0.0000	45.6481	45.6481	8.5700e-003	0.0000	45.8625
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	1.1500e-003	7.0000e-004	8.3100e-003	3.0000e-005	3.3900e-003	3.0000e-005	3.4200e-003	9.0000e-004	2.0000e-005	9.3000e-004	0.0000	2.9914	2.9914	6.0000e-005	0.0000	2.9928
Total	**4.9800e-003**	**0.1582**	**0.0658**	**4.5000e-004**	**0.0123**	**4.6000e-004**	**0.0127**	**3.3400e-003**	**4.3000e-004**	**3.7800e-003**	**0.0000**	**48.6395**	**48.6395**	**8.6300e-003**	**0.0000**	**48.8553**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					0.1242	0.0000	0.1242	0.0188	0.0000	0.0188	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	9.2800e-003	0.0402	0.4857	8.0000e-004		1.2400e-003	1.2400e-003		1.2400e-003	1.2400e-003	0.0000	69.5563	69.5563	0.0177	0.0000	69.9994
Total	**9.2800e-003**	**0.0402**	**0.4857**	**8.0000e-004**	**0.1242**	**1.2400e-003**	**0.1254**	**0.0188**	**1.2400e-003**	**0.0200**	**0.0000**	**69.5563**	**69.5563**	**0.0177**	**0.0000**	**69.9994**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e

Category	tons/yr										MT/yr					
Hauling	3.8300e-003	0.1575	0.0575	4.2000e-004	8.8900e-003	4.3000e-004	9.3200e-003	2.4400e-003	4.1000e-004	2.8500e-003	0.0000	45.6481	45.6481	8.5700e-003	0.0000	45.8625
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	1.1500e-003	7.0000e-004	8.3100e-003	3.0000e-005	3.3900e-003	3.0000e-005	3.4200e-003	9.0000e-004	2.0000e-005	9.3000e-004	0.0000	2.9914	2.9914	6.0000e-005	0.0000	2.9928
Total	**4.9800e-003**	**0.1582**	**0.0658**	**4.5000e-004**	**0.0123**	**4.6000e-004**	**0.0127**	**3.3400e-003**	**4.3000e-004**	**3.7800e-003**	**0.0000**	**48.6395**	**48.6395**	**8.6300e-003**	**0.0000**	**48.8553**

3.3 Site Preparation - 2022

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					2.3900e-003	0.0000	2.3900e-003	2.6000e-004	0.0000	2.6000e-004	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.0455	0.5170	0.3318	8.1000e-004		0.0196	0.0196		0.0181	0.0181	0.0000	71.1053	71.1053	0.0230	0.0000	71.6802
Total	**0.0455**	**0.5170**	**0.3318**	**8.1000e-004**	**2.3900e-003**	**0.0196**	**0.0220**	**2.6000e-004**	**0.0181**	**0.0183**	**0.0000**	**71.1053**	**71.1053**	**0.0230**	**0.0000**	**71.6802**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0179	0.7358	0.2689	1.9700e-003	0.0416	2.0100e-003	0.0436	0.0114	1.9200e-003	0.0133	0.0000	213.3405	213.3405	0.0401	0.0000	214.3422
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

Worker	7.1000e-004	4.3000e-004	5.1200e-003	2.0000e-005	2.0900e-003	2.0000e-005	2.1000e-003	5.5000e-004	1.0000e-005	5.7000e-004	0.0000	1.8408	1.8408	4.0000e-005	0.0000	1.8417
Total	**0.0186**	**0.7363**	**0.2740**	**1.9900e-003**	**0.0436**	**2.0300e-003**	**0.0457**	**0.0120**	**1.9300e-003**	**0.0139**	**0.0000**	**215.1813**	**215.1813**	**0.0401**	**0.0000**	**216.1839**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					2.3900e-003	0.0000	2.3900e-003	2.6000e-004	0.0000	2.6000e-004	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	9.9300e-003	0.0430	0.3914	8.1000e-004		1.3200e-003	1.3200e-003		1.3200e-003	1.3200e-003	0.0000	71.1052	71.1052	0.0230	0.0000	71.6801
Total	**9.9300e-003**	**0.0430**	**0.3914**	**8.1000e-004**	**2.3900e-003**	**1.3200e-003**	**3.7100e-003**	**2.6000e-004**	**1.3200e-003**	**1.5800e-003**	**0.0000**	**71.1052**	**71.1052**	**0.0230**	**0.0000**	**71.6801**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0179	0.7358	0.2689	1.9700e-003	0.0416	2.0100e-003	0.0436	0.0114	1.9200e-003	0.0133	0.0000	213.3405	213.3405	0.0401	0.0000	214.3422
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	7.1000e-004	4.3000e-004	5.1200e-003	2.0000e-005	2.0900e-003	2.0000e-005	2.1000e-003	5.5000e-004	1.0000e-005	5.7000e-004	0.0000	1.8408	1.8408	4.0000e-005	0.0000	1.8417
Total	**0.0186**	**0.7363**	**0.2740**	**1.9900e-003**	**0.0436**	**2.0300e-003**	**0.0457**	**0.0120**	**1.9300e-003**	**0.0139**	**0.0000**	**215.1813**	**215.1813**	**0.0401**	**0.0000**	**216.1839**

3.4 Grading - 2022

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					0.6651	0.0000	0.6651	0.3633	0.0000	0.3633	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.1687	1.8597	1.0096	2.2600e-003		0.0813	0.0813		0.0748	0.0748	0.0000	198.2247	198.2247	0.0641	0.0000	199.8275
Total	**0.1687**	**1.8597**	**1.0096**	**2.2600e-003**	**0.6651**	**0.0813**	**0.7463**	**0.3633**	**0.0748**	**0.4380**	**0.0000**	**198.2247**	**198.2247**	**0.0641**	**0.0000**	**199.8275**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0123	0.5080	0.1856	1.3600e-003	0.0287	1.3900e-003	0.0301	7.8700e-003	1.3300e-003	9.2000e-003	0.0000	147.2799	147.2799	0.0277	0.0000	147.9714
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	2.9400e-003	1.8000e-003	0.0212	8.0000e-005	8.6500e-003	6.0000e-005	8.7200e-003	2.3000e-003	6.0000e-005	2.3600e-003	0.0000	7.6353	7.6353	1.5000e-004	0.0000	7.6390
Total	**0.0153**	**0.5098**	**0.2069**	**1.4400e-003**	**0.0373**	**1.4500e-003**	**0.0388**	**0.0102**	**1.3900e-003**	**0.0116**	**0.0000**	**154.9151**	**154.9151**	**0.0278**	**0.0000**	**155.6104**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e

Category	tons/yr										MT/yr					
Fugitive Dust					0.6651	0.0000	0.6651	0.3633	0.0000	0.3633	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.0276	0.1196	1.1943	2.2600e-003		3.6800e-003	3.6800e-003		3.6800e-003	3.6800e-003	0.0000	198.2245	198.2245	0.0641	0.0000	199.8272
Total	**0.0276**	**0.1196**	**1.1943**	**2.2600e-003**	**0.6651**	**3.6800e-003**	**0.6687**	**0.3633**	**3.6800e-003**	**0.3669**	**0.0000**	**198.2245**	**198.2245**	**0.0641**	**0.0000**	**199.8272**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0123	0.5080	0.1856	1.3600e-003	0.0287	1.3900e-003	0.0301	7.8700e-003	1.3300e-003	9.2000e-003	0.0000	147.2799	147.2799	0.0277	0.0000	147.9714
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	2.9400e-003	1.8000e-003	0.0212	8.0000e-005	8.6500e-003	6.0000e-005	8.7200e-003	2.3000e-003	6.0000e-005	2.3600e-003	0.0000	7.6353	7.6353	1.5000e-004	0.0000	7.6390
Total	**0.0153**	**0.5098**	**0.2069**	**1.4400e-003**	**0.0373**	**1.4500e-003**	**0.0388**	**0.0102**	**1.3900e-003**	**0.0116**	**0.0000**	**154.9151**	**154.9151**	**0.0278**	**0.0000**	**155.6104**

3.5 Draiange/Utilities/Subgrade - 2022

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling					0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor					0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Worker					0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total					**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling					0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor					0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker					0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total					**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**

3.6 Foundations/Concrete Pour - 2022

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.0204	0.1606	0.1579	2.8000e-004		7.7200e-003	7.7200e-003		7.4000e-003	7.4000e-003	0.0000	22.8448	22.8448	4.4100e-003	0.0000	22.9550
Total	**0.0204**	**0.1606**	**0.1579**	**2.8000e-004**		**7.7200e-003**	**7.7200e-003**		**7.4000e-003**	**7.4000e-003**	**0.0000**	**22.8448**	**22.8448**	**4.4100e-003**	**0.0000**	**22.9550**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	1.3800e-003	0.0525	0.0166	1.3000e-004	3.1600e-003	1.1000e-004	3.2700e-003	9.1000e-004	1.1000e-004	1.0200e-003	0.0000	13.0525	13.0525	1.7300e-003	0.0000	13.0958
Worker	2.5400e-003	1.5500e-003	0.0183	7.0000e-005	7.4800e-003	6.0000e-005	7.5300e-003	1.9900e-003	5.0000e-005	2.0400e-003	0.0000	6.5963	6.5963	1.3000e-004	0.0000	6.5995
Total	**3.9200e-003**	**0.0541**	**0.0350**	**2.0000e-004**	**0.0106**	**1.7000e-004**	**0.0108**	**2.9000e-003**	**1.6000e-004**	**3.0600e-003**	**0.0000**	**19.6489**	**19.6489**	**1.8600e-003**	**0.0000**	**19.6953**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	3.6300e-003	0.0426	0.1643	2.8000e-004		3.9000e-004	3.9000e-004		3.9000e-004	3.9000e-004	0.0000	22.8448	22.8448	4.4100e-003	0.0000	22.9550
Total	**3.6300e-003**	**0.0426**	**0.1643**	**2.8000e-004**		**3.9000e-004**	**3.9000e-004**		**3.9000e-004**	**3.9000e-004**	**0.0000**	**22.8448**	**22.8448**	**4.4100e-003**	**0.0000**	**22.9550**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e

Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	1.3800e-003	0.0525	0.0166	1.3000e-004	3.1600e-003	1.1000e-004	3.2700e-003	9.1000e-004	1.1000e-004	1.0200e-003	0.0000	13.0525	13.0525	1.7300e-003	0.0000	13.0958
Worker	2.5400e-003	1.5500e-003	0.0183	7.0000e-005	7.4800e-003	6.0000e-005	7.5300e-003	1.9900e-003	5.0000e-005	2.0400e-003	0.0000	6.5963	6.5963	1.3000e-004	0.0000	6.5995
Total	**3.9200e-003**	**0.0541**	**0.0350**	**2.0000e-004**	**0.0106**	**1.7000e-004**	**0.0108**	**2.9000e-003**	**1.6000e-004**	**3.0600e-003**	**0.0000**	**19.6489**	**19.6489**	**1.8600e-003**	**0.0000**	**19.6953**

3.6 Foundations/Concrete Pour - 2023

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.0925	0.7357	0.7676	1.3500e-003		0.0331	0.0331		0.0318	0.0318	0.0000	112.1591	112.1591	0.0212	0.0000	112.6894
Total	**0.0925**	**0.7357**	**0.7676**	**1.3500e-003**		**0.0331**	**0.0331**		**0.0318**	**0.0318**	**0.0000**	**112.1591**	**112.1591**	**0.0212**	**0.0000**	**112.6894**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	5.4800e-003	0.2138	0.0788	6.0000e-004	0.0155	3.1000e-004	0.0158	4.4900e-003	2.9000e-004	4.7800e-003	0.0000	62.4840	62.4840	8.3100e-003	0.0000	62.6916

Worker	0.0118	6.9100e-003	0.0840	3.4000e-004	0.0367	2.7000e-004	0.0370	9.7600e-003	2.5000e-004	0.0100	0.0000	31.1312	31.1312	5.7000e-004	0.0000	31.1454
Total	**0.0173**	**0.2207**	**0.1628**	**9.4000e-004**	**0.0522**	**5.8000e-004**	**0.0528**	**0.0143**	**5.4000e-004**	**0.0148**	**0.0000**	**93.6152**	**93.6152**	**8.8800e-003**	**0.0000**	**93.8370**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.0178	0.2090	0.8065	1.3500e-003		1.9000e-003	1.9000e-003		1.9000e-003	1.9000e-003	0.0000	112.1590	112.1590	0.0212	0.0000	112.6893
Total	**0.0178**	**0.2090**	**0.8065**	**1.3500e-003**		**1.9000e-003**	**1.9000e-003**		**1.9000e-003**	**1.9000e-003**	**0.0000**	**112.1590**	**112.1590**	**0.0212**	**0.0000**	**112.6893**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	5.4800e-003	0.2138	0.0788	6.0000e-004	0.0155	3.1000e-004	0.0158	4.4900e-003	2.9000e-004	4.7800e-003	0.0000	62.4840	62.4840	8.3100e-003	0.0000	62.6916
Worker	0.0118	6.9100e-003	0.0840	3.4000e-004	0.0367	2.7000e-004	0.0370	9.7600e-003	2.5000e-004	0.0100	0.0000	31.1312	31.1312	5.7000e-004	0.0000	31.1454
Total	**0.0173**	**0.2207**	**0.1628**	**9.4000e-004**	**0.0522**	**5.8000e-004**	**0.0528**	**0.0143**	**5.4000e-004**	**0.0148**	**0.0000**	**93.6152**	**93.6152**	**8.8800e-003**	**0.0000**	**93.8370**

3.7 Building Construction - 2023

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.1302	1.0354	1.0803	1.9000e-003		0.0466	0.0466		0.0447	0.0447	0.0000	157.8536	157.8536	0.0299	0.0000	158.5999
Total	**0.1302**	**1.0354**	**1.0803**	**1.9000e-003**		**0.0466**	**0.0466**		**0.0447**	**0.0447**	**0.0000**	**157.8536**	**157.8536**	**0.0299**	**0.0000**	**158.5999**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	7.7100e-003	0.3009	0.1109	8.5000e-004	0.0219	4.3000e-004	0.0223	6.3200e-003	4.1000e-004	6.7300e-003	0.0000	87.9404	87.9404	0.0117	0.0000	88.2326
Worker	0.0166	9.7300e-003	0.1183	4.8000e-004	0.0517	3.8000e-004	0.0520	0.0137	3.5000e-004	0.0141	0.0000	43.8143	43.8143	8.0000e-004	0.0000	43.8342
Total	**0.0243**	**0.3106**	**0.2291**	**1.3300e-003**	**0.0735**	**8.1000e-004**	**0.0743**	**0.0201**	**7.6000e-004**	**0.0208**	**0.0000**	**131.7547**	**131.7547**	**0.0125**	**0.0000**	**132.0668**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e

Category	tons/yr										MT/yr					
Off-Road	0.0251	0.2942	1.1351	1.9000e-003		2.6700e-003	2.6700e-003		2.6700e-003	2.6700e-003	0.0000	157.8534	157.8534	0.0299	0.0000	158.5997
Total	**0.0251**	**0.2942**	**1.1351**	**1.9000e-003**		**2.6700e-003**	**2.6700e-003**		**2.6700e-003**	**2.6700e-003**	**0.0000**	**157.8534**	**157.8534**	**0.0299**	**0.0000**	**158.5997**

<u>Mitigated Construction Off-Site</u>

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	7.7100e-003	0.3009	0.1109	8.5000e-004	0.0219	4.3000e-004	0.0223	6.3200e-003	4.1000e-004	6.7300e-003	0.0000	87.9404	87.9404	0.0117	0.0000	88.2326
Worker	0.0166	9.7300e-003	0.1183	4.8000e-004	0.0517	3.8000e-004	0.0520	0.0137	3.5000e-004	0.0141	0.0000	43.8143	43.8143	8.0000e-004	0.0000	43.8342
Total	**0.0243**	**0.3106**	**0.2291**	**1.3300e-003**	**0.0735**	**8.1000e-004**	**0.0743**	**0.0201**	**7.6000e-004**	**0.0208**	**0.0000**	**131.7547**	**131.7547**	**0.0125**	**0.0000**	**132.0668**

3.7 Building Construction - 2024

<u>Unmitigated Construction On-Site</u>

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.2092	1.6799	1.8471	3.2800e-003		0.0705	0.0705		0.0675	0.0675	0.0000	272.1052	272.1052	0.0507	0.0000	273.3722
Total	**0.2092**	**1.6799**	**1.8471**	**3.2800e-003**		**0.0705**	**0.0705**		**0.0675**	**0.0675**	**0.0000**	**272.1052**	**272.1052**	**0.0507**	**0.0000**	**273.3722**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0127	0.5059	0.1891	1.4400e-003	0.0377	7.1000e-004	0.0384	0.0109	6.8000e-004	0.0116	0.0000	150.1753	150.1753	0.0201	0.0000	150.6783
Worker	0.0272	0.0153	0.1910	8.0000e-004	0.0890	6.5000e-004	0.0897	0.0237	6.0000e-004	0.0243	0.0000	72.5154	72.5154	1.2500e-003	0.0000	72.5465
Total	**0.0399**	**0.5212**	**0.3801**	**2.2400e-003**	**0.1267**	**1.3600e-003**	**0.1281**	**0.0346**	**1.2800e-003**	**0.0359**	**0.0000**	**222.6906**	**222.6906**	**0.0214**	**0.0000**	**223.2248**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.0432	0.5070	1.9566	3.2800e-003		4.6100e-003	4.6100e-003		4.6100e-003	4.6100e-003	0.0000	272.1049	272.1049	0.0507	0.0000	273.3719
Total	**0.0432**	**0.5070**	**1.9566**	**3.2800e-003**		**4.6100e-003**	**4.6100e-003**		**4.6100e-003**	**4.6100e-003**	**0.0000**	**272.1049**	**272.1049**	**0.0507**	**0.0000**	**273.3719**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0127	0.5059	0.1891	1.4400e-003	0.0377	7.1000e-004	0.0384	0.0109	6.8000e-004	0.0116	0.0000	150.1753	150.1753	0.0201	0.0000	150.6783
Worker	0.0272	0.0153	0.1910	8.0000e-004	0.0890	6.5000e-004	0.0897	0.0237	6.0000e-004	0.0243	0.0000	72.5154	72.5154	1.2500e-003	0.0000	72.5465
Total	**0.0399**	**0.5212**	**0.3801**	**2.2400e-003**	**0.1267**	**1.3600e-003**	**0.1281**	**0.0346**	**1.2800e-003**	**0.0359**	**0.0000**	**222.6906**	**222.6906**	**0.0214**	**0.0000**	**223.2248**

3.7 Building Construction - 2025

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.1944	1.5690	1.8279	3.2700e-003		0.0613	0.0613		0.0587	0.0587	0.0000	271.0946	271.0946	0.0497	0.0000	272.3375
Total	**0.1944**	**1.5690**	**1.8279**	**3.2700e-003**		**0.0613**	**0.0613**		**0.0587**	**0.0587**	**0.0000**	**271.0946**	**271.0946**	**0.0497**	**0.0000**	**272.3375**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					

Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0122	0.4917	0.1887	1.4200e-003	0.0375	6.8000e-004	0.0382	0.0109	6.5000e-004	0.0115	0.0000	148.2324	148.2324	0.0200	0.0000	148.7334
Worker	0.0259	0.0139	0.1778	7.7000e-004	0.0887	6.4000e-004	0.0893	0.0236	5.9000e-004	0.0242	0.0000	69.2838	69.2838	1.1300e-003	0.0000	69.3121
Total	**0.0381**	**0.5056**	**0.3664**	**2.1900e-003**	**0.1262**	**1.3200e-003**	**0.1275**	**0.0344**	**1.2400e-003**	**0.0357**	**0.0000**	**217.5162**	**217.5162**	**0.0212**	**0.0000**	**218.0456**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.0430	0.5051	1.9491	3.2700e-003		4.5900e-003	4.5900e-003		4.5900e-003	4.5900e-003	0.0000	271.0943	271.0943	0.0497	0.0000	272.3372
Total	**0.0430**	**0.5051**	**1.9491**	**3.2700e-003**		**4.5900e-003**	**4.5900e-003**		**4.5900e-003**	**4.5900e-003**	**0.0000**	**271.0943**	**271.0943**	**0.0497**	**0.0000**	**272.3372**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0122	0.4917	0.1887	1.4200e-003	0.0375	6.8000e-004	0.0382	0.0109	6.5000e-004	0.0115	0.0000	148.2324	148.2324	0.0200	0.0000	148.7334
Worker	0.0259	0.0139	0.1778	7.7000e-004	0.0887	6.4000e-004	0.0893	0.0236	5.9000e-004	0.0242	0.0000	69.2838	69.2838	1.1300e-003	0.0000	69.3121

Total	0.0381	0.5056	0.3664	2.1900e-003	0.1262	1.3200e-003	0.1275	0.0344	1.2400e-003	0.0357	0.0000	217.5162	217.5162	0.0212	0.0000	218.0456

3.8 Architectural Coating - 2024

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Archit. Coating	0.7053					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.0237	0.1597	0.2371	3.9000e-004		7.9800e-003	7.9800e-003		7.9800e-003	7.9800e-003	0.0000	33.4476	33.4476	1.8800e-003	0.0000	33.4947
Total	**0.7290**	**0.1597**	**0.2371**	**3.9000e-004**		**7.9800e-003**	**7.9800e-003**		**7.9800e-003**	**7.9800e-003**	**0.0000**	**33.4476**	**33.4476**	**1.8800e-003**	**0.0000**	**33.4947**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	5.3800e-003	3.0200e-003	0.0378	1.6000e-004	0.0176	1.3000e-004	0.0177	4.6800e-003	1.2000e-004	4.8000e-003	0.0000	14.3344	14.3344	2.5000e-004	0.0000	14.3406
Total	**5.3800e-003**	**3.0200e-003**	**0.0378**	**1.6000e-004**	**0.0176**	**1.3000e-004**	**0.0177**	**4.6800e-003**	**1.2000e-004**	**4.8000e-003**	**0.0000**	**14.3344**	**14.3344**	**2.5000e-004**	**0.0000**	**14.3406**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Archit. Coating	0.7053					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	3.8900e-003	0.0169	0.2401	3.9000e-004		5.2000e-004	5.2000e-004		5.2000e-004	5.2000e-004	0.0000	33.4476	33.4476	1.8800e-003	0.0000	33.4947
Total	**0.7092**	**0.0169**	**0.2401**	**3.9000e-004**		**5.2000e-004**	**5.2000e-004**		**5.2000e-004**	**5.2000e-004**	**0.0000**	**33.4476**	**33.4476**	**1.8800e-003**	**0.0000**	**33.4947**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	5.3800e-003	3.0200e-003	0.0378	1.6000e-004	0.0176	1.3000e-004	0.0177	4.6800e-003	1.2000e-004	4.8000e-003	0.0000	14.3344	14.3344	2.5000e-004	0.0000	14.3406
Total	**5.3800e-003**	**3.0200e-003**	**0.0378**	**1.6000e-004**	**0.0176**	**1.3000e-004**	**0.0177**	**4.6800e-003**	**1.2000e-004**	**4.8000e-003**	**0.0000**	**14.3344**	**14.3344**	**2.5000e-004**	**0.0000**	**14.3406**

3.8 Architectural Coating - 2025

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					

Archit. Coating	0.7026					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.0223	0.1495	0.2361	3.9000e-004		6.7200e-003	6.7200e-003		6.7200e-003	6.7200e-003	0.0000	33.3200	33.3200	1.8200e-003	0.0000	33.3654
Total	**0.7249**	**0.1495**	**0.2361**	**3.9000e-004**		**6.7200e-003**	**6.7200e-003**		**6.7200e-003**	**6.7200e-003**	**0.0000**	**33.3200**	**33.3200**	**1.8200e-003**	**0.0000**	**33.3654**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	5.1200e-003	2.7500e-003	0.0351	1.5000e-004	0.0175	1.3000e-004	0.0177	4.6600e-003	1.2000e-004	4.7800e-003	0.0000	13.6956	13.6956	2.2000e-004	0.0000	13.7012
Total	**5.1200e-003**	**2.7500e-003**	**0.0351**	**1.5000e-004**	**0.0175**	**1.3000e-004**	**0.0177**	**4.6600e-003**	**1.2000e-004**	**4.7800e-003**	**0.0000**	**13.6956**	**13.6956**	**2.2000e-004**	**0.0000**	**13.7012**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Archit. Coating	0.7026					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	3.8800e-003	0.0168	0.2391	3.9000e-004		5.2000e-004	5.2000e-004		5.2000e-004	5.2000e-004	0.0000	33.3199	33.3199	1.8200e-003	0.0000	33.3654
Total	**0.7065**	**0.0168**	**0.2391**	**3.9000e-004**		**5.2000e-004**	**5.2000e-004**		**5.2000e-004**	**5.2000e-004**	**0.0000**	**33.3199**	**33.3199**	**1.8200e-003**	**0.0000**	**33.3654**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	5.1200e-003	2.7500e-003	0.0351	1.5000e-004	0.0175	1.3000e-004	0.0177	4.6600e-003	1.2000e-004	4.7800e-003	0.0000	13.6956	13.6956	2.2000e-004	0.0000	13.7012
Total	**5.1200e-003**	**2.7500e-003**	**0.0351**	**1.5000e-004**	**0.0175**	**1.3000e-004**	**0.0177**	**4.6600e-003**	**1.2000e-004**	**4.7800e-003**	**0.0000**	**13.6956**	**13.6956**	**2.2000e-004**	**0.0000**	**13.7012**

4.0 Operational Detail - Mobile

4.1 Mitigation Measures Mobile

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Mitigated	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Unmitigated	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

4.2 Trip Summary Information

	Average Daily Trip Rate			Unmitigated	Mitigated
Land Use	Weekday	Saturday	Sunday	Annual VMT	Annual VMT
Research & Development	0.00	0.00	0.00		
Total	0.00	0.00	0.00		

4.3 Trip Type Information

	Miles			Trip %			Trip Purpose %		
Land Use	H-W or C-W	H-S or C-C	H-O or C-NW	H-W or C-W	H-S or C-C	H-O or C-NW	Primary	Diverted	Pass-by
Research & Development	9.50	7.30	7.30	33.00	48.00	19.00	82	15	3

4.4 Fleet Mix

Land Use	LDA	LDT1	LDT2	MDV	LHD1	LHD2	MHD	HHD	OBUS	UBUS	MCY	SBUS	MH
Research & Development	0.603873	0.037286	0.192865	0.090708	0.013128	0.005155	0.032618	0.009408	0.004276	0.003135	0.006045	0.000953	0.000549

5.0 Energy Detail

Historical Energy Use: N

5.1 Mitigation Measures Energy

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Electricity Mitigated						0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Electricity Unmitigated						0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
NaturalGas Mitigated	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
NaturalGas Unmitigated	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

5.2 Energy by Land Use - NaturalGas

Unmitigated

	NaturalGas Use	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Land Use	kBTU/yr	tons/yr										MT/yr					
Research & Development	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total		**0.0000**	**0.0000**	**0.0000**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**

Mitigated

	NaturalGas Use	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Land Use	kBTU/yr	tons/yr										MT/yr					
Research & Development	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total		**0.0000**	**0.0000**	**0.0000**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**

5.3 Energy by Land Use - Electricity

Unmitigated

	Electricity Use	Total CO2	CH4	N2O	CO2e

Land Use	kWh/yr	MT/yr			
Research & Development	0	0.0000	0.0000	0.0000	0.0000
Total		**0.0000**	**0.0000**	**0.0000**	**0.0000**

Mitigated

	Electricity Use	Total CO2	CH4	N2O	CO2e
Land Use	kWh/yr	MT/yr			
Research & Development	0	0.0000	0.0000	0.0000	0.0000
Total		**0.0000**	**0.0000**	**0.0000**	**0.0000**

6.0 Area Detail

6.1 Mitigation Measures Area

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Mitigated	0.1410	2.0000e-005	2.4700e-003	0.0000		1.0000e-005	1.0000e-005		1.0000e-005	1.0000e-005	0.0000	4.8200e-003	4.8200e-003	1.0000e-005	0.0000	5.1400e-003
Unmitigated	0.1410	2.0000e-005	2.4700e-003	0.0000		1.0000e-005	1.0000e-005		1.0000e-005	1.0000e-005	0.0000	4.8200e-003	4.8200e-003	1.0000e-005	0.0000	5.1400e-003

6.2 Area by SubCategory

Unmitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
SubCategory	tons/yr										MT/yr					
Architectural Coating	0.1408					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Consumer Products	0.0000					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Landscaping	2.3000e-004	2.0000e-005	2.4700e-003	0.0000		1.0000e-005	1.0000e-005		1.0000e-005	1.0000e-005	0.0000	4.8200e-003	4.8200e-003	1.0000e-005	0.0000	5.1400e-003
Total	**0.1410**	**2.0000e-005**	**2.4700e-003**	**0.0000**		**1.0000e-005**	**1.0000e-005**		**1.0000e-005**	**1.0000e-005**	**0.0000**	**4.8200e-003**	**4.8200e-003**	**1.0000e-005**	**0.0000**	**5.1400e-003**

Mitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
SubCategory	tons/yr										MT/yr					
Architectural Coating	0.1408					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Consumer Products	0.0000					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Landscaping	2.3000e-004	2.0000e-005	2.4700e-003	0.0000		1.0000e-005	1.0000e-005		1.0000e-005	1.0000e-005	0.0000	4.8200e-003	4.8200e-003	1.0000e-005	0.0000	5.1400e-003

Total	**0.1410**	**2.0000e-005**	**2.4700e-003**	**0.0000**		**1.0000e-005**	**1.0000e-005**		**1.0000e-005**	**1.0000e-005**	**0.0000**	**4.8200e-003**	**4.8200e-003**	**1.0000e-005**	**0.0000**	**5.1400e-003**

7.0 Water Detail

7.1 Mitigation Measures Water

	Total CO2	CH4	N2O	CO2e
Category	MT/yr			
Mitigated	0.0000	0.0000	0.0000	0.0000
Unmitigated	0.0000	0.0000	0.0000	0.0000

7.2 Water by Land Use

Unmitigated

	Indoor/Outdoor Use	Total CO2	CH4	N2O	CO2e
Land Use	Mgal	MT/yr			
Research & Development	0 / 0	0.0000	0.0000	0.0000	0.0000
Total		**0.0000**	**0.0000**	**0.0000**	**0.0000**

Mitigated

Land Use	Indoor/Outdoor Use	Total CO2	CH4	N2O	CO2e
	Mgal	MT/yr			
Research & Development	0 / 0	0.0000	0.0000	0.0000	0.0000
Total		**0.0000**	**0.0000**	**0.0000**	**0.0000**

8.0 Waste Detail

8.1 Mitigation Measures Waste

Category/Year

	Total CO2	CH4	N2O	CO2e
	MT/yr			
Mitigated	0.0000	0.0000	0.0000	0.0000
Unmitigated	0.0000	0.0000	0.0000	0.0000

8.2 Waste by Land Use

Unmitigated

	Waste Disposed	Total CO2	CH4	N2O	CO2e
Land Use	tons	MT/yr			
Research & Development	0	0.0000	0.0000	0.0000	0.0000
Total		**0.0000**	**0.0000**	**0.0000**	**0.0000**

Mitigated

	Waste Disposed	Total CO2	CH4	N2O	CO2e
Land Use	tons	MT/yr			
Research & Development	0	0.0000	0.0000	0.0000	0.0000
Total		**0.0000**	**0.0000**	**0.0000**	**0.0000**

9.0 Operational Offroad

Equipment Type	Number	Hours/Day	Days/Year	Horse Power	Load Factor	Fuel Type

10.0 Stationary Equipment

Fire Pumps and Emergency Generators

Equipment Type	Number	Hours/Day	Hours/Year	Horse Power	Load Factor	Fuel Type

Boilers

Equipment Type	Number	Heat Input/Day	Heat Input/Year	Boiler Rating	Fuel Type

User Defined Equipment

Equipment Type	Number

11.0 Vegetation

Land Use	kWh/yr	MT/yr			
Research & Development	0	0.0000	0.0000	0.0000	0.0000
Total		**0.0000**	**0.0000**	**0.0000**	**0.0000**

6.0 Area Detail

6.1 Mitigation Measures Area

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Mitigated	0.1410	2.0000e-005	2.4700e-003	0.0000		1.0000e-005	1.0000e-005		1.0000e-005	1.0000e-005	0.0000	4.8200e-003	4.8200e-003	1.0000e-005	0.0000	5.1400e-003
Unmitigated	0.1410	2.0000e-005	2.4700e-003	0.0000		1.0000e-005	1.0000e-005		1.0000e-005	1.0000e-005	0.0000	4.8200e-003	4.8200e-003	1.0000e-005	0.0000	5.1400e-003

6.2 Area by SubCategory

Unmitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
SubCategory	tons/yr										MT/yr					
Architectural Coating	0.1408					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

Consumer Products	0.0000					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Landscaping	2.3000e-004	2.0000e-005	2.4700e-003	0.0000		1.0000e-005	1.0000e-005		1.0000e-005	1.0000e-005	0.0000	4.8200e-003	4.8200e-003	1.0000e-005	0.0000	5.1400e-003
Total	**0.1410**	**2.0000e-005**	**2.4700e-003**	**0.0000**		**1.0000e-005**	**1.0000e-005**		**1.0000e-005**	**1.0000e-005**	**0.0000**	**4.8200e-003**	**4.8200e-003**	**1.0000e-005**	**0.0000**	**5.1400e-003**

Mitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
SubCategory	tons/yr										MT/yr					
Architectural Coating	0.1408					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Consumer Products	0.0000					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Landscaping	2.3000e-004	2.0000e-005	2.4700e-003	0.0000		1.0000e-005	1.0000e-005		1.0000e-005	1.0000e-005	0.0000	4.8200e-003	4.8200e-003	1.0000e-005	0.0000	5.1400e-003
Total	**0.1410**	**2.0000e-005**	**2.4700e-003**	**0.0000**		**1.0000e-005**	**1.0000e-005**		**1.0000e-005**	**1.0000e-005**	**0.0000**	**4.8200e-003**	**4.8200e-003**	**1.0000e-005**	**0.0000**	**5.1400e-003**

7.0 Water Detail

7.1 Mitigation Measures Water

	Total CO2	CH4	N2O	CO2e
Category	MT/yr			
Mitigated	0.0000	0.0000	0.0000	0.0000
Unmitigated	0.0000	0.0000	0.0000	0.0000

7.2 Water by Land Use

Unmitigated

	Indoor/Outdoor Use	Total CO2	CH4	N2O	CO2e
Land Use	Mgal	MT/yr			
Research & Development	0 / 0	0.0000	0.0000	0.0000	0.0000
Total		**0.0000**	**0.0000**	**0.0000**	**0.0000**

Mitigated

	Indoor/Outdoor Use	Total CO2	CH4	N2O	CO2e
Land Use	Mgal	MT/yr			
Research & Development	0 / 0	0.0000	0.0000	0.0000	0.0000
Total		**0.0000**	**0.0000**	**0.0000**	**0.0000**

8.0 Waste Detail

8.1 Mitigation Measures Waste

Category/Year

	Total CO2	CH4	N2O	CO2e
	MT/yr			
Mitigated	0.0000	0.0000	0.0000	0.0000
Unmitigated	0.0000	0.0000	0.0000	0.0000

8.2 Waste by Land Use

Unmitigated

	Waste Disposed	Total CO2	CH4	N2O	CO2e
Land Use	tons	MT/yr			
Research & Development	0	0.0000	0.0000	0.0000	0.0000
Total		**0.0000**	**0.0000**	**0.0000**	**0.0000**

Mitigated

	Waste Disposed	Total CO2	CH4	N2O	CO2e
Land Use	tons	MT/yr			

Research & Development	0	0.0000	0.0000	0.0000	0.0000
Total		**0.0000**	**0.0000**	**0.0000**	**0.0000**

9.0 Operational Offroad

Equipment Type	Number	Hours/Day	Days/Year	Horse Power	Load Factor	Fuel Type

10.0 Stationary Equipment

Fire Pumps and Emergency Generators

Equipment Type	Number	Hours/Day	Hours/Year	Horse Power	Load Factor	Fuel Type

Boilers

Equipment Type	Number	Heat Input/Day	Heat Input/Year	Boiler Rating	Fuel Type

User Defined Equipment

Equipment Type	Number

11.0 Vegetation

Construction Emissions Summary for Initial Phase Projects and the Hospital

Unmitigated Emissions

Year	ROG	Nox	PM10	PM2.5
	Average daily emissions (lbs/day)			
2022	3.95	50.65	1.70	1.58
2023	2.70	24.47	0.95	0.89
2024	9.75	50.80	1.42	1.34
2025	9.90	42.91	1.04	1.00
2026	4.98	50.98	1.01	0.96
2027	2.45	25.15	0.50	0.48
2028	21.74	25.96	0.55	0.53
2029	30.72	25.81	0.56	0.53

Mitigated Emissions (all Projects)

Year	ROG	Nox	PM10	PM2.5
	Average daily emissions (lbs/day)			
2022	1.07	16.82	0.12	0.12
2023	0.83	8.91	0.07	0.06
2024	6.45	18.49	0.08	0.09
2025	7.44	25.59	0.12	0.12
2026	2.66	34.68	0.14	0.14
2027	1.29	17.00	0.07	0.07
2028	22.03	22.18	0.12	0.11
2029	29.42	16.61	0.07	0.07

Mitigated Emissions (RAB and Aldea Only)

Year	ROG	Nox	PM10	PM2.5
	Average daily emissions (lbs/year)			
2021	0.00	0.00	0.00	0.00
2022	1.76	24.71	0.52	0.49
2023	1.32	14.75	0.37	0.34
2024	8.33	40.76	0.86	0.80
2025	8.60	33.74	0.56	0.53
2026	4.98	50.98	1.01	0.96
2027	2.45	25.15	0.50	0.48
2028	23.33	31.31	0.60	0.57
2029	29.42	16.61	0.07	0.07

Calculation of average daily emissions from annual emission output from CalEEMod - ISA

UNMITIGATED EMISSIONS

		Annual Emissions (TPY)				Average Daily Emissions (lb/day)			
Year	Work days	ROG	Nox	PM10	PM2.5	ROG	Nox	PM10	PM2.5
2022	219	0.0994	1.0016	0.0458	0.0427	0.91	9.15	0.42	0.39
2023	239	0.0807	0.8153	0.0386	0.0355	0.68	6.82	0.32	0.30

MITIGATED EMISSIONS

		Annual Emissions (TPY)				Average Daily Emissions (lb/day)			
Year	Work days	ROG	Nox	PM10	PM2.5	ROG	Nox	PM10	PM2.5
2022	219	0.0237	0.1386	2.65E-03	2.63E-03	0.22	1.27	0.02	0.02
2023	239	0.0214	0.1176	2.37E-03	2.36E-03	0.18	0.98	0.02	0.02

Calculation of average daily emissions from annual emission output from CalEEMod - RAB

UNMITIGATED EMISSIONS

		Annual Emissions (TPY)				Average Daily Emissions (lb/day)			
Year	Work days	ROG	Nox	PM10	PM2.5	ROG	Nox	PM10	PM2.5
2022	219	0.3331	4.5442	0.1404	0.13	3.04	41.50	1.28	1.19
2023	261	0.2644	2.3024	0.0812	0.0778	2.03	17.64	0.62	0.60
2024	262	0.9835	2.3637	0.0800	0.0769	7.51	18.04	0.61	0.59
2025	261	0.9625	2.2269	0.0695	0.0668	7.38	17.06	0.53	0.51

MITIGATED EMISSIONS

		Annual Emissions (TPY)				Average Daily Emissions (lb/day)			
Year	Work days	ROG	Nox	PM10	PM2.5	ROG	Nox	PM10	PM2.5
2022	219	0.0932	1.7037	0.0107	0.0105	0.85	15.56	0.10	0.10
2023	261	0.0845	1.0345	5.96E-03	5.88E-03	0.65	7.93	0.05	0.05
2024	262	0.7977	1.0481	6.62E-03	6.52E-03	6.09	8.00	0.05	0.05
2025	261	0.7927	1.0303	6.56E-03	6.47E-03	6.07	7.90	0.05	0.05

Calculation of average daily emissions from annual emission output from CalEEMod - Aldea

		Annual Emissions (TPY)				Average Daily Emissions (lb/day)			
Year	Work days	ROG	Nox	PM10	PM2.5	ROG	Nox	PM10	PM2.5
2028	261	0.352	1.7937	0.0621	0.0591	2.70	13.74	0.48	0.45
2029	8	1.1667	5.26E-03	2.40E-04	2.40E-04	291.68	1.32	0.06	0.06

MITIGATED EMISSIONS

		Annual Emissions (TPY)				Average Daily Emissions (lb/day)			
Year	Work days	ROG	Nox	PM10	PM2.5	ROG	Nox	PM10	PM2.5
2028	261	0.2068	0.6984	5.62E-03	5.50E-03	1.58	5.35	0.04	0.04
2029	8	1.1661	6.90E-04	2.00E-05	2.00E-05	291.53	0.17	0.01	0.01

Calculation of average daily emissions from annual emission output from CalEEMod - New Hospital

UPDATED For No Demolition which was in the 2014 LRDP for LPPI

UNMITIGATED EMISSIONS

		Annual Emissions (TPY)				Average Daily Emissions (lb/day)			
Year	Work days	ROG	Nox	PM10	PM2.5	ROG	Nox	PM10	PM2.5
2024	262	0.2932	4.2909	0.1064	0.0981	2.24	32.75	0.81	0.75
2025	261	0.3301	3.3730	0.0660	0.0631	2.53	25.85	0.51	0.48
2026	261	0.6503	6.6532	0.1317	0.1259	4.98	50.98	1.01	0.96
2027	261	0.3203	3.2825	0.0657	0.0628	2.45	25.15	0.50	0.48
2028	261	2.8376	3.3881	0.0722	0.0693	21.74	25.96	0.55	0.53
2029	261	2.8428	3.3630	0.0723	0.0694	21.78	25.77	0.55	0.53

MITIGATED EMISSIONS

		Annual Emissions (TPY)				Average Daily Emissions (lb/day)			
Year	Work days	ROG	Nox	PM10	PM2.5	ROG	Nox	PM10	PM2.5
2024	262	0.0477	1.3746	0.004256	0.004905	0.36	10.49	0.03	0.04
2025	261	0.1787	2.309	9.30E-03	9.01E-03	1.37	17.69	0.07	0.07
2026	261	0.3475	4.5253	0.0183	0.0177	2.66	34.68	0.14	0.14
2027	261	0.1689	2.2186	8.92E-03	8.65E-03	1.29	17.00	0.07	0.07
2028	261	2.6685	2.196	9.54E-03	9.26E-03	20.45	16.83	0.07	0.07
2029	261	2.673	2.1663	9.32E-03	9.05E-03	20.48	16.60	0.07	0.07

CalEEmod Outputs Existing Operation

CPHP Operational Existing

San Francisco County, Annual

1.0 Project Characteristics

1.1 Land Usage

Land Uses	Size	Metric	Lot Acreage	Floor Surface Area	Population
Hospital	3,900.00	1000sqft	89.53	3,900,000.00	0

1.2 Other Project Characteristics

Urbanization	Urban	**Wind Speed (m/s)**	4.6	**Precipitation Freq (Days)**	64
Climate Zone	5			**Operational Year**	2019
Utility Company	User Defined				
CO2 Intensity (lb/MWhr)	0	**CH4 Intensity (lb/MWhr)**	0	**N2O Intensity (lb/MWhr)**	0

1.3 User Entered Comments & Non-Default Data

Project Characteristics - UCSF Net zero GHG electricity starting in 2025

Land Use - Operational Mobile source and area source only

Construction Phase - mobile source run only

Off-road Equipment - Operational Mobile Source Run only

Trips and VMT - Operational Run Only

Vehicle Trips - Trip rates adjusted to match daily VMT estimates of the Transportation Section

Vehicle Emission Factors - EMFAC 2017

Vehicle Emission Factors -

Vehicle Emission Factors -

Road Dust - CARB Mthod 7.9

Woodstoves -

Consumer Products - SF specific ROG Factor

Energy Use - Net xero electricity. Natural gas separate through CUP

Solid Waste - Adjusted rate to campus-specific wate to landfill in 2018.

Table Name	Column Name	Default Value	New Value
tblConsumerProducts	ROG_EF	2.14E-05	1.51E-05
tblFleetMix	HHD	8.6010e-003	0.02
tblFleetMix	LDA	0.61	0.56
tblFleetMix	LDT1	0.04	0.06
tblFleetMix	LDT2	0.19	0.19
tblFleetMix	LHD1	0.02	0.02
tblFleetMix	LHD2	4.7930e-003	5.5750e-003
tblFleetMix	MCY	7.1780e-003	5.8190e-003
tblFleetMix	MDV	0.09	0.12
tblFleetMix	MH	4.4300e-004	8.1300e-004
tblFleetMix	MHD	0.03	0.02
tblFleetMix	OBUS	4.2620e-003	1.9390e-003
tblFleetMix	SBUS	9.2100e-004	7.5100e-004
tblFleetMix	UBUS	5.3150e-003	1.7020e-003
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	3.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	4.00	0.00
tblRoadDust	RoadSiltLoading	0.1	0.048
tblSolidWaste	SolidWasteGenerationRate	42,120.00	1,600.00
tblVehicleEF	HHD	0.88	0.03
tblVehicleEF	HHD	0.34	0.05
tblVehicleEF	HHD	0.17	0.00
tblVehicleEF	HHD	2.74	5.02

tblVehicleEF	HHD	1.98	0.89
tblVehicleEF	HHD	5.20	7.4690e-003
tblVehicleEF	HHD	3,291.35	1,047.62
tblVehicleEF	HHD	2,092.61	1,603.18
tblVehicleEF	HHD	13.79	0.11
tblVehicleEF	HHD	26.14	6.11
tblVehicleEF	HHD	6.24	5.16
tblVehicleEF	HHD	19.48	1.47
tblVehicleEF	HHD	0.06	0.02
tblVehicleEF	HHD	0.06	0.06
tblVehicleEF	HHD	0.03	0.04
tblVehicleEF	HHD	0.03	0.09
tblVehicleEF	HHD	3.9900e-004	4.0000e-006
tblVehicleEF	HHD	0.05	0.02
tblVehicleEF	HHD	0.03	0.03
tblVehicleEF	HHD	8.5420e-003	8.8600e-003
tblVehicleEF	HHD	0.03	0.09
tblVehicleEF	HHD	3.7600e-004	4.0000e-006
tblVehicleEF	HHD	1.7000e-004	7.0000e-006
tblVehicleEF	HHD	0.01	5.1200e-004
tblVehicleEF	HHD	0.64	0.45
tblVehicleEF	HHD	1.0900e-004	4.0000e-006
tblVehicleEF	HHD	0.16	0.22
tblVehicleEF	HHD	2.3370e-003	2.4610e-003
tblVehicleEF	HHD	0.20	2.0000e-006
tblVehicleEF	HHD	0.03	9.7610e-003
tblVehicleEF	HHD	0.02	0.01
tblVehicleEF	HHD	2.2600e-004	1.0000e-006
tblVehicleEF	HHD	1.7000e-004	7.0000e-006
tblVehicleEF	HHD	0.01	5.1200e-004

tblVehicleEF	HHD	0.77	0.51
tblVehicleEF	HHD	1.0900e-004	4.0000e-006
tblVehicleEF	HHD	0.52	0.29
tblVehicleEF	HHD	2.3370e-003	2.4610e-003
tblVehicleEF	HHD	0.22	3.0000e-006
tblVehicleEF	LDA	6.0130e-003	3.7600e-003
tblVehicleEF	LDA	8.5520e-003	0.07
tblVehicleEF	LDA	0.68	0.83
tblVehicleEF	LDA	1.69	2.52
tblVehicleEF	LDA	306.89	276.87
tblVehicleEF	LDA	63.06	58.32
tblVehicleEF	LDA	0.06	0.06
tblVehicleEF	LDA	0.11	0.25
tblVehicleEF	LDA	2.2590e-003	1.7090e-003
tblVehicleEF	LDA	2.3350e-003	2.0840e-003
tblVehicleEF	LDA	2.0830e-003	1.5760e-003
tblVehicleEF	LDA	2.1470e-003	1.9160e-003
tblVehicleEF	LDA	0.03	0.05
tblVehicleEF	LDA	0.12	0.13
tblVehicleEF	LDA	0.03	0.05
tblVehicleEF	LDA	0.02	0.02
tblVehicleEF	LDA	0.05	0.26
tblVehicleEF	LDA	0.12	0.34
tblVehicleEF	LDA	3.0730e-003	2.7390e-003
tblVehicleEF	LDA	6.6000e-004	5.7700e-004
tblVehicleEF	LDA	0.03	0.05
tblVehicleEF	LDA	0.12	0.13
tblVehicleEF	LDA	0.03	0.05
tblVehicleEF	LDA	0.02	0.02
tblVehicleEF	LDA	0.05	0.26

tblVehicleEF	LDA	0.13	0.37
tblVehicleEF	LDT1	0.01	7.8640e-003
tblVehicleEF	LDT1	0.02	0.10
tblVehicleEF	LDT1	1.15	1.52
tblVehicleEF	LDT1	3.13	2.80
tblVehicleEF	LDT1	367.18	327.08
tblVehicleEF	LDT1	75.56	69.98
tblVehicleEF	LDT1	0.11	0.15
tblVehicleEF	LDT1	0.18	0.34
tblVehicleEF	LDT1	2.6500e-003	2.4420e-003
tblVehicleEF	LDT1	3.0170e-003	3.0100e-003
tblVehicleEF	LDT1	2.4400e-003	2.2490e-003
tblVehicleEF	LDT1	2.7750e-003	2.7690e-003
tblVehicleEF	LDT1	0.07	0.12
tblVehicleEF	LDT1	0.23	0.24
tblVehicleEF	LDT1	0.07	0.09
tblVehicleEF	LDT1	0.03	0.04
tblVehicleEF	LDT1	0.17	0.87
tblVehicleEF	LDT1	0.22	0.51
tblVehicleEF	LDT1	3.6840e-003	3.2370e-003
tblVehicleEF	LDT1	8.1100e-004	6.9200e-004
tblVehicleEF	LDT1	0.07	0.12
tblVehicleEF	LDT1	0.23	0.24
tblVehicleEF	LDT1	0.07	0.09
tblVehicleEF	LDT1	0.04	0.05
tblVehicleEF	LDT1	0.17	0.87
tblVehicleEF	LDT1	0.24	0.56
tblVehicleEF	LDT2	7.3050e-003	5.0180e-003
tblVehicleEF	LDT2	9.3230e-003	0.09
tblVehicleEF	LDT2	0.82	1.06

tblVehicleEF	LDT2	1.93	3.23
tblVehicleEF	LDT2	416.26	360.96
tblVehicleEF	LDT2	85.96	77.32
tblVehicleEF	LDT2	0.09	0.11
tblVehicleEF	LDT2	0.17	0.39
tblVehicleEF	LDT2	2.0990e-003	1.6310e-003
tblVehicleEF	LDT2	2.1870e-003	1.9980e-003
tblVehicleEF	LDT2	1.9300e-003	1.5010e-003
tblVehicleEF	LDT2	2.0110e-003	1.8380e-003
tblVehicleEF	LDT2	0.04	0.06
tblVehicleEF	LDT2	0.11	0.14
tblVehicleEF	LDT2	0.04	0.06
tblVehicleEF	LDT2	0.02	0.02
tblVehicleEF	LDT2	0.07	0.47
tblVehicleEF	LDT2	0.13	0.43
tblVehicleEF	LDT2	4.1680e-003	3.5710e-003
tblVehicleEF	LDT2	8.9200e-004	7.6500e-004
tblVehicleEF	LDT2	0.04	0.06
tblVehicleEF	LDT2	0.11	0.14
tblVehicleEF	LDT2	0.04	0.06
tblVehicleEF	LDT2	0.03	0.03
tblVehicleEF	LDT2	0.07	0.47
tblVehicleEF	LDT2	0.14	0.47
tblVehicleEF	LHD1	7.2340e-003	5.6240e-003
tblVehicleEF	LHD1	0.02	0.01
tblVehicleEF	LHD1	0.02	0.02
tblVehicleEF	LHD1	0.17	0.19
tblVehicleEF	LHD1	1.03	1.18
tblVehicleEF	LHD1	3.13	1.25
tblVehicleEF	LHD1	8.69	9.26

tblVehicleEF	LHD1	739.64	843.69
tblVehicleEF	LHD1	40.42	12.62
tblVehicleEF	LHD1	0.06	0.07
tblVehicleEF	LHD1	0.91	1.32
tblVehicleEF	LHD1	1.28	0.37
tblVehicleEF	LHD1	6.4500e-004	8.1400e-004
tblVehicleEF	LHD1	9.5460e-003	9.6580e-003
tblVehicleEF	LHD1	0.01	0.01
tblVehicleEF	LHD1	1.0450e-003	3.2500e-004
tblVehicleEF	LHD1	6.1700e-004	7.7900e-004
tblVehicleEF	LHD1	2.3870e-003	2.4150e-003
tblVehicleEF	LHD1	0.01	0.01
tblVehicleEF	LHD1	9.6100e-004	3.0000e-004
tblVehicleEF	LHD1	2.0950e-003	2.2090e-003
tblVehicleEF	LHD1	0.10	0.09
tblVehicleEF	LHD1	0.02	0.02
tblVehicleEF	LHD1	1.2880e-003	1.1400e-003
tblVehicleEF	LHD1	0.10	0.12
tblVehicleEF	LHD1	0.29	0.64
tblVehicleEF	LHD1	0.33	0.10
tblVehicleEF	LHD1	8.8000e-005	9.0000e-005
tblVehicleEF	LHD1	7.3010e-003	8.2440e-003
tblVehicleEF	LHD1	4.6400e-004	1.2500e-004
tblVehicleEF	LHD1	2.0950e-003	2.2090e-003
tblVehicleEF	LHD1	0.10	0.09
tblVehicleEF	LHD1	0.03	0.03
tblVehicleEF	LHD1	1.2880e-003	1.1400e-003
tblVehicleEF	LHD1	0.13	0.15
tblVehicleEF	LHD1	0.29	0.64
tblVehicleEF	LHD1	0.36	0.11

tblVehicleEF	LHD2	4.3820e-003	3.7550e-003
tblVehicleEF	LHD2	0.01	9.4180e-003
tblVehicleEF	LHD2	0.01	0.01
tblVehicleEF	LHD2	0.13	0.15
tblVehicleEF	LHD2	0.71	0.84
tblVehicleEF	LHD2	1.77	0.80
tblVehicleEF	LHD2	13.95	14.30
tblVehicleEF	LHD2	737.62	829.16
tblVehicleEF	LHD2	27.42	9.07
tblVehicleEF	LHD2	0.11	0.11
tblVehicleEF	LHD2	0.90	1.46
tblVehicleEF	LHD2	0.63	0.23
tblVehicleEF	LHD2	1.3060e-003	1.3320e-003
tblVehicleEF	LHD2	0.01	0.01
tblVehicleEF	LHD2	0.01	0.02
tblVehicleEF	LHD2	5.4500e-004	1.6600e-004
tblVehicleEF	LHD2	1.2490e-003	1.2750e-003
tblVehicleEF	LHD2	2.6600e-003	2.6540e-003
tblVehicleEF	LHD2	0.01	0.02
tblVehicleEF	LHD2	5.0100e-004	1.5300e-004
tblVehicleEF	LHD2	1.0000e-003	1.2560e-003
tblVehicleEF	LHD2	0.04	0.05
tblVehicleEF	LHD2	0.02	0.02
tblVehicleEF	LHD2	5.7600e-004	6.4600e-004
tblVehicleEF	LHD2	0.11	0.13
tblVehicleEF	LHD2	0.12	0.38
tblVehicleEF	LHD2	0.15	0.06
tblVehicleEF	LHD2	7.1860e-003	8.0200e-003
tblVehicleEF	LHD2	3.0600e-004	9.0000e-005
tblVehicleEF	LHD2	1.0000e-003	1.2560e-003

tblVehicleEF	LHD2	0.04	0.05
tblVehicleEF	LHD2	0.02	0.02
tblVehicleEF	LHD2	5.7600e-004	6.4600e-004
tblVehicleEF	LHD2	0.13	0.15
tblVehicleEF	LHD2	0.12	0.38
tblVehicleEF	LHD2	0.17	0.07
tblVehicleEF	MCY	0.53	0.35
tblVehicleEF	MCY	0.17	0.27
tblVehicleEF	MCY	22.71	21.85
tblVehicleEF	MCY	10.09	8.98
tblVehicleEF	MCY	189.81	215.51
tblVehicleEF	MCY	47.84	63.26
tblVehicleEF	MCY	1.19	1.18
tblVehicleEF	MCY	0.32	0.27
tblVehicleEF	MCY	2.3420e-003	1.9050e-003
tblVehicleEF	MCY	5.3290e-003	3.6620e-003
tblVehicleEF	MCY	2.2010e-003	1.7880e-003
tblVehicleEF	MCY	5.0560e-003	3.4660e-003
tblVehicleEF	MCY	0.79	0.84
tblVehicleEF	MCY	0.87	0.78
tblVehicleEF	MCY	0.52	0.50
tblVehicleEF	MCY	2.95	2.45
tblVehicleEF	MCY	0.96	2.55
tblVehicleEF	MCY	2.35	2.05
tblVehicleEF	MCY	2.3560e-003	2.1330e-003
tblVehicleEF	MCY	7.1300e-004	6.2600e-004
tblVehicleEF	MCY	0.79	0.84
tblVehicleEF	MCY	0.87	0.78
tblVehicleEF	MCY	0.52	0.50
tblVehicleEF	MCY	3.58	2.98

tblVehicleEF	MCY	0.96	2.55
tblVehicleEF	MCY	2.56	2.23
tblVehicleEF	MDV	0.01	6.8920e-003
tblVehicleEF	MDV	0.02	0.11
tblVehicleEF	MDV	1.12	1.31
tblVehicleEF	MDV	2.84	3.93
tblVehicleEF	MDV	537.85	437.34
tblVehicleEF	MDV	108.44	93.47
tblVehicleEF	MDV	0.13	0.15
tblVehicleEF	MDV	0.25	0.49
tblVehicleEF	MDV	2.2800e-003	1.8450e-003
tblVehicleEF	MDV	2.3890e-003	2.3280e-003
tblVehicleEF	MDV	2.1030e-003	1.7030e-003
tblVehicleEF	MDV	2.1990e-003	2.1440e-003
tblVehicleEF	MDV	0.04	0.08
tblVehicleEF	MDV	0.13	0.17
tblVehicleEF	MDV	0.04	0.07
tblVehicleEF	MDV	0.03	0.03
tblVehicleEF	MDV	0.09	0.52
tblVehicleEF	MDV	0.22	0.58
tblVehicleEF	MDV	5.3820e-003	4.3240e-003
tblVehicleEF	MDV	1.1340e-003	9.2500e-004
tblVehicleEF	MDV	0.04	0.08
tblVehicleEF	MDV	0.13	0.17
tblVehicleEF	MDV	0.04	0.07
tblVehicleEF	MDV	0.04	0.05
tblVehicleEF	MDV	0.09	0.52
tblVehicleEF	MDV	0.24	0.63
tblVehicleEF	MH	0.05	0.02
tblVehicleEF	MH	0.04	0.03

tblVehicleEF	MH	4.05	2.38
tblVehicleEF	MH	7.99	2.58
tblVehicleEF	MH	1,210.75	1,622.44
tblVehicleEF	MH	62.93	20.92
tblVehicleEF	MH	1.23	1.73
tblVehicleEF	MH	0.92	0.25
tblVehicleEF	MH	0.01	0.01
tblVehicleEF	MH	0.02	0.03
tblVehicleEF	MH	2.0050e-003	3.8400e-004
tblVehicleEF	MH	3.2170e-003	3.2610e-003
tblVehicleEF	MH	0.02	0.03
tblVehicleEF	MH	1.8630e-003	3.5500e-004
tblVehicleEF	MH	0.76	0.91
tblVehicleEF	MH	0.08	0.08
tblVehicleEF	MH	0.31	0.32
tblVehicleEF	MH	0.16	0.12
tblVehicleEF	MH	0.02	1.94
tblVehicleEF	MH	0.48	0.13
tblVehicleEF	MH	0.01	0.02
tblVehicleEF	MH	7.6900e-004	2.0700e-004
tblVehicleEF	MH	0.76	0.91
tblVehicleEF	MH	0.08	0.08
tblVehicleEF	MH	0.31	0.32
tblVehicleEF	MH	0.21	0.16
tblVehicleEF	MH	0.02	1.94
tblVehicleEF	MH	0.53	0.14
tblVehicleEF	MHD	0.02	3.2750e-003
tblVehicleEF	MHD	0.01	0.02
tblVehicleEF	MHD	0.07	0.01
tblVehicleEF	MHD	0.48	0.37

tblVehicleEF	MHD	0.78	1.07
tblVehicleEF	MHD	7.89	1.29
tblVehicleEF	MHD	143.81	83.12
tblVehicleEF	MHD	1,211.17	1,188.32
tblVehicleEF	MHD	61.55	9.19
tblVehicleEF	MHD	1.03	0.83
tblVehicleEF	MHD	2.73	3.73
tblVehicleEF	MHD	10.79	0.99
tblVehicleEF	MHD	4.2200e-003	3.1980e-003
tblVehicleEF	MHD	0.07	0.11
tblVehicleEF	MHD	1.1080e-003	1.3700e-004
tblVehicleEF	MHD	4.0370e-003	3.0600e-003
tblVehicleEF	MHD	0.06	0.11
tblVehicleEF	MHD	1.0190e-003	1.2700e-004
tblVehicleEF	MHD	1.1130e-003	5.1600e-004
tblVehicleEF	MHD	0.05	0.02
tblVehicleEF	MHD	0.04	0.02
tblVehicleEF	MHD	6.3700e-004	2.6500e-004
tblVehicleEF	MHD	0.17	0.28
tblVehicleEF	MHD	0.03	0.14
tblVehicleEF	MHD	0.49	0.06
tblVehicleEF	MHD	1.3850e-003	7.8800e-004
tblVehicleEF	MHD	0.01	0.01
tblVehicleEF	MHD	7.5400e-004	9.1000e-005
tblVehicleEF	MHD	1.1130e-003	5.1600e-004
tblVehicleEF	MHD	0.05	0.02
tblVehicleEF	MHD	0.05	0.03
tblVehicleEF	MHD	6.3700e-004	2.6500e-004
tblVehicleEF	MHD	0.20	0.32
tblVehicleEF	MHD	0.03	0.14

tblVehicleEF	MHD	0.53	0.06
tblVehicleEF	OBUS	0.01	8.4920e-003
tblVehicleEF	OBUS	0.01	0.02
tblVehicleEF	OBUS	0.03	0.02
tblVehicleEF	OBUS	0.30	0.58
tblVehicleEF	OBUS	0.72	1.35
tblVehicleEF	OBUS	6.00	2.35
tblVehicleEF	OBUS	135.90	100.08
tblVehicleEF	OBUS	1,345.54	1,492.82
tblVehicleEF	OBUS	67.08	18.05
tblVehicleEF	OBUS	0.92	0.77
tblVehicleEF	OBUS	2.92	2.84
tblVehicleEF	OBUS	3.50	0.71
tblVehicleEF	OBUS	5.0700e-004	4.2240e-003
tblVehicleEF	OBUS	0.01	0.07
tblVehicleEF	OBUS	6.2900e-004	1.7400e-004
tblVehicleEF	OBUS	4.8500e-004	4.0410e-003
tblVehicleEF	OBUS	0.01	0.06
tblVehicleEF	OBUS	5.8100e-004	1.6000e-004
tblVehicleEF	OBUS	1.0630e-003	1.1730e-003
tblVehicleEF	OBUS	0.02	0.02
tblVehicleEF	OBUS	0.04	0.07
tblVehicleEF	OBUS	5.5500e-004	5.2900e-004
tblVehicleEF	OBUS	0.10	0.20
tblVehicleEF	OBUS	0.03	0.20
tblVehicleEF	OBUS	0.39	0.12
tblVehicleEF	OBUS	1.3080e-003	9.5100e-004
tblVehicleEF	OBUS	0.01	0.01
tblVehicleEF	OBUS	7.7700e-004	1.7900e-004
tblVehicleEF	OBUS	1.0630e-003	1.1730e-003

tblVehicleEF	OBUS	0.02	0.02
tblVehicleEF	OBUS	0.06	0.08
tblVehicleEF	OBUS	5.5500e-004	5.2900e-004
tblVehicleEF	OBUS	0.12	0.24
tblVehicleEF	OBUS	0.03	0.20
tblVehicleEF	OBUS	0.43	0.13
tblVehicleEF	SBUS	0.86	0.04
tblVehicleEF	SBUS	0.01	6.8040e-003
tblVehicleEF	SBUS	0.07	3.4700e-003
tblVehicleEF	SBUS	7.83	1.66
tblVehicleEF	SBUS	0.76	0.57
tblVehicleEF	SBUS	7.67	0.54
tblVehicleEF	SBUS	1,158.79	341.31
tblVehicleEF	SBUS	1,085.89	1,086.71
tblVehicleEF	SBUS	52.61	2.88
tblVehicleEF	SBUS	11.01	3.58
tblVehicleEF	SBUS	5.00	5.19
tblVehicleEF	SBUS	12.72	0.79
tblVehicleEF	SBUS	0.01	4.2240e-003
tblVehicleEF	SBUS	0.01	0.01
tblVehicleEF	SBUS	0.03	0.03
tblVehicleEF	SBUS	5.3300e-004	3.5000e-005
tblVehicleEF	SBUS	0.01	4.0420e-003
tblVehicleEF	SBUS	2.6600e-003	2.7840e-003
tblVehicleEF	SBUS	0.03	0.03
tblVehicleEF	SBUS	4.9000e-004	3.2000e-005
tblVehicleEF	SBUS	2.0410e-003	3.3100e-004
tblVehicleEF	SBUS	0.02	3.4390e-003
tblVehicleEF	SBUS	0.94	0.18
tblVehicleEF	SBUS	1.0670e-003	1.2700e-004

tblVehicleEF	SBUS	0.11	0.09
tblVehicleEF	SBUS	0.01	0.03
tblVehicleEF	SBUS	0.40	0.02
tblVehicleEF	SBUS	0.01	3.2410e-003
tblVehicleEF	SBUS	0.01	0.01
tblVehicleEF	SBUS	6.5900e-004	2.9000e-005
tblVehicleEF	SBUS	2.0410e-003	3.3100e-004
tblVehicleEF	SBUS	0.02	3.4390e-003
tblVehicleEF	SBUS	1.36	0.25
tblVehicleEF	SBUS	1.0670e-003	1.2700e-004
tblVehicleEF	SBUS	0.14	0.11
tblVehicleEF	SBUS	0.01	0.03
tblVehicleEF	SBUS	0.44	0.02
tblVehicleEF	UBUS	0.46	1.11
tblVehicleEF	UBUS	0.07	5.7840e-003
tblVehicleEF	UBUS	14.98	7.85
tblVehicleEF	UBUS	10.33	0.42
tblVehicleEF	UBUS	2,344.36	1,701.27
tblVehicleEF	UBUS	59.82	4.88
tblVehicleEF	UBUS	19.10	1.73
tblVehicleEF	UBUS	18.10	0.05
tblVehicleEF	UBUS	0.72	0.07
tblVehicleEF	UBUS	0.01	0.03
tblVehicleEF	UBUS	0.37	5.9870e-003
tblVehicleEF	UBUS	2.5020e-003	2.0000e-005
tblVehicleEF	UBUS	0.31	0.03
tblVehicleEF	UBUS	3.0000e-003	7.8890e-003
tblVehicleEF	UBUS	0.35	5.7270e-003
tblVehicleEF	UBUS	2.3570e-003	1.9000e-005
tblVehicleEF	UBUS	4.7670e-003	1.9700e-004

tblVehicleEF	UBUS	0.15	2.6620e-003
tblVehicleEF	UBUS	2.3580e-003	1.2100e-004
tblVehicleEF	UBUS	1.77	0.02
tblVehicleEF	UBUS	0.03	0.02
tblVehicleEF	UBUS	0.91	0.03
tblVehicleEF	UBUS	0.02	0.01
tblVehicleEF	UBUS	7.8900e-004	4.8000e-005
tblVehicleEF	UBUS	4.7670e-003	1.9700e-004
tblVehicleEF	UBUS	0.15	2.6620e-003
tblVehicleEF	UBUS	2.3580e-003	1.2100e-004
tblVehicleEF	UBUS	2.35	1.14
tblVehicleEF	UBUS	0.03	0.02
tblVehicleEF	UBUS	0.99	0.03
tblVehicleTrips	ST_TR	10.18	9.00
tblVehicleTrips	SU_TR	8.91	8.55
tblVehicleTrips	WD_TR	13.22	12.00

2.0 Emissions Summary

2.1 Overall Construction

Unmitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	tons/yr										MT/yr					
2019	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
2020	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Maximum	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**

Mitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	tons/yr										MT/yr					
2019	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
2020	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Maximum	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**

	ROG	**NOx**	**CO**	**SO2**	**Fugitive PM10**	**Exhaust PM10**	**PM10 Total**	**Fugitive PM2.5**	**Exhaust PM2.5**	**PM2.5 Total**	**Bio- CO2**	**NBio-CO2**	**Total CO2**	**CH4**	**N20**	**CO2e**
Percent Reduction	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**

Quarter	**Start Date**	**End Date**	**Maximum Unmitigated ROG + NOX (tons/quarter)**	**Maximum Mitigated ROG + NOX (tons/quarter)**
		Highest		

2.2 Overall Operational

Unmitigated Operational

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Area	12.7845	3.4000e-004	0.0362	0.0000		1.3000e-004	1.3000e-004		1.3000e-004	1.3000e-004	0.0000	0.0697	0.0697	1.9000e-004	0.0000	0.0744
Energy	2.1175	19.2496	16.1696	0.1155		1.4630	1.4630		1.4630	1.4630	0.0000	20,955.4872	20,955.4872	0.4017	0.3842	21,080.0152

Mobile	23.5013	48.7823	183.5492	0.4662	23.5995	0.8085	24.4080	6.6961	0.7653	7.4614	0.0000	43,266.62 30	43,266.623 0	2.3219	0.0000	43,324.669 3
Waste						0.0000	0.0000		0.0000	0.0000	324.7855	0.0000	324.7855	19.1943	0.0000	804.6424
Water						0.0000	0.0000		0.0000	0.0000	155.2558	0.0000	155.2558	15.9463	0.3765	666.1171
Total	**38.4032**	**68.0322**	**199.7550**	**0.5817**	**23.5995**	**2.2716**	**25.8711**	**6.6961**	**2.2284**	**8.9245**	**480.0414**	**64,222.17 99**	**64,702.221 3**	**37.8642**	**0.7607**	**65,875.518 4**

Mitigated Operational

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Area	12.7845	3.4000e-004	0.0362	0.0000		1.3000e-004	1.3000e-004		1.3000e-004	1.3000e-004	0.0000	0.0697	0.0697	1.9000e-004	0.0000	0.0744
Energy	2.1175	19.2496	16.1696	0.1155		1.4630	1.4630		1.4630	1.4630	0.0000	20,955.48 72	20,955.487 2	0.4017	0.3842	21,080.015 2
Mobile	23.5013	48.7823	183.5492	0.4662	23.5995	0.8085	24.4080	6.6961	0.7653	7.4614	0.0000	43,266.62 30	43,266.623 0	2.3219	0.0000	43,324.669 3
Waste						0.0000	0.0000		0.0000	0.0000	324.7855	0.0000	324.7855	19.1943	0.0000	804.6424
Water						0.0000	0.0000		0.0000	0.0000	155.2558	0.0000	155.2558	15.9463	0.3765	666.1171
Total	**38.4032**	**68.0322**	**199.7550**	**0.5817**	**23.5995**	**2.2716**	**25.8711**	**6.6961**	**2.2284**	**8.9245**	**480.0414**	**64,222.17 99**	**64,702.221 3**	**37.8642**	**0.7607**	**65,875.518 4**

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N20	CO2e
Percent Reduction	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**

3.0 Construction Detail

Construction Phase

Phase Number	Phase Name	Phase Type	Start Date	End Date	Num Days Week	Num Days	Phase Description

1	Site Preparation	Site Preparation	12/4/2019	2/25/2020	5	60	

Acres of Grading (Site Preparation Phase): 0

Acres of Grading (Grading Phase): 0

Acres of Paving: 0

Residential Indoor: 0; Residential Outdoor: 0; Non-Residential Indoor: 0; Non-Residential Outdoor: 0; Striped Parking Area: 0

OffRoad Equipment

Phase Name	Offroad Equipment Type	Amount	Usage Hours	Horse Power	Load Factor
Site Preparation	Rubber Tired Dozers	0	8.00	247	0.40
Site Preparation	Tractors/Loaders/Backhoes	0	8.00	97	0.37

Trips and VMT

Phase Name	Offroad Equipment Count	Worker Trip Number	Vendor Trip Number	Hauling Trip Number	Worker Trip Length	Vendor Trip Length	Hauling Trip Length	Worker Vehicle Class	Vendor Vehicle Class	Hauling Vehicle Class
Site Preparation	0	0.00	0.00	0.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT

3.1 Mitigation Measures Construction

3.2 Site Preparation - 2019

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

Total	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**

3.2 Site Preparation - 2020

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e

Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

Worker	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**

4.0 Operational Detail - Mobile

4.1 Mitigation Measures Mobile

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Mitigated	23.5013	48.7823	183.5492	0.4662	23.5995	0.8085	24.4080	6.6961	0.7653	7.4614	0.0000	43,266.6230	43,266.6230	2.3219	0.0000	43,324.6693
Unmitigated	23.5013	48.7823	183.5492	0.4662	23.5995	0.8085	24.4080	6.6961	0.7653	7.4614	0.0000	43,266.6230	43,266.6230	2.3219	0.0000	43,324.6693

4.2 Trip Summary Information

	Average Daily Trip Rate			Unmitigated	Mitigated
Land Use	Weekday	Saturday	Sunday	Annual VMT	Annual VMT
Hospital	46,800.00	35,100.00	33345.00	108,812,645	108,812,645
Total	46,800.00	35,100.00	33,345.00	108,812,645	108,812,645

4.3 Trip Type Information

	Miles			Trip %			Trip Purpose %		
Land Use	H-W or C-W	H-S or C-C	H-O or C-NW	H-W or C-W	H-S or C-C	H-O or C-NW	Primary	Diverted	Pass-by
Hospital	9.50	7.30	7.30	64.90	16.10	19.00	73	25	2

4.4 Fleet Mix

Land Use	LDA	LDT1	LDT2	MDV	LHD1	LHD2	MHD	HHD	OBUS	UBUS	MCY	SBUS	MH
Hospital	0.558355	0.055004	0.187127	0.116886	0.024672	0.005575	0.017164	0.024194	0.001939	0.001702	0.005819	0.000751	0.000813

5.0 Energy Detail

Historical Energy Use: N

5.1 Mitigation Measures Energy

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Electricity Mitigated						0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Electricity Unmitigated						0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
NaturalGas Mitigated	2.1175	19.2496	16.1696	0.1155		1.4630	1.4630		1.4630	1.4630	0.0000	20,955.4872	20,955.4872	0.4017	0.3842	21,080.0152
NaturalGas Unmitigated	2.1175	19.2496	16.1696	0.1155		1.4630	1.4630		1.4630	1.4630	0.0000	20,955.4872	20,955.4872	0.4017	0.3842	21,080.0152

5.2 Energy by Land Use - NaturalGas

Unmitigated

	NaturalGas Use	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Land Use	kBTU/yr	tons/yr										MT/yr					

Hospital	3.92691e+008	2.1175	19.2496	16.1696	0.1155		1.4630	1.4630		1.4630	1.4630	0.0000	20,955.4872	20,955.4872	0.4017	0.3842	21,080.0152
Total		**2.1175**	**19.2496**	**16.1696**	**0.1155**		**1.4630**	**1.4630**		**1.4630**	**1.4630**	**0.0000**	**20,955.4872**	**20,955.4872**	**0.4017**	**0.3842**	**21,080.0152**

Mitigated

	NaturalGas Use	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Land Use	kBTU/yr	tons/yr										MT/yr					
Hospital	3.92691e+008	2.1175	19.2496	16.1696	0.1155		1.4630	1.4630		1.4630	1.4630	0.0000	20,955.4872	20,955.4872	0.4017	0.3842	21,080.0152
Total		**2.1175**	**19.2496**	**16.1696**	**0.1155**		**1.4630**	**1.4630**		**1.4630**	**1.4630**	**0.0000**	**20,955.4872**	**20,955.4872**	**0.4017**	**0.3842**	**21,080.0152**

5.3 Energy by Land Use - Electricity

Unmitigated

	Electricity Use	Total CO2	CH4	N2O	CO2e
Land Use	kWh/yr	MT/yr			
Hospital	6.3258e+007	0.0000	0.0000	0.0000	0.0000
Total		**0.0000**	**0.0000**	**0.0000**	**0.0000**

Mitigated

	Electricity Use	Total CO2	CH4	N2O	CO2e
Land Use	kWh/yr	MT/yr			
Hospital	6.3258e+007	0.0000	0.0000	0.0000	0.0000
Total		**0.0000**	**0.0000**	**0.0000**	**0.0000**

6.0 Area Detail

6.1 Mitigation Measures Area

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Mitigated	12.7845	3.4000e-004	0.0362	0.0000		1.3000e-004	1.3000e-004		1.3000e-004	1.3000e-004	0.0000	0.0697	0.0697	1.9000e-004	0.0000	0.0744
Unmitigated	12.7845	3.4000e-004	0.0362	0.0000		1.3000e-004	1.3000e-004		1.3000e-004	1.3000e-004	0.0000	0.0697	0.0697	1.9000e-004	0.0000	0.0744

6.2 Area by SubCategory

Unmitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
SubCategory	tons/yr										MT/yr					
Architectural Coating	2.0336					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Consumer Products	10.7474					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Landscaping	3.4300e-003	3.4000e-004	0.0362	0.0000		1.3000e-004	1.3000e-004		1.3000e-004	1.3000e-004	0.0000	0.0697	0.0697	1.9000e-004	0.0000	0.0744
Total	**12.7845**	**3.4000e-004**	**0.0362**	**0.0000**		**1.3000e-004**	**1.3000e-004**		**1.3000e-004**	**1.3000e-004**	**0.0000**	**0.0697**	**0.0697**	**1.9000e-004**	**0.0000**	**0.0744**

Mitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
SubCategory	tons/yr										MT/yr					
Architectural Coating	2.0336					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Consumer Products	10.7474					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Landscaping	3.4300e-003	3.4000e-004	0.0362	0.0000		1.3000e-004	1.3000e-004		1.3000e-004	1.3000e-004	0.0000	0.0697	0.0697	1.9000e-004	0.0000	0.0744
Total	**12.7845**	**3.4000e-004**	**0.0362**	**0.0000**		**1.3000e-004**	**1.3000e-004**		**1.3000e-004**	**1.3000e-004**	**0.0000**	**0.0697**	**0.0697**	**1.9000e-004**	**0.0000**	**0.0744**

7.0 Water Detail

7.1 Mitigation Measures Water

	Total CO2	CH4	N2O	CO2e
Category	MT/yr			
Mitigated	155.2558	15.9463	0.3765	666.1171
Unmitigated	155.2558	15.9463	0.3765	666.1171

7.2 Water by Land Use

Unmitigated

	Indoor/Out door Use	Total CO2	CH4	N2O	CO2e
Land Use	Mgal	MT/yr			
Hospital	489.374 / 93.2141	155.2558	15.9463	0.3765	666.1171
Total		**155.2558**	**15.9463**	**0.3765**	**666.1171**

Mitigated

	Indoor/Out door Use	Total CO2	CH4	N2O	CO2e

Land Use	Mgal	MT/yr			
Hospital	489.374 / 93.2141	155.2558	15.9463	0.3765	666.1171
Total		**155.2558**	**15.9463**	**0.3765**	**666.1171**

8.0 Waste Detail

8.1 Mitigation Measures Waste

Category/Year

	Total CO2	CH4	N2O	CO2e
	MT/yr			
Mitigated	324.7855	19.1943	0.0000	804.6424
Unmitigated	324.7855	19.1943	0.0000	804.6424

8.2 Waste by Land Use

Unmitigated

	Waste Disposed	Total CO2	CH4	N2O	CO2e
Land Use	tons	MT/yr			

Hospital	1600	324.7855	19.1943	0.0000	804.6424
Total		**324.7855**	**19.1943**	**0.0000**	**804.6424**

Mitigated

	Waste Disposed	Total CO2	CH4	N2O	CO2e
Land Use	tons	MT/yr			
Hospital	1600	324.7855	19.1943	0.0000	804.6424
Total		**324.7855**	**19.1943**	**0.0000**	**804.6424**

9.0 Operational Offroad

Equipment Type	Number	Hours/Day	Days/Year	Horse Power	Load Factor	Fuel Type

10.0 Stationary Equipment

Fire Pumps and Emergency Generators

Equipment Type	Number	Hours/Day	Hours/Year	Horse Power	Load Factor	Fuel Type

Boilers

Equipment Type	Number	Heat Input/Day	Heat Input/Year	Boiler Rating	Fuel Type

User Defined Equipment

Equipment Type	Number

11.0 Vegetation

Calculation of Daily Emissions from CalEEMod Annual Output

Mobile Sources:

Pollutants:	ROG	NOx	PM10	PM2.5	CO	SO2	PM10 ex	PM10 FD	PM2.5 ex	PM2.5 FD
Annual (TPY) frm CalEEMod =	23.5013	48.7823	24.4080	7.4614	183.5492	0.4662	0.8085	23.5995	0.7653	6.6961
Daily PPD =	128.774247	267.300274	133.742466	40.88438356	1005.749	2.554521	4.430137	129.3123	4.193425	36.69096

1 ton =	2000	pounds
1 Year =	365	days

Area Sources:

Pollutants:	ROG	NOx	PM10	PM2.5
Annual (TPY) frm CalEEMod =	12.7845	3.4000e-004	1.3000e-004	1.3000e-004
Daily PPD =	70.0520548	0.001863014	0.00071233	0.000712329

1 ton =	2000	pounds
1 Year =	365	days

Architectural Coatings:	ROG	NOx	PM10	PM2.5
Pollutants:				
Annual (TPY) frm CalEEMod =	2.0336	NA	NA	NA
Daily PPD =	11.14	NA	NA	NA

Consumer Products:	ROG	NOx	PM10	PM2.5
Annual (TPY) frm CalEEMod =	10.7474	NA	NA	NA
Daily PPD =	58.89	NA	NA	NA

Landscaping:

	ROG	NOx	PM10	PM2.5	CO	SO2
Annual (TPY) frm CalEEMod =	3.4300e-003	3.4000e-004	1.3000e-004	1.3000e-004	0.0362	0.0000
Daily PPD =	0.01879452	0.001863014	0.00071233	0.000712329	0.198356	0

Natural Gas (non-CUP):

Existing non-CUP gas demand =	125792	Therms	From Spreadsheet: TCR 2018 Summary, State and Parn Utilities tab (cell B11)					
Conversion>	1	therm	=	100,000	Btu	U.S. EPA AP-42 Appendix A		
Existing non-CUP gas demand =	12579200000	Btu						
	12579.2	MMBtu						

		ROG	NOx	PM10	PM2.5	CO	SO2
Emission Factors (non-residential from CalEEMod Apx D):							
Pounds/MMBtu =		0.01078431	0.09803922	0.00745098	0.00745098	0.082353	0.000588
2019 Natural Gas Emissions pounds per year =		135.66	1233.25	93.73	93.73	1035.93	7.40
2019 Natural Gas Emissions pounds per day =		0.372	3.379	0.257	0.257	2.838	0.020
2050 increase in square footage =	61%						
2050 Natural Gas Emissions (PPD) =		0.598	5.440	0.413	0.413	4.569	0.033
Incremental Increase from 2019 to 2050 =		0.227	2.061	0.157	0.157	1.731	0.012

Area and Energy Emissions from Existing Aldea Residences to be Demolished

San Francisco County, Annual

1.0 Project Characteristics

1.1 Land Usage

Land Uses	Size	Metric	Lot Acreage	Floor Surface Area	Population
Apartments Mid Rise	42.00	Dwelling Unit	1.11	42,000.00	120

1.2 Other Project Characteristics

Urbanization	Urban	**Wind Speed (m/s)**	4.6	**Precipitation Freq (Days)**	64
Climate Zone	5			**Operational Year**	2019
Utility Company	User Defined				
CO2 Intensity (lb/MWhr)	605.78	**CH4 Intensity (lb/MWhr)**	0	**N2O Intensity (lb/MWhr)**	0

1.3 User Entered Comments & Non-Default Data

Project Characteristics - UCSF specific CO2 EF prior to 2025 net zero

Land Use -

Construction Phase - Operational Run only for energy and area source emissions

Off-road Equipment - Operational Run only for energy and area source emissions

Grading - Operational Run only for energy and area source emissions

Trips and VMT - Operational Run only for energy and area source emissions

Vehicle Trips - Operational Run only for energy and area source emissions

Woodstoves - No Hearths at Aldea

Consumer Products - SF-Specific ROG factor

Energy Use -

Table Name	Column Name	Default Value	New Value
tblConstructionPhase	NumDays	2.00	1.00
tblConstructionPhase	PhaseEndDate	1/10/2020	1/9/2020
tblConsumerProducts	ROG_EF	2.14E-05	1.5E-05
tblFireplaces	NumberGas	6.30	0.00
tblFireplaces	NumberNoFireplace	1.68	42.00
tblFireplaces	NumberWood	7.14	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	0.00
tblProjectCharacteristics	CO2IntensityFactor	0	605.78
tblVehicleTrips	ST_TR	6.39	0.00
tblVehicleTrips	SU_TR	5.86	0.00
tblVehicleTrips	WD_TR	6.65	0.00
tblWoodstoves	NumberCatalytic	0.84	0.00
tblWoodstoves	NumberNoncatalytic	0.84	0.00

2.0 Emissions Summary

2.1 Overall Construction

Unmitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	tons/yr										MT/yr					
2020	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Maximum	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**

Mitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	tons/yr										MT/yr					
2020	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Maximum	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**

	ROG	**NOx**	**CO**	**SO2**	**Fugitive PM10**	**Exhaust PM10**	**PM10 Total**	**Fugitive PM2.5**	**Exhaust PM2.5**	**PM2.5 Total**	**Bio- CO2**	**NBio-CO2**	**Total CO2**	**CH4**	**N20**	**CO2e**
Percent Reduction	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**

Quarter	**Start Date**	**End Date**	**Maximum Unmitigated ROG + NOX (tons/quarter)**	**Maximum Mitigated ROG + NOX (tons/quarter)**
		Highest		

2.2 Overall Operational

Unmitigated Operational

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Area	0.1541	3.6300e-003	0.3134	2.0000e-005		1.7200e-003	1.7200e-003		1.7200e-003	1.7200e-003	0.0000	0.5094	0.5094	5.0000e-004	0.0000	0.5219
Energy	1.9800e-003	0.0169	7.1900e-003	1.1000e-004		1.3700e-003	1.3700e-003		1.3700e-003	1.3700e-003	0.0000	68.2918	68.2918	3.8000e-004	3.6000e-004	68.4081
Mobile	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Waste						0.0000	0.0000		0.0000	0.0000	3.9218	0.0000	3.9218	0.2318	0.0000	9.7161
Water						0.0000	0.0000		0.0000	0.0000	0.8682	5.7278	6.5959	0.0892	2.1100e-003	9.4525
Total	**0.1561**	**0.0205**	**0.3206**	**1.3000e-004**	**0.0000**	**3.0900e-003**	**3.0900e-003**	**0.0000**	**3.0900e-003**	**3.0900e-003**	**4.7900**	**74.5290**	**79.3189**	**0.3218**	**2.4700e-003**	**88.0986**

Mitigated Operational

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Area	0.1541	3.6300e-003	0.3134	2.0000e-005		1.7200e-003	1.7200e-003		1.7200e-003	1.7200e-003	0.0000	0.5094	0.5094	5.0000e-004	0.0000	0.5219
Energy	1.9800e-003	0.0169	7.1900e-003	1.1000e-004		1.3700e-003	1.3700e-003		1.3700e-003	1.3700e-003	0.0000	68.2918	68.2918	3.8000e-004	3.6000e-004	68.4081
Mobile	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Waste						0.0000	0.0000		0.0000	0.0000	3.9218	0.0000	3.9218	0.2318	0.0000	9.7161
Water						0.0000	0.0000		0.0000	0.0000	0.8682	5.7278	6.5959	0.0892	2.1100e-003	9.4525
Total	**0.1561**	**0.0205**	**0.3206**	**1.3000e-004**	**0.0000**	**3.0900e-003**	**3.0900e-003**	**0.0000**	**3.0900e-003**	**3.0900e-003**	**4.7900**	**74.5290**	**79.3189**	**0.3218**	**2.4700e-003**	**88.0986**

	ROG	**NOx**	**CO**	**SO2**	**Fugitive PM10**	**Exhaust PM10**	**PM10 Total**	**Fugitive PM2.5**	**Exhaust PM2.5**	**PM2.5 Total**	**Bio- CO2**	**NBio-CO2**	**Total CO2**	**CH4**	**N20**	**CO2e**
Percent Reduction	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**

3.0 Construction Detail

Construction Phase

Phase Number	Phase Name	Phase Type	Start Date	End Date	Num Days Week	Num Days	Phase Description
1	Site Preparation	Site Preparation	1/9/2020	1/9/2020	5	1	

Acres of Grading (Site Preparation Phase): 0

Acres of Grading (Grading Phase): 0

Acres of Paving: 0

Residential Indoor: 0; Residential Outdoor: 0; Non-Residential Indoor: 0; Non-Residential Outdoor: 0; Striped Parking Area: 0

OffRoad Equipment

Phase Name	Offroad Equipment Type	Amount	Usage Hours	Horse Power	Load Factor
Site Preparation	Graders	0	8.00	187	0.41
Site Preparation	Tractors/Loaders/Backhoes	0	8.00	97	0.37
Site Preparation	Rubber Tired Dozers	0	7.00	247	0.40

Trips and VMT

Phase Name	Offroad Equipment Count	Worker Trip Number	Vendor Trip Number	Hauling Trip Number	Worker Trip Length	Vendor Trip Length	Hauling Trip Length	Worker Vehicle Class	Vendor Vehicle Class	Hauling Vehicle Class
Site Preparation	0	0.00	0.00	0.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT

3.1 Mitigation Measures Construction

3.2 Site Preparation - 2020

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e

Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**

4.0 Operational Detail - Mobile

4.1 Mitigation Measures Mobile

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Mitigated	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Unmitigated	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

4.2 Trip Summary Information

	Average Daily Trip Rate			Unmitigated	Mitigated
Land Use	Weekday	Saturday	Sunday	Annual VMT	Annual VMT
Apartments Mid Rise	0.00	0.00	0.00		
Total	0.00	0.00	0.00		

4.3 Trip Type Information

	Miles			Trip %			Trip Purpose %		
Land Use	H-W or C-W	H-S or C-C	H-O or C-NW	H-W or C-W	H-S or C-C	H-O or C-NW	Primary	Diverted	Pass-by
Apartments Mid Rise	10.80	4.80	5.70	31.00	15.00	54.00	86	11	3

4.4 Fleet Mix

Land Use	LDA	LDT1	LDT2	MDV	LHD1	LHD2	MHD	HHD	OBUS	UBUS	MCY	SBUS	MH
Apartments Mid Rise	0.607141	0.042057	0.190386	0.086590	0.015934	0.004793	0.026379	0.008601	0.004262	0.005315	0.007178	0.000921	0.000443

5.0 Energy Detail

Historical Energy Use: N

5.1 Mitigation Measures Energy

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Electricity Mitigated						0.0000	0.0000		0.0000	0.0000	0.0000	48.7245	48.7245	0.0000	0.0000	48.7245
Electricity Unmitigated						0.0000	0.0000		0.0000	0.0000	0.0000	48.7245	48.7245	0.0000	0.0000	48.7245
NaturalGas Mitigated	1.9800e-003	0.0169	7.1900e-003	1.1000e-004		1.3700e-003	1.3700e-003		1.3700e-003	1.3700e-003	0.0000	19.5673	19.5673	3.8000e-004	3.6000e-004	19.6836
NaturalGas Unmitigated	1.9800e-003	0.0169	7.1900e-003	1.1000e-004		1.3700e-003	1.3700e-003		1.3700e-003	1.3700e-003	0.0000	19.5673	19.5673	3.8000e-004	3.6000e-004	19.6836

5.2 Energy by Land Use - NaturalGas

<u>**Unmitigated**</u>

	NaturalGas Use	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e

Land Use	kBTU/yr	tons/yr										MT/yr					
Apartments Mid Rise	366678	1.9800e-003	0.0169	7.1900e-003	1.1000e-004		1.3700e-003	1.3700e-003		1.3700e-003	1.3700e-003	0.0000	19.5673	19.5673	3.8000e-004	3.6000e-004	19.6836
Total		**1.9800e-003**	**0.0169**	**7.1900e-003**	**1.1000e-004**		**1.3700e-003**	**1.3700e-003**		**1.3700e-003**	**1.3700e-003**	**0.0000**	**19.5673**	**19.5673**	**3.8000e-004**	**3.6000e-004**	**19.6836**

Mitigated

	NaturalGas Use	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Land Use	kBTU/yr	tons/yr										MT/yr					
Apartments Mid Rise	366678	1.9800e-003	0.0169	7.1900e-003	1.1000e-004		1.3700e-003	1.3700e-003		1.3700e-003	1.3700e-003	0.0000	19.5673	19.5673	3.8000e-004	3.6000e-004	19.6836
Total		**1.9800e-003**	**0.0169**	**7.1900e-003**	**1.1000e-004**		**1.3700e-003**	**1.3700e-003**		**1.3700e-003**	**1.3700e-003**	**0.0000**	**19.5673**	**19.5673**	**3.8000e-004**	**3.6000e-004**	**19.6836**

5.3 Energy by Land Use - Electricity

Unmitigated

	Electricity Use	Total CO2	CH4	N2O	CO2e
Land Use	kWh/yr	MT/yr			
Apartments Mid Rise	177324	48.7245	0.0000	0.0000	48.7245
Total		**48.7245**	**0.0000**	**0.0000**	**48.7245**

Mitigated

	Electricity Use	Total CO2	CH4	N2O	CO2e
Land Use	kWh/yr	MT/yr			
Apartments Mid Rise	177324	48.7245	0.0000	0.0000	48.7245
Total		**48.7245**	**0.0000**	**0.0000**	**48.7245**

6.0 Area Detail

6.1 Mitigation Measures Area

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Mitigated	0.1541	3.6300e-003	0.3134	2.0000e-005		1.7200e-003	1.7200e-003		1.7200e-003	1.7200e-003	0.0000	0.5094	0.5094	5.0000e-004	0.0000	0.5219
Unmitigated	0.1541	3.6300e-003	0.3134	2.0000e-005		1.7200e-003	1.7200e-003		1.7200e-003	1.7200e-003	0.0000	0.5094	0.5094	5.0000e-004	0.0000	0.5219

6.2 Area by SubCategory

Unmitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
SubCategory	tons/yr										MT/yr					
Architectural Coating	0.0296					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Consumer Products	0.1150					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Hearth	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Landscaping	9.5900e-003	3.6300e-003	0.3134	2.0000e-005		1.7200e-003	1.7200e-003		1.7200e-003	1.7200e-003	0.0000	0.5094	0.5094	5.0000e-004	0.0000	0.5219
Total	**0.1541**	**3.6300e-003**	**0.3134**	**2.0000e-005**		**1.7200e-003**	**1.7200e-003**		**1.7200e-003**	**1.7200e-003**	**0.0000**	**0.5094**	**0.5094**	**5.0000e-004**	**0.0000**	**0.5219**

Mitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
SubCategory	tons/yr										MT/yr					
Architectural Coating	0.0296					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Consumer Products	0.1150					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Hearth	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Landscaping	9.5900e-003	3.6300e-003	0.3134	2.0000e-005		1.7200e-003	1.7200e-003		1.7200e-003	1.7200e-003	0.0000	0.5094	0.5094	5.0000e-004	0.0000	0.5219
Total	**0.1541**	**3.6300e-003**	**0.3134**	**2.0000e-005**		**1.7200e-003**	**1.7200e-003**		**1.7200e-003**	**1.7200e-003**	**0.0000**	**0.5094**	**0.5094**	**5.0000e-004**	**0.0000**	**0.5219**

7.0 Water Detail

7.1 Mitigation Measures Water

Category	Total CO2	CH4	N2O	CO2e
	MT/yr			
Mitigated	6.5959	0.0892	2.1100e-003	9.4525
Unmitigated	6.5959	0.0892	2.1100e-003	9.4525

7.2 Water by Land Use

Unmitigated

Land Use	Indoor/Outdoor Use	Total CO2	CH4	N2O	CO2e
	Mgal	MT/yr			
Apartments Mid Rise	2.73647 / 1.72517	6.5959	0.0892	2.1100e-003	9.4525
Total		**6.5959**	**0.0892**	**2.1100e-003**	**9.4525**

Mitigated

Land Use	Indoor/Outdoor Use	Total CO2	CH4	N2O	CO2e
	Mgal	MT/yr			

Apartments Mid Rise	2.73647 / 1.72517	6.5959	0.0892	2.1100e-003	9.4525
Total		**6.5959**	**0.0892**	**2.1100e-003**	**9.4525**

8.0 Waste Detail

8.1 Mitigation Measures Waste

Category/Year

	Total CO2	CH4	N2O	CO2e
	MT/yr			
Mitigated	3.9218	0.2318	0.0000	9.7161
Unmitigated	3.9218	0.2318	0.0000	9.7161

8.2 Waste by Land Use

Unmitigated

	Waste Disposed	Total CO2	CH4	N2O	CO2e
Land Use	tons	MT/yr			
Apartments Mid Rise	19.32	3.9218	0.2318	0.0000	9.7161
Total		**3.9218**	**0.2318**	**0.0000**	**9.7161**

Mitigated

	Waste Disposed	Total CO2	CH4	N2O	CO2e
Land Use	tons	MT/yr			
Apartments Mid Rise	19.32	3.9218	0.2318	0.0000	9.7161
Total		**3.9218**	**0.2318**	**0.0000**	**9.7161**

9.0 Operational Offroad

Equipment Type	Number	Hours/Day	Days/Year	Horse Power	Load Factor	Fuel Type

10.0 Stationary Equipment

Fire Pumps and Emergency Generators

Equipment Type	Number	Hours/Day	Hours/Year	Horse Power	Load Factor	Fuel Type

Boilers

Equipment Type	Number	Heat Input/Day	Heat Input/Year	Boiler Rating	Fuel Type

User Defined Equipment

Equipment Type	Number

11.0 Vegetation

Existing Emissions School of Nursing Demolition

San Francisco County, Annual

1.0 Project Characteristics

1.1 Land Usage

Land Uses	Size	Metric	Lot Acreage	Floor Surface Area	Population
Research & Development	88.00	1000sqft	2.02	88,000.00	0

1.2 Other Project Characteristics

Urbanization	Urban	**Wind Speed (m/s)**	4.6	**Precipitation Freq (Days)**	64
Climate Zone	5			**Operational Year**	2000
Utility Company	User Defined				
CO2 Intensity (lb/MWhr)	605.78	**CH4 Intensity (lb/MWhr)**	0	**N2O Intensity (lb/MWhr)**	0

1.3 User Entered Comments & Non-Default Data

Project Characteristics - UCSF Specific emission rate assuming purchased

Land Use -

Construction Phase -

Off-road Equipment - Operational Run Only

Trips and VMT - Operational run only

Vehicle Trips - Operational Energy Run Only for Building to be demolished. Traffic emissions calculated separately as net new for RAB

Consumer Products -

Area Coating -

Landscape Equipment -

Energy Use -

Water And Wastewater -

Solid Waste -

Grading -

Woodstoves -

Table Name	Column Name	Default Value	New Value
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	0.00
tblProjectCharacteristics	CO2IntensityFactor	0	605.78
tblTripsAndVMT	WorkerTripNumber	6.00	0.00
tblVehicleTrips	ST_TR	1.90	0.00
tblVehicleTrips	SU_TR	1.11	0.00
tblVehicleTrips	WD_TR	8.11	0.00

2.0 Emissions Summary

2.1 Overall Construction

Unmitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	tons/yr										MT/yr					
2019	0.4589	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Maximum	**0.4589**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**

Mitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	tons/yr										MT/yr					
2019	0.4589	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Maximum	**0.4589**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**

	ROG	**NOx**	**CO**	**SO2**	**Fugitive PM10**	**Exhaust PM10**	**PM10 Total**	**Fugitive PM2.5**	**Exhaust PM2.5**	**PM2.5 Total**	**Bio- CO2**	**NBio-CO2**	**Total CO2**	**CH4**	**N20**	**CO2e**
Percent Reduction	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**

Quarter	Start Date	End Date	Maximum Unmitigated ROG + NOX (tons/quarter)	Maximum Mitigated ROG + NOX (tons/quarter)
		Highest		

2.2 Overall Operational

Unmitigated Operational

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Area	0.4459	1.0000e-005	1.4300e-003	0.0000		1.0000e-005	1.0000e-005		1.0000e-005	1.0000e-005	0.0000	1.5700e-003	1.5700e-003	1.0000e-005	0.0000	1.8400e-003
Energy	0.0117	0.1068	0.0897	6.4000e-004		8.1100e-003	8.1100e-003		8.1100e-003	8.1100e-003	0.0000	299.0301	299.0301	2.2300e-003	2.1300e-003	299.7208
Mobile	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Waste						0.0000	0.0000		0.0000	0.0000	1.3580	0.0000	1.3580	0.0803	0.0000	3.3644
Water						0.0000	0.0000		0.0000	0.0000	13.7273	64.3333	78.0606	1.4099	0.0333	123.2295
Total	**0.4576**	**0.1068**	**0.0911**	**6.4000e-004**	**0.0000**	**8.1200e-003**	**8.1200e-003**	**0.0000**	**8.1200e-003**	**8.1200e-003**	**15.0853**	**363.3650**	**378.4503**	**1.4924**	**0.0354**	**426.3165**

2.2 Overall Operational

Mitigated Operational

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Area	0.4459	1.0000e-005	1.4300e-003	0.0000		1.0000e-005	1.0000e-005		1.0000e-005	1.0000e-005	0.0000	1.5700e-003	1.5700e-003	1.0000e-005	0.0000	1.8400e-003
Energy	0.0117	0.1068	0.0897	6.4000e-004		8.1100e-003	8.1100e-003		8.1100e-003	8.1100e-003	0.0000	299.0301	299.0301	2.2300e-003	2.1300e-003	299.7208
Mobile	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Waste						0.0000	0.0000		0.0000	0.0000	1.3580	0.0000	1.3580	0.0803	0.0000	3.3644
Water						0.0000	0.0000		0.0000	0.0000	13.7273	64.3333	78.0606	1.4099	0.0333	123.2295
Total	**0.4576**	**0.1068**	**0.0911**	**6.4000e-004**	**0.0000**	**8.1200e-003**	**8.1200e-003**	**0.0000**	**8.1200e-003**	**8.1200e-003**	**15.0853**	**363.3650**	**378.4503**	**1.4924**	**0.0354**	**426.3165**

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N20	CO2e
Percent Reduction	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**

3.0 Construction Detail

Construction Phase

Phase Number	Phase Name	Phase Type	Start Date	End Date	Num Days Week	Num Days	Phase Description
1	Architectural Coating	Architectural Coating	10/30/2019	11/12/2019	5	10	

Acres of Grading (Site Preparation Phase): 0

Acres of Grading (Grading Phase): 0

Acres of Paving: 0

Residential Indoor: 0; Residential Outdoor: 0; Non-Residential Indoor: 132,000; Non-Residential Outdoor: 44,000; Striped Parking Area: 0 (Architectural Coating – sqft)

OffRoad Equipment

Phase Name	Offroad Equipment Type	Amount	Usage Hours	Horse Power	Load Factor
Architectural Coating	Air Compressors	0	6.00	78	0.48

Trips and VMT

Phase Name	Offroad Equipment Count	Worker Trip Number	Vendor Trip Number	Hauling Trip Number	Worker Trip Length	Vendor Trip Length	Hauling Trip Length	Worker Vehicle Class	Vendor Vehicle Class	Hauling Vehicle Class
Architectural Coating	0	0.00	0.00	0.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT

3.1 Mitigation Measures Construction

3.2 Architectural Coating - 2019

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Archit. Coating	0.4589					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**0.4589**	**0.0000**	**0.0000**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**

3.2 Architectural Coating - 2019

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Archit. Coating	0.4589					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**0.4589**	**0.0000**	**0.0000**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**

4.0 Operational Detail - Mobile

4.1 Mitigation Measures Mobile

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Mitigated	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Unmitigated	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

4.2 Trip Summary Information

	Average Daily Trip Rate			Unmitigated	Mitigated
Land Use	Weekday	Saturday	Sunday	Annual VMT	Annual VMT
Research & Development	0.00	0.00	0.00		
Total	0.00	0.00	0.00		

4.3 Trip Type Information

	Miles			Trip %			Trip Purpose %		
Land Use	H-W or C-W	H-S or C-C	H-O or C-NW	H-W or C-W	H-S or C-C	H-O or C-NW	Primary	Diverted	Pass-by
Research & Development	9.50	7.30	7.30	33.00	48.00	19.00	82	15	3

4.4 Fleet Mix

Land Use	LDA	LDT1	LDT2	MDV	LHD1	LHD2	MHD	HHD	OBUS	UBUS	MCY	SBUS	MH
Research & Development	0.652644	0.082781	0.134797	0.044790	0.019744	0.004790	0.031976	0.008157	0.002961	0.010838	0.005393	0.000624	0.000504

5.0 Energy Detail

Historical Energy Use: N

5.1 Mitigation Measures Energy

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Electricity Mitigated						0.0000	0.0000		0.0000	0.0000	0.0000	182.8038	182.8038	0.0000	0.0000	182.8038
Electricity Unmitigated						0.0000	0.0000		0.0000	0.0000	0.0000	182.8038	182.8038	0.0000	0.0000	182.8038
NaturalGas Mitigated	0.0117	0.1068	0.0897	6.4000e-004		8.1100e-003	8.1100e-003		8.1100e-003	8.1100e-003	0.0000	116.2264	116.2264	2.2300e-003	2.1300e-003	116.9171
NaturalGas Unmitigated	0.0117	0.1068	0.0897	6.4000e-004		8.1100e-003	8.1100e-003		8.1100e-003	8.1100e-003	0.0000	116.2264	116.2264	2.2300e-003	2.1300e-003	116.9171

5.2 Energy by Land Use - NaturalGas

Unmitigated

	NaturalGas Use	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Land Use	kBTU/yr	tons/yr										MT/yr					
Research & Development	2.178e +006	0.0117	0.1068	0.0897	6.4000e-004		8.1100e-003	8.1100e-003		8.1100e-003	8.1100e-003	0.0000	116.2264	116.2264	2.2300e-003	2.1300e-003	116.9171
Total		**0.0117**	**0.1068**	**0.0897**	**6.4000e-004**		**8.1100e-003**	**8.1100e-003**		**8.1100e-003**	**8.1100e-003**	**0.0000**	**116.2264**	**116.2264**	**2.2300e-003**	**2.1300e-003**	**116.9171**

Mitigated

	NaturalGas Use	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Land Use	kBTU/yr	tons/yr										MT/yr					
Research & Development	2.178e +006	0.0117	0.1068	0.0897	6.4000e-004		8.1100e-003	8.1100e-003		8.1100e-003	8.1100e-003	0.0000	116.2264	116.2264	2.2300e-003	2.1300e-003	116.9171
Total		**0.0117**	**0.1068**	**0.0897**	**6.4000e-004**		**8.1100e-003**	**8.1100e-003**		**8.1100e-003**	**8.1100e-003**	**0.0000**	**116.2264**	**116.2264**	**2.2300e-003**	**2.1300e-003**	**116.9171**

5.3 Energy by Land Use - Electricity

Unmitigated

	Electricity Use	Total CO2	CH4	N2O	CO2e
Land Use	kWh/yr	MT/yr			
Research & Development	665280	182.8038	0.0000	0.0000	182.8038
Total		**182.8038**	**0.0000**	**0.0000**	**182.8038**

Mitigated

	Electricity Use	Total CO2	CH4	N2O	CO2e
Land Use	kWh/yr	MT/yr			
Research & Development	665280	182.8038	0.0000	0.0000	182.8038
Total		**182.8038**	**0.0000**	**0.0000**	**182.8038**

6.0 Area Detail

6.1 Mitigation Measures Area

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Mitigated	0.4459	1.0000e-005	1.4300e-003	0.0000		1.0000e-005	1.0000e-005		1.0000e-005	1.0000e-005	0.0000	1.5700e-003	1.5700e-003	1.0000e-005	0.0000	1.8400e-003
Unmitigated	0.4459	1.0000e-005	1.4300e-003	0.0000		1.0000e-005	1.0000e-005		1.0000e-005	1.0000e-005	0.0000	1.5700e-003	1.5700e-003	1.0000e-005	0.0000	1.8400e-003

6.2 Area by SubCategory

Unmitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
SubCategory	tons/yr										MT/yr					
Architectural Coating	0.1020					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Consumer Products	0.3437					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Landscaping	2.0000e-004	1.0000e-005	1.4300e-003	0.0000		1.0000e-005	1.0000e-005		1.0000e-005	1.0000e-005	0.0000	1.5700e-003	1.5700e-003	1.0000e-005	0.0000	1.8400e-003
Total	**0.4459**	**1.0000e-005**	**1.4300e-003**	**0.0000**		**1.0000e-005**	**1.0000e-005**		**1.0000e-005**	**1.0000e-005**	**0.0000**	**1.5700e-003**	**1.5700e-003**	**1.0000e-005**	**0.0000**	**1.8400e-003**

6.2 Area by SubCategory

Mitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
SubCategory	tons/yr										MT/yr					
Architectural Coating	0.1020					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Consumer Products	0.3437					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Landscaping	2.0000e-004	1.0000e-005	1.4300e-003	0.0000		1.0000e-005	1.0000e-005		1.0000e-005	1.0000e-005	0.0000	1.5700e-003	1.5700e-003	1.0000e-005	0.0000	1.8400e-003
Total	**0.4459**	**1.0000e-005**	**1.4300e-003**	**0.0000**		**1.0000e-005**	**1.0000e-005**		**1.0000e-005**	**1.0000e-005**	**0.0000**	**1.5700e-003**	**1.5700e-003**	**1.0000e-005**	**0.0000**	**1.8400e-003**

7.0 Water Detail

7.1 Mitigation Measures Water

	Total CO2	CH4	N2O	CO2e
Category	MT/yr			
Mitigated	78.0606	1.4099	0.0333	123.2295
Unmitigated	78.0606	1.4099	0.0333	123.2295

7.2 Water by Land Use

Unmitigated

	Indoor/Outdoor Use	Total CO2	CH4	N2O	CO2e
Land Use	Mgal	MT/yr			
Research & Development	43.2691 / 0	78.0606	1.4099	0.0333	123.2295
Total		**78.0606**	**1.4099**	**0.0333**	**123.2295**

7.2 Water by Land Use

Mitigated

	Indoor/Outdoor Use	Total CO2	CH4	N2O	CO2e
Land Use	Mgal	MT/yr			
Research & Development	43.2691 / 0	78.0606	1.4099	0.0333	123.2295
Total		**78.0606**	**1.4099**	**0.0333**	**123.2295**

8.0 Waste Detail

8.1 Mitigation Measures Waste

Category/Year

	Total CO2	CH4	N2O	CO2e
	MT/yr			
Mitigated	1.3580	0.0803	0.0000	3.3644
Unmitigated	1.3580	0.0803	0.0000	3.3644

8.2 Waste by Land Use

Unmitigated

	Waste Disposed	Total CO2	CH4	N2O	CO2e
Land Use	tons	MT/yr			
Research & Development	6.69	1.3580	0.0803	0.0000	3.3644
Total		**1.3580**	**0.0803**	**0.0000**	**3.3644**

Mitigated

	Waste Disposed	Total CO2	CH4	N2O	CO2e
Land Use	tons	MT/yr			
Research & Development	6.69	1.3580	0.0803	0.0000	3.3644
Total		**1.3580**	**0.0803**	**0.0000**	**3.3644**

9.0 Operational Offroad

Equipment Type	Number	Hours/Day	Days/Year	Horse Power	Load Factor	Fuel Type

10.0 Stationary Equipment

Fire Pumps and Emergency Generators

Equipment Type	Number	Hours/Day	Hours/Year	Horse Power	Load Factor	Fuel Type

Boilers

Equipment Type	Number	Heat Input/Day	Heat Input/Year	Boiler Rating	Fuel Type

User Defined Equipment

Equipment Type	Number

11.0 Vegetation

Existing Emissions Aldea Housing Initial Phase Demolition

San Francisco County, Annual

1.0 Project Characteristics

1.1 Land Usage

Land Uses	Size	Metric	Lot Acreage	Floor Surface Area	Population
Research & Development	145.00	1000sqft	3.33	145,000.00	0

1.2 Other Project Characteristics

Urbanization	Urban	**Wind Speed (m/s)**	4.6	**Precipitation Freq (Days)**	64
Climate Zone	5			**Operational Year**	2000
Utility Company	User Defined				
CO2 Intensity (lb/MWhr)	605.78	**CH4 Intensity (lb/MWhr)**	0	**N2O Intensity (lb/MWhr)**	0

1.3 User Entered Comments & Non-Default Data

Project Characteristics - UCSF Specific emission rate assuming purchased

Land Use -

Construction Phase -

Off-road Equipment - Operational Run Only

Trips and VMT - Operational run only

Vehicle Trips - Operational Energy Run Only for Building to be demolished. Traffic emissions calculated separately as net new for RAB

Consumer Products -

Area Coating -

Landscape Equipment -

Energy Use -

Water And Wastewater -

Solid Waste -

Table Name	Column Name	Default Value	New Value
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	0.00
tblProjectCharacteristics	CO2IntensityFactor	0	605.78
tblTripsAndVMT	WorkerTripNumber	9.00	0.00
tblVehicleTrips	ST_TR	1.90	0.00
tblVehicleTrips	SU_TR	1.11	0.00
tblVehicleTrips	WD_TR	8.11	0.00

2.0 Emissions Summary

2.1 Overall Construction

Unmitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	tons/yr										MT/yr					
2019	0.7561	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Maximum	**0.7561**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**

Mitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e

Year	tons/yr										MT/yr					
2019	0.7561	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Maximum	**0.7561**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**

	ROG	**NOx**	**CO**	**SO2**	**Fugitive PM10**	**Exhaust PM10**	**PM10 Total**	**Fugitive PM2.5**	**Exhaust PM2.5**	**PM2.5 Total**	**Bio- CO2**	**NBio-CO2**	**Total CO2**	**CH4**	**N20**	**CO2e**
Percent Reduction	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**

Quarter	**Start Date**	**End Date**	**Maximum Unmitigated ROG + NOX (tons/quarter)**	**Maximum Mitigated ROG + NOX (tons/quarter)**
		Highest		

2.2 Overall Operational

Unmitigated Operational

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Area	0.7347	2.0000e-005	2.3600e-003	0.0000		1.0000e-005	1.0000e-005		1.0000e-005	1.0000e-005	0.0000	2.5900e-003	2.5900e-003	2.0000e-005	0.0000	3.0300e-003
Energy	0.0194	0.1759	0.1478	1.0600e-003		0.0134	0.0134		0.0134	0.0134	0.0000	492.7201	492.7201	3.6700e-003	3.5100e-003	493.8582
Mobile	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Waste						0.0000	0.0000		0.0000	0.0000	2.2370	0.0000	2.2370	0.1322	0.0000	5.5420
Water						0.0000	0.0000		0.0000	0.0000	22.6188	106.0037	128.6225	2.3232	0.0549	203.0486
Total	**0.7540**	**0.1759**	**0.1501**	**1.0600e-003**	**0.0000**	**0.0134**	**0.0134**	**0.0000**	**0.0134**	**0.0134**	**24.8558**	**598.7264**	**623.5822**	**2.4591**	**0.0584**	**702.4517**

Mitigated Operational

Category	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
	tons/yr										MT/yr					
Area	0.7347	2.0000e-005	2.3600e-003	0.0000		1.0000e-005	1.0000e-005		1.0000e-005	1.0000e-005	0.0000	2.5900e-003	2.5900e-003	2.0000e-005	0.0000	3.0300e-003
Energy	0.0194	0.1759	0.1478	1.0600e-003		0.0134	0.0134		0.0134	0.0134	0.0000	492.7201	492.7201	3.6700e-003	3.5100e-003	493.8582
Mobile	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Waste						0.0000	0.0000		0.0000	0.0000	2.2370	0.0000	2.2370	0.1322	0.0000	5.5420
Water						0.0000	0.0000		0.0000	0.0000	22.6188	106.0037	128.6225	2.3232	0.0549	203.0486
Total	**0.7540**	**0.1759**	**0.1501**	**1.0600e-003**	**0.0000**	**0.0134**	**0.0134**	**0.0000**	**0.0134**	**0.0134**	**24.8558**	**598.7264**	**623.5822**	**2.4591**	**0.0584**	**702.4517**

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N20	CO2e
Percent Reduction	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

3.0 Construction Detail

Construction Phase

Phase Number	Phase Name	Phase Type	Start Date	End Date	Num Days Week	Num Days	Phase Description
1	Architectural Coating	Architectural Coating	10/30/2019	11/22/2019	5	18	

Acres of Grading (Site Preparation Phase): 0

Acres of Grading (Grading Phase): 0

Acres of Paving: 0

Residential Indoor: 0; Residential Outdoor: 0; Non-Residential Indoor: 217,500; Non-Residential Outdoor: 72,500; Striped Parking Area:

OffRoad Equipment

Phase Name	Offroad Equipment Type	Amount	Usage Hours	Horse Power	Load Factor
Architectural Coating	Air Compressors	0	6.00	78	0.48

Trips and VMT

Phase Name	Offroad Equipment Count	Worker Trip Number	Vendor Trip Number	Hauling Trip Number	Worker Trip Length	Vendor Trip Length	Hauling Trip Length	Worker Vehicle Class	Vendor Vehicle Class	Hauling Vehicle Class
Architectural Coating	0	0.00	0.00	0.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT

3.1 Mitigation Measures Construction

3.2 Architectural Coating - 2019

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Archit. Coating	0.7561					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**0.7561**	**0.0000**	**0.0000**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Archit. Coating	0.7561					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**0.7561**	**0.0000**	**0.0000**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**

4.0 Operational Detail - Mobile

4.1 Mitigation Measures Mobile

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Mitigated	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Unmitigated	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

4.2 Trip Summary Information

	Average Daily Trip Rate			Unmitigated	Mitigated
Land Use	Weekday	Saturday	Sunday	Annual VMT	Annual VMT
Research & Development	0.00	0.00	0.00		
Total	0.00	0.00	0.00		

4.3 Trip Type Information

	Miles			Trip %			Trip Purpose %		
Land Use	H-W or C-W	H-S or C-C	H-O or C-NW	H-W or C-W	H-S or C-C	H-O or C-NW	Primary	Diverted	Pass-by
Research & Development	9.50	7.30	7.30	33.00	48.00	19.00	82	15	3

4.4 Fleet Mix

Land Use	LDA	LDT1	LDT2	MDV	LHD1	LHD2	MHD	HHD	OBUS	UBUS	MCY	SBUS	MH
Research & Development	0.652644	0.082781	0.134797	0.044790	0.019744	0.004790	0.031976	0.008157	0.002961	0.010838	0.005393	0.000624	0.000504

5.0 Energy Detail

Historical Energy Use: N

5.1 Mitigation Measures Energy

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Electricity Mitigated						0.0000	0.0000		0.0000	0.0000	0.0000	301.2108	301.2108	0.0000	0.0000	301.2108
Electricity Unmitigated						0.0000	0.0000		0.0000	0.0000	0.0000	301.2108	301.2108	0.0000	0.0000	301.2108
NaturalGas Mitigated	0.0194	0.1759	0.1478	1.0600e-003		0.0134	0.0134		0.0134	0.0134	0.0000	191.5094	191.5094	3.6700e-003	3.5100e-003	192.6474
NaturalGas Unmitigated	0.0194	0.1759	0.1478	1.0600e-003		0.0134	0.0134		0.0134	0.0134	0.0000	191.5094	191.5094	3.6700e-003	3.5100e-003	192.6474

5.2 Energy by Land Use - NaturalGas

Unmitigated

	NaturalGas Use	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Land Use	kBTU/yr	tons/yr										MT/yr					
Research & Development	3.58875e+006	0.0194	0.1759	0.1478	1.0600e-003		0.0134	0.0134		0.0134	0.0134	0.0000	191.5094	191.5094	3.6700e-003	3.5100e-003	192.6474
Total		**0.0194**	**0.1759**	**0.1478**	**1.0600e-003**		**0.0134**	**0.0134**		**0.0134**	**0.0134**	**0.0000**	**191.5094**	**191.5094**	**3.6700e-003**	**3.5100e-003**	**192.6474**

Mitigated

	NaturalGas Use	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Land Use	kBTU/yr	tons/yr										MT/yr					
Research & Development	3.58875e+006	0.0194	0.1759	0.1478	1.0600e-003		0.0134	0.0134		0.0134	0.0134	0.0000	191.5094	191.5094	3.6700e-003	3.5100e-003	192.6474
Total		**0.0194**	**0.1759**	**0.1478**	**1.0600e-003**		**0.0134**	**0.0134**		**0.0134**	**0.0134**	**0.0000**	**191.5094**	**191.5094**	**3.6700e-003**	**3.5100e-003**	**192.6474**

5.3 Energy by Land Use - Electricity

Unmitigated

	Electricity Use	Total CO2	CH4	N2O	CO2e
Land Use	kWh/yr	MT/yr			
Research & Development	1.0962e+006	301.2108	0.0000	0.0000	301.2108
Total		**301.2108**	**0.0000**	**0.0000**	**301.2108**

Mitigated

	Electricity Use	Total CO2	CH4	N2O	CO2e
Land Use	kWh/yr	MT/yr			
Research & Development	1.0962e+006	301.2108	0.0000	0.0000	301.2108

Total		301.2108	0.0000	0.0000	301.2108

6.0 Area Detail

6.1 Mitigation Measures Area

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Mitigated	0.7347	2.0000e-005	2.3600e-003	0.0000		1.0000e-005	1.0000e-005		1.0000e-005	1.0000e-005	0.0000	2.5900e-003	2.5900e-003	2.0000e-005	0.0000	3.0300e-003
Unmitigated	0.7347	2.0000e-005	2.3600e-003	0.0000		1.0000e-005	1.0000e-005		1.0000e-005	1.0000e-005	0.0000	2.5900e-003	2.5900e-003	2.0000e-005	0.0000	3.0300e-003

6.2 Area by SubCategory

Unmitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
SubCategory	tons/yr										MT/yr					
Architectural Coating	0.1680					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Consumer Products	0.5663					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Landscaping	3.3000e-004	2.0000e-005	2.3600e-003	0.0000		1.0000e-005	1.0000e-005		1.0000e-005	1.0000e-005	0.0000	2.5900e-003	2.5900e-003	2.0000e-005	0.0000	3.0300e-003

Total	**0.7347**	**2.0000e-005**	**2.3600e-003**	**0.0000**		**1.0000e-005**	**1.0000e-005**		**1.0000e-005**	**1.0000e-005**	**0.0000**	**2.5900e-003**	**2.5900e-003**	**2.0000e-005**	**0.0000**	**3.0300e-003**

Mitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
SubCategory	tons/yr										MT/yr					
Architectural Coating	0.1680					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Consumer Products	0.5663					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Landscaping	3.3000e-004	2.0000e-005	2.3600e-003	0.0000		1.0000e-005	1.0000e-005		1.0000e-005	1.0000e-005	0.0000	2.5900e-003	2.5900e-003	2.0000e-005	0.0000	3.0300e-003
Total	**0.7347**	**2.0000e-005**	**2.3600e-003**	**0.0000**		**1.0000e-005**	**1.0000e-005**		**1.0000e-005**	**1.0000e-005**	**0.0000**	**2.5900e-003**	**2.5900e-003**	**2.0000e-005**	**0.0000**	**3.0300e-003**

7.0 Water Detail

7.1 Mitigation Measures Water

	Total CO2	CH4	N2O	CO2e
Category	MT/yr			
Mitigated	128.6225	2.3232	0.0549	203.0486
Unmitigated	128.6225	2.3232	0.0549	203.0486

7.2 Water by Land Use

Unmitigated

	Indoor/Outdoor Use	Total CO2	CH4	N2O	CO2e
Land Use	Mgal	MT/yr			
Research & Development	71.2956 / 0	128.6225	2.3232	0.0549	203.0486
Total		**128.6225**	**2.3232**	**0.0549**	**203.0486**

Mitigated

	Indoor/Outdoor Use	Total CO2	CH4	N2O	CO2e
Land Use	Mgal	MT/yr			
Research & Development	71.2956 / 0	128.6225	2.3232	0.0549	203.0486
Total		**128.6225**	**2.3232**	**0.0549**	**203.0486**

8.0 Waste Detail

8.1 Mitigation Measures Waste

Category/Year

	Total CO2	CH4	N2O	CO2e
	MT/yr			
Mitigated	2.2370	0.1322	0.0000	5.5420
Unmitigated	2.2370	0.1322	0.0000	5.5420

8.2 Waste by Land Use

Unmitigated

	Waste Disposed	Total CO2	CH4	N2O	CO2e
Land Use	tons	MT/yr			
Research & Development	11.02	2.2370	0.1322	0.0000	5.5420
Total		**2.2370**	**0.1322**	**0.0000**	**5.5420**

Mitigated

	Waste Disposed	Total CO2	CH4	N2O	CO2e
Land Use	tons	MT/yr			
Research & Development	11.02	2.2370	0.1322	0.0000	5.5420

Total		2.2370	0.1322	0.0000	5.5420

9.0 Operational Offroad

Equipment Type	Number	Hours/Day	Days/Year	Horse Power	Load Factor	Fuel Type

10.0 Stationary Equipment

Fire Pumps and Emergency Generators

Equipment Type	Number	Hours/Day	Hours/Year	Horse Power	Load Factor	Fuel Type

Boilers

Equipment Type	Number	Heat Input/Day	Heat Input/Year	Boiler Rating	Fuel Type

User Defined Equipment

Equipment Type	Number

11.0 Vegetation

CalEEmod Outputs Project Operation

CPHP Operational CPHP Campus Wide 2050

San Francisco County, Annual

1.0 Project Characteristics

1.1 Land Usage

Land Uses	Size	Metric	Lot Acreage	Floor Surface Area	Population
Hospital	6,000.00	1000sqft	137.74	6,000,000.00	0

1.2 Other Project Characteristics

Urbanization	Urban	**Wind Speed (m/s)**	4.6	**Precipitation Freq (Days)**	64
Climate Zone	5			**Operational Year**	2050
Utility Company	User Defined				
CO2 Intensity (lb/MWhr)	0	**CH4 Intensity (lb/MWhr)**	0	**N2O Intensity (lb/MWhr)**	0

1.3 User Entered Comments & Non-Default Data

Project Characteristics - UCSF Net zero GHG electricity starting in 2025

Land Use - Full campus SF to calculate area sources

Construction Phase - mobile source run only

Off-road Equipment - Operational Mobile Source Run only

Trips and VMT - Mobile and area source run only

Vehicle Trips - Adjust trip rates to match daily VMT of the transportation analysis.

Road Dust - CARB Method 7.9

Consumer Products - SF Specific ROG Factor

Energy Use - Net xero electricity. Natural gas separate through CUP

Solid Waste - Adjust waste rates to reflect Utilities analysis data existing and with CPHP

Table Name	Column Name	Default Value	New Value
tblConstructionPhase	NumDays	120.00	1.00
tblConsumerProducts	ROG_EF	2.14E-05	1.5E-05
tblEnergyUse	LightingElect	4.23	0.00
tblEnergyUse	NT24E	5.52	0.00
tblEnergyUse	NT24NG	15.80	0.00
tblEnergyUse	T24E	6.47	0.00
tblEnergyUse	T24NG	84.89	0.00
tblFleetMix	HHD	0.01	0.03
tblFleetMix	LDA	0.59	0.57
tblFleetMix	LDT1	0.04	0.06
tblFleetMix	LDT2	0.19	0.17
tblFleetMix	LHD1	0.01	0.02
tblFleetMix	LHD2	5.4090e-003	6.1250e-003
tblFleetMix	MCY	5.4800e-003	5.3500e-003
tblFleetMix	MDV	0.09	0.11
tblFleetMix	MH	6.8300e-004	7.6200e-004
tblFleetMix	MHD	0.04	0.02
tblFleetMix	OBUS	4.9020e-003	1.6650e-003
tblFleetMix	SBUS	9.2300e-004	1.0690e-003
tblFleetMix	UBUS	1.6050e-003	1.3540e-003
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	3.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	4.00	0.00
tblRoadDust	RoadSiltLoading	0.1	0.048
tblSolidWaste	SolidWasteGenerationRate	64,800.00	2,228.00
tblVehicleEF	HHD	0.28	0.02
tblVehicleEF	HHD	0.42	0.04

tblVehicleEF	HHD	0.05	0.00
tblVehicleEF	HHD	0.97	6.50
tblVehicleEF	HHD	2.63	0.40
tblVehicleEF	HHD	7.01	6.2370e-003
tblVehicleEF	HHD	2,799.48	828.78
tblVehicleEF	HHD	1,647.12	1,033.18
tblVehicleEF	HHD	20.36	0.05
tblVehicleEF	HHD	8.04	5.21
tblVehicleEF	HHD	1.34	2.43
tblVehicleEF	HHD	18.05	2.33
tblVehicleEF	HHD	9.7100e-004	1.8790e-003
tblVehicleEF	HHD	0.06	0.06
tblVehicleEF	HHD	0.03	0.04
tblVehicleEF	HHD	4.8370e-003	0.02
tblVehicleEF	HHD	2.5500e-004	1.0000e-006
tblVehicleEF	HHD	9.2900e-004	1.7980e-003
tblVehicleEF	HHD	0.03	0.03
tblVehicleEF	HHD	8.5490e-003	8.9000e-003
tblVehicleEF	HHD	4.6270e-003	0.02
tblVehicleEF	HHD	2.3400e-004	1.0000e-006
tblVehicleEF	HHD	1.6300e-004	2.0000e-006
tblVehicleEF	HHD	8.4180e-003	7.8000e-005
tblVehicleEF	HHD	0.22	0.43
tblVehicleEF	HHD	1.2700e-004	1.0000e-006
tblVehicleEF	HHD	0.08	0.02
tblVehicleEF	HHD	1.3420e-003	4.0400e-004
tblVehicleEF	HHD	0.12	0.00
tblVehicleEF	HHD	0.02	7.7220e-003
tblVehicleEF	HHD	0.01	9.4730e-003
tblVehicleEF	HHD	3.1700e-004	1.0000e-006

tblVehicleEF	HHD	1.6300e-004	2.0000e-006
tblVehicleEF	HHD	8.4180e-003	7.8000e-005
tblVehicleEF	HHD	0.28	0.50
tblVehicleEF	HHD	1.2700e-004	1.0000e-006
tblVehicleEF	HHD	0.51	0.06
tblVehicleEF	HHD	1.3420e-003	4.0400e-004
tblVehicleEF	HHD	0.13	0.00
tblVehicleEF	LDA	1.4270e-003	5.4400e-004
tblVehicleEF	LDA	4.8300e-004	0.02
tblVehicleEF	LDA	0.25	0.34
tblVehicleEF	LDA	0.31	1.35
tblVehicleEF	LDA	175.93	177.82
tblVehicleEF	LDA	34.59	35.86
tblVehicleEF	LDA	0.02	0.02
tblVehicleEF	LDA	9.7730e-003	0.11
tblVehicleEF	LDA	7.0000e-004	4.6800e-004
tblVehicleEF	LDA	7.8800e-004	6.0800e-004
tblVehicleEF	LDA	6.4400e-004	4.3100e-004
tblVehicleEF	LDA	7.2400e-004	5.5900e-004
tblVehicleEF	LDA	5.9710e-003	0.01
tblVehicleEF	LDA	0.03	0.03
tblVehicleEF	LDA	6.4660e-003	0.01
tblVehicleEF	LDA	3.6030e-003	1.5350e-003
tblVehicleEF	LDA	0.03	0.14
tblVehicleEF	LDA	6.5160e-003	0.06
tblVehicleEF	LDA	3.5000e-004	3.5500e-004
tblVehicleEF	LDA	5.9710e-003	0.01
tblVehicleEF	LDA	0.03	0.03
tblVehicleEF	LDA	6.4660e-003	0.01
tblVehicleEF	LDA	5.2320e-003	2.2240e-003

tblVehicleEF	LDA	0.03	0.14
tblVehicleEF	LDA	7.1350e-003	0.07
tblVehicleEF	LDT1	1.8690e-003	5.8000e-004
tblVehicleEF	LDT1	6.5000e-004	0.02
tblVehicleEF	LDT1	0.31	0.35
tblVehicleEF	LDT1	0.39	1.42
tblVehicleEF	LDT1	220.87	209.99
tblVehicleEF	LDT1	44.08	42.89
tblVehicleEF	LDT1	0.02	0.02
tblVehicleEF	LDT1	0.01	0.13
tblVehicleEF	LDT1	8.4300e-004	4.9300e-004
tblVehicleEF	LDT1	9.6700e-004	6.5500e-004
tblVehicleEF	LDT1	7.7500e-004	4.5400e-004
tblVehicleEF	LDT1	8.8900e-004	6.0200e-004
tblVehicleEF	LDT1	0.01	0.02
tblVehicleEF	LDT1	0.04	0.04
tblVehicleEF	LDT1	0.01	0.02
tblVehicleEF	LDT1	4.6360e-003	1.6150e-003
tblVehicleEF	LDT1	0.04	0.17
tblVehicleEF	LDT1	8.7710e-003	0.06
tblVehicleEF	LDT1	2.2100e-003	2.0780e-003
tblVehicleEF	LDT1	4.4600e-004	4.2400e-004
tblVehicleEF	LDT1	0.01	0.02
tblVehicleEF	LDT1	0.04	0.04
tblVehicleEF	LDT1	0.01	0.02
tblVehicleEF	LDT1	6.7610e-003	2.3560e-003
tblVehicleEF	LDT1	0.04	0.17
tblVehicleEF	LDT1	9.6030e-003	0.07
tblVehicleEF	LDT2	2.1570e-003	7.6000e-004
tblVehicleEF	LDT2	9.4900e-004	0.02

tblVehicleEF	LDT2	0.38	0.40
tblVehicleEF	LDT2	0.47	1.82
tblVehicleEF	LDT2	257.62	210.22
tblVehicleEF	LDT2	51.21	42.99
tblVehicleEF	LDT2	0.03	0.02
tblVehicleEF	LDT2	0.02	0.12
tblVehicleEF	LDT2	8.4100e-004	5.2900e-004
tblVehicleEF	LDT2	9.4700e-004	6.3500e-004
tblVehicleEF	LDT2	7.7400e-004	4.8800e-004
tblVehicleEF	LDT2	8.7100e-004	5.8400e-004
tblVehicleEF	LDT2	0.01	0.02
tblVehicleEF	LDT2	0.03	0.04
tblVehicleEF	LDT2	0.01	0.02
tblVehicleEF	LDT2	5.3850e-003	2.3170e-003
tblVehicleEF	LDT2	0.04	0.17
tblVehicleEF	LDT2	0.01	0.09
tblVehicleEF	LDT2	2.5780e-003	2.0790e-003
tblVehicleEF	LDT2	5.1900e-004	4.2500e-004
tblVehicleEF	LDT2	0.01	0.02
tblVehicleEF	LDT2	0.03	0.04
tblVehicleEF	LDT2	0.01	0.02
tblVehicleEF	LDT2	7.8410e-003	3.3370e-003
tblVehicleEF	LDT2	0.04	0.17
tblVehicleEF	LDT2	0.01	0.09
tblVehicleEF	LHD1	2.4170e-003	3.1500e-003
tblVehicleEF	LHD1	4.6940e-003	3.8390e-003
tblVehicleEF	LHD1	2.6090e-003	4.6680e-003
tblVehicleEF	LHD1	0.12	0.17
tblVehicleEF	LHD1	0.45	0.37
tblVehicleEF	LHD1	0.95	0.74

tblVehicleEF	LHD1	8.76	7.32
tblVehicleEF	LHD1	603.63	618.17
tblVehicleEF	LHD1	20.98	8.26
tblVehicleEF	LHD1	0.04	0.03
tblVehicleEF	LHD1	0.07	0.11
tblVehicleEF	LHD1	0.25	0.17
tblVehicleEF	LHD1	5.8800e-004	1.0160e-003
tblVehicleEF	LHD1	0.01	0.01
tblVehicleEF	LHD1	5.5980e-003	4.6190e-003
tblVehicleEF	LHD1	4.2800e-004	1.7500e-004
tblVehicleEF	LHD1	5.6200e-004	9.7200e-004
tblVehicleEF	LHD1	2.6620e-003	2.5020e-003
tblVehicleEF	LHD1	5.3290e-003	4.3780e-003
tblVehicleEF	LHD1	3.9400e-004	1.6100e-004
tblVehicleEF	LHD1	6.1100e-004	8.1200e-004
tblVehicleEF	LHD1	0.02	0.03
tblVehicleEF	LHD1	0.01	0.01
tblVehicleEF	LHD1	4.8100e-004	5.7000e-004
tblVehicleEF	LHD1	0.09	0.07
tblVehicleEF	LHD1	0.06	0.15
tblVehicleEF	LHD1	0.04	0.02
tblVehicleEF	LHD1	8.6000e-005	7.1000e-005
tblVehicleEF	LHD1	5.8780e-003	6.0210e-003
tblVehicleEF	LHD1	2.2500e-004	8.2000e-005
tblVehicleEF	LHD1	6.1100e-004	8.1200e-004
tblVehicleEF	LHD1	0.02	0.03
tblVehicleEF	LHD1	0.01	0.02
tblVehicleEF	LHD1	4.8100e-004	5.7000e-004
tblVehicleEF	LHD1	0.10	0.08
tblVehicleEF	LHD1	0.06	0.15

tblVehicleEF	LHD1	0.04	0.02
tblVehicleEF	LHD2	2.0490e-003	1.9500e-003
tblVehicleEF	LHD2	4.7590e-003	4.7410e-003
tblVehicleEF	LHD2	1.8250e-003	2.6000e-003
tblVehicleEF	LHD2	0.12	0.13
tblVehicleEF	LHD2	0.44	0.47
tblVehicleEF	LHD2	0.82	0.42
tblVehicleEF	LHD2	13.26	11.61
tblVehicleEF	LHD2	661.14	607.64
tblVehicleEF	LHD2	20.88	5.33
tblVehicleEF	LHD2	0.04	0.05
tblVehicleEF	LHD2	0.06	0.12
tblVehicleEF	LHD2	0.17	0.10
tblVehicleEF	LHD2	8.2400e-004	1.5230e-003
tblVehicleEF	LHD2	0.01	0.01
tblVehicleEF	LHD2	6.9970e-003	0.01
tblVehicleEF	LHD2	3.8600e-004	1.0100e-004
tblVehicleEF	LHD2	7.8800e-004	1.4570e-003
tblVehicleEF	LHD2	2.7120e-003	2.7230e-003
tblVehicleEF	LHD2	6.6700e-003	0.01
tblVehicleEF	LHD2	3.5500e-004	9.2000e-005
tblVehicleEF	LHD2	3.8200e-004	4.5600e-004
tblVehicleEF	LHD2	0.01	0.02
tblVehicleEF	LHD2	0.01	0.01
tblVehicleEF	LHD2	2.9300e-004	3.2000e-004
tblVehicleEF	LHD2	0.09	0.09
tblVehicleEF	LHD2	0.03	0.08
tblVehicleEF	LHD2	0.02	0.01
tblVehicleEF	LHD2	1.2900e-004	1.1100e-004
tblVehicleEF	LHD2	6.4220e-003	5.8570e-003

tblVehicleEF	LHD2	2.2200e-004	5.3000e-005
tblVehicleEF	LHD2	3.8200e-004	4.5600e-004
tblVehicleEF	LHD2	0.01	0.02
tblVehicleEF	LHD2	0.01	0.01
tblVehicleEF	LHD2	2.9300e-004	3.2000e-004
tblVehicleEF	LHD2	0.10	0.11
tblVehicleEF	LHD2	0.03	0.08
tblVehicleEF	LHD2	0.03	0.01
tblVehicleEF	MCY	0.58	0.32
tblVehicleEF	MCY	0.15	0.24
tblVehicleEF	MCY	18.41	17.47
tblVehicleEF	MCY	10.55	9.47
tblVehicleEF	MCY	196.41	213.30
tblVehicleEF	MCY	40.90	57.57
tblVehicleEF	MCY	1.18	1.15
tblVehicleEF	MCY	0.32	0.27
tblVehicleEF	MCY	2.8720e-003	2.3340e-003
tblVehicleEF	MCY	3.2940e-003	3.0160e-003
tblVehicleEF	MCY	2.6770e-003	2.1750e-003
tblVehicleEF	MCY	3.0700e-003	2.8110e-003
tblVehicleEF	MCY	0.74	0.82
tblVehicleEF	MCY	0.60	0.61
tblVehicleEF	MCY	0.45	0.46
tblVehicleEF	MCY	2.66	2.17
tblVehicleEF	MCY	0.47	1.26
tblVehicleEF	MCY	2.08	1.84
tblVehicleEF	MCY	2.3470e-003	2.1110e-003
tblVehicleEF	MCY	6.4200e-004	5.7000e-004
tblVehicleEF	MCY	0.74	0.82
tblVehicleEF	MCY	0.60	0.61

tblVehicleEF	MCY	0.45	0.46
tblVehicleEF	MCY	3.34	2.72
tblVehicleEF	MCY	0.47	1.26
tblVehicleEF	MCY	2.26	2.01
tblVehicleEF	MDV	2.3630e-003	7.4800e-004
tblVehicleEF	MDV	1.1280e-003	0.02
tblVehicleEF	MDV	0.42	0.39
tblVehicleEF	MDV	0.53	1.77
tblVehicleEF	MDV	333.42	253.73
tblVehicleEF	MDV	65.10	50.42
tblVehicleEF	MDV	0.03	0.02
tblVehicleEF	MDV	0.02	0.12
tblVehicleEF	MDV	8.7100e-004	5.0000e-004
tblVehicleEF	MDV	9.8600e-004	6.1900e-004
tblVehicleEF	MDV	8.0200e-004	4.6100e-004
tblVehicleEF	MDV	9.0700e-004	5.6900e-004
tblVehicleEF	MDV	0.03	0.04
tblVehicleEF	MDV	0.07	0.06
tblVehicleEF	MDV	0.03	0.04
tblVehicleEF	MDV	6.0450e-003	2.3020e-003
tblVehicleEF	MDV	0.05	0.17
tblVehicleEF	MDV	0.02	0.08
tblVehicleEF	MDV	3.3310e-003	2.5070e-003
tblVehicleEF	MDV	6.5900e-004	4.9900e-004
tblVehicleEF	MDV	0.03	0.04
tblVehicleEF	MDV	0.07	0.06
tblVehicleEF	MDV	0.03	0.04
tblVehicleEF	MDV	8.7490e-003	3.3090e-003
tblVehicleEF	MDV	0.05	0.17
tblVehicleEF	MDV	0.02	0.09

tblVehicleEF	MH	4.0570e-003	2.8260e-003
tblVehicleEF	MH	0.01	0.02
tblVehicleEF	MH	0.17	0.17
tblVehicleEF	MH	3.07	1.16
tblVehicleEF	MH	1,164.20	1,211.74
tblVehicleEF	MH	55.49	12.75
tblVehicleEF	MH	0.61	0.89
tblVehicleEF	MH	0.52	0.18
tblVehicleEF	MH	0.01	0.01
tblVehicleEF	MH	4.5150e-003	6.0970e-003
tblVehicleEF	MH	9.0600e-004	2.1500e-004
tblVehicleEF	MH	3.2190e-003	3.3060e-003
tblVehicleEF	MH	4.2780e-003	5.7970e-003
tblVehicleEF	MH	8.3300e-004	1.9800e-004
tblVehicleEF	MH	0.23	0.20
tblVehicleEF	MH	0.02	0.01
tblVehicleEF	MH	0.13	0.11
tblVehicleEF	MH	0.02	0.03
tblVehicleEF	MH	3.0800e-003	0.17
tblVehicleEF	MH	0.18	0.06
tblVehicleEF	MH	0.01	0.01
tblVehicleEF	MH	6.0800e-004	1.2600e-004
tblVehicleEF	MH	0.23	0.20
tblVehicleEF	MH	0.02	0.01
tblVehicleEF	MH	0.13	0.11
tblVehicleEF	MH	0.03	0.03
tblVehicleEF	MH	3.0800e-003	0.17
tblVehicleEF	MH	0.20	0.07
tblVehicleEF	MHD	0.02	3.4300e-003
tblVehicleEF	MHD	2.0360e-003	6.2800e-004

tblVehicleEF	MHD	0.03	6.7270e-003
tblVehicleEF	MHD	0.23	0.41
tblVehicleEF	MHD	0.22	0.12
tblVehicleEF	MHD	1.61	0.53
tblVehicleEF	MHD	184.96	59.04
tblVehicleEF	MHD	1,146.81	853.31
tblVehicleEF	MHD	32.83	6.43
tblVehicleEF	MHD	0.49	0.32
tblVehicleEF	MHD	0.99	1.39
tblVehicleEF	MHD	14.70	1.83
tblVehicleEF	MHD	3.8000e-005	8.0000e-005
tblVehicleEF	MHD	2.8650e-003	6.7220e-003
tblVehicleEF	MHD	4.7900e-004	1.0000e-004
tblVehicleEF	MHD	3.6000e-005	7.6000e-005
tblVehicleEF	MHD	2.7390e-003	6.4250e-003
tblVehicleEF	MHD	4.4000e-004	9.2000e-005
tblVehicleEF	MHD	3.1400e-004	2.3500e-004
tblVehicleEF	MHD	0.02	0.01
tblVehicleEF	MHD	0.02	0.02
tblVehicleEF	MHD	2.4400e-004	1.6400e-004
tblVehicleEF	MHD	0.04	9.5590e-003
tblVehicleEF	MHD	6.6150e-003	0.06
tblVehicleEF	MHD	0.11	0.03
tblVehicleEF	MHD	1.7710e-003	5.6000e-004
tblVehicleEF	MHD	0.01	8.1290e-003
tblVehicleEF	MHD	3.5700e-004	6.4000e-005
tblVehicleEF	MHD	3.1400e-004	2.3500e-004
tblVehicleEF	MHD	0.02	0.01
tblVehicleEF	MHD	0.02	0.02
tblVehicleEF	MHD	2.4400e-004	1.6400e-004

tblVehicleEF	MHD	0.05	0.01
tblVehicleEF	MHD	6.6150e-003	0.06
tblVehicleEF	MHD	0.12	0.04
tblVehicleEF	OBUS	0.01	7.1740e-003
tblVehicleEF	OBUS	2.9690e-003	9.9400e-004
tblVehicleEF	OBUS	0.02	0.01
tblVehicleEF	OBUS	0.24	0.69
tblVehicleEF	OBUS	0.28	0.15
tblVehicleEF	OBUS	3.15	0.96
tblVehicleEF	OBUS	191.67	92.21
tblVehicleEF	OBUS	1,273.32	1,079.52
tblVehicleEF	OBUS	56.79	10.79
tblVehicleEF	OBUS	0.47	0.47
tblVehicleEF	OBUS	1.03	1.55
tblVehicleEF	OBUS	4.74	1.23
tblVehicleEF	OBUS	4.3000e-005	1.5700e-004
tblVehicleEF	OBUS	3.2390e-003	8.2570e-003
tblVehicleEF	OBUS	8.9800e-004	1.6500e-004
tblVehicleEF	OBUS	4.1000e-005	1.5000e-004
tblVehicleEF	OBUS	3.0870e-003	7.8860e-003
tblVehicleEF	OBUS	8.2600e-004	1.5200e-004
tblVehicleEF	OBUS	1.0340e-003	9.3800e-004
tblVehicleEF	OBUS	0.01	0.01
tblVehicleEF	OBUS	0.04	0.05
tblVehicleEF	OBUS	5.9200e-004	4.8900e-004
tblVehicleEF	OBUS	0.05	0.01
tblVehicleEF	OBUS	0.03	0.16
tblVehicleEF	OBUS	0.21	0.06
tblVehicleEF	OBUS	1.8390e-003	8.7500e-004
tblVehicleEF	OBUS	0.01	0.01

tblVehicleEF	OBUS	6.2300e-004	1.0700e-004
tblVehicleEF	OBUS	1.0340e-003	9.3800e-004
tblVehicleEF	OBUS	0.01	0.01
tblVehicleEF	OBUS	0.05	0.07
tblVehicleEF	OBUS	5.9200e-004	4.8900e-004
tblVehicleEF	OBUS	0.05	0.01
tblVehicleEF	OBUS	0.03	0.16
tblVehicleEF	OBUS	0.23	0.06
tblVehicleEF	SBUS	0.83	0.08
tblVehicleEF	SBUS	3.4400e-003	1.0470e-003
tblVehicleEF	SBUS	0.05	6.3860e-003
tblVehicleEF	SBUS	7.98	3.37
tblVehicleEF	SBUS	0.27	0.13
tblVehicleEF	SBUS	5.78	0.74
tblVehicleEF	SBUS	1,016.91	266.29
tblVehicleEF	SBUS	1,017.35	760.31
tblVehicleEF	SBUS	54.67	4.58
tblVehicleEF	SBUS	2.15	1.21
tblVehicleEF	SBUS	0.91	1.00
tblVehicleEF	SBUS	11.65	1.94
tblVehicleEF	SBUS	1.5800e-004	2.9400e-004
tblVehicleEF	SBUS	0.01	0.01
tblVehicleEF	SBUS	2.6290e-003	5.6440e-003
tblVehicleEF	SBUS	1.2280e-003	9.0000e-005
tblVehicleEF	SBUS	1.5200e-004	2.8100e-004
tblVehicleEF	SBUS	2.6410e-003	2.6620e-003
tblVehicleEF	SBUS	2.4930e-003	5.3800e-003
tblVehicleEF	SBUS	1.1290e-003	8.3000e-005
tblVehicleEF	SBUS	3.3160e-003	1.1020e-003
tblVehicleEF	SBUS	0.03	0.01

tblVehicleEF	SBUS	0.97	0.35
tblVehicleEF	SBUS	1.9100e-003	5.7700e-004
tblVehicleEF	SBUS	0.04	9.3010e-003
tblVehicleEF	SBUS	0.02	0.07
tblVehicleEF	SBUS	0.33	0.04
tblVehicleEF	SBUS	9.9840e-003	2.5440e-003
tblVehicleEF	SBUS	9.8070e-003	7.2870e-003
tblVehicleEF	SBUS	6.4700e-004	4.5000e-005
tblVehicleEF	SBUS	3.3160e-003	1.1020e-003
tblVehicleEF	SBUS	0.03	0.01
tblVehicleEF	SBUS	1.41	0.50
tblVehicleEF	SBUS	1.9100e-003	5.7700e-004
tblVehicleEF	SBUS	0.05	0.01
tblVehicleEF	SBUS	0.02	0.07
tblVehicleEF	SBUS	0.36	0.04
tblVehicleEF	UBUS	0.23	1.76
tblVehicleEF	UBUS	0.06	5.6880e-003
tblVehicleEF	UBUS	2.03	13.30
tblVehicleEF	UBUS	8.07	0.42
tblVehicleEF	UBUS	1,833.90	1,626.43
tblVehicleEF	UBUS	143.86	3.85
tblVehicleEF	UBUS	0.96	0.68
tblVehicleEF	UBUS	11.91	0.04
tblVehicleEF	UBUS	0.49	0.07
tblVehicleEF	UBUS	0.01	0.03
tblVehicleEF	UBUS	5.1640e-003	4.9490e-003
tblVehicleEF	UBUS	1.7000e-003	5.0000e-005
tblVehicleEF	UBUS	0.21	0.03
tblVehicleEF	UBUS	3.0000e-003	7.8890e-003
tblVehicleEF	UBUS	4.8970e-003	4.7310e-003

tblVehicleEF	UBUS	1.5630e-003	4.6000e-005
tblVehicleEF	UBUS	3.0320e-003	2.1200e-004
tblVehicleEF	UBUS	0.05	2.9750e-003
tblVehicleEF	UBUS	2.2660e-003	1.3000e-004
tblVehicleEF	UBUS	0.02	0.03
tblVehicleEF	UBUS	0.02	0.02
tblVehicleEF	UBUS	0.78	0.03
tblVehicleEF	UBUS	0.02	0.01
tblVehicleEF	UBUS	1.5880e-003	3.8000e-005
tblVehicleEF	UBUS	3.0320e-003	2.1200e-004
tblVehicleEF	UBUS	0.05	2.9750e-003
tblVehicleEF	UBUS	2.2660e-003	1.3000e-004
tblVehicleEF	UBUS	0.26	1.79
tblVehicleEF	UBUS	0.02	0.02
tblVehicleEF	UBUS	0.85	0.03
tblVehicleTrips	ST_TR	10.18	12.00
tblVehicleTrips	SU_TR	8.91	10.91
tblVehicleTrips	WD_TR	13.22	15.00

2.0 Emissions Summary

2.1 Overall Construction

Unmitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	tons/yr										MT/yr					
2019	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

Maximum	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**

Mitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	tons/yr										MT/yr					
2019	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Maximum	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**

	ROG	**NOx**	**CO**	**SO2**	**Fugitive PM10**	**Exhaust PM10**	**PM10 Total**	**Fugitive PM2.5**	**Exhaust PM2.5**	**PM2.5 Total**	**Bio- CO2**	**NBio-CO2**	**Total CO2**	**CH4**	**N20**	**CO2e**
Percent Reduction	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**

Quarter	**Start Date**	**End Date**	**Maximum Unmitigated ROG + NOX (tons/quarter)**	**Maximum Mitigated ROG + NOX (tons/quarter)**
		Highest		

2.2 Overall Operational

Unmitigated Operational

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Area	19.5586	4.9000e-004	0.0548	0.0000		1.9000e-004	1.9000e-004		1.9000e-004	1.9000e-004	0.0000	0.1072	0.1072	2.8000e-004	0.0000	0.1141

Energy	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Mobile	14.3044	43.9280	163.3997	0.5895	46.0200	0.3702	46.3902	13.0759	0.3495	13.4254	0.0000	54,991.33 14	54,991.331 4	1.8725	0.0000	55,038.143 2
Waste						0.0000	0.0000		0.0000	0.0000	452.2639	0.0000	452.2639	26.7280	0.0000	1,120.4646
Water						0.0000	0.0000		0.0000	0.0000	238.8551	0.0000	238.8551	24.5327	0.5793	1,024.7955
Total	**33.8631**	**43.9285**	**163.4545**	**0.5895**	**46.0200**	**0.3704**	**46.3904**	**13.0759**	**0.3497**	**13.4255**	**691.1190**	**54,991.43 86**	**55,682.557 6**	**53.1335**	**0.5793**	**57,183.517 4**

Mitigated Operational

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Area	19.5586	4.9000e-004	0.0548	0.0000		1.9000e-004	1.9000e-004		1.9000e-004	1.9000e-004	0.0000	0.1072	0.1072	2.8000e-004	0.0000	0.1141
Energy	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Mobile	14.3044	43.9280	163.3997	0.5895	46.0200	0.3702	46.3902	13.0759	0.3495	13.4254	0.0000	54,991.33 14	54,991.331 4	1.8725	0.0000	55,038.143 2
Waste						0.0000	0.0000		0.0000	0.0000	452.2639	0.0000	452.2639	26.7280	0.0000	1,120.4646
Water						0.0000	0.0000		0.0000	0.0000	238.8551	0.0000	238.8551	24.5327	0.5793	1,024.7955
Total	**33.8631**	**43.9285**	**163.4545**	**0.5895**	**46.0200**	**0.3704**	**46.3904**	**13.0759**	**0.3497**	**13.4255**	**691.1190**	**54,991.43 86**	**55,682.557 6**	**53.1335**	**0.5793**	**57,183.517 4**

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N20	CO2e
Percent Reduction	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**

3.0 Construction Detail

Construction Phase

Phase Number	Phase Name	Phase Type	Start Date	End Date	Num Days Week	Num Days	Phase Description
1	Site Preparation	Site Preparation	12/4/2019	12/4/2019	5	1	

Acres of Grading (Site Preparation Phase): 0

Acres of Grading (Grading Phase): 0

Acres of Paving: 0

Residential Indoor: 0; Residential Outdoor: 0; Non-Residential Indoor: 0; Non-Residential Outdoor: 0; Striped Parking Area: 0

OffRoad Equipment

Phase Name	Offroad Equipment Type	Amount	Usage Hours	Horse Power	Load Factor
Site Preparation	Rubber Tired Dozers	0	8.00	247	0.40
Site Preparation	Tractors/Loaders/Backhoes	0	8.00	97	0.37

Trips and VMT

Phase Name	Offroad Equipment Count	Worker Trip Number	Vendor Trip Number	Hauling Trip Number	Worker Trip Length	Vendor Trip Length	Hauling Trip Length	Worker Vehicle Class	Vendor Vehicle Class	Hauling Vehicle Class
Site Preparation	0	0.00	0.00	0.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT

3.1 Mitigation Measures Construction

3.2 Site Preparation - 2019

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

Off-Road	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**

4.0 Operational Detail - Mobile

4.1 Mitigation Measures Mobile

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Mitigated	14.3044	43.9280	163.3997	0.5895	46.0200	0.3702	46.3902	13.0759	0.3495	13.4254	0.0000	54,991.3314	54,991.3314	1.8725	0.0000	55,038.1432
Unmitigated	14.3044	43.9280	163.3997	0.5895	46.0200	0.3702	46.3902	13.0759	0.3495	13.4254	0.0000	54,991.3314	54,991.3314	1.8725	0.0000	55,038.1432

4.2 Trip Summary Information

	Average Daily Trip Rate			Unmitigated	Mitigated
Land Use	Weekday	Saturday	Sunday	Annual VMT	Annual VMT
Hospital	90,000.00	72,000.00	65460.00	211,354,384	211,354,384
Total	90,000.00	72,000.00	65,460.00	211,354,384	211,354,384

4.3 Trip Type Information

	Miles			Trip %			Trip Purpose %		
Land Use	H-W or C-W	H-S or C-C	H-O or C-NW	H-W or C-W	H-S or C-C	H-O or C-NW	Primary	Diverted	Pass-by
Hospital	9.50	7.30	7.30	64.90	16.10	19.00	73	25	2

4.4 Fleet Mix

Land Use	LDA	LDT1	LDT2	MDV	LHD1	LHD2	MHD	HHD	OBUS	UBUS	MCY	SBUS	MH
Hospital	0.566162	0.056935	0.174451	0.112896	0.022384	0.006125	0.020280	0.030566	0.001665	0.001354	0.005350	0.001069	0.000762

5.0 Energy Detail

Historical Energy Use: N

5.1 Mitigation Measures Energy

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Electricity Mitigated						0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Electricity Unmitigated						0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
NaturalGas Mitigated	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
NaturalGas Unmitigated	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

5.2 Energy by Land Use - NaturalGas

Unmitigated

	NaturalGas Use	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Land Use	kBTU/yr	tons/yr										MT/yr					
Hospital	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total		**0.0000**	**0.0000**	**0.0000**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**

Mitigated

	NaturalGas Use	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Land Use	kBTU/yr	tons/yr										MT/yr					
Hospital	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total		**0.0000**	**0.0000**	**0.0000**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**

5.3 Energy by Land Use - Electricity

Unmitigated

	Electricity Use	Total CO2	CH4	N2O	CO2e

Land Use	kWh/yr	MT/yr			
Hospital	0	0.0000	0.0000	0.0000	0.0000
Total		**0.0000**	**0.0000**	**0.0000**	**0.0000**

Mitigated

	Electricity Use	Total CO2	CH4	N2O	CO2e
Land Use	kWh/yr	MT/yr			
Hospital	0	0.0000	0.0000	0.0000	0.0000
Total		**0.0000**	**0.0000**	**0.0000**	**0.0000**

6.0 Area Detail

6.1 Mitigation Measures Area

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Mitigated	19.5586	4.9000e-004	0.0548	0.0000		1.9000e-004	1.9000e-004		1.9000e-004	1.9000e-004	0.0000	0.1072	0.1072	2.8000e-004	0.0000	0.1141
Unmitigated	19.5586	4.9000e-004	0.0548	0.0000		1.9000e-004	1.9000e-004		1.9000e-004	1.9000e-004	0.0000	0.1072	0.1072	2.8000e-004	0.0000	0.1141

6.2 Area by SubCategory

Unmitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
SubCategory	tons/yr										MT/yr					
Architectural Coating	3.1286					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Consumer Products	16.4250					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Landscaping	5.0100e-003	4.9000e-004	0.0548	0.0000		1.9000e-004	1.9000e-004		1.9000e-004	1.9000e-004	0.0000	0.1072	0.1072	2.8000e-004	0.0000	0.1141
Total	**19.5586**	**4.9000e-004**	**0.0548**	**0.0000**		**1.9000e-004**	**1.9000e-004**		**1.9000e-004**	**1.9000e-004**	**0.0000**	**0.1072**	**0.1072**	**2.8000e-004**	**0.0000**	**0.1141**

Mitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
SubCategory	tons/yr										MT/yr					
Architectural Coating	3.1286					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Consumer Products	16.4250					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Landscaping	5.0100e-003	4.9000e-004	0.0548	0.0000		1.9000e-004	1.9000e-004		1.9000e-004	1.9000e-004	0.0000	0.1072	0.1072	2.8000e-004	0.0000	0.1141

Total	**19.5586**	**4.9000e-004**	**0.0548**	**0.0000**		**1.9000e-004**	**1.9000e-004**		**1.9000e-004**	**1.9000e-004**	**0.0000**	**0.1072**	**0.1072**	**2.8000e-004**	**0.0000**	**0.1141**

7.0 Water Detail

7.1 Mitigation Measures Water

	Total CO2	CH4	N2O	CO2e
Category	MT/yr			
Mitigated	238.8551	24.5327	0.5793	1,024.7955
Unmitigated	238.8551	24.5327	0.5793	1,024.7955

7.2 Water by Land Use

Unmitigated

	Indoor/Outdoor Use	Total CO2	CH4	N2O	CO2e
Land Use	Mgal	MT/yr			
Hospital	752.883 / 143.406	238.8551	24.5327	0.5793	1,024.7955
Total		**238.8551**	**24.5327**	**0.5793**	**1,024.7955**

Mitigated

	Indoor/Outdoor Use	Total CO2	CH4	N2O	CO2e
Land Use	Mgal	MT/yr			
Hospital	752.883 / 143.406	238.8551	24.5327	0.5793	1,024.7955
Total		**238.8551**	**24.5327**	**0.5793**	**1,024.7955**

8.0 Waste Detail

8.1 Mitigation Measures Waste

Category/Year

	Total CO2	CH4	N2O	CO2e
	MT/yr			
Mitigated	452.2639	26.7280	0.0000	1,120.4646
Unmitigated	452.2639	26.7280	0.0000	1,120.4646

8.2 Waste by Land Use

Unmitigated

	Waste Disposed	Total CO2	CH4	N2O	CO2e
Land Use	tons	MT/yr			
Hospital	2228	452.2639	26.7280	0.0000	1,120.4646
Total		**452.2639**	**26.7280**	**0.0000**	**1,120.4646**

Mitigated

	Waste Disposed	Total CO2	CH4	N2O	CO2e
Land Use	tons	MT/yr			
Hospital	2228	452.2639	26.7280	0.0000	1,120.4646
Total		**452.2639**	**26.7280**	**0.0000**	**1,120.4646**

9.0 Operational Offroad

Equipment Type	Number	Hours/Day	Days/Year	Horse Power	Load Factor	Fuel Type

10.0 Stationary Equipment

Fire Pumps and Emergency Generators

Equipment Type	Number	Hours/Day	Hours/Year	Horse Power	Load Factor	Fuel Type

Boilers

Equipment Type	Number	Heat Input/Day	Heat Input/Year	Boiler Rating	Fuel Type

User Defined Equipment

Equipment Type	Number

11.0 Vegetation

Calculation of Daily Emissions from CalEEMod Annual Output

Mobile Sources:

Pollutants:	ROG	NOx	PM10	PM2.5	CO	SO2	PM10 FD	PM10 EX	PM2.5 FD	PM2.5 EX
Annual (TPY) frm CalEEMod =	14.3044	43.9280	46.3902	13.4254	163.3997	0.5895	46.0200	0.3702	13.0759	13.4254
Daily PPD =	78.380	240.701	254.193	73.564	895.341	3.230	252.164	2.028	71.649	73.564

1 ton = 2000 pounds
1 Year = 365 days

Area Sources:

Pollutants:	ROG	NOx	PM10	PM2.5
Annual (TPY) frm CalEEMod =	19.5586	4.9000e-004	1.9000e-004	1.9000e-004
Daily PPD =	107.1704	0.0027	0.0010	0.0010

Architectural Coatings:	ROG	NOx	PM10	PM2.5	CO	SO2	ROG Difference from 2019
Pollutants:							
Annual (TPY) frm CalEEMod =	3.1286	NA					
Daily PPD =	17.1430137						15.11

Consumer Products:	ROG	NOx	PM10	PM2.5	CO	SO2	
Annual (TPY) frm CalEEMod =	16.4250						
Daily PPD =	90.00						5.68

Landscaping:	ROG	NOx	PM10	PM2.5	CO	SO2
Annual (TPY) frm CalEEMod =	5.0100e-003	4.9000e-004	1.9000e-004	1.9000e-004	0.0548	0.0000
Daily PPD =	2.75E-02	2.68E-03	1.04E-03	1.04E-03	0.300274	0

UCSF Initial Phase Projects Operational

San Francisco County, Annual

1.0 Project Characteristics

1.1 Land Usage

Land Uses	Size	Metric	Lot Acreage	Floor Surface Area	Population
Research & Development	270.00	1000sqft	2.50	270,000.00	0
Apartments High Rise	142.00	Dwelling Unit	2.29	142,000.00	406

1.2 Other Project Characteristics

Urbanization Urban

Wind Speed (m/s) 4.6

Precipitation Freq (Days) 64

Climate Zone 5

Operational Year 2030

Utility Company User Defined

CO2 Intensity (lb/MWhr) 0

CH4 Intensity (lb/MWhr) 0

N2O Intensity (lb/MWhr) 0

1.3 User Entered Comments & Non-Default Data

Project Characteristics - Operational Run Only
UCSF Net zero electricity by 2025

Land Use - Project specific acreage

Construction Phase - operational run only

Off-road Equipment - operational run only. Construction in separate run.

Trips and VMT - operational run only.

Vehicle Trips - Rate changes to match Adavant VMT

Vehicle Emission Factors - EMFAC 2017

Vehicle Emission Factors -

Vehicle Emission Factors -

Road Dust - CARB Method 7.9

Woodstoves - No hearths

Energy Use - UCSF Net zweo electricity by 2030

Table Name	Column Name	Default Value	New Value
tblEnergyUse	LightingElect	741.44	0.00
tblEnergyUse	LightingElect	2.99	0.00
tblEnergyUse	NT24E	3,054.10	0.00
tblEnergyUse	NT24E	3.36	0.00
tblEnergyUse	T24E	426.45	0.00
tblEnergyUse	T24E	1.21	0.00
tblFireplaces	NumberGas	21.30	0.00
tblFireplaces	NumberNoFireplace	5.68	142.00
tblFireplaces	NumberWood	24.14	0.00
tblFleetMix	HHD	9.6790e-003	0.03
tblFleetMix	HHD	9.6790e-003	0.03
tblFleetMix	LDA	0.60	0.57
tblFleetMix	LDA	0.60	0.57
tblFleetMix	LDT1	0.04	0.06
tblFleetMix	LDT1	0.04	0.06
tblFleetMix	LDT2	0.19	0.18
tblFleetMix	LDT2	0.19	0.18
tblFleetMix	LHD1	0.01	0.02
tblFleetMix	LHD1	0.01	0.02
tblFleetMix	LHD2	5.2680e-003	5.9030e-003
tblFleetMix	LHD2	5.2680e-003	5.9030e-003
tblFleetMix	MCY	5.7550e-003	5.4650e-003
tblFleetMix	MCY	5.7550e-003	5.4650e-003
tblFleetMix	MDV	0.09	0.11

tblFleetMix	MDV	0.09	0.11
tblFleetMix	MH	5.9500e-004	7.5700e-004
tblFleetMix	MH	5.9500e-004	7.5700e-004
tblFleetMix	MHD	0.03	0.02
tblFleetMix	MHD	0.03	0.02
tblFleetMix	OBUS	4.2840e-003	1.6410e-003
tblFleetMix	OBUS	4.2840e-003	1.6410e-003
tblFleetMix	SBUS	9.5800e-004	9.3700e-004
tblFleetMix	SBUS	9.5800e-004	9.3700e-004
tblFleetMix	UBUS	2.3520e-003	1.5500e-003
tblFleetMix	UBUS	2.3520e-003	1.5500e-003
tblLandUse	LotAcreage	6.20	2.50
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	3.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	4.00	0.00
tblRoadDust	RoadSiltLoading	0.1	0.048
tblVehicleEF	HHD	0.37	0.02
tblVehicleEF	HHD	0.41	0.05
tblVehicleEF	HHD	0.05	0.00
tblVehicleEF	HHD	1.35	6.22
tblVehicleEF	HHD	2.54	0.41
tblVehicleEF	HHD	5.94	6.5970e-003
tblVehicleEF	HHD	2,895.62	920.46
tblVehicleEF	HHD	1,772.68	1,226.16
tblVehicleEF	HHD	18.00	0.06
tblVehicleEF	HHD	13.06	5.15
tblVehicleEF	HHD	2.21	2.51
tblVehicleEF	HHD	18.39	2.35
tblVehicleEF	HHD	0.01	2.1390e-003
tblVehicleEF	HHD	0.06	0.06
tblVehicleEF	HHD	0.03	0.04

tblVehicleEF	HHD	6.7380e-003	0.02
tblVehicleEF	HHD	2.0500e-004	1.0000e-006
tblVehicleEF	HHD	0.01	2.0460e-003
tblVehicleEF	HHD	0.03	0.03
tblVehicleEF	HHD	8.5330e-003	8.8850e-003
tblVehicleEF	HHD	6.4450e-003	0.02
tblVehicleEF	HHD	1.8800e-004	0.00
tblVehicleEF	HHD	1.1400e-004	1.0000e-006
tblVehicleEF	HHD	5.8060e-003	7.1000e-005
tblVehicleEF	HHD	0.30	0.42
tblVehicleEF	HHD	8.6000e-005	1.0000e-006
tblVehicleEF	HHD	0.09	0.02
tblVehicleEF	HHD	9.6700e-004	3.6600e-004
tblVehicleEF	HHD	0.10	2.0000e-006
tblVehicleEF	HHD	0.02	8.5600e-003
tblVehicleEF	HHD	0.01	0.01
tblVehicleEF	HHD	2.7600e-004	1.0000e-006
tblVehicleEF	HHD	1.1400e-004	1.0000e-006
tblVehicleEF	HHD	5.8060e-003	7.1000e-005
tblVehicleEF	HHD	0.37	0.48
tblVehicleEF	HHD	8.6000e-005	1.0000e-006
tblVehicleEF	HHD	0.51	0.07
tblVehicleEF	HHD	9.6700e-004	3.6600e-004
tblVehicleEF	HHD	0.11	2.0000e-006
tblVehicleEF	LDA	2.2690e-003	9.9700e-004
tblVehicleEF	LDA	2.1520e-003	0.03
tblVehicleEF	LDA	0.35	0.40
tblVehicleEF	LDA	0.64	1.73
tblVehicleEF	LDA	201.31	202.37
tblVehicleEF	LDA	42.27	42.52

tblVehicleEF	LDA	0.03	0.02
tblVehicleEF	LDA	0.03	0.13
tblVehicleEF	LDA	1.4660e-003	9.4400e-004
tblVehicleEF	LDA	1.8270e-003	1.2860e-003
tblVehicleEF	LDA	1.3490e-003	8.6900e-004
tblVehicleEF	LDA	1.6800e-003	1.1830e-003
tblVehicleEF	LDA	0.02	0.02
tblVehicleEF	LDA	0.06	0.07
tblVehicleEF	LDA	0.02	0.02
tblVehicleEF	LDA	5.7180e-003	3.3990e-003
tblVehicleEF	LDA	0.04	0.17
tblVehicleEF	LDA	0.03	0.12
tblVehicleEF	LDA	2.0140e-003	2.0020e-003
tblVehicleEF	LDA	4.3300e-004	4.2100e-004
tblVehicleEF	LDA	0.02	0.02
tblVehicleEF	LDA	0.06	0.07
tblVehicleEF	LDA	0.02	0.02
tblVehicleEF	LDA	8.3060e-003	4.9360e-003
tblVehicleEF	LDA	0.04	0.17
tblVehicleEF	LDA	0.03	0.14
tblVehicleEF	LDT1	3.4810e-003	1.6590e-003
tblVehicleEF	LDT1	4.0640e-003	0.04
tblVehicleEF	LDT1	0.49	0.52
tblVehicleEF	LDT1	1.05	1.86
tblVehicleEF	LDT1	257.11	244.39
tblVehicleEF	LDT1	54.94	51.84
tblVehicleEF	LDT1	0.04	0.03
tblVehicleEF	LDT1	0.05	0.16
tblVehicleEF	LDT1	1.7140e-003	1.0830e-003
tblVehicleEF	LDT1	2.1190e-003	1.4820e-003

tblVehicleEF	LDT1	1.5770e-003	9.9600e-004
tblVehicleEF	LDT1	1.9490e-003	1.3630e-003
tblVehicleEF	LDT1	0.03	0.04
tblVehicleEF	LDT1	0.10	0.10
tblVehicleEF	LDT1	0.03	0.04
tblVehicleEF	LDT1	8.6320e-003	6.4090e-003
tblVehicleEF	LDT1	0.09	0.38
tblVehicleEF	LDT1	0.05	0.16
tblVehicleEF	LDT1	2.5740e-003	2.4180e-003
tblVehicleEF	LDT1	5.6700e-004	5.1300e-004
tblVehicleEF	LDT1	0.03	0.04
tblVehicleEF	LDT1	0.10	0.10
tblVehicleEF	LDT1	0.03	0.04
tblVehicleEF	LDT1	0.01	9.3510e-003
tblVehicleEF	LDT1	0.09	0.38
tblVehicleEF	LDT1	0.06	0.18
tblVehicleEF	LDT2	3.3920e-003	1.6620e-003
tblVehicleEF	LDT2	2.9840e-003	0.04
tblVehicleEF	LDT2	0.50	0.53
tblVehicleEF	LDT2	0.87	2.28
tblVehicleEF	LDT2	291.96	251.38
tblVehicleEF	LDT2	61.17	53.69
tblVehicleEF	LDT2	0.04	0.03
tblVehicleEF	LDT2	0.05	0.17
tblVehicleEF	LDT2	1.6640e-003	1.0370e-003
tblVehicleEF	LDT2	2.0260e-003	1.3450e-003
tblVehicleEF	LDT2	1.5310e-003	9.5500e-004
tblVehicleEF	LDT2	1.8630e-003	1.2370e-003
tblVehicleEF	LDT2	0.02	0.04
tblVehicleEF	LDT2	0.06	0.09

tblVehicleEF	LDT2	0.03	0.05
tblVehicleEF	LDT2	8.4410e-003	6.2060e-003
tblVehicleEF	LDT2	0.06	0.33
tblVehicleEF	LDT2	0.04	0.18
tblVehicleEF	LDT2	2.9220e-003	2.4870e-003
tblVehicleEF	LDT2	6.2500e-004	5.3100e-004
tblVehicleEF	LDT2	0.02	0.04
tblVehicleEF	LDT2	0.06	0.09
tblVehicleEF	LDT2	0.03	0.05
tblVehicleEF	LDT2	0.01	9.0140e-003
tblVehicleEF	LDT2	0.06	0.33
tblVehicleEF	LDT2	0.04	0.20
tblVehicleEF	LHD1	4.2920e-003	4.1460e-003
tblVehicleEF	LHD1	7.5410e-003	5.4760e-003
tblVehicleEF	LHD1	0.01	9.1240e-003
tblVehicleEF	LHD1	0.14	0.18
tblVehicleEF	LHD1	0.54	0.50
tblVehicleEF	LHD1	1.64	0.89
tblVehicleEF	LHD1	8.80	8.34
tblVehicleEF	LHD1	647.27	702.21
tblVehicleEF	LHD1	29.18	10.04
tblVehicleEF	LHD1	0.06	0.05
tblVehicleEF	LHD1	0.34	0.37
tblVehicleEF	LHD1	0.73	0.23
tblVehicleEF	LHD1	7.0700e-004	9.2900e-004
tblVehicleEF	LHD1	0.01	9.9180e-003
tblVehicleEF	LHD1	8.4250e-003	7.8050e-003
tblVehicleEF	LHD1	6.1200e-004	2.1000e-004
tblVehicleEF	LHD1	6.7600e-004	8.8900e-004
tblVehicleEF	LHD1	2.5800e-003	2.4790e-003

tblVehicleEF	LHD1	8.0280e-003	7.4230e-003
tblVehicleEF	LHD1	5.6300e-004	1.9300e-004
tblVehicleEF	LHD1	1.4480e-003	1.3190e-003
tblVehicleEF	LHD1	0.07	0.06
tblVehicleEF	LHD1	0.01	0.02
tblVehicleEF	LHD1	1.0100e-003	7.7900e-004
tblVehicleEF	LHD1	0.09	0.08
tblVehicleEF	LHD1	0.24	0.46
tblVehicleEF	LHD1	0.14	0.04
tblVehicleEF	LHD1	8.8000e-005	8.1000e-005
tblVehicleEF	LHD1	6.3310e-003	6.8460e-003
tblVehicleEF	LHD1	3.2200e-004	9.9000e-005
tblVehicleEF	LHD1	1.4480e-003	1.3190e-003
tblVehicleEF	LHD1	0.07	0.06
tblVehicleEF	LHD1	0.02	0.02
tblVehicleEF	LHD1	1.0100e-003	7.7900e-004
tblVehicleEF	LHD1	0.10	0.09
tblVehicleEF	LHD1	0.24	0.46
tblVehicleEF	LHD1	0.16	0.05
tblVehicleEF	LHD2	2.5500e-003	2.5800e-003
tblVehicleEF	LHD2	5.2880e-003	5.3930e-003
tblVehicleEF	LHD2	3.1530e-003	5.0230e-003
tblVehicleEF	LHD2	0.12	0.13
tblVehicleEF	LHD2	0.45	0.50
tblVehicleEF	LHD2	0.90	0.49
tblVehicleEF	LHD2	13.59	13.05
tblVehicleEF	LHD2	675.88	686.39
tblVehicleEF	LHD2	21.97	6.59
tblVehicleEF	LHD2	0.07	0.08
tblVehicleEF	LHD2	0.18	0.42

tblVehicleEF	LHD2	0.26	0.13
tblVehicleEF	LHD2	1.0400e-003	1.4850e-003
tblVehicleEF	LHD2	0.01	0.01
tblVehicleEF	LHD2	9.0950e-003	0.01
tblVehicleEF	LHD2	3.7200e-004	1.0500e-004
tblVehicleEF	LHD2	9.9500e-004	1.4200e-003
tblVehicleEF	LHD2	2.7070e-003	2.7080e-003
tblVehicleEF	LHD2	8.6790e-003	0.01
tblVehicleEF	LHD2	3.4200e-004	9.6000e-005
tblVehicleEF	LHD2	4.2200e-004	6.0600e-004
tblVehicleEF	LHD2	0.02	0.03
tblVehicleEF	LHD2	0.01	0.01
tblVehicleEF	LHD2	3.0400e-004	3.8500e-004
tblVehicleEF	LHD2	0.09	0.10
tblVehicleEF	LHD2	0.04	0.15
tblVehicleEF	LHD2	0.04	0.02
tblVehicleEF	LHD2	1.3200e-004	1.2500e-004
tblVehicleEF	LHD2	6.5670e-003	6.6220e-003
tblVehicleEF	LHD2	2.3500e-004	6.5000e-005
tblVehicleEF	LHD2	4.2200e-004	6.0600e-004
tblVehicleEF	LHD2	0.02	0.03
tblVehicleEF	LHD2	0.01	0.02
tblVehicleEF	LHD2	3.0400e-004	3.8500e-004
tblVehicleEF	LHD2	0.10	0.11
tblVehicleEF	LHD2	0.04	0.15
tblVehicleEF	LHD2	0.05	0.03
tblVehicleEF	MCY	0.57	0.33
tblVehicleEF	MCY	0.16	0.25
tblVehicleEF	MCY	19.33	18.37
tblVehicleEF	MCY	10.34	9.28

tblVehicleEF	MCY	194.99	213.76
tblVehicleEF	MCY	43.81	59.74
tblVehicleEF	MCY	1.18	1.15
tblVehicleEF	MCY	0.32	0.27
tblVehicleEF	MCY	2.6910e-003	2.2080e-003
tblVehicleEF	MCY	3.2940e-003	2.8780e-003
tblVehicleEF	MCY	2.5100e-003	2.0600e-003
tblVehicleEF	MCY	3.0870e-003	2.6930e-003
tblVehicleEF	MCY	0.76	0.81
tblVehicleEF	MCY	0.68	0.64
tblVehicleEF	MCY	0.47	0.46
tblVehicleEF	MCY	2.71	2.22
tblVehicleEF	MCY	0.60	1.55
tblVehicleEF	MCY	2.17	1.91
tblVehicleEF	MCY	2.3490e-003	2.1150e-003
tblVehicleEF	MCY	6.7100e-004	5.9100e-004
tblVehicleEF	MCY	0.76	0.81
tblVehicleEF	MCY	0.68	0.64
tblVehicleEF	MCY	0.47	0.46
tblVehicleEF	MCY	3.39	2.78
tblVehicleEF	MCY	0.60	1.55
tblVehicleEF	MCY	2.36	2.08
tblVehicleEF	MDV	4.6040e-003	1.7560e-003
tblVehicleEF	MDV	5.0390e-003	0.04
tblVehicleEF	MDV	0.60	0.53
tblVehicleEF	MDV	1.20	2.33
tblVehicleEF	MDV	388.49	303.99
tblVehicleEF	MDV	79.93	63.72
tblVehicleEF	MDV	0.05	0.03
tblVehicleEF	MDV	0.08	0.18

tblVehicleEF	MDV	1.7260e-003	1.0420e-003
tblVehicleEF	MDV	2.0190e-003	1.3490e-003
tblVehicleEF	MDV	1.5890e-003	9.6000e-004
tblVehicleEF	MDV	1.8570e-003	1.2400e-003
tblVehicleEF	MDV	0.04	0.05
tblVehicleEF	MDV	0.10	0.10
tblVehicleEF	MDV	0.04	0.06
tblVehicleEF	MDV	0.01	6.7610e-003
tblVehicleEF	MDV	0.09	0.34
tblVehicleEF	MDV	0.07	0.20
tblVehicleEF	MDV	3.8830e-003	3.0040e-003
tblVehicleEF	MDV	8.1900e-004	6.3100e-004
tblVehicleEF	MDV	0.04	0.05
tblVehicleEF	MDV	0.10	0.10
tblVehicleEF	MDV	0.04	0.06
tblVehicleEF	MDV	0.02	9.7950e-003
tblVehicleEF	MDV	0.09	0.34
tblVehicleEF	MDV	0.07	0.22
tblVehicleEF	MH	5.3570e-003	5.0570e-003
tblVehicleEF	MH	0.01	0.02
tblVehicleEF	MH	0.26	0.32
tblVehicleEF	MH	3.30	1.63
tblVehicleEF	MH	1,173.64	1,351.69
tblVehicleEF	MH	55.96	15.45
tblVehicleEF	MH	0.66	1.09
tblVehicleEF	MH	0.53	0.24
tblVehicleEF	MH	0.01	0.01
tblVehicleEF	MH	6.2520e-003	0.02
tblVehicleEF	MH	8.7800e-004	2.0900e-004
tblVehicleEF	MH	3.2210e-003	3.3000e-003

tblVehicleEF	MH	5.9410e-003	0.02
tblVehicleEF	MH	8.0700e-004	1.9300e-004
tblVehicleEF	MH	0.22	0.31
tblVehicleEF	MH	0.02	0.03
tblVehicleEF	MH	0.11	0.13
tblVehicleEF	MH	0.03	0.04
tblVehicleEF	MH	5.2010e-003	0.51
tblVehicleEF	MH	0.19	0.07
tblVehicleEF	MH	0.01	0.01
tblVehicleEF	MH	6.1700e-004	1.5300e-004
tblVehicleEF	MH	0.22	0.31
tblVehicleEF	MH	0.02	0.03
tblVehicleEF	MH	0.11	0.13
tblVehicleEF	MH	0.03	0.05
tblVehicleEF	MH	5.2010e-003	0.51
tblVehicleEF	MH	0.21	0.08
tblVehicleEF	MHD	0.02	3.2270e-003
tblVehicleEF	MHD	2.3960e-003	9.3800e-004
tblVehicleEF	MHD	0.03	7.0270e-003
tblVehicleEF	MHD	0.27	0.40
tblVehicleEF	MHD	0.24	0.15
tblVehicleEF	MHD	2.80	0.73
tblVehicleEF	MHD	171.39	70.46
tblVehicleEF	MHD	1,159.97	968.31
tblVehicleEF	MHD	41.65	7.11
tblVehicleEF	MHD	0.47	0.38
tblVehicleEF	MHD	1.05	1.43
tblVehicleEF	MHD	13.41	1.78
tblVehicleEF	MHD	7.3000e-005	1.6900e-004
tblVehicleEF	MHD	3.0120e-003	6.9630e-003

tblVehicleEF	MHD	5.2800e-004	9.0000e-005
tblVehicleEF	MHD	6.9000e-005	1.6100e-004
tblVehicleEF	MHD	2.8790e-003	6.6560e-003
tblVehicleEF	MHD	4.8600e-004	8.3000e-005
tblVehicleEF	MHD	4.9900e-004	2.2800e-004
tblVehicleEF	MHD	0.03	0.01
tblVehicleEF	MHD	0.02	0.02
tblVehicleEF	MHD	3.6000e-004	1.4600e-004
tblVehicleEF	MHD	0.04	0.01
tblVehicleEF	MHD	0.01	0.06
tblVehicleEF	MHD	0.18	0.03
tblVehicleEF	MHD	1.6440e-003	6.6800e-004
tblVehicleEF	MHD	0.01	9.2240e-003
tblVehicleEF	MHD	4.6500e-004	7.0000e-005
tblVehicleEF	MHD	4.9900e-004	2.2800e-004
tblVehicleEF	MHD	0.03	0.01
tblVehicleEF	MHD	0.03	0.02
tblVehicleEF	MHD	3.6000e-004	1.4600e-004
tblVehicleEF	MHD	0.05	0.01
tblVehicleEF	MHD	0.01	0.06
tblVehicleEF	MHD	0.19	0.04
tblVehicleEF	OBUS	0.01	7.3320e-003
tblVehicleEF	OBUS	3.7320e-003	2.4610e-003
tblVehicleEF	OBUS	0.02	0.02
tblVehicleEF	OBUS	0.24	0.69
tblVehicleEF	OBUS	0.33	0.29
tblVehicleEF	OBUS	3.91	1.68
tblVehicleEF	OBUS	177.72	102.80
tblVehicleEF	OBUS	1,291.13	1,219.51
tblVehicleEF	OBUS	60.36	14.05

tblVehicleEF	OBUS	0.42	0.46
tblVehicleEF	OBUS	1.09	1.41
tblVehicleEF	OBUS	4.24	1.11
tblVehicleEF	OBUS	3.8000e-005	1.5300e-004
tblVehicleEF	OBUS	3.2850e-003	8.0870e-003
tblVehicleEF	OBUS	7.7100e-004	1.5700e-004
tblVehicleEF	OBUS	3.7000e-005	1.4600e-004
tblVehicleEF	OBUS	3.1300e-003	7.7230e-003
tblVehicleEF	OBUS	7.0800e-004	1.4500e-004
tblVehicleEF	OBUS	0.02	0.02
tblVehicleEF	OBUS	0.03	0.05
tblVehicleEF	OBUS	6.1100e-004	5.3900e-004
tblVehicleEF	OBUS	0.05	0.02
tblVehicleEF	OBUS	0.03	0.21
tblVehicleEF	OBUS	0.25	0.08
tblVehicleEF	OBUS	1.7060e-003	9.7600e-004
tblVehicleEF	OBUS	0.01	0.01
tblVehicleEF	OBUS	6.7200e-004	1.3900e-004
tblVehicleEF	OBUS	0.02	0.02
tblVehicleEF	OBUS	0.05	0.07
tblVehicleEF	OBUS	6.1100e-004	5.3900e-004
tblVehicleEF	OBUS	0.06	0.02
tblVehicleEF	OBUS	0.03	0.21
tblVehicleEF	OBUS	0.28	0.09
tblVehicleEF	SBUS	0.80	0.06
tblVehicleEF	SBUS	5.4460e-003	3.4080e-003
tblVehicleEF	SBUS	0.05	4.8910e-003
tblVehicleEF	SBUS	8.40	2.56
tblVehicleEF	SBUS	0.36	0.29
tblVehicleEF	SBUS	6.39	0.68

tblVehicleEF	SBUS	1,047.94	316.42
tblVehicleEF	SBUS	1,034.23	936.84
tblVehicleEF	SBUS	59.56	3.97
tblVehicleEF	SBUS	4.56	2.32
tblVehicleEF	SBUS	1.78	2.57
tblVehicleEF	SBUS	11.19	1.41
tblVehicleEF	SBUS	2.2950e-003	1.5510e-003
tblVehicleEF	SBUS	0.01	0.01
tblVehicleEF	SBUS	8.8570e-003	0.02
tblVehicleEF	SBUS	8.6200e-004	5.9000e-005
tblVehicleEF	SBUS	2.1950e-003	1.4840e-003
tblVehicleEF	SBUS	2.6250e-003	2.7130e-003
tblVehicleEF	SBUS	8.4590e-003	0.02
tblVehicleEF	SBUS	7.9200e-004	5.4000e-005
tblVehicleEF	SBUS	3.4880e-003	5.4600e-004
tblVehicleEF	SBUS	0.04	5.4730e-003
tblVehicleEF	SBUS	0.99	0.26
tblVehicleEF	SBUS	2.0090e-003	2.7600e-004
tblVehicleEF	SBUS	0.06	0.05
tblVehicleEF	SBUS	0.02	0.04
tblVehicleEF	SBUS	0.36	0.03
tblVehicleEF	SBUS	0.01	3.0130e-003
tblVehicleEF	SBUS	9.9770e-003	8.9520e-003
tblVehicleEF	SBUS	7.0600e-004	3.9000e-005
tblVehicleEF	SBUS	3.4880e-003	5.4600e-004
tblVehicleEF	SBUS	0.04	5.4730e-003
tblVehicleEF	SBUS	1.44	0.38
tblVehicleEF	SBUS	2.0090e-003	2.7600e-004
tblVehicleEF	SBUS	0.07	0.06
tblVehicleEF	SBUS	0.02	0.04

tblVehicleEF	SBUS	0.39	0.03
tblVehicleEF	UBUS	0.26	1.76
tblVehicleEF	UBUS	0.04	4.9700e-003
tblVehicleEF	UBUS	4.60	13.30
tblVehicleEF	UBUS	6.49	0.42
tblVehicleEF	UBUS	2,090.87	1,631.09
tblVehicleEF	UBUS	92.50	4.00
tblVehicleEF	UBUS	9.35	0.68
tblVehicleEF	UBUS	15.33	0.04
tblVehicleEF	UBUS	0.62	0.07
tblVehicleEF	UBUS	0.01	0.03
tblVehicleEF	UBUS	0.18	4.9500e-003
tblVehicleEF	UBUS	1.0140e-003	5.0000e-005
tblVehicleEF	UBUS	0.27	0.03
tblVehicleEF	UBUS	3.0000e-003	7.8890e-003
tblVehicleEF	UBUS	0.17	4.7320e-003
tblVehicleEF	UBUS	9.3200e-004	4.6000e-005
tblVehicleEF	UBUS	1.9840e-003	1.4800e-004
tblVehicleEF	UBUS	0.04	1.8210e-003
tblVehicleEF	UBUS	1.3390e-003	8.8000e-005
tblVehicleEF	UBUS	0.56	0.03
tblVehicleEF	UBUS	0.01	9.4860e-003
tblVehicleEF	UBUS	0.55	0.02
tblVehicleEF	UBUS	0.02	0.01
tblVehicleEF	UBUS	1.0430e-003	4.0000e-005
tblVehicleEF	UBUS	1.9840e-003	1.4800e-004
tblVehicleEF	UBUS	0.04	1.8210e-003
tblVehicleEF	UBUS	1.3390e-003	8.8000e-005
tblVehicleEF	UBUS	0.87	1.79
tblVehicleEF	UBUS	0.01	9.4860e-003

tblVehicleEF	UBUS	0.60	0.02
tblVehicleTrips	CC_TL	7.30	23.80
tblVehicleTrips	CNW_TL	7.30	14.00
tblVehicleTrips	CW_TL	9.50	17.00
tblVehicleTrips	DV_TP	11.00	0.00
tblVehicleTrips	DV_TP	15.00	0.00
tblVehicleTrips	PB_TP	3.00	0.00
tblVehicleTrips	PB_TP	3.00	0.00
tblVehicleTrips	PR_TP	86.00	100.00
tblVehicleTrips	PR_TP	82.00	100.00
tblVehicleTrips	ST_TR	4.98	1.04
tblVehicleTrips	ST_TR	1.90	9.58
tblVehicleTrips	SU_TR	3.65	1.04
tblVehicleTrips	SU_TR	1.11	9.58
tblVehicleTrips	WD_TR	4.20	1.04
tblVehicleTrips	WD_TR	8.11	9.58
tblWoodstoves	NumberCatalytic	2.84	0.00
tblWoodstoves	NumberNoncatalytic	2.84	0.00

2.0 Emissions Summary

2.1 Overall Construction

Unmitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	tons/yr										MT/yr					
2019	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

Maximum	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**

Mitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	tons/yr										MT/yr					
2019	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Maximum	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**

	ROG	**NOx**	**CO**	**SO2**	**Fugitive PM10**	**Exhaust PM10**	**PM10 Total**	**Fugitive PM2.5**	**Exhaust PM2.5**	**PM2.5 Total**	**Bio- CO2**	**NBio-CO2**	**Total CO2**	**CH4**	**N20**	**CO2e**
Percent Reduction	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**

Quarter	**Start Date**	**End Date**	**Maximum Unmitigated ROG + NOX (tons/quarter)**	**Maximum Mitigated ROG + NOX (tons/quarter)**
		Highest		

2.2 Overall Operational

Unmitigated Operational

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Area	1.8815	0.0121	1.0541	6.0000e-005		5.8600e-003	5.8600e-003		5.8600e-003	5.8600e-003	0.0000	1.7271	1.7271	1.6500e-003	0.0000	1.7685

Energy	0.0427	0.3847	0.2995	2.3300e-003		0.0295	0.0295		0.0295	0.0295	0.0000	422.7599	422.7599	8.1000e-003	7.7500e-003	425.2721
Mobile	1.0039	3.3954	13.9250	0.0590	4.1129	0.0431	4.1560	1.1678	0.0404	1.2082	0.0000	5,499.5411	5,499.5411	0.1688	0.0000	5,503.7601
Waste						0.0000	0.0000		0.0000	0.0000	17.4247	0.0000	17.4247	1.0298	0.0000	43.1691
Water						0.0000	0.0000		0.0000	0.0000	45.0530	0.0000	45.0530	4.6274	0.1093	193.2975
Total	**2.9282**	**3.7923**	**15.2786**	**0.0614**	**4.1129**	**0.0784**	**4.1913**	**1.1678**	**0.0758**	**1.2436**	**62.4777**	**5,924.0281**	**5,986.5059**	**5.8357**	**0.1170**	**6,167.2673**

Mitigated Operational

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Area	1.8815	0.0121	1.0541	6.0000e-005		5.8600e-003	5.8600e-003		5.8600e-003	5.8600e-003	0.0000	1.7271	1.7271	1.6500e-003	0.0000	1.7685
Energy	0.0427	0.3847	0.2995	2.3300e-003		0.0295	0.0295		0.0295	0.0295	0.0000	422.7599	422.7599	8.1000e-003	7.7500e-003	425.2721
Mobile	1.0039	3.3954	13.9250	0.0590	4.1129	0.0431	4.1560	1.1678	0.0404	1.2082	0.0000	5,499.5411	5,499.5411	0.1688	0.0000	5,503.7601
Waste						0.0000	0.0000		0.0000	0.0000	17.4247	0.0000	17.4247	1.0298	0.0000	43.1691
Water						0.0000	0.0000		0.0000	0.0000	45.0530	0.0000	45.0530	4.6274	0.1093	193.2975
Total	**2.9282**	**3.7923**	**15.2786**	**0.0614**	**4.1129**	**0.0784**	**4.1913**	**1.1678**	**0.0758**	**1.2436**	**62.4777**	**5,924.0281**	**5,986.5059**	**5.8357**	**0.1170**	**6,167.2673**

	ROG	**NOx**	**CO**	**SO2**	**Fugitive PM10**	**Exhaust PM10**	**PM10 Total**	**Fugitive PM2.5**	**Exhaust PM2.5**	**PM2.5 Total**	**Bio- CO2**	**NBio-CO2**	**Total CO2**	**CH4**	**N20**	**CO2e**
Percent Reduction	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**

3.0 Construction Detail

Construction Phase

Phase Number	Phase Name	Phase Type	Start Date	End Date	Num Days Week	Num Days	Phase Description
1	Site Preparation	Site Preparation	12/10/2019	12/16/2019	5	5	

Acres of Grading (Site Preparation Phase): 0

Acres of Grading (Grading Phase): 0

Acres of Paving: 0

Residential Indoor: 0; Residential Outdoor: 0; Non-Residential Indoor: 0; Non-Residential Outdoor: 0; Striped Parking Area: 0

OffRoad Equipment

Phase Name	Offroad Equipment Type	Amount	Usage Hours	Horse Power	Load Factor
Site Preparation	Rubber Tired Dozers	0	8.00	247	0.40
Site Preparation	Tractors/Loaders/Backhoes	0	8.00	97	0.37

Trips and VMT

Phase Name	Offroad Equipment Count	Worker Trip Number	Vendor Trip Number	Hauling Trip Number	Worker Trip Length	Vendor Trip Length	Hauling Trip Length	Worker Vehicle Class	Vendor Vehicle Class	Hauling Vehicle Class
Site Preparation	0	0.00	0.00	0.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT

3.1 Mitigation Measures Construction

3.2 Site Preparation - 2019

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

Off-Road	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**

4.0 Operational Detail - Mobile

4.1 Mitigation Measures Mobile

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Mitigated	1.0039	3.3954	13.9250	0.0590	4.1129	0.0431	4.1560	1.1678	0.0404	1.2082	0.0000	5,499.541 1	5,499.5411	0.1688	0.0000	5,503.7601
Unmitigated	1.0039	3.3954	13.9250	0.0590	4.1129	0.0431	4.1560	1.1678	0.0404	1.2082	0.0000	5,499.541 1	5,499.5411	0.1688	0.0000	5,503.7601

4.2 Trip Summary Information

	Average Daily Trip Rate	Unmitigated	Mitigated

Land Use	Weekday	Saturday	Sunday	Annual VMT	Annual VMT
Apartments High Rise	147.68	147.68	147.68	384,137	384,137
Research & Development	2,586.60	2,586.60	2586.60	18,542,342	18,542,342
Total	2,734.28	2,734.28	2,734.28	18,926,479	18,926,479

4.3 Trip Type Information

	Miles			Trip %			Trip Purpose %		
Land Use	H-W or C-W	H-S or C-C	H-O or C-NW	H-W or C-W	H-S or C-C	H-O or C-NW	Primary	Diverted	Pass-by
Apartments High Rise	10.80	4.80	5.70	31.00	15.00	54.00	100	0	0
Research & Development	17.00	23.80	14.00	33.00	48.00	19.00	100	0	0

4.4 Fleet Mix

Land Use	LDA	LDT1	LDT2	MDV	LHD1	LHD2	MHD	HHD	OBUS	UBUS	MCY	SBUS	MH
Apartments High Rise	0.567441	0.056499	0.177800	0.113094	0.022543	0.005903	0.019048	0.027325	0.001641	0.001550	0.005465	0.000937	0.000757
Research & Development	0.567441	0.056499	0.177800	0.113094	0.022543	0.005903	0.019048	0.027325	0.001641	0.001550	0.005465	0.000937	0.000757

5.0 Energy Detail

Historical Energy Use: N

5.1 Mitigation Measures Energy

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Electricity Mitigated						0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Electricity Unmitigated						0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
NaturalGas Mitigated	0.0427	0.3847	0.2995	2.3300e-003		0.0295	0.0295		0.0295	0.0295	0.0000	422.7599	422.7599	8.1000e-003	7.7500e-003	425.2721

NaturalGas Unmitigated	0.0427	0.3847	0.2995	2.3300e-003		0.0295	0.0295		0.0295	0.0295	0.0000	422.7599	422.7599	8.1000e-003	7.7500e-003	425.2721

5.2 Energy by Land Use - NaturalGas

Unmitigated

	NaturalGas Use	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Land Use	kBTU/yr	tons/yr										MT/yr					
Apartments High Rise	1.23972e+006	6.6800e-003	0.0571	0.0243	3.6000e-004		4.6200e-003	4.6200e-003		4.6200e-003	4.6200e-003	0.0000	66.1562	66.1562	1.2700e-003	1.2100e-003	66.5494
Research & Development	6.6825e+006	0.0360	0.3276	0.2752	1.9700e-003		0.0249	0.0249		0.0249	0.0249	0.0000	356.6037	356.6037	6.8300e-003	6.5400e-003	358.7228
Total		**0.0427**	**0.3847**	**0.2995**	**2.3300e-003**		**0.0295**	**0.0295**		**0.0295**	**0.0295**	**0.0000**	**422.7599**	**422.7599**	**8.1000e-003**	**7.7500e-003**	**425.2721**

Mitigated

	NaturalGas Use	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Land Use	kBTU/yr	tons/yr										MT/yr					
Apartments High Rise	1.23972e+006	6.6800e-003	0.0571	0.0243	3.6000e-004		4.6200e-003	4.6200e-003		4.6200e-003	4.6200e-003	0.0000	66.1562	66.1562	1.2700e-003	1.2100e-003	66.5494
Research & Development	6.6825e+006	0.0360	0.3276	0.2752	1.9700e-003		0.0249	0.0249		0.0249	0.0249	0.0000	356.6037	356.6037	6.8300e-003	6.5400e-003	358.7228
Total		**0.0427**	**0.3847**	**0.2995**	**2.3300e-003**		**0.0295**	**0.0295**		**0.0295**	**0.0295**	**0.0000**	**422.7599**	**422.7599**	**8.1000e-003**	**7.7500e-003**	**425.2721**

5.3 Energy by Land Use - Electricity

Unmitigated

	Electricity Use	Total CO2	CH4	N2O	CO2e
Land Use	kWh/yr	MT/yr			
Apartments High Rise	0	0.0000	0.0000	0.0000	0.0000
Research & Development	0	0.0000	0.0000	0.0000	0.0000
Total		**0.0000**	**0.0000**	**0.0000**	**0.0000**

Mitigated

	Electricity Use	Total CO2	CH4	N2O	CO2e
Land Use	kWh/yr	MT/yr			
Apartments High Rise	0	0.0000	0.0000	0.0000	0.0000
Research & Development	0	0.0000	0.0000	0.0000	0.0000
Total		**0.0000**	**0.0000**	**0.0000**	**0.0000**

6.0 Area Detail

6.1 Mitigation Measures Area

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e

Category	tons/yr										MT/yr					
Mitigated	1.8815	0.0121	1.0541	6.0000e-005		5.8600e-003	5.8600e-003		5.8600e-003	5.8600e-003	0.0000	1.7271	1.7271	1.6500e-003	0.0000	1.7685
Unmitigated	1.8815	0.0121	1.0541	6.0000e-005		5.8600e-003	5.8600e-003		5.8600e-003	5.8600e-003	0.0000	1.7271	1.7271	1.6500e-003	0.0000	1.7685

6.2 Area by SubCategory

Unmitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
SubCategory	tons/yr										MT/yr					
Architectural Coating	0.2408					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Consumer Products	1.6091					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Hearth	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Landscaping	0.0317	0.0121	1.0541	6.0000e-005		5.8600e-003	5.8600e-003		5.8600e-003	5.8600e-003	0.0000	1.7271	1.7271	1.6500e-003	0.0000	1.7685
Total	**1.8815**	**0.0121**	**1.0541**	**6.0000e-005**		**5.8600e-003**	**5.8600e-003**		**5.8600e-003**	**5.8600e-003**	**0.0000**	**1.7271**	**1.7271**	**1.6500e-003**	**0.0000**	**1.7685**

Mitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
SubCategory	tons/yr										MT/yr					
Architectural Coating	0.2408					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

Consumer Products	1.6091					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Hearth	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Landscaping	0.0317	0.0121	1.0541	6.0000e-005		5.8600e-003	5.8600e-003		5.8600e-003	5.8600e-003	0.0000	1.7271	1.7271	1.6500e-003	0.0000	1.7685
Total	**1.8815**	**0.0121**	**1.0541**	**6.0000e-005**		**5.8600e-003**	**5.8600e-003**		**5.8600e-003**	**5.8600e-003**	**0.0000**	**1.7271**	**1.7271**	**1.6500e-003**	**0.0000**	**1.7685**

7.0 Water Detail

7.1 Mitigation Measures Water

	Total CO2	CH4	N2O	CO2e
Category	MT/yr			
Mitigated	45.0530	4.6274	0.1093	193.2975
Unmitigated	45.0530	4.6274	0.1093	193.2975

7.2 Water by Land Use

Unmitigated

	Indoor/Outdoor Use	Total CO2	CH4	N2O	CO2e
Land Use	Mgal	MT/yr			
Apartments High Rise	9.25187 / 5.8327	2.9352	0.3015	7.1200e-003	12.5933

Research & Development	132.757 / 0	42.1178	4.3259	0.1021	180.7042
Total		**45.0530**	**4.6274**	**0.1093**	**193.2975**

Mitigated

	Indoor/Outdoor Use	Total CO2	CH4	N2O	CO2e
Land Use	Mgal	MT/yr			
Apartments High Rise	9.25187 / 5.8327	2.9352	0.3015	7.1200e-003	12.5933
Research & Development	132.757 / 0	42.1178	4.3259	0.1021	180.7042
Total		**45.0530**	**4.6274**	**0.1093**	**193.2975**

8.0 Waste Detail

8.1 Mitigation Measures Waste

Category/Year

	Total CO2	CH4	N2O	CO2e
	MT/yr			
Mitigated	17.4247	1.0298	0.0000	43.1691
Unmitigated	17.4247	1.0298	0.0000	43.1691

8.2 Waste by Land Use

Unmitigated

	Waste Disposed	Total CO2	CH4	N2O	CO2e
Land Use	tons	MT/yr			
Apartments High Rise	65.32	13.2594	0.7836	0.0000	32.8495
Research & Development	20.52	4.1654	0.2462	0.0000	10.3195
Total		**17.4247**	**1.0298**	**0.0000**	**43.1691**

Mitigated

	Waste Disposed	Total CO2	CH4	N2O	CO2e
Land Use	tons	MT/yr			
Apartments High Rise	65.32	13.2594	0.7836	0.0000	32.8495
Research & Development	20.52	4.1654	0.2462	0.0000	10.3195
Total		**17.4247**	**1.0298**	**0.0000**	**43.1691**

9.0 Operational Offroad

Equipment Type	Number	Hours/Day	Days/Year	Horse Power	Load Factor	Fuel Type

10.0 Stationary Equipment

Fire Pumps and Emergency Generators

Equipment Type	Number	Hours/Day	Hours/Year	Horse Power	Load Factor	Fuel Type

Boilers

Equipment Type	Number	Heat Input/Day	Heat Input/Year	Boiler Rating	Fuel Type

User Defined Equipment

Equipment Type	Number

11.0 Vegetation

Initial Phase Aldea Energy Only

San Francisco County, Annual

1.0 Project Characteristics

1.1 Land Usage

Land Uses	Size	Metric	Lot Acreage	Floor Surface Area	Population
Apartments High Rise	184.00	Dwelling Unit	2.97	184,000.00	526

1.2 Other Project Characteristics

Urbanization	Urban	**Wind Speed (m/s)**	4.6	**Precipitation Freq (Days)**	64
Climate Zone	5			**Operational Year**	2031
Utility Company	User Defined				
CO2 Intensity (lb/MWhr)	605.78	**CH4 Intensity (lb/MWhr)**	0	**N2O Intensity (lb/MWhr)**	0

1.3 User Entered Comments & Non-Default Data

Project Characteristics - UCSF Specific CO2 factor

Land Use -

Construction Phase -

Off-road Equipment - Operational energy run only

Trips and VMT - Operational energy run only

Vehicle Trips - Operational energy run only

Woodstoves - No hearths in student apartments

Energy Use -

Table Name	Column Name	Default Value	New Value

tblFireplaces	NumberGas	27.60	0.00
tblFireplaces	NumberWood	31.28	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	0.00
tblProjectCharacteristics	CO2IntensityFactor	0	605.78
tblTripsAndVMT	WorkerTripNumber	26.00	0.00
tblVehicleTrips	ST_TR	4.98	0.00
tblVehicleTrips	SU_TR	3.65	0.00
tblVehicleTrips	WD_TR	4.20	0.00
tblWoodstoves	NumberCatalytic	3.68	0.00
tblWoodstoves	NumberNoncatalytic	3.68	0.00

2.0 Emissions Summary

2.1 Overall Construction

Unmitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	tons/yr										MT/yr					
2020	1.2953	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Maximum	**1.2953**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**

Mitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e

Year	tons/yr										MT/yr					
2020	1.2953	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Maximum	**1.2953**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**

	ROG	**NOx**	**CO**	**SO2**	**Fugitive PM10**	**Exhaust PM10**	**PM10 Total**	**Fugitive PM2.5**	**Exhaust PM2.5**	**PM2.5 Total**	**Bio- CO2**	**NBio-CO2**	**Total CO2**	**CH4**	**N20**	**CO2e**
Percent Reduction	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**

Quarter	**Start Date**	**End Date**	**Maximum Unmitigated ROG + NOX (tons/quarter)**	**Maximum Mitigated ROG + NOX (tons/quarter)**
		Highest		

2.2 Overall Operational

Unmitigated Operational

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Area	0.8889	0.0157	1.3626	7.0000e-005		7.5800e-003	7.5800e-003		7.5800e-003	7.5800e-003	0.0000	2.2317	2.2317	2.1300e-003	0.0000	2.2849
Energy	8.6600e-003	0.0740	0.0315	4.7000e-004		5.9800e-003	5.9800e-003		5.9800e-003	5.9800e-003	0.0000	299.1832	299.1832	1.6400e-003	1.5700e-003	299.6926
Mobile	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Waste						0.0000	0.0000		0.0000	0.0000	17.1812	0.0000	17.1812	1.0154	0.0000	42.5656
Water						0.0000	0.0000		0.0000	0.0000	3.8034	25.0931	28.8964	0.3906	9.2200e-003	41.4111
Total	**0.8976**	**0.0897**	**1.3941**	**5.4000e-004**	**0.0000**	**0.0136**	**0.0136**	**0.0000**	**0.0136**	**0.0136**	**20.9845**	**326.5079**	**347.4924**	**1.4098**	**0.0108**	**385.9541**

Mitigated Operational

Category	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
	tons/yr										MT/yr					
Area	0.8889	0.0157	1.3626	7.0000e-005		7.5800e-003	7.5800e-003		7.5800e-003	7.5800e-003	0.0000	2.2317	2.2317	2.1300e-003	0.0000	2.2849
Energy	8.6600e-003	0.0740	0.0315	4.7000e-004		5.9800e-003	5.9800e-003		5.9800e-003	5.9800e-003	0.0000	299.1832	299.1832	1.6400e-003	1.5700e-003	299.6926
Mobile	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Waste						0.0000	0.0000		0.0000	0.0000	17.1812	0.0000	17.1812	1.0154	0.0000	42.5656
Water						0.0000	0.0000		0.0000	0.0000	3.8034	25.0931	28.8964	0.3906	9.2200e-003	41.4111
Total	**0.8976**	**0.0897**	**1.3941**	**5.4000e-004**	**0.0000**	**0.0136**	**0.0136**	**0.0000**	**0.0136**	**0.0136**	**20.9845**	**326.5079**	**347.4924**	**1.4098**	**0.0108**	**385.9541**

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N20	CO2e
Percent Reduction	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

3.0 Construction Detail

Construction Phase

Phase Number	Phase Name	Phase Type	Start Date	End Date	Num Days Week	Num Days	Phase Description
1	Architectural Coating	Architectural Coating	10/28/2020	11/10/2020	5	10	

Acres of Grading (Site Preparation Phase): 0

Acres of Grading (Grading Phase): 0

Acres of Paving: 0

Residential Indoor: 372,600; Residential Outdoor: 124,200; Non-Residential Indoor: 0; Non-Residential Outdoor: 0; Striped Parking Area:

OffRoad Equipment

Phase Name	Offroad Equipment Type	Amount	Usage Hours	Horse Power	Load Factor
Architectural Coating	Air Compressors	0	6.00	78	0.48

Trips and VMT

Phase Name	Offroad Equipment Count	Worker Trip Number	Vendor Trip Number	Hauling Trip Number	Worker Trip Length	Vendor Trip Length	Hauling Trip Length	Worker Vehicle Class	Vendor Vehicle Class	Hauling Vehicle Class
Architectural Coating	0	0.00	0.00	0.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT

3.1 Mitigation Measures Construction

3.2 Architectural Coating - 2020

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Archit. Coating	1.2953					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**1.2953**	**0.0000**	**0.0000**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Archit. Coating	1.2953					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**1.2953**	**0.0000**	**0.0000**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**

4.0 Operational Detail - Mobile

4.1 Mitigation Measures Mobile

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Mitigated	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Unmitigated	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

4.2 Trip Summary Information

	Average Daily Trip Rate			Unmitigated	Mitigated
Land Use	Weekday	Saturday	Sunday	Annual VMT	Annual VMT
Apartments High Rise	0.00	0.00	0.00		
Total	0.00	0.00	0.00		

4.3 Trip Type Information

	Miles			Trip %			Trip Purpose %		
Land Use	H-W or C-W	H-S or C-C	H-O or C-NW	H-W or C-W	H-S or C-C	H-O or C-NW	Primary	Diverted	Pass-by
Apartments High Rise	10.80	4.80	5.70	31.00	15.00	54.00	86	11	3

4.4 Fleet Mix

Land Use	LDA	LDT1	LDT2	MDV	LHD1	LHD2	MHD	HHD	OBUS	UBUS	MCY	SBUS	MH
Apartments High Rise	0.601973	0.036168	0.193150	0.092307	0.012222	0.005292	0.035273	0.009746	0.004298	0.002300	0.005708	0.000958	0.000606

5.0 Energy Detail

Historical Energy Use: N

5.1 Mitigation Measures Energy

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Electricity Mitigated						0.0000	0.0000		0.0000	0.0000	0.0000	213.4596	213.4596	0.0000	0.0000	213.4596
Electricity Unmitigated						0.0000	0.0000		0.0000	0.0000	0.0000	213.4596	213.4596	0.0000	0.0000	213.4596
NaturalGas Mitigated	8.6600e-003	0.0740	0.0315	4.7000e-004		5.9800e-003	5.9800e-003		5.9800e-003	5.9800e-003	0.0000	85.7236	85.7236	1.6400e-003	1.5700e-003	86.2330
NaturalGas Unmitigated	8.6600e-003	0.0740	0.0315	4.7000e-004		5.9800e-003	5.9800e-003		5.9800e-003	5.9800e-003	0.0000	85.7236	85.7236	1.6400e-003	1.5700e-003	86.2330

5.2 Energy by Land Use - NaturalGas

Unmitigated

	NaturalGas Use	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Land Use	kBTU/yr	tons/yr										MT/yr					
Apartments High Rise	1.6064e+006	8.6600e-003	0.0740	0.0315	4.7000e-004		5.9800e-003	5.9800e-003		5.9800e-003	5.9800e-003	0.0000	85.7236	85.7236	1.6400e-003	1.5700e-003	86.2330
Total		**8.6600e-003**	**0.0740**	**0.0315**	**4.7000e-004**		**5.9800e-003**	**5.9800e-003**		**5.9800e-003**	**5.9800e-003**	**0.0000**	**85.7236**	**85.7236**	**1.6400e-003**	**1.5700e-003**	**86.2330**

Mitigated

	NaturalGas Use	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Land Use	kBTU/yr	tons/yr										MT/yr					
Apartments High Rise	1.6064e+006	8.6600e-003	0.0740	0.0315	4.7000e-004		5.9800e-003	5.9800e-003		5.9800e-003	5.9800e-003	0.0000	85.7236	85.7236	1.6400e-003	1.5700e-003	86.2330
Total		**8.6600e-003**	**0.0740**	**0.0315**	**4.7000e-004**		**5.9800e-003**	**5.9800e-003**		**5.9800e-003**	**5.9800e-003**	**0.0000**	**85.7236**	**85.7236**	**1.6400e-003**	**1.5700e-003**	**86.2330**

5.3 Energy by Land Use - Electricity

Unmitigated

	Electricity Use	Total CO2	CH4	N2O	CO2e
Land Use	kWh/yr	MT/yr			
Apartments High Rise	776846	213.4596	0.0000	0.0000	213.4596
Total		**213.4596**	**0.0000**	**0.0000**	**213.4596**

Mitigated

	Electricity Use	Total CO2	CH4	N2O	CO2e
Land Use	kWh/yr	MT/yr			
Apartments High Rise	776846	213.4596	0.0000	0.0000	213.4596

Total		213.4596	0.0000	0.0000	213.4596

6.0 Area Detail

6.1 Mitigation Measures Area

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Mitigated	0.8889	0.0157	1.3626	7.0000e-005		7.5800e-003	7.5800e-003		7.5800e-003	7.5800e-003	0.0000	2.2317	2.2317	2.1300e-003	0.0000	2.2849
Unmitigated	0.8889	0.0157	1.3626	7.0000e-005		7.5800e-003	7.5800e-003		7.5800e-003	7.5800e-003	0.0000	2.2317	2.2317	2.1300e-003	0.0000	2.2849

6.2 Area by SubCategory

Unmitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
SubCategory	tons/yr										MT/yr					
Architectural Coating	0.1295					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Consumer Products	0.7186					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Hearth	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

Landscaping	0.0408	0.0157	1.3626	7.0000e-005		7.5800e-003	7.5800e-003		7.5800e-003	7.5800e-003	0.0000	2.2317	2.2317	2.1300e-003	0.0000	2.2849
Total	**0.8889**	**0.0157**	**1.3626**	**7.0000e-005**		**7.5800e-003**	**7.5800e-003**		**7.5800e-003**	**7.5800e-003**	**0.0000**	**2.2317**	**2.2317**	**2.1300e-003**	**0.0000**	**2.2849**

Mitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
SubCategory	tons/yr										MT/yr					
Architectural Coating	0.1295					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Consumer Products	0.7186					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Hearth	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Landscaping	0.0408	0.0157	1.3626	7.0000e-005		7.5800e-003	7.5800e-003		7.5800e-003	7.5800e-003	0.0000	2.2317	2.2317	2.1300e-003	0.0000	2.2849
Total	**0.8889**	**0.0157**	**1.3626**	**7.0000e-005**		**7.5800e-003**	**7.5800e-003**		**7.5800e-003**	**7.5800e-003**	**0.0000**	**2.2317**	**2.2317**	**2.1300e-003**	**0.0000**	**2.2849**

7.0 Water Detail

7.1 Mitigation Measures Water

	Total CO2	CH4	N2O	CO2e
Category	MT/yr			
Mitigated	28.8964	0.3906	9.2200e-003	41.4111
Unmitigated	28.8964	0.3906	9.2200e-003	41.4111

7.2 Water by Land Use

Unmitigated

	Indoor/Outdoor Use	Total CO2	CH4	N2O	CO2e
Land Use	Mgal	MT/yr			
Apartments High Rise	11.9883 / 7.55787	28.8964	0.3906	9.2200e-003	41.4111
Total		**28.8964**	**0.3906**	**9.2200e-003**	**41.4111**

Mitigated

	Indoor/Outdoor Use	Total CO2	CH4	N2O	CO2e
Land Use	Mgal	MT/yr			
Apartments High Rise	11.9883 / 7.55787	28.8964	0.3906	9.2200e-003	41.4111
Total		**28.8964**	**0.3906**	**9.2200e-003**	**41.4111**

8.0 Waste Detail

8.1 Mitigation Measures Waste

Category/Year

	Total CO2	CH4	N2O	CO2e
	MT/yr			
Mitigated	17.1812	1.0154	0.0000	42.5656
Unmitigated	17.1812	1.0154	0.0000	42.5656

8.2 Waste by Land Use

Unmitigated

	Waste Disposed	Total CO2	CH4	N2O	CO2e
Land Use	tons	MT/yr			
Apartments High Rise	84.64	17.1812	1.0154	0.0000	42.5656
Total		**17.1812**	**1.0154**	**0.0000**	**42.5656**

Mitigated

	Waste Disposed	Total CO2	CH4	N2O	CO2e
Land Use	tons	MT/yr			

Apartments High Rise	84.64	17.1812	1.0154	0.0000	42.5656
Total		**17.1812**	**1.0154**	**0.0000**	**42.5656**

9.0 Operational Offroad

Equipment Type	Number	Hours/Day	Days/Year	Horse Power	Load Factor	Fuel Type

10.0 Stationary Equipment

Fire Pumps and Emergency Generators

Equipment Type	Number	Hours/Day	Hours/Year	Horse Power	Load Factor	Fuel Type

Boilers

Equipment Type	Number	Heat Input/Day	Heat Input/Year	Boiler Rating	Fuel Type

User Defined Equipment

Equipment Type	Number

11.0 Vegetation

RAB Energy Emissions Only

San Francisco County, Annual

1.0 Project Characteristics

1.1 Land Usage

Land Uses	Size	Metric	Lot Acreage	Floor Surface Area	Population
Research & Development	271.00	1000sqft	6.22	271,000.00	0

1.2 Other Project Characteristics

Urbanization	Urban	**Wind Speed (m/s)**	4.6	**Precipitation Freq (Days)**	64
Climate Zone	5			**Operational Year**	2026
Utility Company	User Defined				
CO2 Intensity (lb/MWhr)	605.78	**CH4 Intensity (lb/MWhr)**	0	**N2O Intensity (lb/MWhr)**	0

1.3 User Entered Comments & Non-Default Data

Project Characteristics - UCSF-specific CO2 factor. N/A due to net zero by 2025 Policy

Land Use -

Construction Phase -

Off-road Equipment - operational only

Trips and VMT - operational run only

Vehicle Trips - Operational Energy run only for RAB. Mobile emission separate run with other initial phase projects

Energy Use - UCSF to meet 20% reduction over Title 24. ADjuste T24 demand 20%.

Table Name	Column Name	Default Value	New Value
tblEnergyUse	T24E	1.21	0.97

tblEnergyUse	T24NG	17.85	14.28
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	0.00
tblProjectCharacteristics	CO2IntensityFactor	0	605.78
tblTripsAndVMT	WorkerTripNumber	17.00	0.00
tblVehicleTrips	ST_TR	1.90	0.00
tblVehicleTrips	SU_TR	1.11	0.00
tblVehicleTrips	WD_TR	8.11	0.00

2.0 Emissions Summary

2.1 Overall Construction

Unmitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	tons/yr										MT/yr					
2020	0.4239	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
2021	0.9892	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Maximum	**0.9892**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**

Mitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	tons/yr										MT/yr					
2020	0.4239	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

2021	0.9892	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Maximum	**0.9892**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N20	CO2e
Percent Reduction	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**

Quarter	Start Date	End Date	Maximum Unmitigated ROG + NOX (tons/quarter)	Maximum Mitigated ROG + NOX (tons/quarter)
5	**10-31-2020**	**1-30-2021**	1.4131	1.4131
		Highest	1.4131	1.4131

2.2 Overall Operational

Unmitigated Operational

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Area	1.1999	2.0000e-005	2.4800e-003	0.0000		1.0000e-005	1.0000e-005		1.0000e-005	1.0000e-005	0.0000	4.8400e-003	4.8400e-003	1.0000e-005	0.0000	5.1600e-003
Energy	0.0310	0.2814	0.2363	1.6900e-003		0.0214	0.0214		0.0214	0.0214	0.0000	851.2286	851.2286	5.8700e-003	5.6200e-003	853.0488
Mobile	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Waste						0.0000	0.0000		0.0000	0.0000	4.1796	0.0000	4.1796	0.2470	0.0000	10.3547
Water						0.0000	0.0000		0.0000	0.0000	42.2738	198.1173	240.3911	4.3419	0.1025	379.4907
Total	**1.2309**	**0.2814**	**0.2388**	**1.6900e-003**	**0.0000**	**0.0214**	**0.0214**	**0.0000**	**0.0214**	**0.0214**	**46.4534**	**1,049.3507**	**1,095.8041**	**4.5948**	**0.1081**	**1,242.8994**

Mitigated Operational

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Area	1.1999	2.0000e-005	2.4800e-003	0.0000		1.0000e-005	1.0000e-005		1.0000e-005	1.0000e-005	0.0000	4.8400e-003	4.8400e-003	1.0000e-005	0.0000	5.1600e-003
Energy	0.0310	0.2814	0.2363	1.6900e-003		0.0214	0.0214		0.0214	0.0214	0.0000	851.2286	851.2286	5.8700e-003	5.6200e-003	853.0488
Mobile	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Waste						0.0000	0.0000		0.0000	0.0000	4.1796	0.0000	4.1796	0.2470	0.0000	10.3547
Water						0.0000	0.0000		0.0000	0.0000	42.2738	198.1173	240.3911	4.3419	0.1025	379.4907
Total	**1.2309**	**0.2814**	**0.2388**	**1.6900e-003**	**0.0000**	**0.0214**	**0.0214**	**0.0000**	**0.0214**	**0.0214**	**46.4534**	**1,049.3507**	**1,095.8041**	**4.5948**	**0.1081**	**1,242.8994**

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N20	CO2e
Percent Reduction	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

3.0 Construction Detail

Construction Phase

Phase Number	Phase Name	Phase Type	Start Date	End Date	Num Days Week	Num Days	Phase Description
1	Architectural Coating	Architectural Coating	12/24/2020	1/20/2021	5	20	

Acres of Grading (Site Preparation Phase): 0

Acres of Grading (Grading Phase): 0

Acres of Paving: 0

Residential Indoor: 0; Residential Outdoor: 0; Non-Residential Indoor: 406,500; Non-Residential Outdoor: 135,500; Striped Parking Area:

OffRoad Equipment

Phase Name	Offroad Equipment Type	Amount	Usage Hours	Horse Power	Load Factor
Architectural Coating	Air Compressors	0	6.00	78	0.48

Trips and VMT

Phase Name	Offroad Equipment Count	Worker Trip Number	Vendor Trip Number	Hauling Trip Number	Worker Trip Length	Vendor Trip Length	Hauling Trip Length	Worker Vehicle Class	Vendor Vehicle Class	Hauling Vehicle Class
Architectural Coating	0	0.00	0.00	0.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT

3.1 Mitigation Measures Construction

3.2 Architectural Coating - 2020

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Archit. Coating	0.4239					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**0.4239**	**0.0000**	**0.0000**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

Total	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Archit. Coating	0.4239					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**0.4239**	**0.0000**	**0.0000**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**

3.2 Architectural Coating - 2021

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Archit. Coating	0.9892					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**0.9892**	**0.0000**	**0.0000**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					

Archit. Coating	0.9892					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**0.9892**	**0.0000**	**0.0000**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**

4.0 Operational Detail - Mobile

4.1 Mitigation Measures Mobile

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Mitigated	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

Unmitigated	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

4.2 Trip Summary Information

	Average Daily Trip Rate			Unmitigated	Mitigated
Land Use	Weekday	Saturday	Sunday	Annual VMT	Annual VMT
Research & Development	0.00	0.00	0.00		
Total	0.00	0.00	0.00		

4.3 Trip Type Information

	Miles			Trip %			Trip Purpose %		
Land Use	H-W or C-W	H-S or C-C	H-O or C-NW	H-W or C-W	H-S or C-C	H-O or C-NW	Primary	Diverted	Pass-by
Research & Development	9.50	7.30	7.30	33.00	48.00	19.00	82	15	3

4.4 Fleet Mix

Land Use	LDA	LDT1	LDT2	MDV	LHD1	LHD2	MHD	HHD	OBUS	UBUS	MCY	SBUS	MH
Research & Development	0.603873	0.037286	0.192865	0.090708	0.013128	0.005155	0.032618	0.009408	0.004276	0.003135	0.006045	0.000953	0.000549

5.0 Energy Detail

Historical Energy Use: N

5.1 Mitigation Measures Energy

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Electricity Mitigated						0.0000	0.0000		0.0000	0.0000	0.0000	544.9321	544.9321	0.0000	0.0000	544.9321

Electricity Unmitigated						0.0000	0.0000		0.0000	0.0000	0.0000	544.9321	544.9321	0.0000	0.0000	544.9321
NaturalGas Mitigated	0.0310	0.2814	0.2363	1.6900e-003		0.0214	0.0214		0.0214	0.0214	0.0000	306.2965	306.2965	5.8700e-003	5.6200e-003	308.1167
NaturalGas Unmitigated	0.0310	0.2814	0.2363	1.6900e-003		0.0214	0.0214		0.0214	0.0214	0.0000	306.2965	306.2965	5.8700e-003	5.6200e-003	308.1167

5.2 Energy by Land Use - NaturalGas

Unmitigated

	NaturalGas Use	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Land Use	kBTU/yr	tons/yr										MT/yr					
Research & Development	5.74E+06	0.0310	0.2814	0.2363	1.6900e-003		0.0214	0.0214		0.0214	0.0214	0.0000	306.2965	306.2965	5.8700e-003	5.6200e-003	308.1167
Total		**0.0310**	**0.2814**	**0.2363**	**1.6900e-003**		**0.0214**	**0.0214**		**0.0214**	**0.0214**	**0.0000**	**306.2965**	**306.2965**	**5.8700e-003**	**5.6200e-003**	**308.1167**

Mitigated

	NaturalGas Use	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Land Use	kBTU/yr	tons/yr										MT/yr					
Research & Development	5.73978e+006	0.0310	0.2814	0.2363	1.6900e-003		0.0214	0.0214		0.0214	0.0214	0.0000	306.2965	306.2965	5.8700e-003	5.6200e-003	308.1167
Total		**0.0310**	**0.2814**	**0.2363**	**1.6900e-003**		**0.0214**	**0.0214**		**0.0214**	**0.0214**	**0.0000**	**306.2965**	**306.2965**	**5.8700e-003**	**5.6200e-003**	**308.1167**

5.3 Energy by Land Use - Electricity

Unmitigated

	Electricity Use	Total CO2	CH4	N2O	CO2e
Land Use	kWh/yr	MT/yr			
Research & Development	1.98318e+006	544.9321	0.0000	0.0000	544.9321
Total		**544.9321**	**0.0000**	**0.0000**	**544.9321**

Mitigated

	Electricity Use	Total CO2	CH4	N2O	CO2e
Land Use	kWh/yr	MT/yr			
Research & Development	1.98318e+006	544.9321	0.0000	0.0000	544.9321
Total		**544.9321**	**0.0000**	**0.0000**	**544.9321**

6.0 Area Detail

6.1 Mitigation Measures Area

Category	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
	tons/yr										MT/yr					
Mitigated	1.1999	2.0000e-005	2.4800e-003	0.0000		1.0000e-005	1.0000e-005		1.0000e-005	1.0000e-005	0.0000	4.8400e-003	4.8400e-003	1.0000e-005	0.0000	5.1600e-003
Unmitigated	1.1999	2.0000e-005	2.4800e-003	0.0000		1.0000e-005	1.0000e-005		1.0000e-005	1.0000e-005	0.0000	4.8400e-003	4.8400e-003	1.0000e-005	0.0000	5.1600e-003

6.2 Area by SubCategory

Unmitigated

SubCategory	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
	tons/yr										MT/yr					
Architectural Coating	0.1413					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Consumer Products	1.0584					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Landscaping	2.3000e-004	2.0000e-005	2.4800e-003	0.0000		1.0000e-005	1.0000e-005		1.0000e-005	1.0000e-005	0.0000	4.8400e-003	4.8400e-003	1.0000e-005	0.0000	5.1600e-003
Total	**1.1999**	**2.0000e-005**	**2.4800e-003**	**0.0000**		**1.0000e-005**	**1.0000e-005**		**1.0000e-005**	**1.0000e-005**	**0.0000**	**4.8400e-003**	**4.8400e-003**	**1.0000e-005**	**0.0000**	**5.1600e-003**

Mitigated

SubCategory	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
	tons/yr										MT/yr					
Architectural Coating	0.1413					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Consumer Products	1.0584					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

Landscaping	2.3000e-004	2.0000e-005	2.4800e-003	0.0000		1.0000e-005	1.0000e-005		1.0000e-005	1.0000e-005	0.0000	4.8400e-003	4.8400e-003	1.0000e-005	0.0000	5.1600e-003
Total	**1.1999**	**2.0000e-005**	**2.4800e-003**	**0.0000**		**1.0000e-005**	**1.0000e-005**		**1.0000e-005**	**1.0000e-005**	**0.0000**	**4.8400e-003**	**4.8400e-003**	**1.0000e-005**	**0.0000**	**5.1600e-003**

7.0 Water Detail

7.1 Mitigation Measures Water

	Total CO2	CH4	N2O	CO2e
Category	MT/yr			
Mitigated	240.3911	4.3419	0.1025	379.4907
Unmitigated	240.3911	4.3419	0.1025	379.4907

7.2 Water by Land Use

Unmitigated

	Indoor/Outdoor Use	Total CO2	CH4	N2O	CO2e
Land Use	Mgal	MT/yr			
Research & Development	133.249 / 0	240.3911	4.3419	0.1025	379.4907
Total		**240.3911**	**4.3419**	**0.1025**	**379.4907**

Mitigated

	Indoor/Outdoor Use	Total CO2	CH4	N2O	CO2e
Land Use	Mgal	MT/yr			
Research & Development	133.249 / 0	240.3911	4.3419	0.1025	379.4907
Total		**240.3911**	**4.3419**	**0.1025**	**379.4907**

8.0 Waste Detail

8.1 Mitigation Measures Waste

Category/Year

	Total CO2	CH4	N2O	CO2e
	MT/yr			
Mitigated	4.1796	0.2470	0.0000	10.3547
Unmitigated	4.1796	0.2470	0.0000	10.3547

8.2 Waste by Land Use

Unmitigated

	Waste Disposed	Total CO2	CH4	N2O	CO2e
Land Use	tons	MT/yr			
Research & Development	20.59	4.1796	0.2470	0.0000	10.3547
Total		**4.1796**	**0.2470**	**0.0000**	**10.3547**

Mitigated

	Waste Disposed	Total CO2	CH4	N2O	CO2e
Land Use	tons	MT/yr			
Research & Development	20.59	4.1796	0.2470	0.0000	10.3547
Total		**4.1796**	**0.2470**	**0.0000**	**10.3547**

9.0 Operational Offroad

Equipment Type	Number	Hours/Day	Days/Year	Horse Power	Load Factor	Fuel Type

10.0 Stationary Equipment

Fire Pumps and Emergency Generators

Equipment Type	Number	Hours/Day	Hours/Year	Horse Power	Load Factor	Fuel Type

Boilers

Equipment Type	Number	Heat Input/Day	Heat Input/Year	Boiler Rating	Fuel Type

User Defined Equipment

Equipment Type	Number

11.0 Vegetation

CPHP Operational 2050 No Project

San Francisco County, Annual

1.0 Project Characteristics

1.1 Land Usage

Land Uses	Size	Metric	Lot Acreage	Floor Surface Area	Population
Hospital	3,900.00	1000sqft	89.53	3,900,000.00	0

1.2 Other Project Characteristics

Urbanization	Urban	**Wind Speed (m/s)**	4.6	**Precipitation Freq (Days)**	64
Climate Zone	5			**Operational Year**	2050
Utility Company	User Defined				
CO2 Intensity (lb/MWhr)	0	**CH4 Intensity (lb/MWhr)**	0	**N2O Intensity (lb/MWhr)**	0

1.3 User Entered Comments & Non-Default Data

Project Characteristics - UCSF Net zero GHG electricity starting in 2025

Land Use - Operational Mobile source and area source only

Construction Phase - mobile source run only

Off-road Equipment - Operational Mobile Source Run only

Trips and VMT - Operational Run Only

Vehicle Trips - Trip rates adjusted to match daily VMT estimates of the Transportation Section

Vehicle Emission Factors - EMFAC 2017

Vehicle Emission Factors -

Vehicle Emission Factors -

Road Dust - CARB Method 7.9

Woodstoves -

Consumer Products - SF specific ROG Factor

Energy Use - Net xero electricity. Natural gas separate through CUP

Solid Waste - Adjusted rate to campus-specific wate to landfill in 2018.

Table Name	Column Name	Default Value	New Value
tblConsumerProducts	ROG_EF	2.14E-05	1.51E-05
tblEnergyUse	LightingElect	4.23	0.00
tblEnergyUse	NT24E	5.52	0.00
tblEnergyUse	NT24NG	15.80	0.00
tblEnergyUse	T24E	6.47	0.00
tblEnergyUse	T24NG	84.89	0.00
tblFleetMix	HHD	0.01	0.03
tblFleetMix	LDA	0.59	0.57
tblFleetMix	LDT1	0.04	0.06
tblFleetMix	LDT2	0.19	0.17
tblFleetMix	LHD1	0.01	0.02
tblFleetMix	LHD2	5.4090e-003	6.1250e-003
tblFleetMix	MCY	5.4800e-003	5.3500e-003
tblFleetMix	MDV	0.09	0.11
tblFleetMix	MH	6.8300e-004	7.6200e-004
tblFleetMix	MHD	0.04	0.02
tblFleetMix	OBUS	4.9020e-003	1.6650e-003
tblFleetMix	SBUS	9.2300e-004	1.0690e-003
tblFleetMix	UBUS	1.6050e-003	1.3540e-003
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	3.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	4.00	0.00
tblRoadDust	RoadSiltLoading	0.1	0.048
tblSolidWaste	SolidWasteGenerationRate	42,120.00	1,600.00

tblVehicleEF	HHD	0.28	0.02
tblVehicleEF	HHD	0.42	0.04
tblVehicleEF	HHD	0.05	0.00
tblVehicleEF	HHD	0.97	6.50
tblVehicleEF	HHD	2.63	0.40
tblVehicleEF	HHD	7.01	6.2370e-003
tblVehicleEF	HHD	2,799.48	828.78
tblVehicleEF	HHD	1,647.12	1,033.18
tblVehicleEF	HHD	20.36	0.05
tblVehicleEF	HHD	8.04	5.21
tblVehicleEF	HHD	1.34	2.43
tblVehicleEF	HHD	18.05	2.33
tblVehicleEF	HHD	9.7100e-004	1.8790e-003
tblVehicleEF	HHD	0.06	0.06
tblVehicleEF	HHD	0.03	0.04
tblVehicleEF	HHD	4.8370e-003	0.02
tblVehicleEF	HHD	2.5500e-004	1.0000e-006
tblVehicleEF	HHD	9.2900e-004	1.7980e-003
tblVehicleEF	HHD	0.03	0.03
tblVehicleEF	HHD	8.5490e-003	8.9000e-003
tblVehicleEF	HHD	4.6270e-003	0.02
tblVehicleEF	HHD	2.3400e-004	1.0000e-006
tblVehicleEF	HHD	1.6300e-004	2.0000e-006
tblVehicleEF	HHD	8.4180e-003	7.8000e-005
tblVehicleEF	HHD	0.22	0.43
tblVehicleEF	HHD	1.2700e-004	1.0000e-006
tblVehicleEF	HHD	0.08	0.02
tblVehicleEF	HHD	1.3420e-003	4.0400e-004
tblVehicleEF	HHD	0.12	0.00
tblVehicleEF	HHD	0.02	7.7220e-003

tblVehicleEF	HHD	0.01	9.4730e-003
tblVehicleEF	HHD	3.1700e-004	1.0000e-006
tblVehicleEF	HHD	1.6300e-004	2.0000e-006
tblVehicleEF	HHD	8.4180e-003	7.8000e-005
tblVehicleEF	HHD	0.28	0.50
tblVehicleEF	HHD	1.2700e-004	1.0000e-006
tblVehicleEF	HHD	0.51	0.06
tblVehicleEF	HHD	1.3420e-003	4.0400e-004
tblVehicleEF	HHD	0.13	0.00
tblVehicleEF	LDA	1.4270e-003	5.4400e-004
tblVehicleEF	LDA	4.8300e-004	0.02
tblVehicleEF	LDA	0.25	0.34
tblVehicleEF	LDA	0.31	1.35
tblVehicleEF	LDA	175.93	177.82
tblVehicleEF	LDA	34.59	35.86
tblVehicleEF	LDA	0.02	0.02
tblVehicleEF	LDA	9.7730e-003	0.11
tblVehicleEF	LDA	7.0000e-004	4.6800e-004
tblVehicleEF	LDA	7.8800e-004	6.0800e-004
tblVehicleEF	LDA	6.4400e-004	4.3100e-004
tblVehicleEF	LDA	7.2400e-004	5.5900e-004
tblVehicleEF	LDA	5.9710e-003	0.01
tblVehicleEF	LDA	0.03	0.03
tblVehicleEF	LDA	6.4660e-003	0.01
tblVehicleEF	LDA	3.6030e-003	1.5350e-003
tblVehicleEF	LDA	0.03	0.14
tblVehicleEF	LDA	6.5160e-003	0.06
tblVehicleEF	LDA	3.5000e-004	3.5500e-004
tblVehicleEF	LDA	5.9710e-003	0.01
tblVehicleEF	LDA	0.03	0.03

tblVehicleEF	LDA	6.4660e-003	0.01
tblVehicleEF	LDA	5.2320e-003	2.2240e-003
tblVehicleEF	LDA	0.03	0.14
tblVehicleEF	LDA	7.1350e-003	0.07
tblVehicleEF	LDT1	1.8690e-003	5.8000e-004
tblVehicleEF	LDT1	6.5000e-004	0.02
tblVehicleEF	LDT1	0.31	0.35
tblVehicleEF	LDT1	0.39	1.42
tblVehicleEF	LDT1	220.87	209.99
tblVehicleEF	LDT1	44.08	42.89
tblVehicleEF	LDT1	0.02	0.02
tblVehicleEF	LDT1	0.01	0.13
tblVehicleEF	LDT1	8.4300e-004	4.9300e-004
tblVehicleEF	LDT1	9.6700e-004	6.5500e-004
tblVehicleEF	LDT1	7.7500e-004	4.5400e-004
tblVehicleEF	LDT1	8.8900e-004	6.0200e-004
tblVehicleEF	LDT1	0.01	0.02
tblVehicleEF	LDT1	0.04	0.04
tblVehicleEF	LDT1	0.01	0.02
tblVehicleEF	LDT1	4.6360e-003	1.6150e-003
tblVehicleEF	LDT1	0.04	0.17
tblVehicleEF	LDT1	8.7710e-003	0.06
tblVehicleEF	LDT1	2.2100e-003	2.0780e-003
tblVehicleEF	LDT1	4.4600e-004	4.2400e-004
tblVehicleEF	LDT1	0.01	0.02
tblVehicleEF	LDT1	0.04	0.04
tblVehicleEF	LDT1	0.01	0.02
tblVehicleEF	LDT1	6.7610e-003	2.3560e-003
tblVehicleEF	LDT1	0.04	0.17
tblVehicleEF	LDT1	9.6030e-003	0.07

tblVehicleEF	LDT2	2.1570e-003	7.6000e-004
tblVehicleEF	LDT2	9.4900e-004	0.02
tblVehicleEF	LDT2	0.38	0.40
tblVehicleEF	LDT2	0.47	1.82
tblVehicleEF	LDT2	257.62	210.22
tblVehicleEF	LDT2	51.21	42.99
tblVehicleEF	LDT2	0.03	0.02
tblVehicleEF	LDT2	0.02	0.12
tblVehicleEF	LDT2	8.4100e-004	5.2900e-004
tblVehicleEF	LDT2	9.4700e-004	6.3500e-004
tblVehicleEF	LDT2	7.7400e-004	4.8800e-004
tblVehicleEF	LDT2	8.7100e-004	5.8400e-004
tblVehicleEF	LDT2	0.01	0.02
tblVehicleEF	LDT2	0.03	0.04
tblVehicleEF	LDT2	0.01	0.02
tblVehicleEF	LDT2	5.3850e-003	2.3170e-003
tblVehicleEF	LDT2	0.04	0.17
tblVehicleEF	LDT2	0.01	0.09
tblVehicleEF	LDT2	2.5780e-003	2.0790e-003
tblVehicleEF	LDT2	5.1900e-004	4.2500e-004
tblVehicleEF	LDT2	0.01	0.02
tblVehicleEF	LDT2	0.03	0.04
tblVehicleEF	LDT2	0.01	0.02
tblVehicleEF	LDT2	7.8410e-003	3.3370e-003
tblVehicleEF	LDT2	0.04	0.17
tblVehicleEF	LDT2	0.01	0.09
tblVehicleEF	LHD1	2.4170e-003	3.1500e-003
tblVehicleEF	LHD1	4.6940e-003	3.8390e-003
tblVehicleEF	LHD1	2.6090e-003	4.6680e-003
tblVehicleEF	LHD1	0.12	0.17

tblVehicleEF	LHD1	0.45	0.37
tblVehicleEF	LHD1	0.95	0.74
tblVehicleEF	LHD1	8.76	7.32
tblVehicleEF	LHD1	603.63	618.17
tblVehicleEF	LHD1	20.98	8.26
tblVehicleEF	LHD1	0.04	0.03
tblVehicleEF	LHD1	0.07	0.11
tblVehicleEF	LHD1	0.25	0.17
tblVehicleEF	LHD1	5.8800e-004	1.0160e-003
tblVehicleEF	LHD1	0.01	0.01
tblVehicleEF	LHD1	5.5980e-003	4.6190e-003
tblVehicleEF	LHD1	4.2800e-004	1.7500e-004
tblVehicleEF	LHD1	5.6200e-004	9.7200e-004
tblVehicleEF	LHD1	2.6620e-003	2.5020e-003
tblVehicleEF	LHD1	5.3290e-003	4.3780e-003
tblVehicleEF	LHD1	3.9400e-004	1.6100e-004
tblVehicleEF	LHD1	6.1100e-004	8.1200e-004
tblVehicleEF	LHD1	0.02	0.03
tblVehicleEF	LHD1	0.01	0.01
tblVehicleEF	LHD1	4.8100e-004	5.7000e-004
tblVehicleEF	LHD1	0.09	0.07
tblVehicleEF	LHD1	0.06	0.15
tblVehicleEF	LHD1	0.04	0.02
tblVehicleEF	LHD1	8.6000e-005	7.1000e-005
tblVehicleEF	LHD1	5.8780e-003	6.0210e-003
tblVehicleEF	LHD1	2.2500e-004	8.2000e-005
tblVehicleEF	LHD1	6.1100e-004	8.1200e-004
tblVehicleEF	LHD1	0.02	0.03
tblVehicleEF	LHD1	0.01	0.02
tblVehicleEF	LHD1	4.8100e-004	5.7000e-004

tblVehicleEF	LHD1	0.10	0.08
tblVehicleEF	LHD1	0.06	0.15
tblVehicleEF	LHD1	0.04	0.02
tblVehicleEF	LHD2	2.0490e-003	1.9500e-003
tblVehicleEF	LHD2	4.7590e-003	4.7410e-003
tblVehicleEF	LHD2	1.8250e-003	2.6000e-003
tblVehicleEF	LHD2	0.12	0.13
tblVehicleEF	LHD2	0.44	0.47
tblVehicleEF	LHD2	0.82	0.42
tblVehicleEF	LHD2	13.26	11.61
tblVehicleEF	LHD2	661.14	607.64
tblVehicleEF	LHD2	20.88	5.33
tblVehicleEF	LHD2	0.04	0.05
tblVehicleEF	LHD2	0.06	0.12
tblVehicleEF	LHD2	0.17	0.10
tblVehicleEF	LHD2	8.2400e-004	1.5230e-003
tblVehicleEF	LHD2	0.01	0.01
tblVehicleEF	LHD2	6.9970e-003	0.01
tblVehicleEF	LHD2	3.8600e-004	1.0100e-004
tblVehicleEF	LHD2	7.8800e-004	1.4570e-003
tblVehicleEF	LHD2	2.7120e-003	2.7230e-003
tblVehicleEF	LHD2	6.6700e-003	0.01
tblVehicleEF	LHD2	3.5500e-004	9.2000e-005
tblVehicleEF	LHD2	3.8200e-004	4.5600e-004
tblVehicleEF	LHD2	0.01	0.02
tblVehicleEF	LHD2	0.01	0.01
tblVehicleEF	LHD2	2.9300e-004	3.2000e-004
tblVehicleEF	LHD2	0.09	0.09
tblVehicleEF	LHD2	0.03	0.08
tblVehicleEF	LHD2	0.02	0.01

tblVehicleEF	LHD2	1.2900e-004	1.1100e-004
tblVehicleEF	LHD2	6.4220e-003	5.8570e-003
tblVehicleEF	LHD2	2.2200e-004	5.3000e-005
tblVehicleEF	LHD2	3.8200e-004	4.5600e-004
tblVehicleEF	LHD2	0.01	0.02
tblVehicleEF	LHD2	0.01	0.01
tblVehicleEF	LHD2	2.9300e-004	3.2000e-004
tblVehicleEF	LHD2	0.10	0.11
tblVehicleEF	LHD2	0.03	0.08
tblVehicleEF	LHD2	0.03	0.01
tblVehicleEF	MCY	0.58	0.32
tblVehicleEF	MCY	0.15	0.24
tblVehicleEF	MCY	18.41	17.47
tblVehicleEF	MCY	10.55	9.47
tblVehicleEF	MCY	196.41	213.30
tblVehicleEF	MCY	40.90	57.57
tblVehicleEF	MCY	1.18	1.15
tblVehicleEF	MCY	0.32	0.27
tblVehicleEF	MCY	2.8720e-003	2.3340e-003
tblVehicleEF	MCY	3.2940e-003	3.0160e-003
tblVehicleEF	MCY	2.6770e-003	2.1750e-003
tblVehicleEF	MCY	3.0700e-003	2.8110e-003
tblVehicleEF	MCY	0.74	0.82
tblVehicleEF	MCY	0.60	0.61
tblVehicleEF	MCY	0.45	0.46
tblVehicleEF	MCY	2.66	2.17
tblVehicleEF	MCY	0.47	1.26
tblVehicleEF	MCY	2.08	1.84
tblVehicleEF	MCY	2.3470e-003	2.1110e-003
tblVehicleEF	MCY	6.4200e-004	5.7000e-004

tblVehicleEF	MCY	0.74	0.82
tblVehicleEF	MCY	0.60	0.61
tblVehicleEF	MCY	0.45	0.46
tblVehicleEF	MCY	3.34	2.72
tblVehicleEF	MCY	0.47	1.26
tblVehicleEF	MCY	2.26	2.01
tblVehicleEF	MDV	2.3630e-003	7.4800e-004
tblVehicleEF	MDV	1.1280e-003	0.02
tblVehicleEF	MDV	0.42	0.39
tblVehicleEF	MDV	0.53	1.77
tblVehicleEF	MDV	333.42	253.73
tblVehicleEF	MDV	65.10	50.42
tblVehicleEF	MDV	0.03	0.02
tblVehicleEF	MDV	0.02	0.12
tblVehicleEF	MDV	8.7100e-004	5.0000e-004
tblVehicleEF	MDV	9.8600e-004	6.1900e-004
tblVehicleEF	MDV	8.0200e-004	4.6100e-004
tblVehicleEF	MDV	9.0700e-004	5.6900e-004
tblVehicleEF	MDV	0.03	0.04
tblVehicleEF	MDV	0.07	0.06
tblVehicleEF	MDV	0.03	0.04
tblVehicleEF	MDV	6.0450e-003	2.3020e-003
tblVehicleEF	MDV	0.05	0.17
tblVehicleEF	MDV	0.02	0.08
tblVehicleEF	MDV	3.3310e-003	2.5070e-003
tblVehicleEF	MDV	6.5900e-004	4.9900e-004
tblVehicleEF	MDV	0.03	0.04
tblVehicleEF	MDV	0.07	0.06
tblVehicleEF	MDV	0.03	0.04
tblVehicleEF	MDV	8.7490e-003	3.3090e-003

tblVehicleEF	MDV	0.05	0.17
tblVehicleEF	MDV	0.02	0.09
tblVehicleEF	MH	4.0570e-003	2.8260e-003
tblVehicleEF	MH	0.01	0.02
tblVehicleEF	MH	0.17	0.17
tblVehicleEF	MH	3.07	1.16
tblVehicleEF	MH	1,164.20	1,211.74
tblVehicleEF	MH	55.49	12.75
tblVehicleEF	MH	0.61	0.89
tblVehicleEF	MH	0.52	0.18
tblVehicleEF	MH	0.01	0.01
tblVehicleEF	MH	4.5150e-003	6.0970e-003
tblVehicleEF	MH	9.0600e-004	2.1500e-004
tblVehicleEF	MH	3.2190e-003	3.3060e-003
tblVehicleEF	MH	4.2780e-003	5.7970e-003
tblVehicleEF	MH	8.3300e-004	1.9800e-004
tblVehicleEF	MH	0.23	0.20
tblVehicleEF	MH	0.02	0.01
tblVehicleEF	MH	0.13	0.11
tblVehicleEF	MH	0.02	0.03
tblVehicleEF	MH	3.0800e-003	0.17
tblVehicleEF	MH	0.18	0.06
tblVehicleEF	MH	0.01	0.01
tblVehicleEF	MH	6.0800e-004	1.2600e-004
tblVehicleEF	MH	0.23	0.20
tblVehicleEF	MH	0.02	0.01
tblVehicleEF	MH	0.13	0.11
tblVehicleEF	MH	0.03	0.03
tblVehicleEF	MH	3.0800e-003	0.17
tblVehicleEF	MH	0.20	0.07

tblVehicleEF	MHD	0.02	3.4300e-003
tblVehicleEF	MHD	2.0360e-003	6.2800e-004
tblVehicleEF	MHD	0.03	6.7270e-003
tblVehicleEF	MHD	0.23	0.41
tblVehicleEF	MHD	0.22	0.12
tblVehicleEF	MHD	1.61	0.53
tblVehicleEF	MHD	184.96	59.04
tblVehicleEF	MHD	1,146.81	853.31
tblVehicleEF	MHD	32.83	6.43
tblVehicleEF	MHD	0.49	0.32
tblVehicleEF	MHD	0.99	1.39
tblVehicleEF	MHD	14.70	1.83
tblVehicleEF	MHD	3.8000e-005	8.0000e-005
tblVehicleEF	MHD	2.8650e-003	6.7220e-003
tblVehicleEF	MHD	4.7900e-004	1.0000e-004
tblVehicleEF	MHD	3.6000e-005	7.6000e-005
tblVehicleEF	MHD	2.7390e-003	6.4250e-003
tblVehicleEF	MHD	4.4000e-004	9.2000e-005
tblVehicleEF	MHD	3.1400e-004	2.3500e-004
tblVehicleEF	MHD	0.02	0.01
tblVehicleEF	MHD	0.02	0.02
tblVehicleEF	MHD	2.4400e-004	1.6400e-004
tblVehicleEF	MHD	0.04	9.5590e-003
tblVehicleEF	MHD	6.6150e-003	0.06
tblVehicleEF	MHD	0.11	0.03
tblVehicleEF	MHD	1.7710e-003	5.6000e-004
tblVehicleEF	MHD	0.01	8.1290e-003
tblVehicleEF	MHD	3.5700e-004	6.4000e-005
tblVehicleEF	MHD	3.1400e-004	2.3500e-004
tblVehicleEF	MHD	0.02	0.01

tblVehicleEF	MHD	0.02	0.02
tblVehicleEF	MHD	2.4400e-004	1.6400e-004
tblVehicleEF	MHD	0.05	0.01
tblVehicleEF	MHD	6.6150e-003	0.06
tblVehicleEF	MHD	0.12	0.04
tblVehicleEF	OBUS	0.01	7.1740e-003
tblVehicleEF	OBUS	2.9690e-003	9.9400e-004
tblVehicleEF	OBUS	0.02	0.01
tblVehicleEF	OBUS	0.24	0.69
tblVehicleEF	OBUS	0.28	0.15
tblVehicleEF	OBUS	3.15	0.96
tblVehicleEF	OBUS	191.67	92.21
tblVehicleEF	OBUS	1,273.32	1,079.52
tblVehicleEF	OBUS	56.79	10.79
tblVehicleEF	OBUS	0.47	0.47
tblVehicleEF	OBUS	1.03	1.55
tblVehicleEF	OBUS	4.74	1.23
tblVehicleEF	OBUS	4.3000e-005	1.5700e-004
tblVehicleEF	OBUS	3.2390e-003	8.2570e-003
tblVehicleEF	OBUS	8.9800e-004	1.6500e-004
tblVehicleEF	OBUS	4.1000e-005	1.5000e-004
tblVehicleEF	OBUS	3.0870e-003	7.8860e-003
tblVehicleEF	OBUS	8.2600e-004	1.5200e-004
tblVehicleEF	OBUS	1.0340e-003	9.3800e-004
tblVehicleEF	OBUS	0.01	0.01
tblVehicleEF	OBUS	0.04	0.05
tblVehicleEF	OBUS	5.9200e-004	4.8900e-004
tblVehicleEF	OBUS	0.05	0.01
tblVehicleEF	OBUS	0.03	0.16
tblVehicleEF	OBUS	0.21	0.06

tblVehicleEF	OBUS	1.8390e-003	8.7500e-004
tblVehicleEF	OBUS	0.01	0.01
tblVehicleEF	OBUS	6.2300e-004	1.0700e-004
tblVehicleEF	OBUS	1.0340e-003	9.3800e-004
tblVehicleEF	OBUS	0.01	0.01
tblVehicleEF	OBUS	0.05	0.07
tblVehicleEF	OBUS	5.9200e-004	4.8900e-004
tblVehicleEF	OBUS	0.05	0.01
tblVehicleEF	OBUS	0.03	0.16
tblVehicleEF	OBUS	0.23	0.06
tblVehicleEF	SBUS	0.83	0.08
tblVehicleEF	SBUS	3.4400e-003	1.0470e-003
tblVehicleEF	SBUS	0.05	6.3860e-003
tblVehicleEF	SBUS	7.98	3.37
tblVehicleEF	SBUS	0.27	0.13
tblVehicleEF	SBUS	5.78	0.74
tblVehicleEF	SBUS	1,016.91	266.29
tblVehicleEF	SBUS	1,017.35	760.31
tblVehicleEF	SBUS	54.67	4.58
tblVehicleEF	SBUS	2.15	1.21
tblVehicleEF	SBUS	0.91	1.00
tblVehicleEF	SBUS	11.65	1.94
tblVehicleEF	SBUS	1.5800e-004	2.9400e-004
tblVehicleEF	SBUS	0.01	0.01
tblVehicleEF	SBUS	2.6290e-003	5.6440e-003
tblVehicleEF	SBUS	1.2280e-003	9.0000e-005
tblVehicleEF	SBUS	1.5200e-004	2.8100e-004
tblVehicleEF	SBUS	2.6410e-003	2.6620e-003
tblVehicleEF	SBUS	2.4930e-003	5.3800e-003
tblVehicleEF	SBUS	1.1290e-003	8.3000e-005

tblVehicleEF	SBUS	3.3160e-003	1.1020e-003
tblVehicleEF	SBUS	0.03	0.01
tblVehicleEF	SBUS	0.97	0.35
tblVehicleEF	SBUS	1.9100e-003	5.7700e-004
tblVehicleEF	SBUS	0.04	9.3010e-003
tblVehicleEF	SBUS	0.02	0.07
tblVehicleEF	SBUS	0.33	0.04
tblVehicleEF	SBUS	9.9840e-003	2.5440e-003
tblVehicleEF	SBUS	9.8070e-003	7.2870e-003
tblVehicleEF	SBUS	6.4700e-004	4.5000e-005
tblVehicleEF	SBUS	3.3160e-003	1.1020e-003
tblVehicleEF	SBUS	0.03	0.01
tblVehicleEF	SBUS	1.41	0.50
tblVehicleEF	SBUS	1.9100e-003	5.7700e-004
tblVehicleEF	SBUS	0.05	0.01
tblVehicleEF	SBUS	0.02	0.07
tblVehicleEF	SBUS	0.36	0.04
tblVehicleEF	UBUS	0.23	1.76
tblVehicleEF	UBUS	0.06	5.6880e-003
tblVehicleEF	UBUS	2.03	13.30
tblVehicleEF	UBUS	8.07	0.42
tblVehicleEF	UBUS	1,833.90	1,626.43
tblVehicleEF	UBUS	143.86	3.85
tblVehicleEF	UBUS	0.96	0.68
tblVehicleEF	UBUS	11.91	0.04
tblVehicleEF	UBUS	0.49	0.07
tblVehicleEF	UBUS	0.01	0.03
tblVehicleEF	UBUS	5.1640e-003	4.9490e-003
tblVehicleEF	UBUS	1.7000e-003	5.0000e-005
tblVehicleEF	UBUS	0.21	0.03

tblVehicleEF	UBUS	3.0000e-003	7.8890e-003
tblVehicleEF	UBUS	4.8970e-003	4.7310e-003
tblVehicleEF	UBUS	1.5630e-003	4.6000e-005
tblVehicleEF	UBUS	3.0320e-003	2.1200e-004
tblVehicleEF	UBUS	0.05	2.9750e-003
tblVehicleEF	UBUS	2.2660e-003	1.3000e-004
tblVehicleEF	UBUS	0.02	0.03
tblVehicleEF	UBUS	0.02	0.02
tblVehicleEF	UBUS	0.78	0.03
tblVehicleEF	UBUS	0.02	0.01
tblVehicleEF	UBUS	1.5880e-003	3.8000e-005
tblVehicleEF	UBUS	3.0320e-003	2.1200e-004
tblVehicleEF	UBUS	0.05	2.9750e-003
tblVehicleEF	UBUS	2.2660e-003	1.3000e-004
tblVehicleEF	UBUS	0.26	1.79
tblVehicleEF	UBUS	0.02	0.02
tblVehicleEF	UBUS	0.85	0.03
tblVehicleTrips	ST_TR	10.18	9.00
tblVehicleTrips	SU_TR	8.91	8.55
tblVehicleTrips	WD_TR	13.22	12.00

2.0 Emissions Summary

2.1 Overall Construction

Unmitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	tons/yr										MT/yr					

2019	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
2020	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Maximum	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**

Mitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	tons/yr										MT/yr					
2019	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
2020	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Maximum	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**

	ROG	**NOx**	**CO**	**SO2**	**Fugitive PM10**	**Exhaust PM10**	**PM10 Total**	**Fugitive PM2.5**	**Exhaust PM2.5**	**PM2.5 Total**	**Bio- CO2**	**NBio-CO2**	**Total CO2**	**CH4**	**N20**	**CO2e**
Percent Reduction	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**

Quarter	**Start Date**	**End Date**	**Maximum Unmitigated ROG + NOX (tons/quarter)**	**Maximum Mitigated ROG + NOX (tons/quarter)**
		Highest		

2.2 Overall Operational

Unmitigated Operational

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					

Area	12.7843	3.2000e-004	0.0356	0.0000		1.3000e-004	1.3000e-004		1.3000e-004	1.3000e-004	0.0000	0.0697	0.0697	1.8000e-004	0.0000	0.0742
Energy	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Mobile	7.3644	22.6157	84.1239	0.3035	23.6927	0.1906	23.8833	6.7319	0.1799	6.9118	0.0000	28,311.4650	28,311.4650	0.9640	0.0000	28,335.5654
Waste						0.0000	0.0000		0.0000	0.0000	324.7855	0.0000	324.7855	19.1943	0.0000	804.6424
Water						0.0000	0.0000		0.0000	0.0000	155.2558	0.0000	155.2558	15.9463	0.3765	666.1171
Total	**20.1487**	**22.6160**	**84.1595**	**0.3035**	**23.6927**	**0.1907**	**23.8834**	**6.7319**	**0.1801**	**6.9120**	**480.0414**	**28,311.5347**	**28,791.5760**	**36.1047**	**0.3765**	**29,806.3990**

Mitigated Operational

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Area	12.7843	3.2000e-004	0.0356	0.0000		1.3000e-004	1.3000e-004		1.3000e-004	1.3000e-004	0.0000	0.0697	0.0697	1.8000e-004	0.0000	0.0742
Energy	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Mobile	7.3644	22.6157	84.1239	0.3035	23.6927	0.1906	23.8833	6.7319	0.1799	6.9118	0.0000	28,311.4650	28,311.4650	0.9640	0.0000	28,335.5654
Waste						0.0000	0.0000		0.0000	0.0000	324.7855	0.0000	324.7855	19.1943	0.0000	804.6424
Water						0.0000	0.0000		0.0000	0.0000	155.2558	0.0000	155.2558	15.9463	0.3765	666.1171
Total	**20.1487**	**22.6160**	**84.1595**	**0.3035**	**23.6927**	**0.1907**	**23.8834**	**6.7319**	**0.1801**	**6.9120**	**480.0414**	**28,311.5347**	**28,791.5760**	**36.1047**	**0.3765**	**29,806.3990**

	ROG	**NOx**	**CO**	**SO2**	**Fugitive PM10**	**Exhaust PM10**	**PM10 Total**	**Fugitive PM2.5**	**Exhaust PM2.5**	**PM2.5 Total**	**Bio- CO2**	**NBio-CO2**	**Total CO2**	**CH4**	**N20**	**CO2e**
Percent Reduction	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**

3.0 Construction Detail

Construction Phase

Phase Number	Phase Name	Phase Type	Start Date	End Date	Num Days Week	Num Days	Phase Description
1	Site Preparation	Site Preparation	12/4/2019	2/25/2020	5	60	

Acres of Grading (Site Preparation Phase): 0

Acres of Grading (Grading Phase): 0

Acres of Paving: 0

Residential Indoor: 0; Residential Outdoor: 0; Non-Residential Indoor: 0; Non-Residential Outdoor: 0; Striped Parking Area: 0

OffRoad Equipment

Phase Name	Offroad Equipment Type	Amount	Usage Hours	Horse Power	Load Factor
Site Preparation	Rubber Tired Dozers	0	8.00	247	0.40
Site Preparation	Tractors/Loaders/Backhoes	0	8.00	97	0.37

Trips and VMT

Phase Name	Offroad Equipment Count	Worker Trip Number	Vendor Trip Number	Hauling Trip Number	Worker Trip Length	Vendor Trip Length	Hauling Trip Length	Worker Vehicle Class	Vendor Vehicle Class	Hauling Vehicle Class
Site Preparation	0	0.00	0.00	0.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT

3.1 Mitigation Measures Construction

3.2 Site Preparation - 2019

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Fugitive Dust					0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**

3.2 Site Preparation - 2020

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**

Unmitigated Construction Off-Site

Category	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**

Mitigated Construction On-Site

Category	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
	tons/yr										MT/yr					
Fugitive Dust					0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**

Mitigated Construction Off-Site

Category	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**

4.0 Operational Detail - Mobile

4.1 Mitigation Measures Mobile

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Mitigated	7.3644	22.6157	84.1239	0.3035	23.6927	0.1906	23.8833	6.7319	0.1799	6.9118	0.0000	28,311.4650	28,311.4650	0.9640	0.0000	28,335.5654
Unmitigated	7.3644	22.6157	84.1239	0.3035	23.6927	0.1906	23.8833	6.7319	0.1799	6.9118	0.0000	28,311.4650	28,311.4650	0.9640	0.0000	28,335.5654

4.2 Trip Summary Information

	Average Daily Trip Rate			Unmitigated	Mitigated
Land Use	Weekday	Saturday	Sunday	Annual VMT	Annual VMT
Hospital	46,800.00	35,100.00	33345.00	108,812,645	108,812,645
Total	46,800.00	35,100.00	33,345.00	108,812,645	108,812,645

4.3 Trip Type Information

	Miles			Trip %			Trip Purpose %		
Land Use	H-W or C-W	H-S or C-C	H-O or C-NW	H-W or C-W	H-S or C-C	H-O or C-NW	Primary	Diverted	Pass-by
Hospital	9.50	7.30	7.30	64.90	16.10	19.00	73	25	2

4.4 Fleet Mix

Land Use	LDA	LDT1	LDT2	MDV	LHD1	LHD2	MHD	HHD	OBUS	UBUS	MCY	SBUS	MH
Hospital	0.566162	0.056935	0.174451	0.112896	0.022384	0.006125	0.020280	0.030566	0.001665	0.001354	0.005350	0.001069	0.000762

5.0 Energy Detail

Historical Energy Use: N

5.1 Mitigation Measures Energy

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Electricity Mitigated						0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Electricity Unmitigated						0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
NaturalGas Mitigated	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
NaturalGas Unmitigated	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

5.2 Energy by Land Use - NaturalGas

Unmitigated

	NaturalGas Use	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Land Use	kBTU/yr	tons/yr										MT/yr					

Hospital	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total		**0.0000**	**0.0000**	**0.0000**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**

Mitigated

	NaturalGas Use	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Land Use	kBTU/yr	tons/yr										MT/yr					
Hospital	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total		**0.0000**	**0.0000**	**0.0000**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**

5.3 Energy by Land Use - Electricity

Unmitigated

	Electricity Use	Total CO2	CH4	N2O	CO2e
Land Use	kWh/yr	MT/yr			
Hospital	0	0.0000	0.0000	0.0000	0.0000
Total		**0.0000**	**0.0000**	**0.0000**	**0.0000**

Mitigated

	Electricity Use	Total CO2	CH4	N2O	CO2e
Land Use	kWh/yr	MT/yr			
Hospital	0	0.0000	0.0000	0.0000	0.0000
Total		**0.0000**	**0.0000**	**0.0000**	**0.0000**

6.0 Area Detail

6.1 Mitigation Measures Area

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Mitigated	12.7843	3.2000e-004	0.0356	0.0000		1.3000e-004	1.3000e-004		1.3000e-004	1.3000e-004	0.0000	0.0697	0.0697	1.8000e-004	0.0000	0.0742
Unmitigated	12.7843	3.2000e-004	0.0356	0.0000		1.3000e-004	1.3000e-004		1.3000e-004	1.3000e-004	0.0000	0.0697	0.0697	1.8000e-004	0.0000	0.0742

6.2 Area by SubCategory

Unmitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
SubCategory	tons/yr										MT/yr					
Architectural Coating	2.0336					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Consumer Products	10.7474					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Landscaping	3.2600e-003	3.2000e-004	0.0356	0.0000		1.3000e-004	1.3000e-004		1.3000e-004	1.3000e-004	0.0000	0.0697	0.0697	1.8000e-004	0.0000	0.0742
Total	**12.7843**	**3.2000e-004**	**0.0356**	**0.0000**		**1.3000e-004**	**1.3000e-004**		**1.3000e-004**	**1.3000e-004**	**0.0000**	**0.0697**	**0.0697**	**1.8000e-004**	**0.0000**	**0.0742**

Mitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
SubCategory	tons/yr										MT/yr					
Architectural Coating	2.0336					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Consumer Products	10.7474					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Landscaping	3.2600e-003	3.2000e-004	0.0356	0.0000		1.3000e-004	1.3000e-004		1.3000e-004	1.3000e-004	0.0000	0.0697	0.0697	1.8000e-004	0.0000	0.0742
Total	**12.7843**	**3.2000e-004**	**0.0356**	**0.0000**		**1.3000e-004**	**1.3000e-004**		**1.3000e-004**	**1.3000e-004**	**0.0000**	**0.0697**	**0.0697**	**1.8000e-004**	**0.0000**	**0.0742**

7.0 Water Detail

7.1 Mitigation Measures Water

Category	Total CO2	CH4	N2O	CO2e
	MT/yr			
Mitigated	155.2558	15.9463	0.3765	666.1171
Unmitigated	155.2558	15.9463	0.3765	666.1171

7.2 Water by Land Use

Unmitigated

Land Use	Indoor/Outdoor Use	Total CO2	CH4	N2O	CO2e
	Mgal	MT/yr			
Hospital	489.374 / 93.2141	155.2558	15.9463	0.3765	666.1171
Total		**155.2558**	**15.9463**	**0.3765**	**666.1171**

Mitigated

Land Use	Indoor/Outdoor Use	Total CO2	CH4	N2O	CO2e
	Mgal	MT/yr			
Hospital	489.374 / 93.2141	155.2558	15.9463	0.3765	666.1171
Total		**155.2558**	**15.9463**	**0.3765**	**666.1171**

8.0 Waste Detail

8.1 Mitigation Measures Waste

Category/Year

	Total CO2	CH4	N2O	CO2e
	MT/yr			
Mitigated	324.7855	19.1943	0.0000	804.6424
Unmitigated	324.7855	19.1943	0.0000	804.6424

8.2 Waste by Land Use

Unmitigated

	Waste Disposed	Total CO2	CH4	N2O	CO2e
Land Use	tons	MT/yr			
Hospital	1600	324.7855	19.1943	0.0000	804.6424
Total		**324.7855**	**19.1943**	**0.0000**	**804.6424**

Mitigated

	Waste Disposed	Total CO2	CH4	N2O	CO2e
Land Use	tons	MT/yr			
Hospital	1600	324.7855	19.1943	0.0000	804.6424
Total		**324.7855**	**19.1943**	**0.0000**	**804.6424**

9.0 Operational Offroad

Equipment Type	Number	Hours/Day	Days/Year	Horse Power	Load Factor	Fuel Type

10.0 Stationary Equipment

Fire Pumps and Emergency Generators

Equipment Type	Number	Hours/Day	Hours/Year	Horse Power	Load Factor	Fuel Type

Boilers

Equipment Type	Number	Heat Input/Day	Heat Input/Year	Boiler Rating	Fuel Type

User Defined Equipment

Equipment Type	Number

11.0 Vegetation

UCSF – PCUP Emissions Future Phase

UCSF Parnassus Heights LRDP

Initial Phase of LRDP (2030)

PCUP Emissions Estimates, change (increase) from existing only

Based on BAAQMD Annual Reporting

List of Assumptions/References/Notes

Increase is directly related to increase in square footage. Advancements in building energy efficiencies are not considered as to provided a conservative estimate.

Only the square footage from UC Hall/Nursing Building were considered negative. LPPI demolition was previously approved under 2014 LRDP

Aldea Housing does not use steam or energy generated by the PCUP

Existing square footage from ARUP 2019. UCSF Parnassus Heights Utility Master Plan. October 1, 2019

Assume increase in PCUP operations applied evenly to each unit i.e. the % increase in squarefootage is applied directly to each unit

PCUP (existing) Emission Factors are from 2019 BAAQMD Compliance Reporting

Emissions considered are from NG combustion only. Diesel fuel is for emergency backup only.

Turbine emissions are turbine + DB

Calculations

Square Footage

Existing, total campus	3,900,000	ft^2
Existing, connected to PCUP	2,844,131	ft^2
Final, total campus	6,000,000	ft^2
Net increase Aldea	378,000	ft^2
Future Phase Increase	2,100,000	ft^2
Future Phase Increase, no Aldea	1,722,000	
% increase	61%	ft^2

Utility Budget Projection Model 2018-10-01, Utilities Commodity Summary

Budget 2018-19	10,184,566.16	therms
	1,018,213.20	mmbtu
	998.25	mmscf
% increase	61%	
Increase	616,484.66	mmbtu

Permit Limits	Turbine 1	Turbine 2	DB 1	DB 2	Boiler 1	Boiler 2	Total
therms/yr	12,000,000		4,400,000		1,000,000	1,000,000	18,400,000

Unit	Rating (mmbtu/hr)	Controls	Capacity Fraction
Turbine 1	76	SCR + CO Cat.	33%
Duct Burner 1	46		12%
Turbine 2	62	SCR + CO Cat.	33%
Duct Burner 2	46		12%
Boiler 1	120	none	5%
Boiler 2	120	none	5%

Existing 2018-19 Reporting

Pollutant	Sources							UOM
	Turbine 1	Turbine 2	DB 1	DB 2	Boiler 1	Boiler 2	Total PCUP	
Benzene	2.27E-02	2.65E-02	2.70E-04	7.78E-04	5.63E-05	8.11E-05	5.04E-02	lb/day
Formaldehyde	3.30E+00	3.85E+00	3.18E-03	9.15E-03	2.79E-03	4.02E-03	7.17E+00	lb/day
Organics (other, including	1.58E+00	1.84E+00	4.32E-01	1.24E+00	9.21E-02	1.33E-01	5.32E+00	lb/day
Particulates (part not spe	6.47E+00	7.54E+00	2.85E-01	8.21E-01	2.29E-01	3.29E-01	1.57E+01	lb/day
Nitrous Oxide (N2O)	3.11E-02	3.62E-02	1.37E-03	3.94E-03	6.95E-03	1.00E-02	8.96E-02	lb/day
Nitrogen Oxides (part not	2.53E+00	2.95E+00	1.11E-01	3.21E-01	9.31E-01	1.34E+00	8.18E+00	lb/day
Sulfur Dioxide (SO2)	5.46E-01	6.37E-01	2.41E-02	6.93E-02	1.71E-02	2.46E-02	1.32E+00	lb/day
Carbon Monoxide (CO) pollu	5.05E+00	5.89E+00	9.68E-01	2.79E+00	1.13E+00	1.63E+00	1.75E+01	lb/day
Carbon Dioxide, non-biogen	1.18E+05	1.37E+05	5.19E+03	1.49E+04	3.69E+03	5.31E+03	2.84E+05	lb/day
Methane (CH4)	4.34E+00	5.06E+00	8.04E-02	2.32E-01	5.72E-02	8.24E-02	9.85E+00	lb/day
Toluene	0.00E+00	0.00E+00	1.44E-04	4.15E-04	0.00E+00	0.00E+00	5.59E-04	lb/day
PM10	6.43E+00	7.49E+00	0.00E+00	0.00E+00	2.29E-01	3.29E-01	1.45E+01	lb/day

PM2.5	6.02E+00	7.01E+00	0.00E+00	0.00E+00	2.29E-01	3.29E-01	1.36E+01	lb/day	8.29E+00

Estimated Increase

Pollutant	Sources					UOM	Sources					UOM
	Turbine 1	Turbine 2	Boiler 1	Boiler 2	Total PCUP		Turbine 1	Turbine 2	Boiler 1	Boiler 2	Total PCUP	
Benzene	1.39E-02	1.65E-02	3.41E-05	4.91E-05	3.05E-02	lb/day	2.54E-03	3.01E-03	6.22E-06	8.96E-06	5.57E-03	ton/yr
Formaldehyde	2.00E+00	2.34E+00	1.69E-03	2.43E-03	4.34E+00	lb/day	3.65E-01	4.26E-01	3.08E-04	4.44E-04	7.92E-01	ton/yr
Organics (other, including	1.22E+00	1.86E+00	5.58E-02	8.05E-02	3.22E+00	lb/day	2.22E-01	3.40E-01	1.02E-02	1.47E-02	5.88E-01	ton/yr
Particulates (part not spe	4.09E+00	5.06E+00	1.39E-01	1.99E-01	9.49E+00	lb/day	7.46E-01	9.24E-01	2.53E-02	3.64E-02	1.73E+00	ton/yr
Nitrous Oxide (N2O)	1.97E-02	2.43E-02	4.21E-03	6.05E-03	5.42E-02	lb/day	3.59E-03	4.44E-03	7.68E-04	1.10E-03	9.90E-03	ton/yr
Nitrogen Oxides (part not	1.60E+00	1.98E+00	5.64E-01	8.11E-01	4.95E+00	lb/day	2.92E-01	3.61E-01	1.03E-01	1.48E-01	9.04E-01	ton/yr
Sulfur Dioxide (SO2)	3.45E-01	4.28E-01	1.04E-02	1.49E-02	7.98E-01	lb/day	6.30E-02	7.80E-02	1.89E-03	2.72E-03	1.46E-01	ton/yr
Carbon Monoxide (CO) pollu	3.64E+00	5.26E+00	6.84E-01	9.87E-01	1.06E+01	lb/day	6.65E-01	9.59E-01	1.25E-01	1.80E-01	1.93E+00	ton/yr
Carbon Dioxide, non-biogen	7.46E+04	9.20E+04	2.23E+03	3.21E+03	1.72E+05	lb/day	1.36E+04	1.68E+04	4.08E+02	5.87E+02	3.14E+04	ton/yr
Methane (CH4)	2.68E+00	3.20E+00	3.46E-02	4.99E-02	5.96E+00	lb/day	4.88E-01	5.85E-01	6.32E-03	9.10E-03	1.09E+00	ton/yr
Toluene	8.72E-05	2.51E-04	0.00E+00	0.00E+00	3.38E-04	lb/day	1.59E-05	4.59E-05	0.00E+00	0.00E+00	6.18E-05	ton/yr
PM10	3.89E+00	4.54E+00	1.39E-01	1.99E-01	8.77E+00	lb/day	7.11E-01	8.28E-01	2.53E-02	3.64E-02	1.60E+00	ton/yr
PM2.5	3.64E+00	4.25E+00	1.39E-01	1.99E-01	8.23E+00	lb/day	6.65E-01	7.75E-01	2.53E-02	3.64E-02	1.50E+00	ton/yr

Criteria Summary

Pollutant	Turbine 1	Turbine 2	Boiler 1	Boiler 2	Total PCUP	UOM	Turbine 1	Turbine 2	Boiler 1	Boiler 2	Total PCUP	UOM	Total 2050
ROG	1.22	1.86	0.06	0.08	3.22	lb/day	0.22	0.34	0.01	0.01	0.59	ton/yr	Total 2050
NOX	1.60	1.98	0.56	0.81	4.95	lb/day	0.29	0.36	0.10	0.15	0.90	ton/yr	1.31E+01
PM10	3.89	4.54	0.14	0.20	8.77	lb/day	0.71	0.83	0.03	0.04	1.60	ton/yr	2.33E+01
PM2.5	3.64	4.25	0.14	0.20	8.23	lb/day	0.66	0.77	0.03	0.04	1.50	ton/yr	2.18E+01

AIR HRA Methods and Approach

APPROACH AND METHODOLOGY TO HEALTH RISK ASSESSMENT

A Health Risk Assessment (HRA) was prepared to analyze the estimate cancer risks, chronic health hazards, and acute health hazards from TAC exposure as well as exposure to fine particulates presented as the annual average $PM_{2.5}$ concentration. A three-step process was used to calculated the health risk associated to construction activities and also the health risk from new operations of the initial phase building out. The first steps involve calculating TAC emissions from all new sources. Emissions from construction were calculated using CARB's CalEEMod software program to estimate average annual diesel exhaust emissions (as reported as exhaust of PM_{10}) during project construction. Idling emissions associated with heavy-duty trucks (haul trucks, concrete trucks, material delivery trucks, etc.) were estimated based on the anticipated number of truck trips and idling emission factors for heavy-duty vehicles from EMFAC2017 for on-road emissions. These emissions were modeled outside of CalEEMod because the model does not accurately account for the anticipated idling activity at the project site, which is needed for the HRA.

Operational emissions associated to the initial phase build out that are anticipated to increase or relocate TAC sources include: fume hoods at the RAB, a new emergency diesel generator at the RAB, and increased power generation from the CUP to accommodate additional building square footage. The emergency diesel generator emissions were calculated using CalEEMod to estimate the annual average DPM (as reported as exhaust PM_{10}) based on an anticipated permit limit of 50 hours per year for engine reliability.[i] Fume hood TAC emissions were calculated using methodologies documented in a memorandum to UCSF dated December 3, 2018 that was commissioned for the approach to analysis in the UCSF Mission Bay HRA[ii],[iii]. CUP calculations were based on UCSF's BAAQMD emissions report from their most recent reporting cycle and supplemented with emission calculation methodologies utilized for UCSF Mission Bay HRA , [iv]. Detailed calculations, including all assumptions and discussion of approach to analysis, can be found in this appendix.

The second step involved using the AERMOD (version 18081) dispersion model to convert emissions to maximum annual TAC concentrations for the cancer risk, chronic risk and $PM_{2.5}$ exposure, and also maximum 1-hour TAC concentrations for the acute risk analysis. Modeled sensitive receptor locations include residential areas, daycares, and schools (for children under 16 years of age). A 20-meter receptor grid co-located with the CRRP-HRA grid was modeled using a receptor height of 1.8 meters (breathing height).

Emission rates from the various emission sources (e.g., construction activities, haul truck routes, CUP etc.) were based on the anticipated hours of activity for each source and other information. The following sources were included in each respective model.

Construction model:

- Four Area Source for the main construction activates for each the ISA, RAB, New Hospital, and initial phase of Aldea housing expansion.
- Four Area Source for the idling emissions associated with haul truck import/export for each the ISA, RAB, New Hospital, and initial phase of Aldea housing expansion.
- A Line Area source for the haul route along Parnassus Aveunue
- Two Line Area sources to represent the haul route for the Aldea housing construction

Operational model:

- Forty Point Sources on top of the RAB building to model fume hoods
- One Point Source for the emergency generator for the RAB
- Four Point Sources for each the Combustion Turbine/After Burner 1 and 2, and Boilers 1 and 2 at the central utility plant

The source parameters included in the modeling input are detailed in tables AIR-1, AIR-2, and AIR-3. Because each emission source was modeled separately within AERMOD, a unitized emission rate concept for each source, where each source is modeled with a unitized emission rate of 1 gram/second (g/s). The modeled concentration at each receptor (micrograms per cubic meter [μ/m^3]/[g/s]) represents a "dispersion factor," which was then multiplied by the actual emission rate of each source to determine actual concentrations.

In accordance with OEHHA *Air Toxics Hot Spots Program Guidance Manual for Preparation of Health Risk Assessments* the last step was accomplished by applying the highest estimated concentrations of TAC at the receptors analyzed to the established cancer potency factors and acceptable reference concentrations for non-cancer health effects[v]. Increased cancer risks were calculated using the modeled TAC concentrations and OEHHA-recommended methodologies for both a child exposure (starting at 3rd trimester) as well as daycare and school exposure. The cancer risk calculations were based on applying the OEHHA-recommended age sensitivity factors and breathing rates, as well as fraction of time at home and an exposure duration of 30 years. Age-sensitivity factors reflect the greater sensitivity of infants and small children to cancer causing air pollutants. Because health risk is a localized impact, two exposure scenarios were considered because the MEI for the construction HRA varied from the MEI for the operational HRA. The first scenario evaluated the construction impacts plus operational impacts for 30 total years of exposure and the second scenario evaluated the operational impacts only for 30 years of exposure. The full HRA calculations are presented in this appendix.

These conservative methodologies overestimate both non-carcinogenic and carcinogenic health risk, possibly by an order of magnitude or more. Therefore, for carcinogenic risks, the actual probabilities of cancer formation in the populations of concern due to exposure to carcinogenic pollutants are likely to be lower than the risks derived using the HRA methodology. The extrapolation of toxicity data in animals to humans, the estimation of concentration prediction methods within dispersion models; and the variability in lifestyles, fitness and other confounding factors of the human population also contribute to the overestimation of health impacts. Therefore, the results of the HRA are highly overstated.

[i] BAAQMD, 2018a. Bay Area Air Quality Management District Engineering Division Permit Handbook. October 2018. Available: http://www.baaqmd.gov/~/media/files/engineering/permit-handbook/baaqmd-permit-handbook.pdf

[ii] Atmospheric Dynamics, Inc., 2018. Memorandum Subject: Draft Fume Hood Emissions Quantification Methodology (Revised). December 3, 2018.

[iii] Atmospheric Dynamics, Inc., 2019. Health Risk Assessment Final Report Submittal UCSF Mission Bay Campus. May 2019.

[iv] BAAQMD, 2019a. Bay Area Air Quality Management District Detail Pollutants – Abated, Most Recent P/O Approved (2019), UCSF/Parnassus (P# 2478). Received via Stationary Source Inquiry Form, Available: http://www.baaqmd.gov/plans-and-climate/california-environmental-quality-act-ceqa/ceqa-tools

[v] OEHHA, 2019. Consolidated Table of OEHHA/ARB Approved Risk Assessment Health Values. September 2019. Available: https://ww3.arb.ca.gov/toxics/healthval/contable.pdf

AIR Construction Idling Calculations

UCSF Parnassus Heights LRDP
Construction On-Site Idling Emissions
assume 15 minutes of onsite idling per haul or delivery trip

From EMFAC2017 (San Francisco Bay Area, Diesel fueled HHDT)
Idling Emission Factors -g/h g/hr

	ROG	NOX	PM10	PM2.5
2021	2.4	35.9	0.0	0.0
2022	2.4	34.3	0.0	0.0
2023	2.3	31.4	0.0	0.0
2024	2.3	31.1	0.0	0.0
2025	2.4	30.8	0.0	0.0
2026	2.4	30.5	0.0	0.0
2027	2.4	30.3	0.0	0.0
2028	2.4	30.1	0.0	0.0
2029	2.4	29.9	0.0	0.0
2030	2.4	29.7	0.0	0.0

per haul trip	15

Project Area	Phase Name	Start Date	End Date	Workdays	total trips
ISA	Demo	3/1/2022	5/31/2022	66	136
ISA	Excavation	3/1/2022	5/31/2022	66	125
RAB	Demo	3/1/2022	5/31/2022	66	1060
RAB	Site Prep	3/1/2022	5/31/2022	66	4954
RAB	Grading	3/1/2022	12/31/2022	219	3420
HDMC	Grading	6/1/2024	12/31/2024	152	16847
IAH	Demo	1/3/2028	1/28/2028	20	108
IAH	Site Prep	1/29/2028	2/2/2028	3	247
IAH	Grading	2/3/2028	2/10/2028	6	312

Trips and phasing from CalEEMod modeling

					Haul Truck Emissions (g)				Haul Truck Emissions (tons)			
Project Area	Phase Name	Year	Num Days	Haul Trips	ROG	NOX	PM10	PM2.5	ROG	NOX	PM10	PM2.5
ISA	Demo	2021	0	0	0.00	0.00	0.00	0.00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
ISA	Demo	2022	66	136	80.24	1165.23	0.84	0.80	8.84E-05	1.28E-03	9.23E-07	8.83E-07
ISA	Excavation	2022	66	125	73.75	1070.98	0.77	0.74	8.13E-05	1.18E-03	8.48E-07	8.11E-07
RAB	Demo	2021	0	0	0.00	0.00	0.00	0.00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
RAB	Demo	2022	66	1060	625.39	9081.94	6.52	6.24	6.89E-04	1.00E-02	7.19E-06	6.88E-06
RAB	Site Prep	2021	0	0	0.00	0.00	0.00	0.00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
RAB	Site Prep	2022	66	4954	2922.83	42445.21	30.48	29.17	3.22E-03	4.68E-02	3.36E-05	3.22E-05
RAB	Grading	2021	0	0	0.00	0.00	0.00	0.00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
RAB	Grading	2022	219	3420	2017.78	29302.10	21.05	20.13	2.22E-03	3.23E-02	2.32E-05	2.22E-05
HDMC	Grading	2024	152	16847	9894.76	130843.12	80.67	77.18	1.09E-02	1.44E-01	8.89E-05	8.51E-05
IAH	Demo	2028	20	108	63.55	812.88	0.43	0.41	7.00E-05	8.96E-04	4.69E-07	4.48E-07
IAH	Site Prep	2028	3	247	145.33	1859.08	0.97	0.93	1.60E-04	2.05E-03	1.07E-06	1.03E-06
IAH	Grading	2028	6	312	183.58	2348.31	1.23	1.18	2.02E-04	2.59E-03	1.35E-06	1.30E-06
									1.76E-02	**2.41E-01**	**1.58E-04**	**1.51E-04**

Idling Onsite - Tons Per Year

Project Area	Year	ROG	NOX	Exhaust PM10	Exhaust PM2.5
ISA	2021	0.00E+00	0.00E+00	0.00E+00	0.00E+00
ISA	2022	1.70E-04	2.47E-03	1.77E-06	1.69E-06
ISA	2023	0.00E+00	0.00E+00	0.00E+00	0.00E+00
RAB	2021	0.00E+00	0.00E+00	0.00E+00	0.00E+00
RAB	2022	6.14E-03	8.91E-02	6.40E-05	6.12E-05
RAB	2023	0.00E+00	0.00E+00	0.00E+00	0.00E+00
RAB	2024	0.00E+00	0.00E+00	0.00E+00	0.00E+00
RAB	2025	0.00E+00	0.00E+00	0.00E+00	0.00E+00
HDMC	2023	0.00E+00	0.00E+00	0.00E+00	0.00E+00
HDMC	2024	1.09E-02	1.44E-01	8.89E-05	8.51E-05
HDMC	2025	0.00E+00	0.00E+00	0.00E+00	0.00E+00
HDMC	2026	0.00E+00	0.00E+00	0.00E+00	0.00E+00
HDMC	2027	0.00E+00	0.00E+00	0.00E+00	0.00E+00
HDMC	2028	0.00E+00	0.00E+00	0.00E+00	0.00E+00
HDMC	2029	0.00E+00	0.00E+00	0.00E+00	0.00E+00
IAH	2028	4.33E-04	5.53E-03	2.89E-06	2.77E-06
IAH	2029	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Total tons by year		ROG	NOX	ExhaustPM10	ExhaustPM2.5
	2021	0.00E+00	0.00E+00	0.00E+00	0.00E+00
	2022	6.31E-03	9.16E-02	6.58E-05	6.29E-05
	2023	0.00E+00	0.00E+00	0.00E+00	0.00E+00
	2024	1.09E-02	1.44E-01	8.89E-05	8.51E-05
	2025	0.00E+00	0.00E+00	0.00E+00	0.00E+00
	2026	0.00E+00	0.00E+00	0.00E+00	0.00E+00
	2027	0.00E+00	0.00E+00	0.00E+00	0.00E+00
	2028	4.33E-04	5.53E-03	2.89E-06	2.77E-06
	2029	0.00E+00	0.00E+00	0.00E+00	0.00E+00

Lbs/day by year			ROG	NOX	ExhaustPM10	ExhaustPM2.5
2021	6/1/2021 12/31/2021	154.00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
2022	1/1/2022 12/31/2022	260.00	4.85E-02	7.04E-01	5.06E-04	4.84E-04
2023	1/1/2023 12/31/2023	260.00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
2024	1/1/2024 12/31/2024	262.00	8.33E-02	1.10E+00	6.79E-04	6.49E-04
2025	1/1/2025 12/31/2025	261.00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
2026	1/1/2026 12/31/2026	261.00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
2027	1/1/2027 12/31/2027	261.00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
2028	1/1/2028 12/31/2028	260.00	3.33E-03	4.26E-02	2.23E-05	2.13E-05
2029	1/1/2029 1/11/2029	9.00	0.00E+00	0.00E+00	0.00E+00	0.00E+00

AIR Operational Calculations (Initial Phase – for HRA)

UCSF Parnassus Heights LRDP

Initial Phase of LRDP (2030)

PCUP Emissions Estimates, change (increase) from existing only

Based on BAAQMD Annual Reporting

List of Assumptions/References/Notes

Increase is directly related to increase in square footage. Advancements in building energy efficiencies are not considered as to provided a conservative estimate.

Only the square footage from UC Hall/Nursing Building were considered negative. LPPI demolition was previously approved under 2014 LRDP

Aldea Housing does not use steam or energy generated by the PCUP

Existing square footage from ARUP 2019. UCSF Parnassus Heights Utility Master Plan. October 1, 2019

Assume increase in PCUP operations applied evenly to each unit i.e. the % increase in squarefootage is applied directly to each unit

PCUP (existing) Emission Factors are from 2019 BAAQMD Compliance Reporting

Emissions considered are from NG combustion only. Diesel fuel is for emergency backup only.

Turbine emissions are turbine + DB

Calculations

Square Footage

Existing	2,844,131	ft^2
Demo'd	236,335	ft^2
New	295,000	ft^2
ISA	25,000	
RAB	270,000	
% increase	2%	ft^2

Permit Limits	Turbine 1	Turbine 2	DB 1	DB 2	Boiler 1	Boiler 2
therms/yr	12,000,000		4,400,000		1,000,000	1,000,000

Existing 2018-19 Reporting

Pollutant	Sources							UOM
	Turbine 1	Turbine 2	DB 1	DB 2	Boiler 1	Boiler 2	Total PCUP	
Benzene	2.27E-02	2.65E-02	2.70E-04	7.78E-04	5.63E-05	8.11E-05	5.04E-02	lb/day
Formaldehyde	3.30E+00	3.85E+00	3.18E-03	9.15E-03	2.79E-03	4.02E-03	7.17E+00	lb/day
Organics (other, including	1.58E+00	1.84E+00	4.32E-01	1.24E+00	9.21E-02	1.33E-01	5.32E+00	lb/day
Particulates (part not spe	6.47E+00	7.54E+00	2.85E-01	8.21E-01	2.29E-01	3.29E-01	1.57E+01	lb/day
Nitrous Oxide (N2O)	3.11E-02	3.62E-02	1.37E-03	3.94E-03	6.95E-03	1.00E-02	8.96E-02	lb/day
Nitrogen Oxides (part not	2.53E+00	2.95E+00	1.11E-01	3.21E-01	9.31E-01	1.34E+00	8.18E+00	lb/day
Sulfur Dioxide (SO2)	5.46E-01	6.37E-01	2.41E-02	6.93E-02	1.71E-02	2.46E-02	1.32E+00	lb/day
Carbon Monoxide (CO) pollu	5.05E+00	5.89E+00	9.68E-01	2.79E+00	1.13E+00	1.63E+00	1.75E+01	lb/day
Carbon Dioxide, non-biogen	1.18E+05	1.37E+05	5.19E+03	1.49E+04	3.69E+03	5.31E+03	2.84E+05	lb/day
Methane (CH4)	4.34E+00	5.06E+00	8.04E-02	2.32E-01	5.72E-02	8.24E-02	9.85E+00	lb/day
Toluene	0.00E+00	0.00E+00	1.44E-04	4.15E-04	0.00E+00	0.00E+00	5.59E-04	lb/day
PM10	6.43E+00	7.49E+00	0.00E+00	0.00E+00	2.29E-01	3.29E-01	1.45E+01	lb/day
PM2.5	6.02E+00	7.01E+00	0.00E+00	0.00E+00	2.29E-01	3.29E-01	1.36E+01	lb/day

Estimated Increase

Pollutant	Sources					UOM	Sources					UOM
	Turbine 1	Turbine 2	Boiler 1	Boiler 2	Total PCUP		Turbine 1	Turbine 2	Boiler 1	Boiler 2	Total PCUP	
Benzene	4.74E-04	5.63E-04	1.16E-06	1.67E-06	1.04E-03	lb/day	8.65E-05	1.03E-04	2.12E-07	3.05E-07	1.90E-04	ton/yr
Formaldehyde	6.81E-02	7.96E-02	5.75E-05	8.29E-05	1.48E-01	lb/day	1.24E-02	1.45E-02	1.05E-05	1.51E-05	2.70E-02	ton/yr
Organics (other, including	4.15E-02	6.35E-02	1.90E-03	2.74E-03	1.10E-01	lb/day	7.57E-03	1.16E-02	3.47E-04	5.01E-04	2.00E-02	ton/yr
Particulates (part not spe	1.39E-01	1.72E-01	4.72E-03	6.79E-03	3.23E-01	lb/day	2.54E-02	3.15E-02	8.62E-04	1.24E-03	5.90E-02	ton/yr
Nitrous Oxide (N2O)	6.70E-04	8.28E-04	1.43E-04	2.06E-04	1.85E-03	lb/day	1.22E-04	1.51E-04	2.62E-05	3.76E-05	3.37E-04	ton/yr
Nitrogen Oxides (part not	5.45E-02	6.75E-02	1.92E-02	2.76E-02	1.69E-01	lb/day	9.94E-03	1.23E-02	3.50E-03	5.04E-03	3.08E-02	ton/yr
Sulfur Dioxide (SO2)	1.18E-02	1.46E-02	3.53E-04	5.07E-04	2.72E-02	lb/day	2.15E-03	2.66E-03	6.44E-05	9.26E-05	4.96E-03	ton/yr
Carbon Monoxide (CO) pollu	1.24E-01	1.79E-01	2.33E-02	3.36E-02	3.60E-01	lb/day	2.27E-02	3.27E-02	4.25E-03	6.14E-03	6.57E-02	ton/yr
Carbon Dioxide, non-biogen	2.54E+03	3.13E+03	7.61E+01	1.10E+02	5.86E+03	lb/day	4.64E+02	5.72E+02	1.39E+01	2.00E+01	1.07E+03	ton/yr
Methane (CH4)	9.12E-02	1.09E-01	1.18E-03	1.70E-03	2.03E-01	lb/day	1.66E-02	1.99E-02	2.15E-04	3.10E-04	3.71E-02	ton/yr
Toluene	2.97E-06	8.56E-06	0.00E+00	0.00E+00	1.15E-05	lb/day	5.42E-07	1.56E-06	0.00E+00	0.00E+00	2.10E-06	ton/yr
PM10	1.33E-01	1.55E-01	4.72E-03	6.79E-03	2.99E-01	lb/day	2.42E-02	2.82E-02	8.62E-04	1.24E-03	5.45E-02	ton/yr
PM2.5	1.24E-01	1.45E-01	4.72E-03	6.79E-03	2.80E-01	lb/day	2.27E-02	2.64E-02	8.62E-04	1.24E-03	5.11E-02	ton/yr

UCSF Parnassus Heights LRDP

Initial Phase of LRDP (2030)

PCUP Emissions Estimates, change (increase) from existing only

Based on methods certified in Mission Bay EIR (SCAQMD AB2588 Reporting Procedures for AB2588 Facilities, 12/2016.)

List of Assumptions/References/Notes

Increase is directly related to increase in square footage. Advancements in building energy efficiencies are not considered as to provided a conservative estimate.

Only the square footage from UC Hall/Nursing Building were considered negative. LPPI demolition was previously approved under 2014 LRDP

Aldea Housing does not use steam or energy generated by the PCUP

Existing square footage from ARUP 2019. UCSF Parnassus Heights Utility Master Plan. October 1, 2019

Assume increase in PCUP operations applied evenly to each unit i.e. the % increase in squarefootage is applied directly to each unit

PCUP (existing) Emission Factors are from 2019 BAAQMD Compliance Reporting

Emissions considered are from NG combustion only. Diesel fuel is for emergency backup only.

Turbine emissions are turbine + DB

Calculations

Square Footage

Existing	2,844,131	ft^2
Demoed	236,335	ft^2
New	295,000	ft^2
% increase	2%	ft^2

Utility Budget Projection Model 2018-10-01, Utilities Commodity Summary

Budget 2018-19	10,184,566.16	therms
	1,018,213.20	mmbtu
	998.25	mmscf

CO Catalyst HAP Control %	80%	see Mission Bay EIR + EPA 2015 reference

Permit Limits	Turbine 1	Turbine 2	DB 1	DB 2	Boiler 1	Boiler 2	Total
therms/yr	12,000,000		4,400,000		1,000,000	1,000,000	18,400,000

Unit	Rating (mmbtu/hr)	Controls	Capacity Fraction
Turbine 1	76	SCR + CO Cat.	45%
Duct Burner 1	46		
Turbine 2	62	SCR + CO Cat.	45%
Duct Burner 2	46		
Boiler 1	120	none	5%
Boiler 2	120	none	5%

Emission Factors from Table B-1

Pollutant	Sources				UOM
	Turbine 1	Turbine 2	Boiler 1	Boiler 2	
1,3-Butadiene	4.39E-04	4.39E-04	0.00E+00	0.00E+00	lb/mmscf
Total PAH (excluding Napthalene)	9.18E-04	9.18E-04	1.00E-04	1.00E-04	lb/mmscf
Naphthalene	1.33E-03	1.33E-03	3.00E-04	3.00E-04	lb/mmscf
Acetaldehyde	4.08E-02	4.08E-02	9.00E-04	9.00E-04	lb/mmscf
Acrolein	6.53E-03	6.53E-03	8.00E-04	8.00E-04	lb/mmscf
Ammonia	9.10E+00	9.10E+00	3.20E+00	3.20E+00	lb/mmscf
Ethyl benzene	3.26E-02	3.26E-02	2.00E-03	2.00E-03	lb/mmscf
Propylene oxide	2.96E-02	2.96E-02	0.00E+00	0.00E+00	lb/mmscf
Hexane	0.00E+00	0.00E+00	1.30E-03	1.30E-03	lb/mmscf
Xylene	6.53E-02	6.53E-02	5.80E-03	5.80E-03	lb/mmscf

Controlled Emission Factors

Pollutant	Sources				UOM
	Turbine 1	Turbine 2	Boiler 1	Boiler 2	
1,3-Butadiene	8.78E-05	8.78E-05	0.00E+00	0.00E+00	lb/mmscf
Total PAH (excluding	1.84E-04	1.84E-04	1.00E-04	1.00E-04	lb/mmscf
Naphthalene	2.66E-04	2.66E-04	3.00E-04	3.00E-04	lb/mmscf
Acetaldehyde	8.16E-03	8.16E-03	9.00E-04	9.00E-04	lb/mmscf
Acrolein	1.31E-03	1.31E-03	8.00E-04	8.00E-04	lb/mmscf
Ammonia	9.10E+00	9.10E+00	3.20E+00	3.20E+00	lb/mmscf
Ethyl benzene	6.52E-03	6.52E-03	2.00E-03	2.00E-03	lb/mmscf
Propylene oxide	5.92E-03	5.92E-03	0.00E+00	0.00E+00	lb/mmscf
Hexane	0.00E+00	0.00E+00	1.30E-03	1.30E-03	lb/mmscf
Xylene	1.31E-02	1.31E-02	5.80E-03	5.80E-03	lb/mmscf

CO catalysts on gas turbines result in approximately 90 percent reduction of CO and 85 to 90 percent control of formaldehyde (similar reductions can be expected on other HAPs).
US EPA 2015. Catalog of CHP Technologies Section 3. Technology Characterization - Combustion Turbines. March 2015
https://www.epa.gov/sites/production/files/2015-07/documents/catalog_of_chp_technologies_section_3._technology_characterization_-_combustion_turbines.pdf

Estimated Increase

Pollutant	Sources					UOM	Sources					UOM
	Turbine 1	Turbine 2	Boiler 1	Boiler 2	Total PCUP		Turbine 1	Turbine 2	Boiler 1	Boiler 2	Total PCUP	
1,3-Butadiene	2.21E-06	2.21E-06	0.00E+00	0.00E+00	4.41E-06	lb/day	4.03E-07	4.03E-07	0.00E+00	0.00E+00	8.06E-07	ton/yr
Total PAH (excluding Napthalene)	4.62E-06	4.62E-06	3.07E-07	3.07E-07	9.84E-06	lb/day	8.42E-07	8.42E-07	5.60E-08	5.60E-08	1.80E-06	ton/yr
Naphthalene	6.69E-06	6.69E-06	9.20E-07	9.20E-07	1.52E-05	lb/day	1.22E-06	1.22E-06	1.68E-07	1.68E-07	2.78E-06	ton/yr
Acetaldehyde	2.05E-04	2.05E-04	2.76E-06	2.76E-06	4.16E-04	lb/day	3.74E-05	3.74E-05	5.04E-07	5.04E-07	7.59E-05	ton/yr
Acrolein	3.28E-05	3.28E-05	2.45E-06	2.45E-06	7.06E-05	lb/day	5.99E-06	5.99E-06	4.48E-07	4.48E-07	1.29E-05	ton/yr
Ammonia	2.29E-01	2.29E-01	9.81E-03	9.81E-03	4.77E-01	lb/day	4.18E-02	4.18E-02	1.79E-03	1.79E-03	8.71E-02	ton/yr
Ethyl benzene	1.64E-04	1.64E-04	6.13E-06	6.13E-06	3.40E-04	lb/day	2.99E-05	2.99E-05	1.12E-06	1.12E-06	6.21E-05	ton/yr
Propylene oxide	1.49E-04	1.49E-04	0.00E+00	0.00E+00	2.98E-04	lb/day	2.72E-05	2.72E-05	0.00E+00	0.00E+00	5.43E-05	ton/yr
Hexane	0.00E+00	0.00E+00	3.99E-06	3.99E-06	7.97E-06	lb/day	0.00E+00	0.00E+00	7.27E-07	7.27E-07	1.45E-06	ton/yr
Xylene	3.28E-04	3.28E-04	1.78E-05	1.78E-05	6.92E-04	lb/day	5.99E-05	5.99E-05	3.25E-06	3.25E-06	1.26E-04	ton/yr

UCSF Parnassus Heights LRDP

Initial Phase of LRDP (2030)

PCUP Emissions Estimates, change (increase) from existing only

Summary of Emissions to be used for criteria reporting and HRA calculations

List of Assumptions/References/Notes

See PCUP Calcuations Part 1 and Part 2 for specific assumptions

Emissions from BAAQMD 2018-19 Reporting were used as default, SCAQMD AB2588 emission calculation methods were used to suppliment

From BAAQMD 2018-19 Reporting: Benzene
- Formaldehyde
- Toluene
- PM10
- PM2.5
- Particulates (part notspec elsewhere)
- Organics (other, including CH4)
- Nitrous Oxide (N2O)
- Nitrogen Oxides (part not spec elsewhere) (2990)
- Sulfur Dioxide (SO2)
- Carbon Monoxide (CO) pollutant
- Carbon Dioxide, non-biogenic CO2
- Methane (CH4)

Calculations

Estimated Increase

Pollutant	Sources					UOM	Sources					UOM	CPF[2]	Chronic REL[2]
	Turbine 1	Turbine 2	Boiler 1	Boiler 2	Total PCUP		Turbine 1	Turbine 2	Boiler 1	Boiler 2	Total PCUP		$(mg/kg\text{-}day)^{-1}$	(ug/m^3)
Acetaldehyde	2.05E-04	2.05E-04	2.76E-06	2.76E-06	4.16E-04	lb/day	3.74E-05	3.74E-05	5.04E-07	5.04E-07	7.59E-05	ton/yr	1.00E-02	1.40E+02
Acrolein	3.28E-05	3.28E-05	2.45E-06	2.45E-06	7.06E-05	lb/day	5.99E-06	5.99E-06	4.48E-07	4.48E-07	1.29E-05	ton/yr	--	3.50E-01
Ammonia	2.29E-01	2.29E-01	9.81E-03	9.81E-03	4.77E-01	lb/day	4.18E-02	4.18E-02	1.79E-03	1.79E-03	8.71E-02	ton/yr	--	2.00E+02
Benzene	4.74E-04	5.63E-04	1.16E-06	1.67E-06	1.04E-03	lb/day	8.65E-05	1.03E-04	2.12E-07	3.05E-07	1.90E-04	ton/yr	1.00E-01	3.00E+00
1,3-Butadiene	2.21E-06	2.21E-06	0.00E+00	0.00E+00	4.41E-06	lb/day	4.03E-07	4.03E-07	0.00E+00	0.00E+00	8.06E-07	ton/yr	6.00E-01	2.00E+00
Ethyl benzene	1.64E-04	1.64E-04	6.13E-06	6.13E-06	3.40E-04	lb/day	2.99E-05	2.99E-05	1.12E-06	1.12E-06	6.21E-05	ton/yr	8.70E-03	2.00E+03
Formaldehyde	6.81E-02	7.96E-02	5.75E-05	8.29E-05	1.48E-01	lb/day	1.24E-02	1.45E-02	1.05E-05	1.51E-05	2.70E-02	ton/yr	2.10E-02	9.00E+00
Hexane	0.00E+00	0.00E+00	3.99E-06	3.99E-06	7.97E-06	lb/day	0.00E+00	0.00E+00	7.27E-07	7.27E-07	1.45E-06	ton/yr	--	7.00E+03
Naphthalene	6.69E-06	6.69E-06	9.20E-07	9.20E-07	1.52E-05	lb/day	1.22E-06	1.22E-06	1.68E-07	1.68E-07	2.78E-06	ton/yr	1.20E-01	9.00E+00
Propylene oxide	1.49E-04	1.49E-04	0.00E+00	0.00E+00	2.98E-04	lb/day	2.72E-05	2.72E-05	0.00E+00	0.00E+00	5.43E-05	ton/yr	1.30E-02	3.00E+01
Toluene	2.97E-06	8.56E-06	0.00E+00	0.00E+00	1.15E-05	lb/day	5.42E-07	1.56E-06	0.00E+00	0.00E+00	2.10E-06	ton/yr	--	3.00E+02
Total PAH (excluding Napthalene)[2]	4.62E-06	4.62E-06	3.07E-07	3.07E-07	9.84E-06	lb/day	8.42E-07	8.42E-07	5.60E-08	5.60E-08	1.80E-06	ton/yr	3.90E+00	--
Xylene	3.28E-04	3.28E-04	1.78E-05	1.78E-05	6.92E-04	lb/day	5.99E-05	5.99E-05	3.25E-06	3.25E-06	1.26E-04	ton/yr	--	7.00E+02
PM10	1.33E-01	1.55E-01	4.72E-03	6.79E-03	2.99E-01	lb/day	2.42E-02	2.82E-02	8.62E-04	1.24E-03	5.45E-02	ton/yr	--	--
PM2.5	1.24E-01	1.45E-01	4.72E-03	6.79E-03	2.80E-01	lb/day	2.27E-02	2.64E-02	8.62E-04	1.24E-03	5.11E-02	ton/yr	--	--
Particulates (part notspec elsewhere)	1.39E-01	1.72E-01	4.72E-03	6.79E-03	3.23E-01	lb/day	2.54E-02	3.15E-02	8.62E-04	1.24E-03	5.90E-02	ton/yr	--	--
Organics (other, including CH4)	4.15E-02	6.35E-02	1.90E-03	2.74E-03	1.10E-01	lb/day	7.57E-03	1.16E-02	3.47E-04	5.01E-04	2.00E-02	ton/yr	--	--
Nitrous Oxide (N2O)	6.70E-04	8.28E-04	1.43E-04	2.06E-04	1.85E-03	lb/day	1.22E-04	1.51E-04	2.62E-05	3.76E-05	3.37E-04	ton/yr	--	--
Nitrogen Oxides (part not spec elsewher	5.45E-02	6.75E-02	1.92E-02	2.76E-02	1.69E-01	lb/day	9.94E-03	1.23E-02	3.50E-03	5.04E-03	3.08E-02	ton/yr	--	--
Sulfur Dioxide (SO2)	1.18E-02	1.46E-02	3.53E-04	5.07E-04	2.72E-02	lb/day	2.15E-03	2.66E-03	6.44E-05	9.26E-05	4.96E-03	ton/yr	--	--
Carbon Monoxide (CO) pollutant	1.24E-01	1.79E-01	2.33E-02	3.36E-02	3.60E-01	lb/day	2.27E-02	3.27E-02	4.25E-03	6.14E-03	6.57E-02	ton/yr	--	--
Carbon Dioxide, non-biogenic CO2	2.54E+03	3.13E+03	7.61E+01	1.10E+02	5.86E+03	lb/day	4.64E+02	5.72E+02	1.39E+01	2.00E+01	1.07E+03	ton/yr	--	--
Methane (CH4)	9.12E-02	1.09E-01	1.18E-03	1.70E-03	2.03E-01	lb/day	1.66E-02	1.99E-02	2.15E-04	3.10E-04	3.71E-02	ton/yr	--	--

Pollutant (HRA ONLY)	Sources				UOM
	Turbine 1	Turbine 2	Boiler 1	Boiler 2	
Acetaldehyde	1.08E-06	1.08E-06	1.45E-08	1.45E-08	g/s
Benzene	2.49E-06	2.95E-06	6.10E-09	8.78E-09	g/s
1,3-Butadiene	1.16E-08	1.16E-08	0.00E+00	0.00E+00	g/s
Ethyl benzene	8.61E-07	8.61E-07	3.22E-08	3.22E-08	g/s
Formaldehyde	3.58E-04	4.18E-04	3.02E-07	4.35E-07	g/s
Naphthalene	3.51E-08	3.51E-08	4.83E-09	4.83E-09	g/s
Propylene oxide	7.81E-07	7.81E-07	0.00E+00	0.00E+00	g/s
Total PAH (excluding Napthalene)	2.42E-08	2.42E-08	1.61E-09	1.61E-09	g/s
Acrolein	1.72E-07	1.72E-07	1.29E-08	1.29E-08	g/s
Ammonia	1.20E-03	1.20E-03	5.15E-05	5.15E-05	g/s
Hexane	0.00E+00	0.00E+00	2.09E-08	2.09E-08	g/s
Toluene	1.56E-08	4.49E-08	0.00E+00	0.00E+00	g/s
Xylene	1.72E-06	1.72E-06	9.34E-08	9.34E-08	g/s
Nitrogen Oxides (part not spec elsewher	2.86E-04	3.54E-04	1.01E-04	1.45E-04	g/s
PM2.5	6.52E-04	7.59E-04	2.48E-05	3.56E-05	g/s

1. There are two PAHs detected in gas turbines: benzo(a)anthracene and benzo(a)pyrene. Only benzo(a)pyrene is detected in boiler exhaust. Inhalation Potency Factor for benzo(a)pyrene is greater than benzo(a)anthracene, therefore the IPF for benzo(a)pyrene was used for Total PAHs.
2. From Consolidated Table of OEHHA/ARB Approved Risk Assessment Health Values, last updated September 19, 2019

UCSF Parnassus Heights LRDP
Initial Phase of LRDP (2030)
New Emergency Diesel Generator Emissions Estimates, for RAB

List of Assumptions/References/Notes

Assume new engine to be limited to 50 hours of O&M per year.
Emissions Calculated in CalEEMod
Generator to be ~1MW
Use specification from Generac SD1000

from CalEEMod

From CalEEMod Results

Pollutant	Source ~1500hp	UOM
Diesel Engine Exhaust Particulate	2.93E-03	tpy
$PM_{2.5}$	2.93E-03	tpy

For AERMOD results

Pollutant	Source ~1500hp	UOM
Diesel Engine Exhaust Particulate	8.43E-05	g/s
$PM_{2.5}$	8.43E-05	g/s

UCSF Parnassus Heights LRDP

Initial Phase of LRDP (2030)
Fume Emissions Estimates
Based on methods certified in Mission Bay EIR (SCAQMD AB2588 Reporting Procedures for AB2588 Facilities, 12/2016.)

List of Assumptions/References/Notes

Estimate of count of fume hoods provided by UCSF
Only new fume hoods as part of the Initial Phase evaluated (i.e. RAB)
Fume hoods at UC Hall decommissioned prior to NOP
LPPI demolition was previously approved under 2014 LRDP
Only one active fume hood exist in the Nursing Building and is conservatively considered negligible
Assume new fume hoods have controls
Fume hood chemical inventory not implemented at Parnassus Camps, assume comparible to Mission Bay

Calculations

Total Fume Hoods	40	RAB

Emission Factor to apply to AERMOD Outputs

Chemical	CAS #	CPF (mg/kg-day)$^{-1}$	Chronic REL (ug/m^3)	Physical State	Vapor Pressure (mm Hg)	Liquids Specific Gravity	Total Amount Used (lbs/yr)[1]	Constant Value[2]	Estimated Fraction Emitted	Estimated Emissions (lbs/yr)	Total # Fume Hoods[1]	Lbs/Yr per Fume Hood	Annual RAB Fume Hood Source (g/s)	Hourly RAB Fume Hood Source (g/s)[3]
Arsenic and compounds	7440382	12	0.015	solid	0.001		0.055	NA	0.00001	0.00	14	3.93E-08	5.65E-13	2.12E-12
Benzene	71432	0.1	3	liquid	69.35	0.882	11.8	0.0001	0.006935	0.08	14	5.85E-03	8.41E-08	3.15E-07
Benzidine	92875	500	0	solid	0.1		0	NA	0.00001	0.00	14	0.00E+00	0.00E+00	0.00E+00
Benzyl chloride	100447	1.70E-01	0	liquid/solid	0.75	1.104	2.5	0.0001	0.000075	0.00	14	1.34E-05	1.93E-10	7.21E-10
Cadmium and compounds	7440439	15	0.02	solid	0		8.2	NA	0.00001	0.00	14	5.86E-06	8.42E-11	3.15E-10
Carbon tetrachloride	56235	0.15	40	liquid	85.4	1.59	29.5	0.0001	0.00854	0.25	14	1.80E-02	2.59E-07	9.69E-07
Chloroform	67663	1.90E-02	300	liquid	143.8	0.966	828.9	0.0001438	0.0206784	17.14	14	1.22E+00	1.76E-05	6.59E-05
Chromium (VI)	18540299	5.10E+02	0.2	solid	0.001		0.1	NA	0.00001	0.00	14	7.14E-08	1.03E-12	3.85E-12
Dichloroethylene, 1,1-	75354	0	70	liquid	470.6	1.25	0	0.0004706	0.2214644	0.00	14	0.00E+00	0.00E+00	0.00E+00
Dioxane, 1,4-	123911	2.70E-02	3000	liquid	26.4	1.04	45.7	0.0001	0.00264	0.12	14	8.62E-03	1.24E-07	4.64E-07
Ethylene dibromide	106934	2.50E-01	0.8	liquid	11.3	2.18	59.9	0.0001	0.00113	0.07	14	4.83E-03	6.95E-08	2.60E-07
Ethylene dichloride	107062	7.20E-02	400	liquid	54	1.25	1.4	0.0001	0.0054	0.01	14	5.40E-04	7.77E-09	2.91E-08
Formaldehyde	50000	2.10E-02	9	liquid	1	1.46	4036.8	0.0001	0.0001	0.40	14	2.88E-02	4.15E-07	1.55E-06
Hydrazine	302012	0.0049	0.2	liquid/solid	14.4	1.01	2.6	0.0001	0.00144	0.00	14	2.67E-04	3.85E-09	1.44E-08
Manganese and compounds	7439965	0	0.09	solid	0.001		1.4	NA	0.00001	0.00	14	1.00E-06	1.44E-11	5.38E-11
Mercury and compounds	7439947	0	0.03	liquid	1	13.546	0	NA	0.00001	0.00	14	0.00E+00	0.00E+00	0.00E+00
Mercuric chloride	7487947	0	0.03	solid	0.0004		1.4	0.0001	4E-08	0.00	14	4.00E-09	5.75E-14	2.15E-13
Methyl ethyl ketone	78933	0	0	liquid	65	0.805	2.8	0.0001	0.0065	0.02	14	1.30E-03	1.87E-08	7.00E-08
Methylene bis (2-chloroaniline), 4,4'-	101144	1.5	0	liquid	0.1	1.213	0	0.0001	0.00001	0.00	14	0.00E+00	0.00E+00	0.00E+00
Methylene chloride	75092	3.50E-03	400	liquid	328	1.332	203.6	0.000328	0.107584	21.90	14	1.56E+00	2.25E-05	8.42E-05
Nickel and compounds	7440020	0.91	0.014	solid	0.001		0	NA	0.00001	0.00	14	0.00E+00	0.00E+00	0.00E+00
Phosgene	75445	0	0	liquid	1130	1.43	0.6	0.00113	1.2769	0.77	14	5.47E-02	7.87E-07	2.95E-06
PAH (as benzo(a)pyrene)	50328	3.90E+00	0	liquid	0.001	1.351	0.011	0.0001	0.0000001	0.00	14	7.86E-11	1.13E-15	4.23E-15
Sulfates	14808798	0	0	solid	0.001		0	NA	0.00001	0.00	14	0.00E+00	0.00E+00	0.00E+00
Sulfuric acid/Oleum	8014957	0	1	liquid	0.001	1.97	626.3	NA	0.00001	0.01	14	4.47E-04	6.43E-09	2.41E-08
Vinyl chloride	75014	0.27	0	liquid/solid	2660	1.406	0	0.00266	7.0756	0.00	14	0.00E+00	0.00E+00	0.00E+00
Ethyl Benzene	100414	8.70E-03	2000	liquid	7.51	0.867	69.9	0.0001	0.000751	0.05	14	3.75E-03	5.39E-08	2.02E-07
Nitric Acid	7697372	0	0	liquid	48	1.5	239.3	0.0001	0.0048	1.15	14	8.20E-02	1.18E-06	4.42E-06
Sodium Hydroxide	1310732	0	0	liquid	0.001	1.5	8881.7	NA	0.00001	0.09	14	6.34E-03	9.12E-08	3.42E-07
Copper	7440508	0	0	solid	0.001		0.8	NA	0.00001	0.00	14	5.71E-07	8.22E-12	3.08E-11

1. Chemical Inventory and fume hood count from Mission Bay 2018 (Atmospheric Dynamics, Inc, 2019. Health Risk Assessment Final Report Submittal - UCSF Mission Bay Campus. May 2019)

2. Constant value used in equation to determine the fraction emitted. The methodology and subsequent equation are as follows: (Atmospheric Dynamics, Inc, 2018. Memorandum to Paul Franke, UCSF. Subject: Draft Fume Hood Emissions Quantification Methodology (Revised). December 3, 2018)

Fraction emitted = (substance VP)*(constant value)

Where,

VP = Vapor pressure at 25°C

Constant Value =

VP <= 100 mmHg, then use 0.0001

VP > 100 mmHg, then use VP/100 * 0.0001

-or-

if chemical listed below, then Fraction emitted = 0.00001

Determined list from memo

- Arsenic and compounds
- Benzidine
- Cadmium and compounds
- Chromium (VI)
- Manganese and compounds
- Mercury and compounds
- Nickel and compounds
- Sulfates
- Sulfuric acid/Oleum
- Sodium Hydroxide
- Copper

3. Hours of operation were based on Mission Bay HRA assumption of 2340 hour/year

AIR AERMOD Model Inputs (Summary Tables)

Table AIR-1

Overall AERMOD Modeling Parameters

Pathway	Description	Parameter
Control	Averaging Time	Period average, 1-Hour Maximum
	Urban Population	884,363 [a]
	Model Version	AERMOD v18081
Source	Spacing	*See Table AIR-2 and Table AIR-3*
	Release Height	*See Table AIR-2 and Table AIR-3*
	Initial Vertical Dimension	*See Table AIR-2 and Table AIR-3*
	Initial Lateral Dimension	*See Table AIR-2 and Table AIR-3*
	Variable Emission Factor	*See Table AIR-2 and Table AIR-3*
Buildings	Building Downwash Included?	Construction Model: No Operational Model: Yes
Terrain	Horizontal Datum	NAD 83
	National Elevation Dataset	1/3 arc-second
Receptor	Receptor Height, all	1.8m [b]
	Grid	20m x 20m [b]
Meteorology	Surface Data	San Francisco International Airport (Site # 23234) [c]
	On-Site Station	Mission Bay (Site #5803) [c]
	Upper Air	Oakland (Site #23230) [c]
	Station Elevation	2.0 m
	MET Data Years	2008-2012

NOTES:

[a] For 2017, City of San Francisco (US Census Bureau 2019).

[b] from the CRRP-HRA (BAAQMD, SF DPH & SF Planning, 2012)

[c] from BAAQMD, stations consistent with the CRRP-HRA (BAAQMD, SF DPH & SF Planning, 2012)

SOURCES:

1. United States Census Bureau. 2016. QuickFacts: San Francisco city, California. Available at https://www.census.gov/quickfacts/table/PST045216/0667000,00. Accessed May 2019.

2. Bay Area Air Quality Management District, San Francisco Department of Public Health, and San Francisco Planning Department. 2012. The San Francisco Community Risk Reduction Plan: Technical Support Documentation. December. Available at http://www.gsweventcenter.com/Appeal_Response_References/2012_1201_BAAQMD.pdf. Accessed May 2019.
3. California Air Resources Board. 2015. Meteorological Files. Available at https://www.arb.ca.gov/toxics/harp/metfiles2.htm. Accessed May 2019.

ABBREVIATIONS:
AERMOD = American Meteorological Society/Environmental Protection Agency regulatory air dispersion model
NAD = North American Datum
m = meters

Table AIR-2
Source Modeling Parameters

Period	Source	Source Type [a]	Variable Emissions	Number of Sources [b]	Release Height [c] [m]	Initial Vertical Dimension [d] [m]	Source Area [e] [m²]	Source Length [f] [m]	Source Width [g] [m]
Construction	Off-Road Construction Equipment	Area	Factor of 1.85 applied to MET hours [08-20] Factor of 0 for all other hours	4	5	1.4	11,080 (RAB) 1911 (ISA) 4957 (New Hospital) 6239 (Aldea Housing)	n/a	n/a
	Haul Truck Idling	Area	Factor of 1.85 applied to MET hours [08-20] Factor of 0 for all other hours	4	2.55	2.37	11,080 (RAB) 1911 (ISA) 4957 (New Hospital) 6239 (Aldea Housing)	n/a	n/a
	On-Road Trucks - Campus Construction	Line Area	Factor of 1.85 applied to MET hours [08-20] Factor of 0 for all other hours	—	2.55	2.37	n/a	841	18
	On-Road Trucks- Aldea Construction	Line Area	Factor of 1.85 applied to MET hours [08-20] Factor of 0 for all other hours	—	2.55	2.37	n/a	843	18
	On-Road Trucks- Aldea Construction [h]	Line Area	Factor of 1.85 applied to MET hours [08-20] Factor of 0 for all other hours	—	2.55	2.37	n/a	308	12
Operations	Emergency Diesel Generator (RAB)	Stack	No variable emissions	1	41.5	n/a	*see Table AIR-3 for additional source parameters*		
	Fume Hoods - 1 thru 40 (RAB)	Stack	No variable emissions	40	41.5	n/a	*see Table AIR-3 for additional source parameters*		
	CUP - Boiler 1 and Boiler 2	Stack	No variable emissions	2	24.7	n/a	*see Table AIR-3 for additional source parameters*		
	CUP - CT1+DB1 and CT2+DB2	Stack	No variable emissions	2	24.7	n/a	*see Table AIR-3 for additional source parameters*		

NOTES:

[a] Construction is modeled as an area source covering the project site, consistent with the CRRP-HRA (BAAQMD, SF DPH & SF Planning, 2012).

[b] The number of on-road mobile sources is based on the geometry of the truck or traffic routes.

[c] Release height for off-road construction equipment and on-road operational mobile sources from the CRRP-HRA (BAAQMD, SF DPH & SF Planning, 2012). For on-road construction trucks and operational delivery truck idling at street-level, the release height is equal to 0.5 * top of plume height, which is equal to 1.7 * the vehicle height, which is equal to 3 meters; equation = 0.5 * 1.7 * 3 = 2.55 (USEPA 2012).

[d] Initial vertical dimension for off-road construction equipment and on-road operational mobile sources from the CRRP-HRA (BAAQMD, SF DPH & SF Planning, 2012). Initial vertical dimension for on-road construction trucks and truck idling is equal to the top of the plume height ÷ 2.15 = 1.7 * 3 / 2.15 = 2.37.

[e] Area value generated by AERMOD.

[f] Length value generated by AERMOD.

[g] Roadway side length includes road lane widths plus mixing zone.

[h] Roadway represents haul truck route entering Aldea housing/parking area.

SOURCES:

1. United States Environmental Protection Agency. 2012. Haul Road Workgroup Final Report Submission to EPA-OAQPS. March. Available at: https://www3.epa.gov/scram001/reports/Haul_Road_Workgroup-
2. United States Environmental Protection Agency. 2016a. User's Guide for the AMS/EPA Regulatory Model – AERMOD. December. Available at https://www3.epa.gov/ttn/scram/models/aermod/aermod_userguide.pdf. Accessed November 2019.
3. Bay Area Air Quality Management District, San Francisco Department of Public Health, and San Francisco Planning Department. 2012. The San Francisco Community Risk Reduction Plan: Technical Support Documentation. December. Available at http://www.gsweventcenter.com/Appeal_Response_References/2012_1201_BAAQMD.pdf. Accessed November 2019.

ABBREVIATIONS:

ISA = Irving Street Arrival
RAB = Research and Academic Building
m = meters

Table AIR-3

Stack Source Modeling Parameters

Period	Source	Source Type	Variable Emissions	Number of Sources	Release Height [a] [m]	Gas Exit Temperature [b] [K]	Stack Inside Diameter [c] [m]	Gas Exit Velocity [d] [m/s]	Gas Exit Flow Rate [e] [m^3/s]
Operations	Emergency Diesel Generator (RAB)	Stack	No variable emissions	1	41.5	819.3	0.3	--	4.5
	Fume Hoods - 1 thru 40 (RAB)	Stack	No variable emissions	40	41.5	293	1.5	12.7	--
	CUP - Boiler 1 and Boiler 2	Stack	No variable emissions	2	24.7	409.3	1.2	--	8.0
	CUP - CT1+DB1 and CT2+DB2	Stack	No variable emissions	2	24.7	411.5	1.2	--	28.7

NOTES:

[a] Release height for emergency generator and fume hood stacks are 20 ft + Building height per P. Franke (UCSF). Release heights for CUP are from P-Forms submitted with permit application #10962 (BAAQMD, 1993)

[b] Gas exit temperatures for CUP are from P-Forms submitted with permit application #10962 (BAAQMD, 1993). Fume hood exit temperatures consistent with HRA for USCF Mission Bay Campus (Atmospheric Dynamnics, Inc., 2019). Emergency diesel parameters obtain from specification sheet for a 1 MW EDG (Generac, 2015).

[c] Stack diameter for CUP are from P-Forms submitted with permit application #10962 (BAAQMD, 1993). Fume hood parameters consistent with HRA for USCF Mission Bay Campus (Atmospheric Dynamnics, Inc., 2019). Emergency diesel parameters obtain from specification sheet for a 1 MW EDG (Generac, 2015).

[d] Fume hood parameters consistent with HRA for USCF Mission Bay Campus (Atmospheric Dynamnics, Inc., 2019). AERMOD only requires the exit velocity or the flow rate and calculates the remaining input.

[e] Stack flow rate for CUP are from P-Forms submitted with permit application #10962 (BAAQMD, 1993). Emergency diesel parameters obtain from specification sheet for a 1 MW EDG (Generac, 2015). AERMOD only requires the exit velocity or the flow rate and calculates the remaining input.

SOURCES:

1. Atmospheric Dynamics, Inc., 2019. Health Risk Assessment Final Report Submittal UCSF Mission Bay Campus. May 2019.
2. Generac Power Systems, Inc., 2015. SD1000 Spec Sheet. Available: https://legacy.genconnect.generac.com/Media/vwDoc.axd?d=031903a3-b258-49bb-91bf-cffb7447863c
3. BAAQMD, 1993. New/Modified Industrial Permit Application (Application #10962). Received via public records requested, available: http://www.baaqmd.gov/contact-us/request-public-records

ABBREVIATIONS:

K = degrees Kelvin

m = meters

RAB = Research and Academic Building

s = seconds

AIR Construction HRA Calculations (Unmitigated)

UCSF Parnassus Heights LRDP

Initial Phase of LRDP (2030)

Summary of Project Level Impacts by Project

ISA

Unmitigated

Receptor Type	UTM E	UTM N	Project			Location
			Cancer Risk	Hazard Index	$PM_{2.5}$	
Offsite Res	547740	4179820	24.99	0.02	0.09	pot. res.
Onsite Res	547600	4179760	5.33	0.00	0.02	3rd Ave Housing
Daycare	547560	4179680	1.18	0.00	0.01	Lucia Child Care Center
School	548260	4179640	0.07	0.00	0.01	Haight Ashbury Community Nursery School

Mitigated

Receptor Type	UTM E	UTM N	Project			Location
			Cancer Risk	Hazard Index	$PM_{2.5}$	
Offsite Res	547860	4179780	1.17	0.00	0.00	pot. res.
Onsite Res	547600	4179760	0.30	0.00	0.00	3rd Ave Housing
Daycare	547560	4179680	0.07	0.00	0.00	Lucia Child Care Center
School	548260	4179640	0.00	0.00	0.00	Haight Ashbury Community Nursery School

RAB

Unmitigated

Receptor Type	UTM E	UTM N	Project			Location
			Cancer Risk	Hazard Index	$PM_{2.5}$	
Offsite Res	547520	4179640	51.03	0.04	0.16	pot. res.
Onsite Res	547600	4179700	25.50	0.02	0.08	3rd Ave Housing
Daycare	547560	4179660	19.98	0.04	0.17	Lucia Child Care Center
School	548260	4179620	0.19	0.00	0.01	Haight Ashbury Community Nursery School

Mitigated

Receptor Type	UTM E	UTM N	Project			Location
			Cancer Risk	Hazard Index	$PM_{2.5}$	
Offsite Res	547520	4179640	2.91	0.00	0.01	pot. res.
Onsite Res	547600	4179700	1.44	0.00	0.00	3rd Ave Housing
Daycare	547560	4179660	1.10	0.00	0.01	Lucia Child Care Center
School	548260	4179620	0.01	0.00	0.00	Haight Ashbury Community Nursery School

NH

Unmitigated

Receptor Type	UTM E	UTM N	Project			Location
			Cancer Risk	Hazard Index	$PM_{2.5}$	
Offsite Res	547980	4179760	67.06	0.04	0.19	pot. res.
Onsite Res	547600	4179700	6.54	0.00	0.02	3rd Ave Housing
Daycare	547560	4179660	1.91	0.00	0.02	Lucia Child Care Center
School	548260	4179640	0.50	0.01	0.03	Haight Ashbury Community Nursery School

Mitigated

Receptor Type	UTM E	UTM N	Project			Location
			Cancer Risk	Hazard Index	$PM_{2.5}$	
Offsite Res	547980	4179760	4.72	0.00	0.01	pot. res.
Onsite Res	547600	4179700	0.50	0.00	0.00	3rd Ave Housing
Daycare	547560	4179660	0.16	0.00	0.00	Lucia Child Care Center
School	548260	4179640	0.04	0.00	0.00	Haight Ashbury Community Nursery School

AHD

Unmitigated

Receptor Type	UTM E	UTM N	Project			Location
			Cancer Risk	Hazard Index	$PM_{2.5}$	
Offsite Res	548040	4178980	8.99	0.10	0.06	pot. res.
Onsite Res	547980	4179080	60.81	0.09	0.42	Aldea Housing
Daycare	547480	4179400	0.07	0.00	0.00	Kirkham Child Care Center
School	547900	4178680	0.01	0.00	0.00	Clarendon Alternative Elementary

Mitigated

Receptor Type	UTM E	UTM N	Project			Location
			Cancer Risk	Hazard Index	$PM_{2.5}$	
Offsite Res	548040	4178980	0.67	0.00	0.00	pot. res.
Onsite Res	547980	4179080	4.53	0.01	0.03	Aldea Housing
Daycare	547480	4179400	0.01	0.00	0.00	Kirkham Child Care Center
School	547940	4178680	0.00	0.00	0.00	Clarendon Alternative Elementary

UCSF Parnassus Heights LRDP

Initial Phase of LRDP (2030)

Unmitigated Irving Street Arrival Construction Cancer Risk Calculations for Residential Child Receptor

Haul Truck Trip Adjustment Factor to Model

	One Way (miles)					
	ISA	RAB	HDMC	IAH1	IAH2	
CalEEMod, Haul	20	20	20	20	20	*haul truck trip distance as modeled in CalEEMod*
CalEEMod, Vend	7.3	7.3	7.3	7.3	7.3	*vendor trip distance as modeled in CalEEMod*
AERMOD	0.52	0.52	0.52	0.52	0.19	
% in Dispersion Model, Haul	3%	3%	3%	3%	1%	
% in Dispersion Model, Vend	7%	7%	7%	7%	3%	

Construction Emissions, *as applied to AERMOD results*

				Days				Total Umitigated DPM (tons)				Total Umitigated DPM (g/s)			
	Year	Start Date	Stop Date	3rd Trimester	0<2	2<9	Duration	Offroad	Haul/Vend1	Haul/Vend2	Idle	Offroad	Haul1	Haul2	Idle
Irving Street Arrival	2022	3/1/2022	12/31/2022	91.00	215.00	0	306	4.56E-02	5.74E-06	--	1.77E-06	1.56E-03	1.97E-07	--	6.07E-08
	2023	1/1/2023	11/30/2023	0.00	334.00	0	334	3.85E-02	4.29E-06	--	0.00E+00	1.21E-03	1.35E-07	--	0.00E+00

Risk Factors

	Abbreviation	UOM	3rd Trimester	0<2	2<9
Daily Breathing Rate (95th %'ile)	DBR	L/kg-day	361	1090	631
Fraction Of Time At Home	FAH	unitless	1	1	1
Exposure Frequency	EF	days/year	0.96	0.96	0.96
Age Sensitivity Factor	ASF	unitless	10	10	3
Inhalation Absorption Factor	A	unitless	1	1	1
Conversion Factor	CF_1	m^3/L	0.001	0.001	0.001
Conversion Factor	CF_2	$\mu g/m^3$	0.001	0.001	0.001
Cancer Potency Factor (diesel exhaust)	CPF	$mg/kg\text{-}day^{-1}$	1.1	1.1	1.1
Averaging Time (for residential exposure)	AT	years	70.00	70.00	70.00

Intake Factor for Inhalation, IF (m^3/kg-day)

	Year	Equation	3rd Trimester	0<2	2<9
Irving Street Arrival	2022	DBR*FAH*EF*ED*ASF*A*CF/AT	0.012	0.088	0.000
	2023		0.000	0.137	0.000

Risk Calculation Part 1, R1

	3rd Trimester	0<2	2<9
IF*CPF*CF	1.36E-05	9.67E-05	0.00E+00
	0.00E+00	1.50E-04	0.00E+00

Diesel Particulate Matter concentration, C_{DPM} (ug/m^3) / Risk Calculation Part 2

		ISA		∑R1*C_{DPM}				Cancer Risk	
X (UTM)	Y (UTM	2022	2023	3rd Trimeste	0<2	2<9	Total	per million	Receptor Determination
547740	4179820	0.110	0.085	1.50E-06	2.35E-05	0.00E+00	2.50E-05	24.99	pot. res.
547860	4179800	0.093	0.072	1.26E-06	1.98E-05	0.00E+00	2.11E-05	21.05	pot. res.
547860	4179780	0.093	0.072	1.26E-06	1.97E-05	0.00E+00	2.10E-05	20.99	pot. res.
547860	4179820	0.083	0.064	1.13E-06	1.77E-05	0.00E+00	1.88E-05	18.84	pot. res.
547760	4179840	0.076	0.059	1.03E-06	1.62E-05	0.00E+00	1.72E-05	17.18	pot. res.
547860	4179840	0.074	0.057	1.00E-06	1.57E-05	0.00E+00	1.67E-05	16.71	pot. res.
547840	4179860	0.062	0.048	8.37E-07	1.32E-05	0.00E+00	1.40E-05	13.99	pot. res.
547740	4179840	0.059	0.046	8.04E-07	1.26E-05	0.00E+00	1.34E-05	13.44	pot. res.
547700	4179820	0.059	0.046	8.00E-07	1.26E-05	0.00E+00	1.34E-05	13.36	pot. res.
547860	4179860	0.057	0.044	7.69E-07	1.21E-05	0.00E+00	1.28E-05	12.85	pot. res.
547880	4179860	0.051	0.039	6.87E-07	1.08E-05	0.00E+00	1.15E-05	11.48	pot. res.
547900	4179820	0.049	0.038	6.67E-07	1.05E-05	0.00E+00	1.11E-05	11.15	pot. res.
547720	4179840	0.048	0.037	6.55E-07	1.03E-05	0.00E+00	1.09E-05	10.94	pot. res.
547900	4179840	0.044	0.034	5.97E-07	9.37E-06	0.00E+00	9.97E-06	9.97	pot. res.
547760	4179860	0.044	0.034	5.95E-07	9.35E-06	0.00E+00	9.95E-06	9.95	pot. res.
547900	4179860	0.044	0.034	5.91E-07	9.29E-06	0.00E+00	9.88E-06	9.88	pot. res.
547680	4179820	0.044	0.034	5.90E-07	9.28E-06	0.00E+00	9.87E-06	9.87	pot. res.
547840	4179880	0.042	0.033	5.73E-07	9.00E-06	0.00E+00	9.58E-06	9.58	pot. res.
547860	4179880	0.041	0.032	5.60E-07	8.79E-06	0.00E+00	9.35E-06	9.35	pot. res.
547820	4179880	0.041	0.032	5.56E-07	8.73E-06	0.00E+00	9.28E-06	9.28	pot. res.
547920	4179820	0.040	0.031	5.41E-07	8.50E-06	0.00E+00	9.04E-06	9.04	pot. res.
547700	4179840	0.039	0.030	5.27E-07	8.27E-06	0.00E+00	8.80E-06	8.80	pot. res.
547880	4179880	0.039	0.030	5.26E-07	8.26E-06	0.00E+00	8.79E-06	8.79	pot. res.
547800	4179880	0.037	0.029	5.04E-07	7.91E-06	0.00E+00	8.42E-06	8.42	pot. res.
547740	4179860	0.037	0.029	5.00E-07	7.86E-06	0.00E+00	8.36E-06	8.36	pot. res.
547940	4179800	0.037	0.028	4.98E-07	7.83E-06	0.00E+00	8.33E-06	8.33	pot. res.
547920	4179860	0.036	0.028	4.85E-07	7.62E-06	0.00E+00	8.10E-06	8.10	pot. res.
547900	4179880	0.036	0.028	4.84E-07	7.60E-06	0.00E+00	8.08E-06	8.08	pot. res.
547940	4179820	0.034	0.027	4.66E-07	7.31E-06	0.00E+00	7.78E-06	7.78	pot. res.
547920	4179840	0.034	0.026	4.61E-07	7.25E-06	0.00E+00	7.71E-06	7.71	pot. res.
547660	4179820	0.033	0.026	4.51E-07	7.08E-06	0.00E+00	7.53E-06	7.53	pot. res.
547780	4179880	0.032	0.025	4.41E-07	6.92E-06	0.00E+00	7.36E-06	7.36	pot. res.
547920	4179880	0.032	0.025	4.40E-07	6.91E-06	0.00E+00	7.35E-06	7.35	pot. res.
547960	4179800	0.032	0.025	4.36E-07	6.84E-06	0.00E+00	7.28E-06	7.28	pot. res.
547940	4179860	0.032	0.025	4.35E-07	6.84E-06	0.00E+00	7.27E-06	7.27	pot. res.
547940	4179840	0.032	0.025	4.32E-07	6.79E-06	0.00E+00	7.22E-06	7.22	pot. res.
547720	4179860	0.031	0.024	4.26E-07	6.69E-06	0.00E+00	7.12E-06	7.12	pot. res.
547680	4179840	0.031	0.024	4.22E-07	6.63E-06	0.00E+00	7.05E-06	7.05	pot. res.
547960	4179820	0.031	0.024	4.19E-07	6.58E-06	0.00E+00	7.00E-06	7.00	pot. res.
547980	4179780	0.031	0.024	4.17E-07	6.55E-06	0.00E+00	6.97E-06	6.97	pot. res.
547960	4179840	0.030	0.024	4.12E-07	6.48E-06	0.00E+00	6.89E-06	6.89	pot. res.
547960	4179860	0.030	0.023	4.07E-07	6.40E-06	0.00E+00	6.81E-06	6.81	pot. res.
547860	4179900	0.030	0.023	4.07E-07	6.39E-06	0.00E+00	6.79E-06	6.79	pot. res.
547880	4179900	0.030	0.023	4.00E-07	6.28E-06	0.00E+00	6.68E-06	6.68	pot. res.
547980	4179800	0.029	0.023	3.98E-07	6.25E-06	0.00E+00	6.65E-06	6.65	pot. res.
547940	4179880	0.029	0.023	3.98E-07	6.25E-06	0.00E+00	6.65E-06	6.65	pot. res.
547840	4179900	0.029	0.023	3.98E-07	6.25E-06	0.00E+00	6.64E-06	6.64	pot. res.
547980	4179820	0.029	0.022	3.89E-07	6.11E-06	0.00E+00	6.50E-06	6.50	pot. res.
547980	4179760	0.029	0.022	3.89E-07	6.11E-06	0.00E+00	6.50E-06	6.50	pot. res.
547980	4179840	0.029	0.022	3.87E-07	6.08E-06	0.00E+00	6.47E-06	6.47	pot. res.
547760	4179880	0.028	0.022	3.86E-07	6.07E-06	0.00E+00	6.46E-06	6.46	pot. res.
547900	4179900	0.028	0.022	3.83E-07	6.02E-06	0.00E+00	6.40E-06	6.40	pot. res.
548000	4179780	0.028	0.022	3.82E-07	6.00E-06	0.00E+00	6.38E-06	6.38	pot. res.
547820	4179900	0.028	0.021	3.74E-07	5.88E-06	0.00E+00	6.25E-06	6.25	pot. res.
548000	4179800	0.027	0.021	3.69E-07	5.79E-06	0.00E+00	6.16E-06	6.16	pot. res.
547700	4179860	0.027	0.021	3.64E-07	5.72E-06	0.00E+00	6.09E-06	6.09	pot. res.
547980	4179860	0.027	0.021	3.64E-07	5.71E-06	0.00E+00	6.08E-06	6.08	pot. res.
548000	4179820	0.027	0.021	3.60E-07	5.66E-06	0.00E+00	6.02E-06	6.02	pot. res.
547920	4179900	0.027	0.021	3.60E-07	5.65E-06	0.00E+00	6.01E-06	6.01	pot. res.
547960	4179880	0.026	0.020	3.58E-07	5.63E-06	0.00E+00	5.99E-06	5.99	pot. res.
548020	4179780	0.026	0.020	3.52E-07	5.53E-06	0.00E+00	5.88E-06	5.88	pot. res.
547640	4179820	0.026	0.020	3.49E-07	5.48E-06	0.00E+00	5.83E-06	5.83	pot. res.
548000	4179840	0.026	0.020	3.46E-07	5.44E-06	0.00E+00	5.79E-06	5.79	pot. res.
548020	4179800	0.025	0.020	3.45E-07	5.42E-06	0.00E+00	5.76E-06	5.76	pot. res.
548000	4179760	0.025	0.020	3.44E-07	5.40E-06	0.00E+00	5.74E-06	5.74	pot. res.
547660	4179840	0.025	0.020	3.42E-07	5.37E-06	0.00E+00	5.72E-06	5.72	pot. res.
547740	4179880	0.025	0.019	3.39E-07	5.33E-06	0.00E+00	5.67E-06	5.67	pot. res.
547940	4179900	0.025	0.019	3.34E-07	5.25E-06	0.00E+00	5.58E-06	5.58	pot. res.
547800	4179900	0.025	0.019	3.33E-07	5.24E-06	0.00E+00	5.57E-06	5.57	pot. res.
548020	4179820	0.024	0.019	3.31E-07	5.20E-06	0.00E+00	5.53E-06	5.53	pot. res.
547980	4179740	0.024	0.019	3.26E-07	5.12E-06	0.00E+00	5.44E-06	5.44	pot. res.
548000	4179860	0.024	0.019	3.25E-07	5.10E-06	0.00E+00	5.43E-06	5.43	pot. res.
548040	4179780	0.024	0.019	3.25E-07	5.10E-06	0.00E+00	5.42E-06	5.42	pot. res.
547980	4179880	0.024	0.018	3.23E-07	5.07E-06	0.00E+00	5.40E-06	5.40	pot. res.
548040	4179800	0.024	0.018	3.22E-07	5.05E-06	0.00E+00	5.37E-06	5.37	pot. res.
548020	4179840	0.023	0.018	3.18E-07	5.00E-06	0.00E+00	5.31E-06	5.31	pot. res.
548020	4179760	0.023	0.018	3.10E-07	4.87E-06	0.00E+00	5.18E-06	5.18	pot. res.
547680	4179860	0.023	0.018	3.10E-07	4.86E-06	0.00E+00	5.17E-06	5.17	pot. res.
548040	4179820	0.023	0.018	3.09E-07	4.85E-06	0.00E+00	5.16E-06	5.16	pot. res.
547960	4179900	0.023	0.018	3.08E-07	4.83E-06	0.00E+00	5.14E-06	5.14	pot. res.

UCSF Parnassus Heights LRDP

Initial Phase of LRDP (2030)

Unmitigated Research and Academic Building Construction Cancer Risk Calculations for Residential Child Receptor

Haul Truck Trip Adjustment Factor to Model

	One Way (miles)					
	ISA	RAB	HDMC	IAH1	IAH2	
CalEEMod, Haul	20	20	20	20	20	*haul truck trip distance as modeled in CalEEMod*
CalEEMod, Vend	7.3	7.3	7.3	7.3	7.3	*vendor trip distance as modeled in CalEEMod*
AERMOD	0.52	0.52	0.52	0.52	0.19	
% in Dispersion Model, Haul	3%	3%	3%	3%	1%	
% in Dispersion Model, Vend	7%	7%	7%	7%	3%	

Construction Emissions, *as applied to AERMOD results*

				Days				Total Umitigated DPM (tons)				Total Umitigated DPM (g/s)			
	Year	Start Date	Stop Date	3rd Trimester	0<2	2<9	Duration	Offroad	Haul/Vend1	Haul/Vend2	Idle	Offroad	Haul1	Haul2	Idle
Research and Academic Building	2022	3/1/2022	12/31/2022	91.00	215.00	0.00	306					4.68E-03	3.70E-06	--	2.20E-06
	2023	1/1/2023	12/31/2023	0.00	365.00	0.00	365					2.29E-03	1.52E-06	--	0.00E+00
	2024	1/1/2024	12/31/2024	0.00	150.00	216.00	366					2.25E-03	1.46E-06	--	0.00E+00
	2025	1/1/2025	12/31/2025	0.00	0.00	365.00	365					1.96E-03	1.40E-06	--	0.00E+00

Risk Factors

	Abbreviation	UOM	3rd Trimester	0<2	2<9
Daily Breathing Rate (95th %'ile)	DBR	L/kg-day	361	1090	631
Fraction Of Time At Home	FAH	unitless	1	1	1
Exposure Frequency	EF	days/year	0.96	0.96	0.96
Age Sensitivity Factor	ASF	unitless	10	10	3
Inhalation Absorption Factor	A	unitless	1	1	1
Conversion Factor	CF_1	m^3/L	0.001	0.001	0.001
Conversion Factor	CF_2	$\mu g/m^3$	0.001	0.001	0.001
Cancer Potency Factor (diesel exhaust)	CPF	$mg/kg\text{-}day^{-1}$	1.1	1.1	1.1
Averaging Time (for residential exposure)	AT	years	70.00	70.00	70.00

Intake Factor for Inhalation, IF (m^3/kg-day)

	Year	Equation	3rd Trimester	0<2	2<9
Research and Academic Building	2022	DBR*FAH*EF*ED*ASF*A*CF/AT	0.012	0.088	0.000
	2023		0.000	0.149	0.000
	2024		0.000	0.061	0.015
	2025		0.000	0.000	0.026

Risk Calculation Part 1, R1

	3rd Trimester	0<2	2<9
IF*CPF*CF	1.36E-05	9.67E-05	0.00E+00
	0.00E+00	1.64E-04	0.00E+00
	0.00E+00	6.75E-05	1.69E-05
	0.00E+00	0.00E+00	2.86E-05

Diesel Particulate Matter concentration, C_{DPM} (ug/m^3) / Risk Calculation Part 2

		RAB				∑R1*C_{DPM}				Cancer Risk	
X (UTM)	Y (UTM	2021	2022	2023	2024	3rd Trimeste	0<2	2<9	Total	per million	Receptor Determination
547520	4179640	0.210	0.103	0.101	0.088	2.84E-06	4.40E-05	4.21E-06		5.10E-05	51.03 pot. res.
547500	4179640	0.149	0.073	0.072	0.062	2.03E-06	3.13E-05	3.00E-06		3.64E-05	36.37 pot. res.
547520	4179660	0.125	0.061	0.060	0.052	1.69E-06	2.61E-05	2.50E-06		3.03E-05	30.30 pot. res.
547440	4179580	0.125	0.061	0.060	0.052	1.69E-06	2.61E-05	2.50E-06		3.03E-05	30.30 pot. res.
547460	4179620	0.119	0.058	0.057	0.050	1.62E-06	2.50E-05	2.39E-06		2.90E-05	29.00 pot. res.
547440	4179540	0.115	0.056	0.055	0.048	1.56E-06	2.41E-05	2.31E-06		2.80E-05	28.00 pot. res.
547480	4179640	0.113	0.055	0.054	0.047	1.53E-06	2.37E-05	2.27E-06		2.75E-05	27.52 pot. res.
547440	4179600	0.108	0.053	0.052	0.045	1.46E-06	2.26E-05	2.16E-06		2.62E-05	26.24 pot. res.
547500	4179660	0.097	0.047	0.046	0.040	1.31E-06	2.02E-05	1.94E-06		2.35E-05	23.48 pot. res.
547440	4179520	0.096	0.047	0.046	0.040	1.30E-06	2.01E-05	1.92E-06		2.33E-05	23.27 pot. res.
547420	4179580	0.087	0.042	0.042	0.036	1.18E-06	1.82E-05	1.74E-06		2.11E-05	21.08 pot. res.
547440	4179620	0.086	0.042	0.041	0.036	1.17E-06	1.80E-05	1.72E-06		2.09E-05	20.90 pot. res.
547460	4179640	0.086	0.042	0.041	0.036	1.16E-06	1.80E-05	1.72E-06		2.09E-05	20.85 pot. res.
547520	4179680	0.082	0.040	0.039	0.034	1.11E-06	1.71E-05	1.64E-06		1.99E-05	19.88 pot. res.
547560	4179700	0.081	0.039	0.039	0.034	1.09E-06	1.69E-05	1.62E-06		1.96E-05	19.62 pot. res.
547480	4179660	0.079	0.038	0.038	0.033	1.06E-06	1.65E-05	1.58E-06		1.91E-05	19.10 pot. res.
547420	4179600	0.077	0.038	0.037	0.032	1.04E-06	1.61E-05	1.54E-06		1.87E-05	18.73 pot. res.
547440	4179500	0.077	0.037	0.037	0.032	1.04E-06	1.60E-05	1.54E-06		1.86E-05	18.62 pot. res.
547540	4179700	0.068	0.033	0.033	0.029	9.26E-07	1.43E-05	1.37E-06		1.66E-05	16.61 pot. res.
547500	4179680	0.067	0.033	0.032	0.028	9.15E-07	1.42E-05	1.35E-06		1.64E-05	16.42 pot. res.
547400	4179560	0.067	0.033	0.032	0.028	9.07E-07	1.40E-05	1.34E-06		1.63E-05	16.27 pot. res.
547440	4179640	0.066	0.032	0.032	0.028	8.96E-07	1.38E-05	1.33E-06		1.61E-05	16.07 pot. res.
547400	4179540	0.066	0.032	0.032	0.028	8.94E-07	1.38E-05	1.32E-06		1.60E-05	16.03 pot. res.
547420	4179620	0.064	0.031	0.031	0.027	8.70E-07	1.34E-05	1.29E-06		1.56E-05	15.60 pot. res.
547400	4179580	0.064	0.031	0.031	0.027	8.72E-07	1.35E-05	1.29E-06		1.56E-05	15.63 pot. res.
547460	4179660	0.063	0.031	0.030	0.026	8.54E-07	1.32E-05	1.26E-06		1.53E-05	15.32 pot. res.
547580	4179720	0.063	0.031	0.030	0.026	8.53E-07	1.32E-05	1.26E-06		1.53E-05	15.30 pot. res.
547400	4179520	0.061	0.030	0.030	0.026	8.33E-07	1.29E-05	1.23E-06		1.49E-05	14.95 pot. res.
547440	4179480	0.061	0.030	0.029	0.026	8.28E-07	1.28E-05	1.23E-06		1.49E-05	14.86 pot. res.
547520	4179700	0.058	0.029	0.028	0.024	7.89E-07	1.22E-05	1.17E-06		1.42E-05	14.16 pot. res.
547400	4179600	0.058	0.028	0.028	0.024	7.88E-07	1.22E-05	1.17E-06		1.41E-05	14.13 pot. res.
547480	4179680	0.058	0.028	0.028	0.024	7.82E-07	1.21E-05	1.16E-06		1.40E-05	14.03 pot. res.
547560	4179720	0.057	0.028	0.027	0.024	7.69E-07	1.19E-05	1.14E-06		1.38E-05	13.80 pot. res.
547400	4179500	0.055	0.027	0.026	0.023	7.42E-07	1.15E-05	1.10E-06		1.33E-05	13.32 pot. res.
547380	4179540	0.052	0.026	0.025	0.022	7.11E-07	1.10E-05	1.05E-06		1.27E-05	12.75 pot. res.
547420	4179640	0.052	0.026	0.025	0.022	7.09E-07	1.10E-05	1.05E-06		1.27E-05	12.72 pot. res.
547380	4179560	0.052	0.026	0.025	0.022	7.10E-07	1.10E-05	1.05E-06		1.27E-05	12.73 pot. res.
547440	4179660	0.052	0.025	0.025	0.022	7.01E-07	1.08E-05	1.04E-06		1.26E-05	12.57 pot. res.
547380	4179520	0.050	0.025	0.024	0.021	6.80E-07	1.05E-05	1.01E-06		1.22E-05	12.20 pot. res.
547500	4179700	0.050	0.025	0.024	0.021	6.79E-07	1.05E-05	1.00E-06		1.22E-05	12.18 pot. res.
547540	4179720	0.050	0.024	0.024	0.021	6.78E-07	1.05E-05	1.00E-06		1.22E-05	12.16 pot. res.
547380	4179580	0.050	0.025	0.024	0.021	6.82E-07	1.05E-05	1.01E-06		1.22E-05	12.22 pot. res.
547400	4179620	0.050	0.024	0.024	0.021	6.77E-07	1.05E-05	1.00E-06		1.22E-05	12.15 pot. res.
547440	4179460	0.050	0.024	0.024	0.021	6.76E-07	1.05E-05	1.00E-06		1.21E-05	12.13 pot. res.
547460	4179680	0.048	0.024	0.023	0.020	6.57E-07	1.02E-05	9.73E-07		1.18E-05	11.79 pot. res.
547400	4179480	0.048	0.023	0.023	0.020	6.45E-07	9.98E-06	9.55E-07		1.16E-05	11.58 pot. res.
547380	4179500	0.046	0.023	0.022	0.019	6.28E-07	9.71E-06	9.29E-07		1.13E-05	11.27 pot. res.
547380	4179600	0.046	0.022	0.022	0.019	6.22E-07	9.61E-06	9.20E-07		1.12E-05	11.16 pot. res.
547580	4179740	0.045	0.022	0.022	0.019	6.16E-07	9.52E-06	9.11E-07		1.10E-05	11.04 pot. res.
547480	4179700	0.044	0.022	0.021	0.018	5.98E-07	9.24E-06	8.85E-07		1.07E-05	10.72 pot. res.
547520	4179720	0.044	0.021	0.021	0.018	5.95E-07	9.20E-06	8.81E-07		1.07E-05	10.68 pot. res.
547420	4179660	0.042	0.021	0.020	0.018	5.72E-07	8.84E-06	8.46E-07		1.03E-05	10.25 pot. res.
547360	4179540	0.042	0.021	0.020	0.018	5.72E-07	8.84E-06	8.46E-07		1.03E-05	10.25 pot. res.
547400	4179640	0.042	0.021	0.020	0.018	5.70E-07	8.82E-06	8.44E-07		1.02E-05	10.23 pot. res.
547380	4179480	0.042	0.020	0.020	0.017	5.66E-07	8.75E-06	8.37E-07		1.02E-05	10.15 pot. res.
547360	4179560	0.042	0.020	0.020	0.017	5.66E-07	8.75E-06	8.37E-07		1.02E-05	10.16 pot. res.
547560	4179740	0.042	0.020	0.020	0.017	5.64E-07	8.71E-06	8.34E-07		1.01E-05	10.11 pot. res.
547440	4179440	0.041	0.020	0.020	0.017	5.59E-07	8.64E-06	8.27E-07		1.00E-05	10.03 pot. res.
547400	4179460	0.041	0.020	0.020	0.017	5.58E-07	8.63E-06	8.26E-07		1.00E-05	10.01 pot. res.
547360	4179520	0.041	0.020	0.020	0.017	5.58E-07	8.63E-06	8.26E-07		1.00E-05	10.02 pot. res.
547440	4179680	0.041	0.020	0.020	0.017	5.57E-07	8.62E-06	8.25E-07		1.00E-05	10.00 pot. res.

UCSF Parnassus Heights LRDP

Initial Phase of LRDP (2030)

Unmitigated New Hospital Construction Cancer Risk Calculations for Residential Child Receptor

Haul Truck Trip Adjustment Factor to Model

	One Way (miles)					
	ISA	RAB	HDMC	IAH1	IAH2	
CalEEMod, Haul	20	20	20	20	20	*haul truck trip distance as modeled in CalEEMod*
CalEEMod, Vend	7.3	7.3	7.3	7.3	7.3	*vendor trip distance as modeled in CalEEMod*
AERMOD	0.52	0.52	0.52	0.52	0.19	
% in Dispersion Model, Haul	3%	3%	3%	3%	1%	
% in Dispersion Model, Vend	7%	7%	7%	7%	3%	

Construction Emissions, *as applied to AERMOD results*				Days				Total Unmitigated DPM (tons)				Total Unmitigated DPM (g/s)			
	Year	Start Date	Stop Date	3rd Trimester	0<2	2<9	Duration	Offroad	Haul/Vend1	Haul/Vend2	Idle	Offroad	Haul1	Haul2	Idle
New Hospital	2023	6/1/2023	12/31/2023	90.00	124.00	0.00	214					2.52E-03	0.00E+00	--	0.00E+00
	2024	1/1/2024	12/31/2024	0.00	366.00	0.00	366					3.94E-03	2.72E-06	--	2.55E-06
	2025	1/1/2025	12/31/2025	0.00	240.00	125.00	365					1.76E-03	5.00E-06	--	0.00E+00
	2026	1/1/2026	12/31/2026	0.00	0.00	365.00	365					3.53E-03	9.55E-06	--	0.00E+00
	2027	1/1/2027	12/31/2027	0.00	0.00	365.00	365					1.76E-03	4.57E-06	--	0.00E+00
	2028	1/1/2028	12/31/2028	0.00	0.00	366.00	366					1.95E-03	4.35E-06	--	0.00E+00
	2029	1/1/2029	12/31/2029	0.00	0.00	365.00	365					1.96E-03	4.20E-06	--	0.00E+00

Risk Factors

	Abbreviation	UOM	3rd Trimester	0<2	2<9
Daily Breathing Rate (95th %'ile)	DBR	L/kg-day	361	1090	631
Fraction Of Time At Home	FAH	unitless	1	1	1
Exposure Frequency	EF	days/year	0.96	0.96	0.96
Age Sensitivity Factor	ASF	unitless	10	10	3
Inhalation Absorption Factor	A	unitless	1	1	1
Conversion Factor	CF_1	m^3/L	0.001	0.001	0.001
Conversion Factor	CF_2	$\mu g/m^3$	0.001	0.001	0.001
Cancer Potency Factor (diesel exhaust)	CPF	$mg/kg\text{-}day^{-1}$	1.1	1.1	1.1
Averaging Time (for residential exposure)	AT	years	70.00	70.00	70.00

Intake Factor for Inhalation, IF (m^3/kg-day)

	Year	Equation	3rd Trimester	0<2	2<9
New Hospital	2023	DBR*FAH*EF*ED*ASF*A*CF/AT	0.012	0.051	0.000
	2024		0.000	0.150	0.000
	2025		0.000	0.098	0.009
	2026		0.000	0.000	0.026
	2027		0.000	0.000	0.026
	2028		0.000	0.000	0.026
	2029		0.000	0.000	0.026

Risk Calculation Part 1, R1

	3rd Trimester	0<2	2<9
IF*CPF*CF	1.34E-05	5.58E-05	0.00E+00
	0.00E+00	1.65E-04	0.00E+00
	0.00E+00	1.08E-04	9.78E-06
	0.00E+00	0.00E+00	2.86E-05
	0.00E+00	0.00E+00	2.86E-05
	0.00E+00	0.00E+00	2.86E-05
	0.00E+00	0.00E+00	2.86E-05

Diesel Particulate Matter concentration, C_{DPM} (ug/m^3) / Risk Calculation Part 2

		HDMC							$\sum R1 \cdot C_{DPM}$				Cancer Risk	Receptor
X (UTM)	Y (UTM	2023	2024	2025	2026	2027	2028	2029	3rd Trimester	0<2	2<9	Total	per million	Determination
547980	4179760	0.131	0.204	0.091	0.183	0.091	0.101	0.101	1.75E-06	5.08E-05	1.45E-05	6.71E-05	67.06	pot. res.
547980	4179720	0.112	0.175	0.078	0.157	0.078	0.086	0.087	1.50E-06	4.36E-05	1.24E-05	5.75E-05	57.54	pot. res.
547980	4179700	0.111	0.173	0.077	0.155	0.077	0.085	0.086	1.49E-06	4.31E-05	1.23E-05	5.69E-05	56.87	pot. res.
548000	4179760	0.107	0.167	0.075	0.150	0.075	0.082	0.083	1.43E-06	4.16E-05	1.19E-05	5.49E-05	54.90	pot. res.
547980	4179740	0.106	0.165	0.074	0.148	0.074	0.081	0.082	1.42E-06	4.11E-05	1.17E-05	5.42E-05	54.22	pot. res.
547980	4179780	0.103	0.161	0.072	0.144	0.072	0.079	0.080	1.38E-06	4.00E-05	1.14E-05	5.28E-05	52.85	pot. res.
547980	4179680	0.101	0.158	0.071	0.141	0.071	0.078	0.078	1.36E-06	3.93E-05	1.12E-05	5.19E-05	51.90	pot. res.
548000	4179700	0.097	0.152	0.068	0.135	0.068	0.075	0.075	1.30E-06	3.77E-05	1.07E-05	4.97E-05	49.73	pot. res.
548000	4179720	0.096	0.150	0.067	0.134	0.067	0.074	0.074	1.29E-06	3.73E-05	1.06E-05	4.92E-05	49.20	pot. res.
548000	4179740	0.092	0.144	0.064	0.129	0.064	0.071	0.071	1.23E-06	3.58E-05	1.02E-05	4.72E-05	47.23	pot. res.
548000	4179680	0.089	0.140	0.063	0.125	0.063	0.069	0.069	1.20E-06	3.48E-05	9.93E-06	4.59E-05	45.93	pot. res.
548020	4179760	0.089	0.139	0.062	0.124	0.062	0.069	0.069	1.19E-06	3.46E-05	9.87E-06	4.57E-05	45.68	pot. res.
548000	4179780	0.087	0.137	0.061	0.122	0.061	0.067	0.068	1.17E-06	3.39E-05	9.68E-06	4.48E-05	44.80	pot. res.
548040	4179720	0.086	0.134	0.060	0.120	0.060	0.066	0.066	1.15E-06	3.33E-05	9.50E-06	4.39E-05	43.94	pot. res.
547940	4179800	0.085	0.133	0.060	0.119	0.060	0.066	0.066	1.14E-06	3.31E-05	9.45E-06	4.37E-05	43.70	pot. res.
548020	4179720	0.084	0.131	0.059	0.117	0.059	0.065	0.065	1.12E-06	3.26E-05	9.29E-06	4.30E-05	42.99	pot. res.
547960	4179800	0.083	0.130	0.058	0.116	0.058	0.064	0.065	1.11E-06	3.23E-05	9.23E-06	4.27E-05	42.69	pot. res.
548020	4179700	0.083	0.130	0.058	0.116	0.058	0.064	0.064	1.11E-06	3.23E-05	9.22E-06	4.27E-05	42.67	pot. res.
548040	4179740	0.082	0.129	0.058	0.115	0.058	0.064	0.064	1.10E-06	3.21E-05	9.15E-06	4.23E-05	42.31	pot. res.
547860	4179780	0.082	0.129	0.058	0.115	0.058	0.064	0.064	1.10E-06	3.20E-05	9.14E-06	4.23E-05	42.27	pot. res.
548020	4179740	0.082	0.128	0.057	0.114	0.057	0.063	0.063	1.09E-06	3.17E-05	9.05E-06	4.19E-05	41.88	pot. res.
548040	4179700	0.081	0.127	0.057	0.114	0.057	0.063	0.063	1.09E-06	3.16E-05	9.02E-06	4.17E-05	41.73	pot. res.
547980	4179660	0.081	0.127	0.057	0.114	0.057	0.063	0.063	1.09E-06	3.16E-05	9.02E-06	4.17E-05	41.72	pot. res.
548060	4179720	0.079	0.124	0.056	0.111	0.056	0.061	0.062	1.07E-06	3.09E-05	8.82E-06	4.08E-05	40.80	pot. res.
548060	4179700	0.079	0.124	0.055	0.111	0.055	0.061	0.061	1.06E-06	3.08E-05	8.78E-06	4.06E-05	40.59	pot. res.
548020	4179680	0.077	0.121	0.054	0.108	0.054	0.060	0.060	1.03E-06	3.00E-05	8.56E-06	3.96E-05	39.62	pot. res.
547980	4179800	0.077	0.120	0.054	0.107	0.054	0.059	0.059	1.03E-06	2.98E-05	8.50E-06	3.93E-05	39.33	pot. res.
548040	4179760	0.075	0.117	0.052	0.105	0.052	0.058	0.058	1.00E-06	2.91E-05	8.31E-06	3.84E-05	38.43	pot. res.
548000	4179660	0.075	0.117	0.052	0.105	0.052	0.058	0.058	1.00E-06	2.91E-05	8.30E-06	3.84E-05	38.38	pot. res.
548020	4179780	0.074	0.116	0.052	0.104	0.052	0.057	0.057	9.93E-07	2.88E-05	8.22E-06	3.80E-05	38.01	pot. res.
548040	4179680	0.071	0.112	0.050	0.100	0.050	0.055	0.055	9.59E-07	2.78E-05	7.94E-06	3.67E-05	36.71	pot. res.
548060	4179680	0.071	0.112	0.050	0.100	0.050	0.055	0.055	9.56E-07	2.77E-05	7.92E-06	3.66E-05	36.62	pot. res.
548080	4179700	0.070	0.110	0.049	0.098	0.049	0.054	0.054	9.41E-07	2.73E-05	7.79E-06	3.60E-05	36.04	pot. res.
548060	4179740	0.070	0.109	0.049	0.098	0.049	0.054	0.054	9.36E-07	2.72E-05	7.75E-06	3.59E-05	35.85	pot. res.
548000	4179800	0.068	0.107	0.048	0.096	0.048	0.053	0.053	9.17E-07	2.66E-05	7.59E-06	3.51E-05	35.11	pot. res.
548080	4179680	0.068	0.106	0.047	0.095	0.047	0.052	0.052	9.06E-07	2.63E-05	7.50E-06	3.47E-05	34.70	pot. res.
548020	4179660	0.067	0.104	0.047	0.093	0.047	0.051	0.052	8.94E-07	2.59E-05	7.40E-06	3.42E-05	34.25	pot. res.
548040	4179780	0.063	0.099	0.044	0.089	0.044	0.049	0.049	8.49E-07	2.46E-05	7.03E-06	3.25E-05	32.52	pot. res.
548060	4179760	0.063	0.099	0.044	0.088	0.044	0.049	0.049	8.45E-07	2.45E-05	7.00E-06	3.24E-05	32.37	pot. res.
548080	4179720	0.062	0.098	0.044	0.087	0.044	0.048	0.048	8.37E-07	2.43E-05	6.93E-06	3.21E-05	32.05	pot. res.
548040	4179660	0.062	0.097	0.044	0.087	0.044	0.048	0.048	8.35E-07	2.42E-05	6.91E-06	3.20E-05	31.97	pot. res.
548020	4179800	0.060	0.094	0.042	0.084	0.042	0.046	0.047	8.07E-07	2.34E-05	6.68E-06	3.09E-05	30.91	pot. res.
548060	4179660	0.060	0.093	0.042	0.083	0.042	0.046	0.046	8.00E-07	2.32E-05	6.63E-06	3.06E-05	30.65	pot. res.
548100	4179680	0.059	0.093	0.042	0.083	0.042	0.046	0.046	7.97E-07	2.31E-05	6.60E-06	3.05E-05	30.53	pot. res.
548080	4179660	0.059	0.093	0.042	0.083	0.042	0.046	0.046	7.97E-07	2.31E-05	6.60E-06	3.05E-05	30.53	pot. res.
548080	4179740	0.059	0.092	0.041	0.082	0.041	0.045	0.046	7.89E-07	2.29E-05	6.53E-06	3.02E-05	30.22	pot. res.
547980	4179640	0.058	0.091	0.040	0.081	0.040	0.045	0.045	7.76E-07	2.25E-05	6.42E-06	2.97E-05	29.71	pot. res.
547960	4179820	0.057	0.089	0.040	0.080	0.040	0.044	0.044	7.65E-07	2.22E-05	6.33E-06	2.93E-05	29.30	pot. res.
547940	4179820	0.056	0.087	0.039	0.078	0.039	0.043	0.043	7.50E-07	2.18E-05	6.21E-06	2.87E-05	28.71	pot. res.
548000	4179640	0.056	0.087	0.039	0.078	0.039	0.043	0.043	7.45E-07	2.16E-05	6.17E-06	2.85E-05	28.53	pot. res.
547980	4179820	0.055	0.086	0.039	0.077	0.039	0.043	0.043	7.39E-07	2.14E-05	6.12E-06	2.83E-05	28.30	pot. res.
548060	4179780	0.055	0.085	0.038	0.076	0.038	0.042	0.042	7.31E-07	2.12E-05	6.05E-06	2.80E-05	28.01	pot. res.
548100	4179700	0.054	0.085	0.038	0.076	0.038	0.042	0.042	7.28E-07	2.11E-05	6.03E-06	2.79E-05	27.89	pot. res.
548080	4179760	0.054	0.084	0.038	0.075	0.038	0.042	0.042	7.23E-07	2.10E-05	5.98E-06	2.77E-05	27.67	pot. res.
548100	4179660	0.054	0.084	0.038	0.075	0.038	0.041	0.042	7.20E-07	2.09E-05	5.96E-06	2.76E-05	27.59	pot. res.
548100	4179720	0.053	0.083	0.037	0.074	0.037	0.041	0.041	7.11E-07	2.06E-05	5.89E-06	2.72E-05	27.23	pot. res.
548040	4179800	0.053	0.083	0.037	0.074	0.037	0.041	0.041	7.09E-07	2.06E-05	5.87E-06	2.71E-05	27.14	pot. res.
548000	4179820	0.052	0.081	0.036	0.072	0.036	0.040	0.040	6.93E-07	2.01E-05	5.74E-06	2.66E-05	26.55	pot. res.
548020	4179640	0.052	0.081	0.036	0.072	0.036	0.040	0.040	6.92E-07	2.01E-05	5.73E-06	2.65E-05	26.48	pot. res.
547920	4179820	0.052	0.081	0.036	0.072	0.036	0.040	0.040	6.91E-07	2.01E-05	5.72E-06	2.65E-05	26.47	pot. res.

UCSF Parnassus Heights LRDP

Initial Phase of LRDP (2030)

Unmitigated Initial Phase of Aldea Housing Densification Construction Cancer Risk Calculations for Residential Child Receptor

Haul Truck Trip Adjustment Factor to Model

	One Way (miles)					
	ISA	RAB	HDMC	IAH1	IAH2	
CalEEMod, Haul	20	20	20	20	20	*haul truck trip distance as modeled in CalEEMod*
CalEEMod, Vend	7.3	7.3	7.3	7.3	7.3	*vendor trip distance as modeled in CalEEMod*
AERMOD	0.52	0.52	0.52	0.52	0.19	
% in Dispersion Model, Haul	3%	3%	3%	3%	1%	
% in Dispersion Model, Vend	7%	7%	7%	7%	3%	

Construction Emissions, *as applied to AERMOD results*

	Year	Start Date Stop Date	Days				Total Umitigated DPM (tons)				Total Umitigated DPM (g/s)			
			3rd Trimester	0<2	2<9	Duration	Offroad	Haul/Vend1	Haul/Vend2	Idle	Offroad	Haul1	Haul2	Idle
Initial phase of Aldea Housing Densification	2028	1/3/2028 12/31/2028	90.00	274.00	0.00	364	6.10E-02	1.96E-05	7.17E-06	2.89E-06	1.76E-03	5.67E-07	2.07E-07	8.35E-08
	2029	1/1/2029 1/11/2029	0.00	11.00	0.00	11	2.30E-04	0.00E+00	0.00E+00	0.00E+00	2.20E-04	0.00E+00	0.00E+00	0.00E+00

Risk Factors

	Abbreviation	UOM	3rd Trimester	0<2	2<9
Daily Breathing Rate (95th %'ile)	DBR	L/kg-day	361	1090	631
Fraction Of Time At Home	FAH	unitless	1	1	1
Exposure Frequency	EF	days/year	0.96	0.96	0.96
Age Sensitivity Factor	ASF	unitless	10	10	3
Inhalation Absorption Factor	A	unitless	1	1	1
Conversion Factor	CF_1	m^3/L	0.001	0.001	0.001
Conversion Factor	CF_2	$\mu g/m^3$	0.001	0.001	0.001
Cancer Potency Factor (diesel exhaust)	CPF	$mg/kg\text{-}day^{-1}$	1.1	1.1	1.1
Averaging Time (for residential exposure)	AT	years	70.00	70.00	70.00

Intake Factor for Inhalation, IF (m^3/kg-day)

	Year	Equation	3rd Trimester	0<2	2<9
Initial phase of Aldea Housing Densification	2028	DBR*FAH*EF*ED*ASF*A*CF/AT	0.012	0.112	0.000
	2029		0.000	0.004	0.000

Risk Calculation Part 1, R1

	3rd Trimester	0<2	2<9
IF*CPF*CF	1.34E-05	1.23E-04	0.00E+00
	0.00E+00	4.95E-06	0.00E+00

Diesel Particulate Matter concentration, C_{DPM} (ug/m^3) / Risk Calculation Part 2

X (UTM)	Y (UTM	IAH 2028	IAH 2029	$\sum R1*C_{DPM}$ 3rd Trimester	0<2	2<9	Total	Cancer Risk per million	Receptor Determination
547980	4179080	0.443	0.055	5.94E-06	5.49E-05	0.00E+00	6.08E-05	60.81	Aldea Housing Res Hall
547980	4179100	0.443	0.055	5.94E-06	5.49E-05	0.00E+00	6.08E-05	60.80	Aldea Housing Res Hall
548000	4179040	0.312	0.039	4.18E-06	3.86E-05	0.00E+00	4.28E-05	42.81	Aldea Housing Res Hall
548000	4179100	0.310	0.039	4.16E-06	3.84E-05	0.00E+00	4.26E-05	42.55	Aldea Housing Res Hall
548000	4179060	0.310	0.039	4.15E-06	3.84E-05	0.00E+00	4.25E-05	42.54	Aldea Housing Res Hall
548000	4179080	0.299	0.037	4.01E-06	3.70E-05	0.00E+00	4.11E-05	41.05	Aldea Housing Res Hall
548000	4179120	0.294	0.037	3.94E-06	3.64E-05	0.00E+00	4.04E-05	40.37	Aldea Housing Res Hall
548000	4179020	0.260	0.032	3.49E-06	3.23E-05	0.00E+00	3.58E-05	35.75	Aldea Housing Res Hall
548000	4179140	0.204	0.025	2.74E-06	2.53E-05	0.00E+00	2.81E-05	28.05	Aldea Housing Res Hall
548020	4179080	0.201	0.025	2.69E-06	2.49E-05	0.00E+00	2.75E-05	27.55	Aldea Housing Res Hall
548020	4179060	0.200	0.025	2.68E-06	2.48E-05	0.00E+00	2.74E-05	27.45	Aldea Housing Res Hall
548020	4179100	0.199	0.025	2.67E-06	2.46E-05	0.00E+00	2.73E-05	27.29	Aldea Housing Res Hall
548020	4179040	0.190	0.024	2.55E-06	2.35E-05	0.00E+00	2.61E-05	26.07	Aldea Housing Res Hall
548020	4179120	0.186	0.023	2.49E-06	2.30E-05	0.00E+00	2.55E-05	25.50	Aldea Housing Res Hall
548020	4179020	0.160	0.020	2.15E-06	1.98E-05	0.00E+00	2.20E-05	21.98	Aldea Housing Res Hall
548040	4179080	0.140	0.017	1.87E-06	1.73E-05	0.00E+00	1.92E-05	19.17	Aldea Housing Res Hall
548040	4179060	0.139	0.017	1.86E-06	1.72E-05	0.00E+00	1.91E-05	19.07	Aldea Housing Res Hall
548020	4179140	0.137	0.017	1.84E-06	1.70E-05	0.00E+00	1.88E-05	18.82	Aldea Housing Res Hall
548040	4179100	0.136	0.017	1.83E-06	1.69E-05	0.00E+00	1.87E-05	18.73	Aldea Housing Res Hall
548040	4179040	0.129	0.016	1.73E-06	1.60E-05	0.00E+00	1.77E-05	17.70	Aldea Housing Res Hall
548040	4179120	0.123	0.015	1.65E-06	1.52E-05	0.00E+00	1.69E-05	16.85	Aldea Housing Res Hall
548020	4179000	0.118	0.015	1.58E-06	1.46E-05	0.00E+00	1.61E-05	16.15	Aldea Housing Res Hall
548040	4179020	0.111	0.014	1.49E-06	1.37E-05	0.00E+00	1.52E-05	15.24	Aldea Housing Res Hall
548060	4179080	0.104	0.013	1.39E-06	1.28E-05	0.00E+00	1.42E-05	14.23	Aldea Housing Res Hall
548060	4179060	0.100	0.012	1.34E-06	1.24E-05	0.00E+00	1.37E-05	13.71	Aldea Housing Res Hall
548060	4179100	0.099	0.012	1.33E-06	1.23E-05	0.00E+00	1.36E-05	13.65	Aldea Housing Res Hall
548000	4179160	0.096	0.012	1.29E-06	1.19E-05	0.00E+00	1.32E-05	13.20	Aldea Housing Res Hall
548040	4179140	0.095	0.012	1.28E-06	1.18E-05	0.00E+00	1.31E-05	13.07	Aldea Housing Res Hall
548060	4179040	0.095	0.012	1.27E-06	1.18E-05	0.00E+00	1.30E-05	13.03	Aldea Housing Res Hall
548060	4179120	0.092	0.011	1.23E-06	1.14E-05	0.00E+00	1.26E-05	12.61	Aldea Housing Res Hall
547980	4179160	0.088	0.011	1.19E-06	1.10E-05	0.00E+00	1.21E-05	12.14	Aldea Housing Res Hall
548040	4179000	0.088	0.011	1.18E-06	1.09E-05	0.00E+00	1.21E-05	12.07	Aldea Housing Res Hall
548020	4179160	0.086	0.011	1.16E-06	1.07E-05	0.00E+00	1.19E-05	11.87	Aldea Housing Res Hall
548060	4179020	0.084	0.010	1.13E-06	1.04E-05	0.00E+00	1.16E-05	11.55	Aldea Housing Res Hall
548080	4179080	0.078	0.010	1.04E-06	9.64E-06	0.00E+00	1.07E-05	10.68	Aldea Housing Res Hall
548080	4179060	0.077	0.010	1.04E-06	9.60E-06	0.00E+00	1.06E-05	10.64	Aldea Housing Res Hall
548060	4179140	0.075	0.009	1.01E-06	9.31E-06	0.00E+00	1.03E-05	10.31	Aldea Housing Res Hall
548080	4179040	0.074	0.009	9.93E-07	9.17E-06	0.00E+00	1.02E-05	10.16	Aldea Housing Res Hall
548080	4179100	0.074	0.009	9.92E-07	9.16E-06	0.00E+00	1.02E-05	10.16	Aldea Housing Res Hall
548040	4179160	0.071	0.009	9.53E-07	8.80E-06	0.00E+00	9.76E-06	9.76	Aldea Housing Res Hall
548080	4179120	0.069	0.009	9.26E-07	8.55E-06	0.00E+00	9.48E-06	9.48	Aldea Housing Res Hall
548100	4179080	0.062	0.008	8.30E-07	7.67E-06	0.00E+00	8.50E-06	8.50	Aldea Housing Res Hall
548080	4179140	0.059	0.007	7.98E-07	7.37E-06	0.00E+00	8.17E-06	8.17	Aldea Housing Res Hall
548100	4179100	0.059	0.007	7.88E-07	7.28E-06	0.00E+00	8.07E-06	8.07	Aldea Housing Res Hall
548060	4179160	0.058	0.007	7.80E-07	7.20E-06	0.00E+00	7.98E-06	7.98	Aldea Housing Res Hall
548100	4179120	0.054	0.007	7.27E-07	6.71E-06	0.00E+00	7.44E-06	7.44	Aldea Housing Res Hall
548020	4179180	0.052	0.007	7.02E-07	6.48E-06	0.00E+00	7.18E-06	7.18	Aldea Housing Res Hall
548000	4179180	0.051	0.006	6.88E-07	6.36E-06	0.00E+00	7.05E-06	7.05	Aldea Housing Res Hall
548040	4179180	0.050	0.006	6.65E-07	6.15E-06	0.00E+00	6.81E-06	6.81	Aldea Housing Res Hall
548080	4179160	0.049	0.006	6.59E-07	6.09E-06	0.00E+00	6.75E-06	6.75	Aldea Housing Res Hall
548100	4179140	0.049	0.006	6.57E-07	6.07E-06	0.00E+00	6.73E-06	6.73	Aldea Housing Res Hall
548120	4179100	0.049	0.006	6.52E-07	6.02E-06	0.00E+00	6.68E-06	6.68	Aldea Housing Res Hall
548120	4179120	0.045	0.006	6.08E-07	5.61E-06	0.00E+00	6.22E-06	6.22	Aldea Housing Res Hall
548060	4179180	0.045	0.006	6.01E-07	5.55E-06	0.00E+00	6.15E-06	6.15	Aldea Housing Res Hall
548100	4179160	0.042	0.005	5.61E-07	5.19E-06	0.00E+00	5.75E-06	5.75	Aldea Housing Res Hall
548120	4179140	0.040	0.005	5.41E-07	5.00E-06	0.00E+00	5.54E-06	5.54	Aldea Housing Res Hall
548080	4179180	0.038	0.005	5.14E-07	4.75E-06	0.00E+00	5.26E-06	5.26	Aldea Housing Res Hall
548140	4179120	0.038	0.005	5.03E-07	4.65E-06	0.00E+00	5.15E-06	5.15	Aldea Housing Res Hall
548100	4179180	0.035	0.004	4.64E-07	4.29E-06	0.00E+00	4.75E-06	4.75	Aldea Housing Res Hall
548120	4179160	0.034	0.004	4.63E-07	4.27E-06	0.00E+00	4.74E-06	4.74	Aldea Housing Res Hall
548140	4179140	0.034	0.004	4.55E-07	4.21E-06	0.00E+00	4.66E-06	4.66	Aldea Housing Res Hall
548160	4179120	0.032	0.004	4.30E-07	3.97E-06	0.00E+00	4.40E-06	4.40	Aldea Housing Res Hall
548140	4179160	0.030	0.004	4.02E-07	3.71E-06	0.00E+00	4.11E-06	4.11	Aldea Housing Res Hall
548080	4179200	0.030	0.004	4.00E-07	3.69E-06	0.00E+00	4.09E-06	4.09	Aldea Housing Res Hall
548120	4179180	0.030	0.004	3.96E-07	3.66E-06	0.00E+00	4.05E-06	4.05	Aldea Housing Res Hall
548160	4179140	0.029	0.004	3.91E-07	3.61E-06	0.00E+00	4.00E-06	4.00	Aldea Housing Res Hall
548100	4179200	0.028	0.003	3.70E-07	3.42E-06	0.00E+00	3.79E-06	3.79	Aldea Housing Res Hall
548160	4179160	0.026	0.003	3.52E-07	3.25E-06	0.00E+00	3.60E-06	3.60	Aldea Housing Res Hall
548140	4179180	0.026	0.003	3.48E-07	3.21E-06	0.00E+00	3.56E-06	3.56	Aldea Housing Res Hall
548180	4179140	0.026	0.003	3.46E-07	3.19E-06	0.00E+00	3.54E-06	3.54	Aldea Housing Res Hall
548120	4179200	0.025	0.003	3.34E-07	3.09E-06	0.00E+00	3.42E-06	3.42	Aldea Housing Res Hall

UCSF Parnassus Heights LRDP

Initial Phase of LRDP (2030)

Unmitigated Construction Hazard Index Calculations for Residential Child Receptor

Haul Truck Trip Adjustment Factor to Model

	One Way (miles)					
	ISA	RAB	HDMC	IAH1	IAH2	
CalEEMod, Haul	20	20	20	20	20	*haul truck trip distance as modeled in CalEEMod*
CalEEMod, Vend	7.3	7.3	7.3	7.3	7.3	*vendor trip distance as modeled in CalEEMod*
AERMOD	0.52	0.52	0.52	0.52	0.19	
% in Dispersion Model, Haul	3%	3%	3%	3%	1%	
% in Dispersion Model, Vend	7%	7%	7%	7%	3%	

HI DPM
5

Construction Emissions, *as applied to AERMOD results*				Total Unmitigated DPM (tons)				Total Unmitigated DPM (g/s)			
	Year	Start Date	Stop Date	Offroad	Haul/Vend1	Haul/Vend2	Idle	Offroad	Haul1	Haul2	Idle
Irving Street Arrival	2022	3/1/2022	12/31/2022	4.56E-02	5.74E-06	--	1.77E-06	1.31E-03	1.65E-07	--	5.09E-08
	2023	1/1/2023	11/30/2023	3.85E-02	4.29E-06	--	0.00E+00	1.11E-03	1.24E-07	--	0.00E+00
Research and Academic Building	2022	3/1/2022	12/31/2022	1.36E-01	1.08E-04	--	6.40E-05	3.92E-03	3.10E-06	--	1.84E-06
	2023	1/1/2023	12/31/2023	7.97E-02	5.30E-05	--	0.00E+00	2.29E-03	1.52E-06	--	0.00E+00
	2024	1/1/2024	12/31/2024	7.85E-02	5.08E-05	--	0.00E+00	2.26E-03	1.46E-06	--	0.00E+00
	2025	1/1/2025	12/31/2025	6.80E-02	4.87E-05	--	0.00E+00	1.96E-03	1.40E-06	--	0.00E+00
New Hospital	2023	6/1/2023	12/31/2023	5.14E-02	0.00E+00	--	0.00E+00	1.48E-03	0.00E+00	--	0.00E+00
	2024	1/1/2024	12/31/2024	1.38E-01	9.48E-05	--	8.89E-05	3.96E-03	2.73E-06	--	2.56E-06
	2025	1/1/2025	12/31/2025	6.13E-02	1.74E-04	--	0.00E+00	1.76E-03	5.00E-06	--	0.00E+00
	2026	1/1/2026	12/31/2026	1.23E-01	3.32E-04	--	0.00E+00	3.53E-03	9.55E-06	--	0.00E+00
	2027	1/1/2027	12/31/2027	6.13E-02	1.59E-04	--	0.00E+00	1.76E-03	4.57E-06	--	0.00E+00
	2028	1/1/2028	12/31/2028	6.78E-02	1.52E-04	--	0.00E+00	1.95E-03	4.36E-06	--	0.00E+00
	2029	1/1/2029	12/31/2029	6.80E-02	1.46E-04	--	0.00E+00	1.96E-03	4.20E-06	--	0.00E+00
Initial phase of Aldea Housing Densification	2028	1/3/2028	12/31/2028	6.10E-02	1.96E-05	7.17E-06	2.89E-06	1.76E-03	5.65E-07	2.06E-07	8.33E-08
	2029	1/1/2029	1/11/2029	2.30E-04	0.00E+00	0.00E+00	0.00E+00	6.62E-06	0.00E+00	0.00E+00	0.00E+00

Diesel Particulate Matter concentration, C_{DPM} (ug/m³)

		ISA		RAB				HDMC							IAH		By project ISA	By project RAB	By project HDMC	By project IAH
X (UTM)	Y (UTM	2022	2023	2022	2023	2024	2025	2023	2024	2025	2026	2027	2028	2029	2028	2029				
547560	4179660	0.010	0.008	0.183	0.107	0.105	0.091	0.006	0.017	0.008	0.015	0.008	0.008	0.009	0.001	0.000	0.002	0.037	0.003	0.000
547520	4179640	0.008	0.006	0.176	0.103	0.101	0.088	0.005	0.014	0.006	0.013	0.006	0.007	0.007	0.001	0.000	0.002	0.035	0.003	0.000
547540	4179660	0.009	0.008	0.139	0.081	0.080	0.069	0.005	0.015	0.007	0.013	0.007	0.007	0.007	0.001	0.000	0.002	0.028	0.003	0.000
547500	4179640	0.007	0.006	0.125	0.073	0.072	0.062	0.004	0.012	0.006	0.011	0.006	0.006	0.006	0.001	0.000	0.001	0.025	0.002	0.000
547440	4179580	0.005	0.004	0.104	0.061	0.060	0.052	0.003	0.009	0.004	0.009	0.004	0.005	0.005	0.001	0.000	0.001	0.021	0.002	0.000
547560	4179680	0.011	0.009	0.106	0.062	0.061	0.053	0.006	0.016	0.007	0.015	0.007	0.008	0.008	0.001	0.000	0.002	0.021	0.003	0.000
547520	4179660	0.008	0.007	0.104	0.061	0.060	0.052	0.005	0.013	0.006	0.012	0.006	0.006	0.007	0.001	0.000	0.002	0.021	0.003	0.000
547460	4179620	0.006	0.005	0.100	0.058	0.057	0.050	0.004	0.010	0.005	0.009	0.005	0.005	0.005	0.001	0.000	0.001	0.020	0.002	0.000
547440	4179540	0.004	0.003	0.096	0.056	0.056	0.048	0.003	0.009	0.004	0.008	0.004	0.005	0.005	0.001	0.000	0.001	0.019	0.002	0.000
547480	4179640	0.006	0.005	0.095	0.055	0.055	0.047	0.004	0.011	0.005	0.010	0.005	0.005	0.005	0.001	0.000	0.001	0.019	0.002	0.000
547860	4179780	0.078	0.066	0.031	0.018	0.018	0.016	0.048	0.129	0.058	0.115	0.058	0.064	0.064	0.001	0.000	0.016	0.006	0.026	0.000
547860	4179800	0.078	0.066	0.027	0.016	0.016	0.013	0.029	0.077	0.034	0.069	0.034	0.038	0.038	0.001	0.000	0.016	0.005	0.015	0.000
547980	4179760	0.024	0.020	0.023	0.014	0.013	0.012	0.077	0.205	0.091	0.183	0.091	0.101	0.101	0.001	0.000	0.005	0.005	0.041	0.000
547740	4179820	0.092	0.078	0.022	0.013	0.013	0.011	0.009	0.025	0.011	0.023	0.011	0.012	0.013	0.001	0.000	0.018	0.004	0.005	0.000
547860	4179820	0.070	0.059	0.023	0.014	0.013	0.012	0.019	0.052	0.023	0.046	0.023	0.026	0.026	0.001	0.000	0.014	0.005	0.010	0.000
547980	4179780	0.026	0.022	0.022	0.013	0.013	0.011	0.060	0.162	0.072	0.144	0.072	0.080	0.080	0.001	0.000	0.005	0.004	0.032	0.000
548000	4179760	0.021	0.018	0.022	0.013	0.013	0.011	0.063	0.168	0.075	0.150	0.075	0.083	0.083	0.001	0.000	0.004	0.004	0.034	0.000
547980	4179720	0.018	0.015	0.021	0.012	0.012	0.011	0.066	0.176	0.078	0.157	0.078	0.087	0.087	0.001	0.000	0.004	0.004	0.035	0.000
547980	4179740	0.020	0.017	0.021	0.012	0.012	0.011	0.062	0.166	0.074	0.148	0.074	0.082	0.082	0.001	0.000	0.004	0.004	0.033	0.000
547980	4179700	0.015	0.012	0.022	0.013	0.012	0.011	0.065	0.174	0.077	0.155	0.077	0.086	0.086	0.001	0.000	0.003	0.004	0.035	0.000
547980	4179680	0.012	0.010	0.023	0.013	0.013	0.011	0.059	0.159	0.071	0.141	0.071	0.078	0.078	0.001	0.000	0.002	0.005	0.032	0.000
548000	4179720	0.016	0.014	0.021	0.012	0.012	0.010	0.056	0.150	0.067	0.134	0.067	0.074	0.074	0.001	0.000	0.003	0.004	0.030	0.000
548000	4179700	0.014	0.012	0.022	0.013	0.013	0.011	0.057	0.152	0.068	0.135	0.068	0.075	0.075	0.001	0.000	0.003	0.004	0.030	0.000
548000	4179740	0.018	0.015	0.021	0.012	0.012	0.010	0.054	0.144	0.064	0.129	0.064	0.071	0.071	0.001	0.000	0.004	0.004	0.029	0.000
547860	4179840	0.062	0.052	0.020	0.012	0.011	0.010	0.014	0.037	0.017	0.033	0.017	0.018	0.018	0.001	0.000	0.012	0.004	0.007	0.000
547760	4179840	0.064	0.054	0.019	0.011	0.011	0.010	0.009	0.024	0.011	0.021	0.011	0.012	0.012	0.001	0.000	0.013	0.004	0.005	0.000
547700	4179820	0.049	0.042	0.021	0.012	0.012	0.010	0.007	0.020	0.009	0.018	0.009	0.010	0.010	0.001	0.000	0.010	0.004	0.004	0.000
547840	4179860	0.052	0.044	0.017	0.010	0.010	0.008	0.010	0.026	0.012	0.023	0.012	0.013	0.013	0.001	0.000	0.010	0.003	0.005	0.000
547740	4179840	0.050	0.042	0.019	0.011	0.011	0.009	0.008	0.021	0.010	0.019	0.010	0.011	0.011	0.001	0.000	0.010	0.004	0.004	0.000
547860	4179860	0.048	0.040	0.017	0.010	0.010	0.008	0.010	0.028	0.013	0.025	0.013	0.014	0.014	0.001	0.000	0.010	0.003	0.006	0.000
547980	4179100	0.000	0.000	0.001	0.001	0.001	0.001	0.000	0.001	0.001	0.001	0.001	0.001	0.001	0.442	0.002	0.000	0.000	0.000	0.088
547980	4179080	0.000	0.000	0.001	0.001	0.001	0.001	0.000	0.001	0.001	0.001	0.001	0.001	0.001	0.442	0.002	0.000	0.000	0.000	0.088
548000	4179100	0.000	0.000	0.001	0.001	0.001	0.001	0.000	0.001	0.001	0.001	0.001	0.001	0.001	0.309	0.001	0.000	0.000	0.000	0.062
548000	4179060	0.000	0.000	0.001	0.001	0.001	0.001	0.000	0.001	0.000	0.001	0.000	0.001	0.001	0.309	0.001	0.000	0.000	0.000	0.062
548000	4179120	0.000	0.000	0.002	0.001	0.001	0.001	0.000	0.001	0.001	0.001	0.001	0.001	0.001	0.293	0.001	0.000	0.000	0.000	0.059
548000	4179040	0.000	0.000	0.001	0.001	0.001	0.001	0.000	0.001	0.000	0.001	0.000	0.001	0.001	0.311	0.001	0.000	0.000	0.000	0.062
548000	4179080	0.000	0.000	0.001	0.001	0.001	0.001	0.000	0.001	0.000	0.001	0.000	0.001	0.001	0.298	0.001	0.000	0.000	0.000	0.060
548000	4179020	0.000	0.000	0.001	0.001	0.001	0.001	0.000	0.001	0.000	0.001	0.000	0.000	0.000	0.260	0.001	0.000	0.000	0.000	0.052
548000	4179140	0.000	0.000	0.002	0.001	0.001	0.001	0.000	0.001	0.001	0.001	0.001	0.001	0.001	0.204	0.001	0.000	0.000	0.000	0.041
548020	4179080	0.000	0.000	0.001	0.001	0.001	0.001	0.000	0.001	0.000	0.001	0.000	0.001	0.001	0.200	0.001	0.000	0.000	0.000	0.040

UCSF Parnassus Heights LRDP

Initial Phase of LRDP (2030)

Unmitigated Construction Cancer Risk Calculations for Daycare and School Receptors

Solver was used to maximize the exposure

Haul Truck Trip Adjustment Factor to Model

	One Way (miles)					
	ISA	RAB	HDMC	IAH1	IAH2	
CalEEMod, Haul	20	20	20	20	20	*haul truck trip distance as modeled in CalEEMod*
CalEEMod, Vend	7.3	7.3	7.3	7.3	7.3	*vendor trip distance as modeled in CalEEMod*
AERMOD	0.52	0.52	0.52	0.52	0.19	
% in Dispersion Model, Haul	3%	3%	3%	3%	1%	
% in Dispersion Model, Vend	7%	7%	7%	7%	3%	

Construction Emissions, *as represented in AERMOD*

					Total Umitigated DPM (tons)				Total Umitigated DPM (g/s)			
	Year	Start Date	Stop Date	Duration (Days)	Offroad	Haul/Vend1	Haul/Vend2	Idle	Offroad	Haul1	Haul2	Idle
Irving Street Arrival	2022	3/1/2022	12/31/2022	306	4.56E-02	5.74E-06	--	1.77E-06	1.56E-03	1.97E-07	--	6.07E-08
	2023	1/1/2023	11/30/2023	334	3.85E-02	4.29E-06	--	0.00E+00	1.21E-03	1.35E-07	--	0.00E+00
Research and Academic Building	2022	3/1/2022	12/31/2022	306	1.36E-01	1.08E-04	--	6.40E-05	4.68E-03	3.70E-06	--	2.20E-06
	2023	1/1/2023	12/31/2023	365	7.97E-02	5.30E-05	--	0.00E+00	2.29E-03	1.52E-06	--	0.00E+00
	2024	1/1/2024	12/31/2024	366	7.85E-02	5.08E-05	--	0.00E+00	2.25E-03	1.46E-06	--	0.00E+00
	2025	1/1/2025	12/31/2025	365	6.80E-02	4.87E-05	--	0.00E+00	1.96E-03	1.40E-06	--	0.00E+00
New Hospital	2023	6/1/2023	12/31/2023	214	5.14E-02	0.00E+00	--	0.00E+00	2.52E-03	0.00E+00	--	0.00E+00
	2024	1/1/2024	12/31/2024	366	1.38E-01	9.48E-05	--	8.89E-05	3.94E-03	2.72E-06	--	2.55E-06
	2025	1/1/2025	12/31/2025	365	6.13E-02	1.74E-04	--	0.00E+00	1.76E-03	5.00E-06	--	0.00E+00
	2026	1/1/2026	12/31/2026	365	1.23E-01	3.32E-04	--	0.00E+00	3.53E-03	9.55E-06	--	0.00E+00
	2027	1/1/2027	12/31/2027	365	6.13E-02	1.59E-04	--	0.00E+00	1.76E-03	4.57E-06	--	0.00E+00
	2028	1/1/2028	12/31/2028	366	6.78E-02	1.52E-04	--	0.00E+00	1.95E-03	4.35E-06	--	0.00E+00
	2029	1/1/2029	12/31/2029	365	6.80E-02	1.46E-04	--	0.00E+00	1.96E-03	4.20E-06	--	0.00E+00
Initial phase of Aldea Housing Densification	2028	1/3/2028	12/31/2028	364	6.10E-02	1.96E-05	7.17E-06	2.89E-06	1.76E-03	5.67E-07	2.07E-07	8.35E-08
	2029	1/1/2029	1/11/2029	11	2.30E-04	0.00E+00	0.00E+00	0.00E+00	2.20E-04	0.00E+00	0.00E+00	0.00E+00

		Daycare1		Daycare2		Daycare3		School1	School2	School3	School4
Name		Lucia Child Care Center		ABC Bay Area Child Care		Kirkham Child Care Center		Clarendon Alternative Elementary	Independence High	Stepping Stones Preschool	Haight Ashbury Community Nursery School
Max Exposure (years)		5		5		5		7	5	4	4
Exposure Duration	Year	0<2	2<9	0<2	2<9	0<2	2<9	2<16	2<16	2<16	2<16
Irving Street Arrival	2022	306.00	0.00	306.00	0.00	306.00	0.00	306.00	306.00	306.00	306.00
	2023	334.00	0.00	334.00	0.00	334.00	0.00	334.00	334.00	334.00	334.00
Research and Academic Building	2022	306.00	0.00	306.00	0.00	306.00	0.00	306.00	306.00	306.00	306.00
	2023	365.00	0.00	365.00	0.00	365.00	0.00	365.00	365.00	365.00	365.00
	2024	59.00	307.00	59.00	307.00	59.00	307.00	366.00	366.00	366.00	366.00
	2025	0.00	365.00	0.00	365.00	0.00	365.00	365.00	365.00	365.00	365.00
New Hospital	2023	214.00	0.00	214.00	0.00	214.00	0.00	214.00	214.00	214.00	214.00
	2024	366.00	0.00	366.00	0.00	366.00	0.00	366.00	366.00	366.00	366.00
	2025	180.00	185.00	180.00	185.00	180.00	185.00	365.00	365.00	365.00	365.00
	2026	0.00	365.00	0.00	365.00	0.00	365.00	365.00	365.00	365.00	365.00
	2027	0.00	365.00	0.00	365.00	0.00	365.00	365.00	365.00	151.00	151.00
	2028	0.00	181.00	0.00	181.00	0.00	181.00	366.00	151.00	0.00	0.00
	2029	0.00	0.00	0.00	0.00	0.00	0.00	365.00	0.00	0.00	0.00
Initial phase of Aldea Housing Densification	2028	364.00	0.00	364.00	0.00	364.00	0.00	364.00	364.00	364.00	364.00
	2029	11.00	0.00	11.00	0.00	11.00	0.00	11.00	11.00	11.00	11.00
		730.00	1096.0	730	1096	730	1096	2556.00	1826.00	1461	1461.00

Risk Factors

			Daycare		School
	Abbreviation	UOM	0<2	2<9	2<16
8HR Breathing Rate (95th %'ile, moderate intensity)	BR	L/kg-day	1200	640	520
Fraction Of Time At Home	FAH	unitless	0.33	0.33	0.33
Exposure Frequency	EF	days/year	0.68	0.68	0.49
Age Sensitivity Factor	ASF	unitless	10	3	3
Inhalation Absorption Factor	A	unitless	1	1	1
Modeling Adjustment Factor	MAF	unitless	1.4	1.4	1.4
Conversion Factor	CF_1	m^3/L	0.001	0.001	0.001
Conversion Factor	CF_2	$\mu g/m^3$	0.001	0.001	0.001
Cancer Potency Factor (diesel exhaust)	CPF	$mg/kg\text{-}day^{-1}$	1.1	1.1	1.1
Averaging Time (for residential exposure)	AT	years	70.00	70.00	70.00

Intake Factor for Inhalation, IF ($m^3/kg\text{-}day$)

			Daycare1		Daycare2		Daycare3		School1	School2	School3	School4
	Year	Equation	0<2	2<9	0<2	2<9	0<2	2<9	2<16	2<16	2<16	2<16
Irving Street Arrival	2022		0.045	0.000	0.045	0.000	0.045	0.000	0.004	0.004	0.004	0.004
	2023		0.050	0.000	0.050	0.000	0.050	0.000	0.005	0.005	0.005	0.005
Research and Academic Building	2022		0.045	0.000	0.045	0.000	0.045	0.000	0.004	0.004	0.004	0.004
	2023		0.054	0.000	0.054	0.000	0.054	0.000	0.005	0.005	0.005	0.005
	2024		0.009	0.007	0.009	0.007	0.009	0.007	0.005	0.005	0.005	0.005
	2025		0.000	0.009	0.000	0.009	0.000	0.009	0.005	0.005	0.005	0.005
New Hospital	2023	BR*FAH*EF*	0.032	0.000	0.032	0.000	0.032	0.000	0.003	0.003	0.003	0.003
	2024	ED*ASF*A*	0.054	0.000	0.054	0.000	0.054	0.000	0.005	0.005	0.005	0.005
	2025	MAF*CF/AT	0.027	0.004	0.027	0.004	0.027	0.004	0.005	0.005	0.005	0.005
	2026		0.000	0.009	0.000	0.009	0.000	0.009	0.005	0.005	0.005	0.005
	2027		0.000	0.009	0.000	0.009	0.000	0.009	0.005	0.005	0.002	0.002
	2028		0.000	0.004	0.000	0.004	0.000	0.004	0.005	0.002	0.000	0.000
	2029		0.000	0.000	0.000	0.000	0.000	0.000	0.005	0.000	0.000	0.000
Initial phase of Aldea Housing Densification	2028		0.054	0.000	0.054	0.000	0.054	0.000	0.005	0.005	0.005	0.005

	Year	Equation										
	2029		0.002	0.000	0.002	0.000	0.002	0.000	0.000	0.000	0.000	0.000

Risk Calculation Part 1, R1

	Year	Equation	Daycare1 0<2	Daycare1 2<9	Daycare2 0<2	Daycare2 2<9	Daycare3 0<2	Daycare3 2<9	School1 2<16	School2 2<16	School3 2<16	School4 2<16
Irving Street Arrival	2022	IF*CPF*CF	5.00E-05	0.00E+00	5.00E-05	0.00E+00	5.00E-05	0.00E+00	4.68E-06	4.68E-06	4.68E-06	4.68E-06
	2023		5.46E-05	0.00E+00	5.46E-05	0.00E+00	5.46E-05	0.00E+00	5.11E-06	5.11E-06	5.11E-06	5.11E-06
Research and Academic Building	2022		5.00E-05	0.00E+00	5.00E-05	0.00E+00	5.00E-05	0.00E+00	4.68E-06	4.68E-06	4.68E-06	4.68E-06
	2023		5.97E-05	0.00E+00	5.97E-05	0.00E+00	5.97E-05	0.00E+00	5.59E-06	5.59E-06	5.59E-06	5.59E-06
	2024		9.65E-06	8.03E-06	9.65E-06	8.03E-06	9.65E-06	8.03E-06	5.60E-06	5.60E-06	5.60E-06	5.60E-06
	2025		0.00E+00	9.55E-06	0.00E+00	9.55E-06	0.00E+00	9.55E-06	5.59E-06	5.59E-06	5.59E-06	5.59E-06
New Hospital	2023		3.50E-05	0.00E+00	3.50E-05	0.00E+00	3.50E-05	0.00E+00	3.27E-06	3.27E-06	3.27E-06	3.27E-06
	2024		5.98E-05	0.00E+00	5.98E-05	0.00E+00	5.98E-05	0.00E+00	5.60E-06	5.60E-06	5.60E-06	5.60E-06
	2025		2.94E-05	4.84E-06	2.94E-05	4.84E-06	2.94E-05	4.84E-06	5.59E-06	5.59E-06	5.59E-06	5.59E-06
	2026		0.00E+00	9.55E-06	0.00E+00	9.55E-06	0.00E+00	9.55E-06	5.59E-06	5.59E-06	5.59E-06	5.59E-06
	2027		0.00E+00	9.55E-06	0.00E+00	9.55E-06	0.00E+00	9.55E-06	5.59E-06	5.59E-06	2.31E-06	2.31E-06
	2028		0.00E+00	4.73E-06	0.00E+00	4.73E-06	0.00E+00	4.73E-06	5.60E-06	2.31E-06	0.00E+00	0.00E+00
	2029		0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	5.59E-06	0.00E+00	0.00E+00	0.00E+00
Initial phase of Aldea Housing Densification	2028		5.95E-05	0.00E+00	5.95E-05	0.00E+00	5.95E-05	0.00E+00	5.57E-06	5.57E-06	5.57E-06	5.57E-06
	2029		1.80E-06	0.00E+00	1.80E-06	0.00E+00	1.80E-06	0.00E+00	1.68E-07	1.68E-07	1.68E-07	1.68E-07

Diesel Particulate Matter concentration, C_{DPM} (ug/m^3)

Risk Calculation Part 2

																	R1*∑C_{DPM} ISA	R1*∑C_{DPM} RAB	R1*∑C_{DPM} HDMC	R1*∑C_{DPM} IAH	
547880	4178580	0.000	0.000	0.001	0.000	0.000	0.000	0.000	0.001	0.000	0.001	0.000	0.000	0.000	0.002	0.000	1.46E-03	8.20E-03	1.38E-02	9.13E-03	Clarendon Alternative Elementary
547900	4178580	0.000	0.000	0.001	0.000	0.000	0.000	0.000	0.001	0.000	0.001	0.000	0.000	0.000	0.002	0.000	1.44E-03	8.02E-03	1.35E-02	9.02E-03	Clarendon Alternative Elementary
547920	4178580	0.000	0.000	0.001	0.000	0.000	0.000	0.000	0.001	0.000	0.001	0.000	0.000	0.000	0.002	0.000	1.43E-03	8.04E-03	1.35E-02	8.94E-03	Clarendon Alternative Elementary
547860	4178600	0.000	0.000	0.001	0.000	0.000	0.000	0.000	0.001	0.000	0.001	0.000	0.000	0.000	0.002	0.000	1.51E-03	8.32E-03	1.40E-02	1.01E-02	Clarendon Alternative Elementary
547880	4178600	0.000	0.000	0.001	0.000	0.000	0.000	0.000	0.001	0.000	0.001	0.000	0.000	0.000	0.002	0.000	1.49E-03	8.15E-03	1.37E-02	9.92E-03	Clarendon Alternative Elementary
547900	4178600	0.000	0.000	0.001	0.000	0.000	0.000	0.000	0.001	0.000	0.001	0.000	0.000	0.000	0.002	0.000	1.46E-03	7.94E-03	1.34E-02	9.79E-03	Clarendon Alternative Elementary
547920	4178600	0.000	0.000	0.001	0.000	0.000	0.000	0.000	0.001	0.000	0.001	0.000	0.000	0.000	0.002	0.000	1.45E-03	7.97E-03	1.34E-02	9.65E-03	Clarendon Alternative Elementary
547880	4178620	0.000	0.000	0.001	0.000	0.000	0.000	0.000	0.001	0.000	0.001	0.000	0.000	0.000	0.002	0.000	1.52E-03	8.24E-03	1.39E-02	1.08E-02	Clarendon Alternative Elementary
547900	4178620	0.000	0.000	0.001	0.000	0.000	0.000	0.000	0.001	0.000	0.001	0.000	0.000	0.000	0.002	0.000	1.50E-03	8.13E-03	1.37E-02	1.06E-02	Clarendon Alternative Elementary
547880	4178640	0.000	0.000	0.001	0.000	0.000	0.000	0.000	0.001	0.000	0.001	0.000	0.000	0.000	0.002	0.000	1.56E-03	8.46E-03	1.43E-02	1.18E-02	Clarendon Alternative Elementary
547900	4178640	0.000	0.000	0.001	0.000	0.000	0.000	0.000	0.001	0.000	0.001	0.000	0.000	0.000	0.002	0.000	1.54E-03	8.36E-03	1.41E-02	1.16E-02	Clarendon Alternative Elementary
547920	4178640	0.000	0.000	0.001	0.000	0.000	0.000	0.000	0.001	0.000	0.001	0.000	0.000	0.000	0.002	0.000	1.52E-03	8.28E-03	1.39E-02	1.14E-02	Clarendon Alternative Elementary
547880	4178660	0.000	0.000	0.001	0.000	0.000	0.000	0.000	0.001	0.000	0.001	0.000	0.000	0.000	0.002	0.000	1.60E-03	8.59E-03	1.45E-02	1.29E-02	Clarendon Alternative Elementary
547900	4178660	0.000	0.000	0.001	0.000	0.000	0.000	0.000	0.001	0.000	0.001	0.000	0.000	0.000	0.002	0.000	1.58E-03	8.43E-03	1.42E-02	1.27E-02	Clarendon Alternative Elementary
547920	4178660	0.000	0.000	0.001	0.000	0.000	0.000	0.000	0.001	0.000	0.001	0.000	0.000	0.000	0.002	0.000	1.55E-03	8.31E-03	1.40E-02	1.25E-02	Clarendon Alternative Elementary
547900	4178680	0.000	0.000	0.001	0.000	0.000	0.000	0.000	0.001	0.000	0.001	0.000	0.000	0.000	0.003	0.000	1.62E-03	8.58E-03	1.44E-02	1.41E-02	Clarendon Alternative Elementary
547920	4178680	0.000	0.000	0.001	0.000	0.000	0.000	0.000	0.001	0.000	0.001	0.000	0.000	0.000	0.002	0.000	1.59E-03	8.47E-03	1.42E-02	1.38E-02	Clarendon Alternative Elementary
547940	4178680	0.000	0.000	0.001	0.000	0.000	0.000	0.000	0.001	0.000	0.001	0.000	0.000	0.000	0.002	0.000	1.57E-03	8.37E-03	1.40E-02	1.36E-02	Clarendon Alternative Elementary
547220	4179660	0.002	0.002	0.011	0.005	0.005	0.005	0.002	0.004	0.002	0.003	0.002	0.002	0.002	0.001	0.000	2.07E-02	1.37E-01	7.13E-02	2.98E-03	Independence High
547240	4179660	0.003	0.002	0.012	0.006	0.006	0.005	0.003	0.004	0.002	0.004	0.002	0.002	0.002	0.001	0.000	2.22E-02	1.52E-01	7.54E-02	3.06E-03	Independence High
547220	4179680	0.002	0.002	0.010	0.005	0.005	0.004	0.002	0.004	0.002	0.003	0.002	0.002	0.002	0.001	0.000	2.03E-02	1.30E-01	6.92E-02	2.91E-03	Independence High
547240	4179680	0.003	0.002	0.011	0.006	0.005	0.005	0.002	0.004	0.002	0.004	0.002	0.002	0.002	0.001	0.000	2.18E-02	1.42E-01	7.32E-02	2.99E-03	Independence High
547160	4179700	0.002	0.001	0.008	0.004	0.004	0.003	0.002	0.003	0.001	0.003	0.001	0.002	0.002	0.000	0.000	1.62E-02	9.46E-02	4.93E-02	2.64E-03	Stepping Stones Preschool
547180	4179700	0.002	0.002	0.008	0.004	0.004	0.003	0.002	0.003	0.001	0.003	0.001	0.002	0.002	0.000	0.000	1.73E-02	1.02E-01	5.18E-02	2.71E-03	Stepping Stones Preschool
547160	4179720	0.002	0.001	0.007	0.004	0.003	0.003	0.002	0.003	0.001	0.003	0.001	0.001	0.001	0.000	0.000	1.58E-02	8.96E-02	4.78E-02	2.59E-03	Stepping Stones Preschool
547180	4179720	0.002	0.002	0.008	0.004	0.004	0.003	0.002	0.003	0.001	0.003	0.001	0.002	0.002	0.000	0.000	1.69E-02	9.67E-02	5.02E-02	2.65E-03	Stepping Stones Preschool
548260	4179620	0.008	0.006	0.016	0.008	0.007	0.007	0.019	0.030	0.013	0.027	0.013	0.015	0.015	0.001	0.000	7.02E-02	1.94E-01	4.89E-01	7.74E-03	Haight Ashbury Community Nursery School
548280	4179620	0.008	0.006	0.015	0.007	0.007	0.006	0.018	0.028	0.013	0.025	0.012	0.014	0.014	0.001	0.000	6.70E-02	1.85E-01	4.53E-01	7.87E-03	Haight Ashbury Community Nursery School
548260	4179640	0.009	0.007	0.015	0.008	0.007	0.006	0.020	0.031	0.014	0.028	0.014	0.015	0.015	0.001	0.000	7.47E-02	1.92E-01	5.04E-01	7.17E-03	Haight Ashbury Community Nursery School
548280	4179640	0.008	0.006	0.015	0.007	0.007	0.006	0.018	0.029	0.013	0.026	0.013	0.014	0.014	0.001	0.000	7.07E-02	1.82E-01	4.65E-01	7.28E-03	Haight Ashbury Community Nursery School

Diesel Particulate Matter concentration, C_{DPM} (ug/m^3)

Risk Calculation Part 2

X (UTM)	Y (UTM	ISA 2022	ISA 2023	RAB 2022	RAB 2023	RAB 2024	RAB 2025	HDMC 2023	HDMC 2024	HDMC 2025	HDMC 2026	HDMC 2027	HDMC 2028	HDMC 2029	IAH 2028	IAH 2029	R1*∑C_{DPM} ISA	R1*∑C_{DPM} RAB	R1*∑C_{DPM} HDMC	R1*∑C_{DPM} IAH	
547540	4179680	0.012	0.009	0.102	0.050	0.049	0.043	0.009	0.014	0.006	0.013	0.006	0.007	0.007	0.001	0.000	1.07E+00	9.35E+00	1.58E+00	4.62E-02	Lucia Child Care Center
547560	4179680	0.013	0.010	0.127	0.062	0.061	0.053	0.010	0.016	0.007	0.015	0.007	0.008	0.008	0.001	0.000	1.18E+00	1.16E+01	1.82E+00	4.73E-02	Lucia Child Care Center
547540	4179660	0.011	0.008	0.166	0.081	0.080	0.069	0.009	0.015	0.007	0.013	0.007	0.007	0.007	0.001	0.000	9.81E-01	1.52E+01	1.67E+00	4.82E-02	Lucia Child Care Center
547560	4179660	0.011	0.009	0.218	0.107	0.105	0.091	0.011	0.017	0.008	0.015	0.008	0.008	0.009	0.001	0.000	1.06E+00	2.00E+01	1.91E+00	4.93E-02	Lucia Child Care Center
547200	4179140	0.001	0.001	0.006	0.003	0.003	0.002	0.002	0.003	0.001	0.003	0.001	0.001	0.001	0.001	0.000	9.08E-02	5.19E-01	3.19E-01	5.59E-02	ABC Bay Area Child Care
547220	4179140	0.001	0.001	0.006	0.003	0.003	0.002	0.002	0.003	0.001	0.003	0.001	0.001	0.001	0.001	0.000	9.31E-02	5.24E-01	3.23E-01	5.84E-02	ABC Bay Area Child Care
547460	4179400	0.002	0.002	0.030	0.015	0.014	0.012	0.005	0.008	0.003	0.007	0.003	0.004	0.004	0.001	0.000	2.05E-01	2.73E+00	8.79E-01	7.02E-02	Kirkham Child Care Center
547480	4179400	0.002	0.002	0.029	0.014	0.014	0.012	0.005	0.008	0.004	0.007	0.004	0.004	0.004	0.001	0.000	1.97E-01	2.70E+00	9.18E-01	7.35E-02	Kirkham Child Care Center

UCSF Parnassus Heights LRDP

Initial Phase of LRDP (2030)

Unmitigated Construction Annual PM2.5 Concentration by Construction Year

Haul Truck Trip Adjustment Factor to Model

	One Way (miles)					
	ISA	RAB	HDMC	IAH1	IAH2	
CalEEMod, Haul	20	20	20	20	20	*haul truck trip distance as modeled in CalEEMod*
CalEEMod, Vend	7.3	7.3	7.3	7.3	7.3	*vendor trip distance as modeled in CalEEMod*
AERMOD	0.52	0.52	0.52	0.52	0.19	
% in Dispersion Model, Haul	3%	3%	3%	3%	1%	
% in Dispersion Model, Vend	7%	7%	7%	7%	3%	

Construction Emissions, *as applied to AERMOD results*

				Total Unmitigated PM2.5 (tons)				Total Unmitigated PM2.5 (g/s)			
	Year	Start Date	Stop Date	Offroad	Haul/Vend1	Haul/Vend2	Idle	Offroad	Haul1	Haul2	Idle
Irving Street Arrival	2022	3/1/2022	12/31/2022	4.24E-02	5.47E-06	--	1.69E-06	1.22E-03	1.57E-07	--	4.87E-08
	2023	1/1/2023	11/30/2023	3.54E-02	4.29E-06	--	0.00E+00	1.02E-03	1.24E-07	--	0.00E+00
Research and Academic Building	2022	3/1/2022	12/31/2022	1.26E-01	1.03E-04	--	6.12E-05	3.63E-03	2.98E-06	--	1.76E-06
	2023	1/1/2023	12/31/2023	7.65E-02	5.01E-05	--	0.00E+00	2.20E-03	1.44E-06	--	0.00E+00
	2024	1/1/2024	12/31/2024	7.55E-02	4.87E-05	--	0.00E+00	2.17E-03	1.40E-06	--	0.00E+00
	2025	1/1/2025	12/31/2025	6.54E-02	4.65E-05	--	0.00E+00	1.88E-03	1.34E-06	--	0.00E+00
New Hospital	2023	6/1/2023	12/31/2023	4.81E-02	0.00E+00	--	0.00E+00	1.38E-03	0.00E+00	--	0.00E+00
	2024	1/1/2024	12/31/2024	1.27E-01	9.06E-05	--	8.51E-05	3.65E-03	2.61E-06	--	2.45E-06
	2025	1/1/2025	12/31/2025	5.87E-02	1.67E-04	--	0.00E+00	1.69E-03	4.80E-06	--	0.00E+00
	2026	1/1/2026	12/31/2026	1.17E-01	3.18E-04	--	0.00E+00	3.38E-03	9.14E-06	--	0.00E+00
	2027	1/1/2027	12/31/2027	5.87E-02	1.52E-04	--	0.00E+00	1.69E-03	4.36E-06	--	0.00E+00
	2028	1/1/2028	12/31/2028	6.52E-02	1.45E-04	--	0.00E+00	1.88E-03	4.18E-06	--	0.00E+00
	2029	1/1/2029	12/31/2029	6.54E-02	1.40E-04	--	0.00E+00	1.88E-03	4.01E-06	--	0.00E+00
Initial phase of Aldea Housing Densification	2028	1/3/2028	12/31/2028	5.82E-02	1.87E-05	6.81E-06	2.77E-06	1.67E-03	5.37E-07	1.96E-07	7.97E-08
	2029	1/1/2029	1/11/2029	2.30E-04	0.00E+00	0.00E+00	0.00E+00	6.62E-06	0.00E+00	0.00E+00	0.00E+00

Diesel Particulate Matter concentration, C_{DPM} (ug/m^3)

		ISA		RAB				HDMC							IAH		Max by Project			
X (UTM)	Y (UTM	2022	2023	2022	2023	2024	2025	2023	2024	2025	2026	2027	2028	2029	2028	2029	ISA	RAB	HDMC	IAH
547560	4179660	0.009	0.007	0.169	0.102	0.101	0.088	0.006	0.016	0.007	0.015	0.007	0.008	0.008	0.001	0.000	0.009	0.169	0.016	0.001
547520	4179640	0.007	0.006	0.163	0.099	0.097	0.084	0.005	0.013	0.006	0.012	0.006	0.007	0.007	0.001	0.000	0.007	0.163	0.013	0.001
547980	4179080	0.000	0.000	0.001	0.001	0.001	0.001	0.000	0.001	0.000	0.001	0.000	0.001	0.001	0.421	0.002	0.000	0.001	0.001	0.421
547980	4179100	0.000	0.000	0.001	0.001	0.001	0.001	0.000	0.001	0.001	0.001	0.001	0.001	0.001	0.421	0.002	0.000	0.001	0.001	0.421
547540	4179660	0.008	0.007	0.129	0.078	0.077	0.067	0.005	0.014	0.006	0.013	0.006	0.007	0.007	0.001	0.000	0.008	0.129	0.014	0.001
547500	4179640	0.007	0.005	0.116	0.070	0.069	0.060	0.004	0.011	0.005	0.011	0.005	0.006	0.006	0.001	0.000	0.007	0.116	0.011	0.001
548000	4179040	0.000	0.000	0.001	0.001	0.001	0.001	0.000	0.001	0.000	0.001	0.000	0.000	0.000	0.296	0.001	0.000	0.001	0.001	0.296
548000	4179100	0.000	0.000	0.001	0.001	0.001	0.001	0.000	0.001	0.000	0.001	0.000	0.001	0.001	0.295	0.001	0.000	0.001	0.001	0.295
548000	4179060	0.000	0.000	0.001	0.001	0.001	0.001	0.000	0.001	0.000	0.001	0.000	0.001	0.001	0.294	0.001	0.000	0.001	0.001	0.294
548000	4179080	0.000	0.000	0.001	0.001	0.001	0.001	0.000	0.001	0.000	0.001	0.000	0.001	0.001	0.284	0.001	0.000	0.001	0.001	0.284
548000	4179120	0.000	0.000	0.001	0.001	0.001	0.001	0.000	0.001	0.001	0.001	0.001	0.001	0.001	0.279	0.001	0.000	0.001	0.001	0.279
547560	4179680	0.010	0.008	0.098	0.060	0.059	0.051	0.006	0.015	0.007	0.014	0.007	0.008	0.008	0.001	0.000	0.010	0.098	0.015	0.001
547520	4179660	0.008	0.006	0.097	0.059	0.058	0.050	0.004	0.012	0.006	0.011	0.006	0.006	0.006	0.001	0.000	0.008	0.097	0.012	0.001
547440	4179580	0.004	0.004	0.097	0.059	0.058	0.050	0.003	0.009	0.004	0.009	0.004	0.005	0.005	0.001	0.000	0.004	0.097	0.009	0.001
548000	4179020	0.000	0.000	0.001	0.001	0.001	0.001	0.000	0.001	0.000	0.001	0.000	0.000	0.000	0.247	0.001	0.000	0.001	0.001	0.247
547460	4179620	0.005	0.004	0.092	0.056	0.055	0.048	0.003	0.009	0.005	0.009	0.005	0.005	0.005	0.001	0.000	0.005	0.092	0.009	0.001
547440	4179540	0.004	0.003	0.089	0.054	0.053	0.046	0.003	0.009	0.004	0.008	0.004	0.004	0.004	0.001	0.000	0.004	0.089	0.009	0.001
547480	4179640	0.006	0.005	0.088	0.053	0.052	0.045	0.004	0.010	0.005	0.009	0.005	0.005	0.005	0.001	0.000	0.006	0.088	0.010	0.001
547980	4179760	0.022	0.019	0.022	0.013	0.013	0.011	0.072	0.189	0.087	0.175	0.087	0.097	0.097	0.001	0.000	0.022	0.022	0.189	0.001
548000	4179140	0.000	0.000	0.002	0.001	0.001	0.001	0.000	0.001	0.001	0.001	0.001	0.001	0.001	0.194	0.001	0.000	0.002	0.001	0.194
548020	4179080	0.000	0.000	0.001	0.001	0.001	0.001	0.000	0.001	0.000	0.001	0.000	0.001	0.001	0.191	0.001	0.000	0.001	0.001	0.191
547980	4179720	0.016	0.014	0.020	0.012	0.012	0.010	0.061	0.162	0.075	0.150	0.075	0.083	0.084	0.001	0.000	0.016	0.020	0.162	0.001
547980	4179700	0.014	0.011	0.020	0.012	0.012	0.010	0.061	0.161	0.074	0.148	0.074	0.082	0.083	0.001	0.000	0.014	0.020	0.161	0.001
548000	4179760	0.020	0.016	0.021	0.012	0.012	0.011	0.059	0.155	0.072	0.143	0.072	0.080	0.080	0.001	0.000	0.020	0.021	0.155	0.001
547980	4179740	0.019	0.016	0.020	0.012	0.012	0.010	0.058	0.153	0.071	0.141	0.071	0.079	0.079	0.001	0.000	0.019	0.020	0.153	0.001
547860	4179780	0.072	0.060	0.029	0.018	0.017	0.015	0.045	0.119	0.055	0.110	0.055	0.061	0.061	0.001	0.000	0.072	0.029	0.119	0.001
547980	4179780	0.024	0.020	0.021	0.012	0.012	0.011	0.056	0.149	0.069	0.138	0.069	0.077	0.077	0.001	0.000	0.024	0.021	0.149	0.001
547980	4179680	0.011	0.009	0.021	0.013	0.013	0.011	0.055	0.147	0.068	0.135	0.068	0.075	0.075	0.001	0.000	0.011	0.021	0.147	0.001
547740	4179820	0.086	0.072	0.021	0.013	0.012	0.011	0.009	0.023	0.011	0.022	0.011	0.012	0.012	0.001	0.000	0.086	0.021	0.023	0.001
548000	4179700	0.013	0.011	0.020	0.012	0.012	0.010	0.053	0.140	0.065	0.130	0.065	0.072	0.072	0.001	0.000	0.013	0.020	0.140	0.001
547860	4179800	0.073	0.060	0.025	0.015	0.015	0.013	0.027	0.071	0.033	0.066	0.033	0.037	0.037	0.001	0.000	0.073	0.025	0.071	0.001
548000	4179720	0.015	0.013	0.019	0.012	0.012	0.010	0.053	0.139	0.064	0.128	0.064	0.071	0.072	0.001	0.000	0.015	0.019	0.139	0.001
548000	4179740	0.017	0.014	0.019	0.012	0.011	0.010	0.050	0.133	0.062	0.123	0.062	0.068	0.069	0.001	0.000	0.017	0.019	0.133	0.001
547860	4179820	0.065	0.054	0.021	0.013	0.013	0.011	0.018	0.048	0.022	0.044	0.022	0.025	0.025	0.001	0.000	0.065	0.021	0.048	0.001
547760	4179840	0.059	0.049	0.018	0.011	0.011	0.009	0.008	0.022	0.010	0.020	0.010	0.011	0.011	0.001	0.000	0.059	0.018	0.022	0.001
547860	4179840	0.058	0.048	0.018	0.011	0.011	0.009	0.013	0.034	0.016	0.032	0.016	0.018	0.018	0.001	0.000	0.058	0.018	0.034	0.001
547700	4179820	0.046	0.038	0.019	0.012	0.012	0.010	0.007	0.018	0.009	0.017	0.009	0.009	0.009	0.001	0.000	0.046	0.019	0.018	0.001
547740	4179840	0.046	0.039	0.017	0.011	0.010	0.009	0.007	0.020	0.009	0.018	0.009	0.010	0.010	0.001	0.000	0.046	0.017	0.020	0.001
547840	4179860	0.048	0.040	0.016	0.009	0.009	0.008	0.009	0.024	0.011	0.022	0.011	0.012	0.013	0.001	0.000	0.048	0.016	0.024	0.001

AIR Construction HRA Calculations (Mitigated)

UCSF Parnassus Heights LRDP

Initial Phase of LRDP (2030)

Mitigated Irving Street Arrival Construction Cancer Risk Calculations for Residential Child Receptor

Haul Truck Trip Adjustment Factor to Model

	One Way (miles)					
	ISA	RAB	HDMC	IAH1	IAH2	
CalEEMod, Haul	20	20	20	20	20	*haul truck trip distance as modeled in CalEEMod*
CalEEMod, Vend	7.3	7.3	7.3	7.3	7.3	*vendor trip distance as modeled in CalEEMod*
AERMOD	0.52	0.52	0.52	0.52	0.19	
% in Dispersion Model, Haul	3%	3%	3%	3%	1%	
% in Dispersion Model, Vend	7%	7%	7%	7%	3%	

Construction Emissions, *as applied to AERMOD results*

				Days				Total Mitigated DPM (tons)				Total Mitigated DPM (g/s)			
	Year	Start Date	Stop Date	3rd Trimester	0<2	2<9	Duration	Offroad	Haul/Vend1	Haul/Vend2	Idle	Offroad	Haul1	Haul2	Idle
Irving Street Arrival	2022	3/1/2022	12/31/2022	91.00	215.00	0	306	2.40E-03	5.74E-06	--	1.77E-06	8.24E-05	1.97E-07	--	6.07E-08
	2023	1/1/2023	11/30/2023	0.00	334.00	0	334	2.24E-03	4.29E-06	--	0.00E+00	7.04E-05	1.35E-07	--	0.00E+00

Risk Factors

	Abbreviation	UOM	3rd Trimester	0<2	2<9
Daily Breathing Rate (95th %'ile)	DBR	L/kg-day	361	1090	631
Fraction Of Time At Home	FAH	unitless	1	1	1
Exposure Frequency	EF	days/year	0.96	0.96	0.96
Age Sensitivity Factor	ASF	unitless	10	10	3
Inhalation Absorption Factor	A	unitless	1	1	1
Conversion Factor	CF_1	m^3/L	0.001	0.001	0.001
Conversion Factor	CF_2	$\mu g/m^3$	0.001	0.001	0.001
Cancer Potency Factor (diesel exhaust)	CPF	$mg/kg\text{-}day^{-1}$	1.1	1.1	1.1
Averaging Time (for residential exposure)	AT	years	70.00	70.00	70.00

Intake Factor for Inhalation, IF (m^3/kg-day)

	Year	Equation	3rd Trimester	0<2	2<9
Irving Street Arrival	2022	DBR*FAH*EF*ED*ASF*A*CF/AT	0.012	0.088	0.000
	2023		0.000	0.137	0.000

Risk Calculation Part 1, R1

	3rd Trimester	0<2	2<9
IF*CPF*CF	1.36E-05	9.67E-05	0.00E+00
	0.00E+00	1.50E-04	0.00E+00

Diesel Particulate Matter concentration, C_{DPM} (ug/m³) / Risk Calculation Part 2

		ISA		∑R1*C_{DPM}				Cancer Risk	
X (UTM)	Y (UTM	2022	2023	3rd Trimeste	0<2	2<9	Total	per million	Receptor Determination
547740	4179820	0.006	0.005	7.89E-08	1.31E-06	0.00E+00	1.39E-06	1.39	pot. res.
547860	4179800	0.005	0.004	6.64E-08	1.10E-06	0.00E+00	1.17E-06	1.17	pot. res.
547860	4179780	0.005	0.004	6.63E-08	1.10E-06	0.00E+00	1.17E-06	1.17	pot. res.
547860	4179820	0.004	0.004	5.95E-08	9.87E-07	0.00E+00	1.05E-06	1.05	pot. res.
547760	4179840	0.004	0.003	5.42E-08	9.00E-07	0.00E+00	9.55E-07	0.95	pot. res.
547860	4179840	0.004	0.003	5.27E-08	8.76E-07	0.00E+00	9.28E-07	0.93	pot. res.
547840	4179860	0.003	0.003	4.42E-08	7.33E-07	0.00E+00	7.77E-07	0.78	pot. res.
547740	4179840	0.003	0.003	4.24E-08	7.04E-07	0.00E+00	7.47E-07	0.75	pot. res.
547700	4179820	0.003	0.003	4.22E-08	7.00E-07	0.00E+00	7.42E-07	0.74	pot. res.
547860	4179860	0.003	0.003	4.05E-08	6.73E-07	0.00E+00	7.14E-07	0.71	pot. res.
547880	4179860	0.003	0.002	3.62E-08	6.01E-07	0.00E+00	6.38E-07	0.64	pot. res.
547900	4179820	0.003	0.002	3.52E-08	5.84E-07	0.00E+00	6.19E-07	0.62	pot. res.
547720	4179840	0.003	0.002	3.45E-08	5.73E-07	0.00E+00	6.08E-07	0.61	pot. res.
547900	4179840	0.002	0.002	3.15E-08	5.23E-07	0.00E+00	5.54E-07	0.55	pot. res.
547760	4179860	0.002	0.002	3.14E-08	5.21E-07	0.00E+00	5.53E-07	0.55	pot. res.
547900	4179860	0.002	0.002	3.12E-08	5.18E-07	0.00E+00	5.49E-07	0.55	pot. res.
547680	4179820	0.002	0.002	3.11E-08	5.17E-07	0.00E+00	5.48E-07	0.55	pot. res.
547840	4179880	0.002	0.002	3.02E-08	5.02E-07	0.00E+00	5.32E-07	0.53	pot. res.
547860	4179880	0.002	0.002	2.95E-08	4.90E-07	0.00E+00	5.20E-07	0.52	pot. res.
547820	4179880	0.002	0.002	2.93E-08	4.86E-07	0.00E+00	5.16E-07	0.52	pot. res.
547920	4179820	0.002	0.002	2.85E-08	4.74E-07	0.00E+00	5.02E-07	0.50	pot. res.
547700	4179840	0.002	0.002	2.78E-08	4.61E-07	0.00E+00	4.89E-07	0.49	pot. res.
547880	4179880	0.002	0.002	2.77E-08	4.61E-07	0.00E+00	4.88E-07	0.49	pot. res.
547800	4179880	0.002	0.002	2.66E-08	4.41E-07	0.00E+00	4.68E-07	0.47	pot. res.
547740	4179860	0.002	0.002	2.64E-08	4.38E-07	0.00E+00	4.65E-07	0.46	pot. res.
547940	4179800	0.002	0.002	2.63E-08	4.36E-07	0.00E+00	4.63E-07	0.46	pot. res.
547920	4179860	0.002	0.002	2.56E-08	4.25E-07	0.00E+00	4.50E-07	0.45	pot. res.
547900	4179880	0.002	0.002	2.55E-08	4.23E-07	0.00E+00	4.49E-07	0.45	pot. res.
547940	4179820	0.002	0.002	2.46E-08	4.08E-07	0.00E+00	4.32E-07	0.43	pot. res.
547920	4179840	0.002	0.002	2.43E-08	4.04E-07	0.00E+00	4.28E-07	0.43	pot. res.
547660	4179820	0.002	0.001	2.38E-08	3.95E-07	0.00E+00	4.19E-07	0.42	pot. res.
547780	4179880	0.002	0.001	2.32E-08	3.86E-07	0.00E+00	4.09E-07	0.41	pot. res.
547920	4179880	0.002	0.001	2.32E-08	3.85E-07	0.00E+00	4.08E-07	0.41	pot. res.
547960	4179800	0.002	0.001	2.30E-08	3.81E-07	0.00E+00	4.04E-07	0.40	pot. res.
547940	4179860	0.002	0.001	2.30E-08	3.81E-07	0.00E+00	4.04E-07	0.40	pot. res.
547940	4179840	0.002	0.001	2.28E-08	3.78E-07	0.00E+00	4.01E-07	0.40	pot. res.
547720	4179860	0.002	0.001	2.25E-08	3.73E-07	0.00E+00	3.95E-07	0.40	pot. res.
547680	4179840	0.002	0.001	2.22E-08	3.69E-07	0.00E+00	3.92E-07	0.39	pot. res.
547960	4179820	0.002	0.001	2.21E-08	3.67E-07	0.00E+00	3.89E-07	0.39	pot. res.
547980	4179780	0.002	0.001	2.20E-08	3.65E-07	0.00E+00	3.87E-07	0.39	pot. res.
547960	4179840	0.002	0.001	2.17E-08	3.61E-07	0.00E+00	3.83E-07	0.38	pot. res.
547960	4179860	0.002	0.001	2.15E-08	3.57E-07	0.00E+00	3.78E-07	0.38	pot. res.
547860	4179900	0.002	0.001	2.14E-08	3.56E-07	0.00E+00	3.77E-07	0.38	pot. res.
547880	4179900	0.002	0.001	2.11E-08	3.50E-07	0.00E+00	3.71E-07	0.37	pot. res.
547980	4179800	0.002	0.001	2.10E-08	3.48E-07	0.00E+00	3.69E-07	0.37	pot. res.
547940	4179880	0.002	0.001	2.10E-08	3.48E-07	0.00E+00	3.69E-07	0.37	pot. res.
547840	4179900	0.002	0.001	2.10E-08	3.48E-07	0.00E+00	3.69E-07	0.37	pot. res.
547980	4179820	0.002	0.001	2.05E-08	3.41E-07	0.00E+00	3.61E-07	0.36	pot. res.
547980	4179760	0.002	0.001	2.05E-08	3.41E-07	0.00E+00	3.61E-07	0.36	pot. res.
547980	4179840	0.002	0.001	2.04E-08	3.39E-07	0.00E+00	3.59E-07	0.36	pot. res.
547760	4179880	0.002	0.001	2.04E-08	3.38E-07	0.00E+00	3.59E-07	0.36	pot. res.
547900	4179900	0.001	0.001	2.02E-08	3.35E-07	0.00E+00	3.56E-07	0.36	pot. res.
548000	4179780	0.001	0.001	2.01E-08	3.34E-07	0.00E+00	3.54E-07	0.35	pot. res.
547820	4179900	0.001	0.001	1.97E-08	3.28E-07	0.00E+00	3.47E-07	0.35	pot. res.
548000	4179800	0.001	0.001	1.95E-08	3.23E-07	0.00E+00	3.42E-07	0.34	pot. res.
547700	4179860	0.001	0.001	1.92E-08	3.19E-07	0.00E+00	3.38E-07	0.34	pot. res.
547980	4179860	0.001	0.001	1.92E-08	3.18E-07	0.00E+00	3.38E-07	0.34	pot. res.
548000	4179820	0.001	0.001	1.90E-08	3.15E-07	0.00E+00	3.34E-07	0.33	pot. res.
547920	4179900	0.001	0.001	1.90E-08	3.15E-07	0.00E+00	3.34E-07	0.33	pot. res.
547960	4179880	0.001	0.001	1.89E-08	3.14E-07	0.00E+00	3.33E-07	0.33	pot. res.
548020	4179780	0.001	0.001	1.86E-08	3.08E-07	0.00E+00	3.27E-07	0.33	pot. res.
547640	4179820	0.001	0.001	1.84E-08	3.05E-07	0.00E+00	3.24E-07	0.32	pot. res.
548000	4179840	0.001	0.001	1.83E-08	3.03E-07	0.00E+00	3.21E-07	0.32	pot. res.
548020	4179800	0.001	0.001	1.82E-08	3.02E-07	0.00E+00	3.20E-07	0.32	pot. res.
548000	4179760	0.001	0.001	1.81E-08	3.01E-07	0.00E+00	3.19E-07	0.32	pot. res.
547660	4179840	0.001	0.001	1.80E-08	3.00E-07	0.00E+00	3.18E-07	0.32	pot. res.
547740	4179880	0.001	0.001	1.79E-08	2.97E-07	0.00E+00	3.15E-07	0.31	pot. res.
547940	4179900	0.001	0.001	1.76E-08	2.92E-07	0.00E+00	3.10E-07	0.31	pot. res.
547800	4179900	0.001	0.001	1.76E-08	2.92E-07	0.00E+00	3.10E-07	0.31	pot. res.
548020	4179820	0.001	0.001	1.75E-08	2.90E-07	0.00E+00	3.08E-07	0.31	pot. res.
547980	4179740	0.001	0.001	1.72E-08	2.85E-07	0.00E+00	3.03E-07	0.30	pot. res.
548000	4179860	0.001	0.001	1.71E-08	2.84E-07	0.00E+00	3.01E-07	0.30	pot. res.
548040	4179780	0.001	0.001	1.71E-08	2.84E-07	0.00E+00	3.01E-07	0.30	pot. res.
547980	4179880	0.001	0.001	1.70E-08	2.83E-07	0.00E+00	3.00E-07	0.30	pot. res.
548040	4179800	0.001	0.001	1.70E-08	2.82E-07	0.00E+00	2.99E-07	0.30	pot. res.
548020	4179840	0.001	0.001	1.68E-08	2.78E-07	0.00E+00	2.95E-07	0.30	pot. res.
548020	4179760	0.001	0.001	1.64E-08	2.72E-07	0.00E+00	2.88E-07	0.29	pot. res.
547680	4179860	0.001	0.001	1.63E-08	2.71E-07	0.00E+00	2.87E-07	0.29	pot. res.
548040	4179820	0.001	0.001	1.63E-08	2.70E-07	0.00E+00	2.87E-07	0.29	pot. res.
547960	4179900	0.001	0.001	1.62E-08	2.69E-07	0.00E+00	2.86E-07	0.29	pot. res.

UCSF Parnassus Heights LRDP

Initial Phase of LRDP (2030)

Mitigated Research and Academic Building Construction Cancer Risk Calculations for Residential Child Receptor

Haul Truck Trip Adjustment Factor to Model

	One Way (miles)					
	ISA	RAB	HDMC	IAH1	IAH2	
CalEEMod, Haul	20	20	20	20	20	*haul truck trip distance as modeled in CalEEMod*
CalEEMod, Vend	7.3	7.3	7.3	7.3	7.3	*vendor trip distance as modeled in CalEEMod*
AERMOD	0.52	0.52	0.52	0.52	0.19	
% in Dispersion Model, Haul	3%	3%	3%	3%	1%	
% in Dispersion Model, Vend	7%	7%	7%	7%	3%	

Construction Emissions, *as applied to AERMOD results*

				Days				Total Mitigated DPM (tons)				Total Mitigated DPM (g/s)			
	Year	Start Date	Stop Date	3rd Trimester	0<2	2<9	Duration	Offroad	Haul/Vend1	Haul/Vend2	Idle	Offroad	Haul1	Haul2	Idle
Research and Academic Building	2022	3/1/2022	12/31/2022	91.00	215.00	0.00	306					2.27E-04	3.70E-06	--	2.20E-06
	2023	1/1/2023	12/31/2023	0.00	365.00	0.00	365					1.31E-04	1.52E-06	--	0.00E+00
	2024	1/1/2024	12/31/2024	0.00	150.00	216.00	366					1.47E-04	1.46E-06	--	0.00E+00
	2025	1/1/2025	12/31/2025	0.00	0.00	365.00	365					1.47E-04	1.40E-06	--	0.00E+00

Risk Factors

	Abbreviation	UOM	3rd Trimester	0<2	2<9
Daily Breathing Rate (95th %'ile)	DBR	L/kg-day	361	1090	631
Fraction Of Time At Home	FAH	unitless	1	1	1
Exposure Frequency	EF	days/year	0.96	0.96	0.96
Age Sensitivity Factor	ASF	unitless	10	10	3
Inhalation Absorption Factor	A	unitless	1	1	1
Conversion Factor	CF_1	m^3/L	0.001	0.001	0.001
Conversion Factor	CF_2	$\mu g/m^3$	0.001	0.001	0.001
Cancer Potency Factor (diesel exhaust)	CPF	$mg/kg\text{-}day^{-1}$	1.1	1.1	1.1
Averaging Time (for residential exposure)	AT	years	70.00	70.00	70.00

Intake Factor for Inhalation, IF (m^3/kg-day)

	Year	Equation	3rd Trimester	0<2	2<9
Research and Academic Building	2022	DBR*FAH*EF*ED*ASF*A*CF/AT	0.012	0.088	0.000
	2023		0.000	0.149	0.000
	2024		0.000	0.061	0.015
	2025		0.000	0.000	0.026

Risk Calculation Part 1, R1

	3rd Trimester	0<2	2<9
IF*CPF*CF	1.36E-05	9.67E-05	0.00E+00
	0.00E+00	1.64E-04	0.00E+00
	0.00E+00	6.75E-05	1.69E-05
	0.00E+00	0.00E+00	2.86E-05

Diesel Particulate Matter concentration, C_{DPM} (ug/m^3) / Risk Calculation Part 2

X (UTM)	Y (UTM	RAB 2021	RAB 2022	RAB 2023	RAB 2024	$\sum R1*C_{DPM}$ 3rd Trimeste	0<2	2<9	Total	Cancer Risk per million	Receptor Determination
547520	4179640	0.011	0.006	0.007	0.007	1.44E-07	2.46E-06	3.04E-07	2.91E-06	2.91	pot. res.
547500	4179640	0.008	0.004	0.005	0.005	1.02E-07	1.75E-06	2.17E-07	2.07E-06	2.07	pot. res.
547520	4179660	0.006	0.004	0.004	0.004	8.46E-08	1.45E-06	1.80E-07	1.72E-06	1.72	pot. res.
547440	4179580	0.006	0.004	0.004	0.004	8.69E-08	1.49E-06	1.83E-07	1.76E-06	1.76	pot. res.
547460	4179620	0.006	0.003	0.004	0.004	8.28E-08	1.42E-06	1.75E-07	1.67E-06	1.67	pot. res.
547440	4179540	0.006	0.003	0.004	0.004	7.81E-08	1.34E-06	1.66E-07	1.59E-06	1.59	pot. res.
547480	4179640	0.006	0.003	0.004	0.004	7.74E-08	1.33E-06	1.64E-07	1.57E-06	1.57	pot. res.
547440	4179600	0.006	0.003	0.004	0.004	7.87E-08	1.33E-06	1.63E-07	1.58E-06	1.58	pot. res.
547500	4179660	0.005	0.003	0.003	0.003	6.57E-08	1.13E-06	1.40E-07	1.33E-06	1.33	pot. res.
547440	4179520	0.005	0.003	0.003	0.003	6.47E-08	1.11E-06	1.38E-07	1.31E-06	1.31	pot. res.
547420	4179580	0.005	0.003	0.003	0.003	6.32E-08	1.07E-06	1.31E-07	1.27E-06	1.27	pot. res.
547440	4179620	0.004	0.002	0.003	0.003	5.98E-08	1.02E-06	1.26E-07	1.21E-06	1.21	pot. res.
547460	4179640	0.004	0.002	0.003	0.003	5.88E-08	1.01E-06	1.25E-07	1.19E-06	1.19	pot. res.
547520	4179680	0.004	0.002	0.003	0.003	5.55E-08	9.53E-07	1.18E-07	1.13E-06	1.13	pot. res.
547560	4179700	0.004	0.002	0.003	0.003	5.46E-08	9.39E-07	1.16E-07	1.11E-06	1.11	pot. res.
547480	4179660	0.004	0.002	0.003	0.002	5.35E-08	9.19E-07	1.14E-07	1.09E-06	1.09	pot. res.
547420	4179600	0.004	0.002	0.003	0.003	5.65E-08	9.57E-07	1.16E-07	1.13E-06	1.13	pot. res.
547440	4179500	0.004	0.002	0.002	0.002	5.17E-08	8.89E-07	1.10E-07	1.05E-06	1.05	pot. res.
547540	4179700	0.003	0.002	0.002	0.002	4.63E-08	7.96E-07	9.85E-08	9.40E-07	0.94	pot. res.
547500	4179680	0.003	0.002	0.002	0.002	4.59E-08	7.88E-07	9.76E-08	9.32E-07	0.93	pot. res.
547400	4179560	0.003	0.002	0.002	0.002	4.75E-08	8.09E-07	9.92E-08	9.55E-07	0.96	pot. res.
547440	4179640	0.003	0.002	0.002	0.002	4.54E-08	7.79E-07	9.62E-08	9.20E-07	0.92	pot. res.
547400	4179540	0.003	0.002	0.002	0.002	4.55E-08	7.80E-07	9.62E-08	9.22E-07	0.92	pot. res.
547420	4179620	0.003	0.002	0.002	0.002	4.48E-08	7.66E-07	9.42E-08	9.05E-07	0.90	pot. res.
547400	4179580	0.004	0.002	0.002	0.002	5.03E-08	8.42E-07	1.01E-07	9.94E-07	0.99	pot. res.
547460	4179660	0.003	0.002	0.002	0.002	4.30E-08	7.38E-07	9.13E-08	8.73E-07	0.87	pot. res.
547580	4179720	0.003	0.002	0.002	0.002	4.26E-08	7.32E-07	9.07E-08	8.66E-07	0.87	pot. res.
547400	4179520	0.003	0.002	0.002	0.002	4.20E-08	7.21E-07	8.91E-08	8.52E-07	0.85	pot. res.
547440	4179480	0.003	0.002	0.002	0.002	4.12E-08	7.09E-07	8.79E-08	8.38E-07	0.84	pot. res.
547520	4179700	0.003	0.002	0.002	0.002	3.95E-08	6.79E-07	8.41E-08	8.03E-07	0.80	pot. res.
547400	4179600	0.003	0.002	0.002	0.002	4.25E-08	7.21E-07	8.78E-08	8.51E-07	0.85	pot. res.
547480	4179680	0.003	0.002	0.002	0.002	3.92E-08	6.74E-07	8.34E-08	7.97E-07	0.80	pot. res.
547560	4179720	0.003	0.002	0.002	0.002	3.84E-08	6.61E-07	8.18E-08	7.81E-07	0.78	pot. res.
547400	4179500	0.003	0.002	0.002	0.002	3.73E-08	6.40E-07	7.92E-08	7.57E-07	0.76	pot. res.
547380	4179540	0.003	0.002	0.002	0.002	3.67E-08	6.27E-07	7.71E-08	7.41E-07	0.74	pot. res.
547420	4179640	0.003	0.002	0.002	0.002	3.61E-08	6.19E-07	7.63E-08	7.31E-07	0.73	pot. res.
547380	4179560	0.003	0.002	0.002	0.002	3.82E-08	6.47E-07	7.89E-08	7.64E-07	0.76	pot. res.
547440	4179660	0.003	0.001	0.002	0.002	3.54E-08	6.07E-07	7.50E-08	7.18E-07	0.72	pot. res.
547380	4179520	0.003	0.001	0.002	0.002	3.46E-08	5.93E-07	7.31E-08	7.00E-07	0.70	pot. res.
547500	4179700	0.003	0.001	0.002	0.002	3.40E-08	5.85E-07	7.24E-08	6.91E-07	0.69	pot. res.
547540	4179720	0.002	0.001	0.002	0.002	3.39E-08	5.83E-07	7.22E-08	6.89E-07	0.69	pot. res.
547380	4179580	0.003	0.002	0.002	0.002	4.20E-08	6.97E-07	8.25E-08	8.21E-07	0.82	pot. res.
547400	4179620	0.003	0.001	0.002	0.002	3.52E-08	6.00E-07	7.37E-08	7.09E-07	0.71	pot. res.
547440	4179460	0.002	0.001	0.002	0.002	3.36E-08	5.78E-07	7.17E-08	6.84E-07	0.68	pot. res.
547460	4179680	0.002	0.001	0.002	0.002	3.31E-08	5.68E-07	7.02E-08	6.71E-07	0.67	pot. res.
547400	4179480	0.002	0.001	0.002	0.002	3.23E-08	5.55E-07	6.87E-08	6.56E-07	0.66	pot. res.
547380	4179500	0.002	0.001	0.001	0.001	3.17E-08	5.44E-07	6.72E-08	6.42E-07	0.64	pot. res.
547380	4179600	0.003	0.001	0.002	0.002	3.40E-08	5.76E-07	6.99E-08	6.80E-07	0.68	pot. res.
547580	4179740	0.002	0.001	0.001	0.001	3.08E-08	5.29E-07	6.55E-08	6.25E-07	0.62	pot. res.
547480	4179700	0.002	0.001	0.001	0.001	3.00E-08	5.15E-07	6.37E-08	6.09E-07	0.61	pot. res.
547520	4179720	0.002	0.001	0.001	0.001	2.98E-08	5.12E-07	6.34E-08	6.05E-07	0.60	pot. res.
547420	4179660	0.002	0.001	0.001	0.001	2.90E-08	4.97E-07	6.13E-08	5.87E-07	0.59	pot. res.
547360	4179540	0.002	0.001	0.001	0.001	3.00E-08	5.11E-07	6.26E-08	6.03E-07	0.60	pot. res.
547400	4179640	0.002	0.001	0.001	0.001	2.92E-08	5.00E-07	6.16E-08	5.91E-07	0.59	pot. res.
547380	4179480	0.002	0.001	0.001	0.001	2.84E-08	4.88E-07	6.04E-08	5.77E-07	0.58	pot. res.
547360	4179560	0.002	0.001	0.001	0.001	3.14E-08	5.29E-07	6.41E-08	6.25E-07	0.62	pot. res.
547560	4179740	0.002	0.001	0.001	0.001	2.82E-08	4.84E-07	6.00E-08	5.73E-07	0.57	pot. res.
547440	4179440	0.002	0.001	0.001	0.001	2.78E-08	4.78E-07	5.93E-08	5.65E-07	0.56	pot. res.
547400	4179460	0.002	0.001	0.001	0.001	2.78E-08	4.79E-07	5.93E-08	5.66E-07	0.57	pot. res.
547360	4179520	0.002	0.001	0.001	0.001	2.86E-08	4.90E-07	6.03E-08	5.79E-07	0.58	pot. res.
547440	4179680	0.002	0.001	0.001	0.001	2.81E-08	4.82E-07	5.96E-08	5.70E-07	0.57	pot. res.

UCSF Parnassus Heights LRDP

Initial Phase of LRDP (2030)

Mitigated New Hospital Construction Cancer Risk Calculations for Residential Child Receptor

Haul Truck Trip Adjustment Factor to Model

	One Way (miles)					
	ISA	RAB	HDMC	IAH1	IAH2	
CalEEMod, Haul	20	20	20	20	20	*haul truck trip distance as modeled in CalEEMod*
CalEEMod, Vend	7.3	7.3	7.3	7.3	7.3	*vendor trip distance as modeled in CalEEMod*
AERMOD	0.52	0.52	0.52	0.52	0.19	
% in Dispersion Model, Haul	3%	3%	3%	3%	1%	
% in Dispersion Model, Vend	7%	7%	7%	7%	3%	

Construction Emissions, *as applied to AERMOD results*

				Days				Total Umitigated DPM (tons)				Total Umitigated DPM (g/s)			
	Year	Start Date	Stop Date	3rd Trimester	0<2	2<9	Duration	Offroad	Haul/Vend1	Haul/Vend2	Idle	Offroad	Haul1	Haul2	Idle
New Hospital	2023	6/1/2023	12/31/2023	90.00	124.00	0.00	214					1.40E-04	0.00E+00	--	0.00E+00
	2024	1/1/2024	12/31/2024	0.00	366.00	0.00	366					2.77E-04	2.72E-06	--	2.55E-06
	2025	1/1/2025	12/31/2025	0.00	240.00	125.00	365					1.32E-04	5.00E-06	--	0.00E+00
	2026	1/1/2026	12/31/2026	0.00	0.00	365.00	365					2.64E-04	9.55E-06	--	0.00E+00
	2027	1/1/2027	12/31/2027	0.00	0.00	365.00	365					1.32E-04	4.57E-06	--	0.00E+00
	2028	1/1/2028	12/31/2028	0.00	0.00	366.00	366					1.46E-04	4.35E-06	--	0.00E+00
	2029	1/1/2029	12/31/2029	0.00	0.00	365.00	365					1.47E-04	4.20E-06	--	0.00E+00

Risk Factors

	Abbreviation	UOM	3rd Trimester	0<2	2<9
Daily Breathing Rate (95th %'ile)	DBR	L/kg-day	361	1090	631
Fraction Of Time At Home	FAH	unitless	1	1	1
Exposure Frequency	EF	days/year	0.96	0.96	0.96
Age Sensitivity Factor	ASF	unitless	10	10	3
Inhalation Absorption Factor	A	unitless	1	1	1
Conversion Factor	CF_1	m^3/L	0.001	0.001	0.001
Conversion Factor	CF_2	$\mu g/m^3$	0.001	0.001	0.001
Cancer Potency Factor (diesel exhaust)	CPF	$mg/kg\text{-}day^{-1}$	1.1	1.1	1.1
Averaging Time (for residential exposure)	AT	years	70.00	70.00	70.00

Intake Factor for Inhalation, IF (m^3/kg-day)

	Year	Equation	3rd Trimester	0<2	2<9
New Hospital	2023		0.012	0.051	0.000
	2024		0.000	0.150	0.000
	2025	DBR*FAH*EF	0.000	0.098	0.009
	2026	*ED*ASF*A*	0.000	0.000	0.026
	2027	CF/AT	0.000	0.000	0.026
	2028		0.000	0.000	0.026
	2029		0.000	0.000	0.026

Risk Calculation Part 1, R1

	3rd Trimester	0<2	2<9
	1.34E-05	5.58E-05	0.00E+00
	0.00E+00	1.65E-04	0.00E+00
	0.00E+00	1.08E-04	9.78E-06
IF*CPF*CF	0.00E+00	0.00E+00	2.86E-05
	0.00E+00	0.00E+00	2.86E-05
	0.00E+00	0.00E+00	2.86E-05
	0.00E+00	0.00E+00	2.86E-05

Diesel Particulate Matter concentration, C_{DPM} (ug/m^3)

Risk Calculation Part 2

		HDMC							$\sum R1*C_{DPM}$				Cancer Risk	Receptor
X (UTM)	Y (UTM	2023	2024	2025	2026	2027	2028	2029	3rd Trimester	0<2	2<9	Total	per million	Determination
547980	4179760	0.007	0.015	0.007	0.014	0.007	0.008	0.008	9.71E-08	3.54E-06	1.09E-06	4.72E-06	4.72	pot. res.
547980	4179720	0.006	0.012	0.006	0.012	0.006	0.007	0.007	8.33E-08	3.04E-06	9.36E-07	4.06E-06	4.06	pot. res.
547980	4179700	0.006	0.012	0.006	0.012	0.006	0.006	0.006	8.23E-08	3.00E-06	9.25E-07	4.01E-06	4.01	pot. res.
548000	4179760	0.006	0.012	0.006	0.011	0.006	0.006	0.006	7.95E-08	2.90E-06	8.93E-07	3.87E-06	3.87	pot. res.
547980	4179740	0.006	0.012	0.006	0.011	0.006	0.006	0.006	7.85E-08	2.86E-06	8.82E-07	3.82E-06	3.82	pot. res.
547980	4179780	0.006	0.011	0.005	0.011	0.005	0.006	0.006	7.65E-08	2.79E-06	8.60E-07	3.72E-06	3.72	pot. res.
547980	4179680	0.006	0.011	0.005	0.011	0.005	0.006	0.006	7.52E-08	2.74E-06	8.45E-07	3.66E-06	3.66	pot. res.
548000	4179700	0.005	0.011	0.005	0.010	0.005	0.006	0.006	7.20E-08	2.62E-06	8.09E-07	3.51E-06	3.51	pot. res.
548000	4179720	0.005	0.011	0.005	0.010	0.005	0.006	0.006	7.13E-08	2.60E-06	8.01E-07	3.47E-06	3.47	pot. res.
548000	4179740	0.005	0.010	0.005	0.010	0.005	0.005	0.005	6.84E-08	2.49E-06	7.69E-07	3.33E-06	3.33	pot. res.
548000	4179680	0.005	0.010	0.005	0.009	0.005	0.005	0.005	6.65E-08	2.42E-06	7.48E-07	3.24E-06	3.24	pot. res.
548020	4179760	0.005	0.010	0.005	0.009	0.005	0.005	0.005	6.61E-08	2.41E-06	7.44E-07	3.22E-06	3.22	pot. res.
548000	4179780	0.005	0.010	0.005	0.009	0.005	0.005	0.005	6.49E-08	2.36E-06	7.29E-07	3.16E-06	3.16	pot. res.
548040	4179720	0.005	0.010	0.005	0.009	0.005	0.005	0.005	6.36E-08	2.32E-06	7.16E-07	3.10E-06	3.10	pot. res.
547940	4179800	0.005	0.009	0.004	0.009	0.004	0.005	0.005	6.33E-08	2.31E-06	7.12E-07	3.08E-06	3.08	pot. res.
548020	4179720	0.005	0.009	0.004	0.009	0.004	0.005	0.005	6.22E-08	2.27E-06	7.00E-07	3.03E-06	3.03	pot. res.
547960	4179800	0.005	0.009	0.004	0.009	0.004	0.005	0.005	6.18E-08	2.25E-06	6.95E-07	3.01E-06	3.01	pot. res.
548020	4179700	0.005	0.009	0.004	0.009	0.004	0.005	0.005	6.18E-08	2.25E-06	6.95E-07	3.01E-06	3.01	pot. res.
547860	4179780	0.005	0.009	0.004	0.009	0.004	0.005	0.005	6.12E-08	2.24E-06	6.92E-07	2.99E-06	2.99	pot. res.
548040	4179740	0.005	0.009	0.004	0.009	0.004	0.005	0.005	6.13E-08	2.23E-06	6.89E-07	2.98E-06	2.98	pot. res.
548020	4179740	0.005	0.009	0.004	0.009	0.004	0.005	0.005	6.06E-08	2.21E-06	6.82E-07	2.95E-06	2.95	pot. res.
547980	4179660	0.005	0.009	0.004	0.009	0.004	0.005	0.005	6.04E-08	2.20E-06	6.80E-07	2.94E-06	2.94	pot. res.
548040	4179700	0.005	0.009	0.004	0.009	0.004	0.005	0.005	6.04E-08	2.20E-06	6.80E-07	2.94E-06	2.94	pot. res.
548060	4179720	0.004	0.009	0.004	0.008	0.004	0.005	0.005	5.91E-08	2.15E-06	6.65E-07	2.88E-06	2.88	pot. res.
548060	4179700	0.004	0.009	0.004	0.008	0.004	0.005	0.005	5.88E-08	2.14E-06	6.61E-07	2.86E-06	2.86	pot. res.
548020	4179680	0.004	0.009	0.004	0.008	0.004	0.004	0.005	5.74E-08	2.09E-06	6.45E-07	2.79E-06	2.79	pot. res.
547980	4179800	0.004	0.009	0.004	0.008	0.004	0.004	0.004	5.69E-08	2.08E-06	6.41E-07	2.77E-06	2.77	pot. res.
548040	4179760	0.004	0.008	0.004	0.008	0.004	0.004	0.004	5.56E-08	2.03E-06	6.26E-07	2.71E-06	2.71	pot. res.
548000	4179660	0.004	0.008	0.004	0.008	0.004	0.004	0.004	5.56E-08	2.03E-06	6.25E-07	2.71E-06	2.71	pot. res.
548020	4179780	0.004	0.008	0.004	0.008	0.004	0.004	0.004	5.50E-08	2.01E-06	6.19E-07	2.68E-06	2.68	pot. res.
548040	4179680	0.004	0.008	0.004	0.008	0.004	0.004	0.004	5.32E-08	1.94E-06	5.98E-07	2.59E-06	2.59	pot. res.
548060	4179680	0.004	0.008	0.004	0.008	0.004	0.004	0.004	5.30E-08	1.93E-06	5.97E-07	2.58E-06	2.58	pot. res.
548080	4179700	0.004	0.008	0.004	0.007	0.004	0.004	0.004	5.22E-08	1.90E-06	5.87E-07	2.54E-06	2.54	pot. res.
548060	4179740	0.004	0.008	0.004	0.007	0.004	0.004	0.004	5.19E-08	1.89E-06	5.84E-07	2.53E-06	2.53	pot. res.
548000	4179800	0.004	0.008	0.004	0.007	0.004	0.004	0.004	5.08E-08	1.85E-06	5.72E-07	2.48E-06	2.48	pot. res.
548080	4179680	0.004	0.008	0.004	0.007	0.004	0.004	0.004	5.03E-08	1.83E-06	5.66E-07	2.45E-06	2.45	pot. res.
548020	4179660	0.004	0.007	0.004	0.007	0.004	0.004	0.004	4.96E-08	1.81E-06	5.58E-07	2.42E-06	2.42	pot. res.
548040	4179780	0.004	0.007	0.003	0.007	0.003	0.004	0.004	4.71E-08	1.72E-06	5.30E-07	2.29E-06	2.29	pot. res.
548060	4179760	0.003	0.007	0.003	0.007	0.003	0.004	0.004	4.69E-08	1.71E-06	5.28E-07	2.28E-06	2.28	pot. res.
548080	4179720	0.003	0.007	0.003	0.007	0.003	0.004	0.004	4.64E-08	1.69E-06	5.22E-07	2.26E-06	2.26	pot. res.
548040	4179660	0.003	0.007	0.003	0.007	0.003	0.004	0.004	4.63E-08	1.69E-06	5.21E-07	2.26E-06	2.26	pot. res.
548020	4179800	0.003	0.007	0.003	0.006	0.003	0.004	0.004	4.48E-08	1.63E-06	5.04E-07	2.18E-06	2.18	pot. res.
548060	4179660	0.003	0.007	0.003	0.006	0.003	0.003	0.003	4.44E-08	1.62E-06	5.00E-07	2.16E-06	2.16	pot. res.
548080	4179660	0.003	0.007	0.003	0.006	0.003	0.003	0.003	4.42E-08	1.61E-06	4.98E-07	2.15E-06	2.15	pot. res.
548100	4179680	0.003	0.007	0.003	0.006	0.003	0.003	0.003	4.42E-08	1.61E-06	4.98E-07	2.15E-06	2.15	pot. res.
548080	4179740	0.003	0.007	0.003	0.006	0.003	0.003	0.003	4.38E-08	1.60E-06	4.93E-07	2.13E-06	2.13	pot. res.
547980	4179640	0.003	0.006	0.003	0.006	0.003	0.003	0.003	4.30E-08	1.57E-06	4.85E-07	2.10E-06	2.10	pot. res.
547960	4179820	0.003	0.006	0.003	0.006	0.003	0.003	0.003	4.24E-08	1.55E-06	4.78E-07	2.07E-06	2.07	pot. res.
547940	4179820	0.003	0.006	0.003	0.006	0.003	0.003	0.003	4.16E-08	1.52E-06	4.69E-07	2.03E-06	2.03	pot. res.
548000	4179640	0.003	0.006	0.003	0.006	0.003	0.003	0.003	4.13E-08	1.51E-06	4.66E-07	2.01E-06	2.01	pot. res.
547980	4179820	0.003	0.006	0.003	0.006	0.003	0.003	0.003	4.10E-08	1.49E-06	4.62E-07	2.00E-06	2.00	pot. res.
548060	4179780	0.003	0.006	0.003	0.006	0.003	0.003	0.003	4.06E-08	1.48E-06	4.57E-07	1.98E-06	1.98	pot. res.
548100	4179700	0.003	0.006	0.003	0.006	0.003	0.003	0.003	4.04E-08	1.47E-06	4.55E-07	1.97E-06	1.97	pot. res.
548080	4179760	0.003	0.006	0.003	0.006	0.003	0.003	0.003	4.01E-08	1.46E-06	4.51E-07	1.95E-06	1.95	pot. res.
548100	4179660	0.003	0.006	0.003	0.006	0.003	0.003	0.003	3.99E-08	1.46E-06	4.50E-07	1.95E-06	1.95	pot. res.
548100	4179720	0.003	0.006	0.003	0.006	0.003	0.003	0.003	3.94E-08	1.44E-06	4.44E-07	1.92E-06	1.92	pot. res.
548040	4179800	0.003	0.006	0.003	0.006	0.003	0.003	0.003	3.93E-08	1.43E-06	4.43E-07	1.91E-06	1.91	pot. res.
548000	4179820	0.003	0.006	0.003	0.005	0.003	0.003	0.003	3.84E-08	1.40E-06	4.33E-07	1.87E-06	1.87	pot. res.
548020	4179640	0.003	0.006	0.003	0.005	0.003	0.003	0.003	3.83E-08	1.40E-06	4.32E-07	1.87E-06	1.87	pot. res.
547920	4179820	0.003	0.006	0.003	0.005	0.003	0.003	0.003	3.83E-08	1.40E-06	4.33E-07	1.87E-06	1.87	pot. res.

UCSF Parnassus Heights LRDP

Initial Phase of LRDP (2030)

Mitigated Initial Phase of Aldea Housing Densification Construction Cancer Risk Calculations for Residential Child Receptor

Haul Truck Trip Adjustment Factor to Model

	One Way (miles)					
	ISA	RAB	HDMC	IAH1	IAH2	
CalEEMod, Haul	20	20	20	20	20	*haul truck trip distance as modeled in CalEEMod*
CalEEMod, Vend	7.3	7.3	7.3	7.3	7.3	*vendor trip distance as modeled in CalEEMod*
AERMOD	0.52	0.52	0.52	0.52	0.19	
% in Dispersion Model, Haul	3%	3%	3%	3%	1%	
% in Dispersion Model, Vend	7%	7%	7%	7%	3%	

Construction Emissions, *as applied to AERMOD results*

				Days				Total Umitigated DPM (tons)				Total Umitigated DPM (g/s)			
	Year	Start Date	Stop Date	3rd Trimester	0<2	2<9	Duration	Offroad	Haul/Vend1	Haul/Vend2	Idle	Offroad	Haul1	Haul2	Idle
Initial phase of Aldea Housing Densification	2028	1/3/2028	12/31/2028	90.00	274.00	0.00	364	4.54E-03	1.96E-05	7.17E-06	2.89E-06	1.31E-04	5.67E-07	2.07E-07	8.35E-08
	2029	1/1/2029	1/11/2029	0.00	11.00	0.00	11	2.00E-05	0.00E+00	0.00E+00	0.00E+00	1.91E-05	0.00E+00	0.00E+00	0.00E+00

Risk Factors

	Abbreviation	UOM	3rd Trimester	0<2	2<9
Daily Breathing Rate (95th %'ile)	DBR	L/kg-day	361	1090	631
Fraction Of Time At Home	FAH	unitless	1	1	1
Exposure Frequency	EF	days/year	0.96	0.96	0.96
Age Sensitivity Factor	ASF	unitless	10	10	3
Inhalation Absorption Factor	A	unitless	1	1	1
Conversion Factor	CF_1	m^3/L	0.001	0.001	0.001
Conversion Factor	CF_2	$\mu g/m^3$	0.001	0.001	0.001
Cancer Potency Factor (diesel exhaust)	CPF	$mg/kg\text{-}day^{-1}$	1.1	1.1	1.1
Averaging Time (for residential exposure)	AT	years	70.00	70.00	70.00

Intake Factor for Inhalation, IF (m^3/kg-day)

	Year	Equation	3rd Trimester	0<2	2<9
Initial phase of Aldea Housing Densification	2028	DBR*FAH*EF*ED*ASF*A*CF/AT	0.012	0.112	0.000
	2029		0.000	0.004	0.000

Risk Calculation Part 1, R1

IF*CPF*CF	1.34E-05	1.23E-04	0.00E+00
	0.00E+00	4.95E-06	0.00E+00

Diesel Particulate Matter concentration, C_{DPM} (ug/m^3) / Risk Calculation Part 2

		IAH		∑R1*C_{DPM}				Cancer Risk	
X (UTM)	Y (UTM	2028	2029	3rd Trimester	0<2	2<9	Total	per million	Receptor Determination
547980	4179080	0.033	0.005	4.42E-07	4.09E-06	0.00E+00	4.53E-06	4.53	Aldea Housing Res Hall
547980	4179100	0.033	0.005	4.42E-07	4.09E-06	0.00E+00	4.53E-06	4.53	Aldea Housing Res Hall
548000	4179040	0.023	0.003	3.12E-07	2.88E-06	0.00E+00	3.19E-06	3.19	Aldea Housing Res Hall
548000	4179060	0.023	0.003	3.10E-07	2.87E-06	0.00E+00	3.18E-06	3.18	Aldea Housing Res Hall
548000	4179100	0.023	0.003	3.10E-07	2.86E-06	0.00E+00	3.17E-06	3.17	Aldea Housing Res Hall
548000	4179080	0.022	0.003	2.99E-07	2.76E-06	0.00E+00	3.06E-06	3.06	Aldea Housing Res Hall
548000	4179120	0.022	0.003	2.94E-07	2.72E-06	0.00E+00	3.01E-06	3.01	Aldea Housing Res Hall
548000	4179020	0.019	0.003	2.60E-07	2.40E-06	0.00E+00	2.66E-06	2.66	Aldea Housing Res Hall
548000	4179140	0.015	0.002	2.04E-07	1.89E-06	0.00E+00	2.09E-06	2.09	Aldea Housing Res Hall
548020	4179080	0.015	0.002	2.01E-07	1.86E-06	0.00E+00	2.06E-06	2.06	Aldea Housing Res Hall
548020	4179060	0.015	0.002	2.00E-07	1.85E-06	0.00E+00	2.05E-06	2.05	Aldea Housing Res Hall
548020	4179100	0.015	0.002	1.99E-07	1.84E-06	0.00E+00	2.04E-06	2.04	Aldea Housing Res Hall
548020	4179040	0.014	0.002	1.90E-07	1.76E-06	0.00E+00	1.94E-06	1.94	Aldea Housing Res Hall
548020	4179120	0.014	0.002	1.86E-07	1.72E-06	0.00E+00	1.90E-06	1.90	Aldea Housing Res Hall
548020	4179020	0.012	0.002	1.60E-07	1.48E-06	0.00E+00	1.64E-06	1.64	Aldea Housing Res Hall
548040	4179080	0.010	0.002	1.40E-07	1.30E-06	0.00E+00	1.44E-06	1.44	Aldea Housing Res Hall
548040	4179060	0.010	0.002	1.39E-07	1.28E-06	0.00E+00	1.42E-06	1.42	Aldea Housing Res Hall
548040	4179100	0.010	0.001	1.37E-07	1.27E-06	0.00E+00	1.41E-06	1.41	Aldea Housing Res Hall
548020	4179140	0.010	0.001	1.37E-07	1.27E-06	0.00E+00	1.40E-06	1.40	Aldea Housing Res Hall
548040	4179040	0.010	0.001	1.29E-07	1.19E-06	0.00E+00	1.32E-06	1.32	Aldea Housing Res Hall
548040	4179120	0.009	0.001	1.23E-07	1.14E-06	0.00E+00	1.26E-06	1.26	Aldea Housing Res Hall
548020	4179000	0.009	0.001	1.18E-07	1.09E-06	0.00E+00	1.20E-06	1.20	Aldea Housing Res Hall
548040	4179020	0.008	0.001	1.11E-07	1.03E-06	0.00E+00	1.14E-06	1.14	Aldea Housing Res Hall
548060	4179080	0.008	0.001	1.04E-07	9.60E-07	0.00E+00	1.06E-06	1.06	Aldea Housing Res Hall
548060	4179060	0.007	0.001	9.99E-08	9.24E-07	0.00E+00	1.02E-06	1.02	Aldea Housing Res Hall
548060	4179100	0.007	0.001	9.99E-08	9.24E-07	0.00E+00	1.02E-06	1.02	Aldea Housing Res Hall
548000	4179160	0.007	0.001	9.61E-08	8.89E-07	0.00E+00	9.85E-07	0.98	Aldea Housing Res Hall
548040	4179140	0.007	0.001	9.53E-08	8.81E-07	0.00E+00	9.77E-07	0.98	Aldea Housing Res Hall
548060	4179040	0.007	0.001	9.50E-08	8.78E-07	0.00E+00	9.73E-07	0.97	Aldea Housing Res Hall
548060	4179120	0.007	0.001	9.29E-08	8.59E-07	0.00E+00	9.51E-07	0.95	Aldea Housing Res Hall
547980	4179160	0.007	0.001	8.84E-08	8.17E-07	0.00E+00	9.05E-07	0.91	Aldea Housing Res Hall
548040	4179000	0.007	0.001	8.79E-08	8.13E-07	0.00E+00	9.01E-07	0.90	Aldea Housing Res Hall
548020	4179160	0.006	0.001	8.64E-08	7.99E-07	0.00E+00	8.86E-07	0.89	Aldea Housing Res Hall
548060	4179020	0.006	0.001	8.42E-08	7.79E-07	0.00E+00	8.63E-07	0.86	Aldea Housing Res Hall
548080	4179080	0.006	0.001	7.80E-08	7.21E-07	0.00E+00	7.99E-07	0.80	Aldea Housing Res Hall
548080	4179060	0.006	0.001	7.76E-08	7.18E-07	0.00E+00	7.95E-07	0.80	Aldea Housing Res Hall
548060	4179140	0.006	0.001	7.58E-08	7.01E-07	0.00E+00	7.76E-07	0.78	Aldea Housing Res Hall
548080	4179100	0.006	0.001	7.42E-08	6.86E-07	0.00E+00	7.60E-07	0.76	Aldea Housing Res Hall
548080	4179040	0.006	0.001	7.42E-08	6.86E-07	0.00E+00	7.60E-07	0.76	Aldea Housing Res Hall
548040	4179160	0.005	0.001	7.12E-08	6.58E-07	0.00E+00	7.29E-07	0.73	Aldea Housing Res Hall
548080	4179120	0.005	0.001	6.94E-08	6.42E-07	0.00E+00	7.11E-07	0.71	Aldea Housing Res Hall
548100	4179080	0.005	0.001	6.21E-08	5.74E-07	0.00E+00	6.36E-07	0.64	Aldea Housing Res Hall
548080	4179140	0.004	0.001	6.01E-08	5.55E-07	0.00E+00	6.15E-07	0.62	Aldea Housing Res Hall
548100	4179100	0.004	0.001	5.89E-08	5.45E-07	0.00E+00	6.04E-07	0.60	Aldea Housing Res Hall
548060	4179160	0.004	0.001	5.85E-08	5.41E-07	0.00E+00	6.00E-07	0.60	Aldea Housing Res Hall
548100	4179120	0.004	0.001	5.44E-08	5.03E-07	0.00E+00	5.58E-07	0.56	Aldea Housing Res Hall
548020	4179180	0.004	0.001	5.23E-08	4.84E-07	0.00E+00	5.36E-07	0.54	Aldea Housing Res Hall
548000	4179180	0.004	0.001	5.13E-08	4.75E-07	0.00E+00	5.26E-07	0.53	Aldea Housing Res Hall
548080	4179160	0.004	0.001	5.00E-08	4.62E-07	0.00E+00	5.12E-07	0.51	Aldea Housing Res Hall
548040	4179180	0.004	0.001	4.97E-08	4.60E-07	0.00E+00	5.09E-07	0.51	Aldea Housing Res Hall
548100	4179140	0.004	0.001	4.93E-08	4.56E-07	0.00E+00	5.05E-07	0.51	Aldea Housing Res Hall
548120	4179100	0.004	0.001	4.88E-08	4.51E-07	0.00E+00	5.00E-07	0.50	Aldea Housing Res Hall
548120	4179120	0.003	0.000	4.55E-08	4.21E-07	0.00E+00	4.66E-07	0.47	Aldea Housing Res Hall
548060	4179180	0.003	0.000	4.50E-08	4.17E-07	0.00E+00	4.62E-07	0.46	Aldea Housing Res Hall
548100	4179160	0.003	0.000	4.23E-08	3.91E-07	0.00E+00	4.33E-07	0.43	Aldea Housing Res Hall
548120	4179140	0.003	0.000	4.06E-08	3.75E-07	0.00E+00	4.16E-07	0.42	Aldea Housing Res Hall
548080	4179180	0.003	0.000	3.92E-08	3.62E-07	0.00E+00	4.02E-07	0.40	Aldea Housing Res Hall
548140	4179120	0.003	0.000	3.78E-08	3.49E-07	0.00E+00	3.87E-07	0.39	Aldea Housing Res Hall
548100	4179180	0.003	0.000	3.54E-08	3.27E-07	0.00E+00	3.63E-07	0.36	Aldea Housing Res Hall
548120	4179160	0.003	0.000	3.49E-08	3.23E-07	0.00E+00	3.58E-07	0.36	Aldea Housing Res Hall
548140	4179140	0.003	0.000	3.43E-08	3.17E-07	0.00E+00	3.51E-07	0.35	Aldea Housing Res Hall
548160	4179120	0.002	0.000	3.24E-08	2.99E-07	0.00E+00	3.32E-07	0.33	Aldea Housing Res Hall
548140	4179160	0.002	0.000	3.05E-08	2.82E-07	0.00E+00	3.12E-07	0.31	Aldea Housing Res Hall
548120	4179180	0.002	0.000	3.04E-08	2.81E-07	0.00E+00	3.11E-07	0.31	Aldea Housing Res Hall
548080	4179200	0.002	0.000	3.01E-08	2.78E-07	0.00E+00	3.08E-07	0.31	Aldea Housing Res Hall
548160	4179140	0.002	0.000	2.96E-08	2.74E-07	0.00E+00	3.04E-07	0.30	Aldea Housing Res Hall
548100	4179200	0.002	0.000	2.82E-08	2.61E-07	0.00E+00	2.89E-07	0.29	Aldea Housing Res Hall
548160	4179160	0.002	0.000	2.73E-08	2.53E-07	0.00E+00	2.80E-07	0.28	Aldea Housing Res Hall
548180	4179140	0.002	0.000	2.69E-08	2.48E-07	0.00E+00	2.75E-07	0.28	Aldea Housing Res Hall
548140	4179180	0.002	0.000	2.68E-08	2.48E-07	0.00E+00	2.75E-07	0.27	Aldea Housing Res Hall
548120	4179200	0.002	0.000	2.54E-08	2.35E-07	0.00E+00	2.61E-07	0.26	Aldea Housing Res Hall
548180	4179160	0.002	0.000	2.41E-08	2.23E-07	0.00E+00	2.47E-07	0.25	Aldea Housing Res Hall
548080	4179220	0.002	0.000	2.34E-08	2.16E-07	0.00E+00	2.40E-07	0.24	Aldea Housing Res Hall
548160	4179180	0.002	0.000	2.32E-08	2.15E-07	0.00E+00	2.38E-07	0.24	Aldea Housing Res Hall
548140	4179200	0.002	0.000	2.22E-08	2.05E-07	0.00E+00	2.27E-07	0.23	Aldea Housing Res Hall
548100	4179220	0.002	0.000	2.21E-08	2.05E-07	0.00E+00	2.27E-07	0.23	Aldea Housing Res Hall

UCSF Parnassus Heights LRDP

Initial Phase of LRDP (2030)

Mitigated Construction Hazard Index Calculations for Residential Child Receptor

Haul Truck Trip Adjustment Factor to Model

	One Way (miles)					
	ISA	RAB	HDMC	IAH1	IAH2	
CalEEMod, Haul	20	20	20	20	20	*haul truck trip distance as modeled in CalEEMod*
CalEEMod, Vend	7.3	7.3	7.3	7.3	7.3	*vendor trip distance as modeled in CalEEMod*
AERMOD	0.52	0.52	0.52	0.52	0.19	
% in Dispersion Model, Haul	3%	3%	3%	3%	1%	
% in Dispersion Model, Vend	7%	7%	7%	7%	3%	

HI DPM
5

Construction Emissions, *as applied to AERMOD results*

				Total Mitigated DPM (tons)				Total Mitigated DPM (g/s)			
	Year	Start Date	Stop Date	Offroad	Haul/Vend1	Haul/Vend2	Idle	Offroad	Haul1	Haul2	Idle
Irving Street Arrival	2022	3/1/2022	12/31/2022	2.40E-03	5.74E-06	--	1.77E-06	6.90E-05	1.65E-07	--	5.09E-08
	2023	1/1/2023	11/30/2023	2.24E-03	4.29E-06	--	0.00E+00	6.44E-05	1.24E-07	--	0.00E+00
Research and Academic Building	2022	3/1/2022	12/31/2022	6.63E-03	1.08E-04	--	6.40E-05	1.91E-04	3.10E-06	--	1.84E-06
	2023	1/1/2023	12/31/2023	4.57E-03	5.30E-05	--	0.00E+00	1.31E-04	1.52E-06	--	0.00E+00
	2024	1/1/2024	12/31/2024	5.13E-03	5.08E-05	--	0.00E+00	1.48E-04	1.46E-06	--	0.00E+00
	2025	1/1/2025	12/31/2025	5.11E-03	4.87E-05	--	0.00E+00	1.47E-04	1.40E-06	--	0.00E+00
New Hospital	2023	6/1/2023	12/31/2023	2.85E-03	0.00E+00	--	0.00E+00	8.20E-05	0.00E+00	--	0.00E+00
	2024	1/1/2024	12/31/2024	9.67E-03	9.48E-05	--	8.89E-05	2.78E-04	2.73E-06	--	2.56E-06
	2025	1/1/2025	12/31/2025	4.59E-03	1.74E-04	--	0.00E+00	1.32E-04	5.00E-06	--	0.00E+00
	2026	1/1/2026	12/31/2026	9.18E-03	3.32E-04	--	0.00E+00	2.64E-04	9.55E-06	--	0.00E+00
	2027	1/1/2027	12/31/2027	4.59E-03	1.59E-04	--	0.00E+00	1.32E-04	4.57E-06	--	0.00E+00
	2028	1/1/2028	12/31/2028	5.09E-03	1.52E-04	--	0.00E+00	1.46E-04	4.36E-06	--	0.00E+00
	2029	1/1/2029	12/31/2029	5.11E-03	1.46E-04	--	0.00E+00	1.47E-04	4.20E-06	--	0.00E+00
Initial phase of Aldea Housing Densification	2028	1/3/2028	12/31/2028	4.54E-03	1.96E-05	7.17E-06	2.89E-06	1.31E-04	5.65E-07	2.06E-07	8.33E-08
	2029	1/1/2029	1/11/2029	2.00E-05	0.00E+00	0.00E+00	0.00E+00	5.75E-07	0.00E+00	0.00E+00	0.00E+00

Diesel Particulate Matter concentration, C_{DPM} (ug/m^3)

By project

		ISA		RAB				HDMC							IAH		ISA	RAB	HDMC	IAH
X (UTM)	Y (UTM	2022	2023	2022	2023	2024	2025	2023	2024	2025	2026	2027	2028	2029	2028	2029				
547560	4179660	0.001	0.000	0.009	0.006	0.007	0.007	0.000	0.001	0.001	0.002	0.001	0.001	0.001	0.000	0.000	0.000	0.002	0.000	0.000
547520	4179640	0.000	0.000	0.009	0.006	0.007	0.007	0.000	0.001	0.001	0.002	0.001	0.001	0.001	0.000	0.000	0.000	0.002	0.000	0.000
547540	4179660	0.000	0.000	0.007	0.005	0.005	0.005	0.000	0.001	0.001	0.001	0.001	0.001	0.001	0.000	0.000	0.000	0.001	0.000	0.000
547500	4179640	0.000	0.000	0.006	0.004	0.005	0.005	0.000	0.001	0.001	0.001	0.001	0.001	0.001	0.000	0.000	0.000	0.001	0.000	0.000
547440	4179580	0.000	0.000	0.005	0.004	0.004	0.004	0.000	0.001	0.001	0.001	0.001	0.001	0.001	0.000	0.000	0.000	0.001	0.000	0.000
547560	4179680	0.001	0.001	0.005	0.004	0.004	0.004	0.000	0.001	0.001	0.001	0.001	0.001	0.001	0.000	0.000	0.000	0.001	0.000	0.000
547520	4179660	0.000	0.000	0.005	0.004	0.004	0.004	0.000	0.001	0.001	0.001	0.001	0.001	0.001	0.000	0.000	0.000	0.001	0.000	0.000
547460	4179620	0.000	0.000	0.005	0.003	0.004	0.004	0.000	0.001	0.001	0.001	0.001	0.001	0.001	0.000	0.000	0.000	0.001	0.000	0.000
547440	4179540	0.000	0.000	0.005	0.003	0.004	0.004	0.000	0.001	0.000	0.001	0.000	0.000	0.000	0.000	0.000	0.000	0.001	0.000	0.000
547480	4179640	0.000	0.000	0.005	0.003	0.004	0.004	0.000	0.001	0.001	0.001	0.001	0.001	0.001	0.000	0.000	0.000	0.001	0.000	0.000
547860	4179780	0.004	0.004	0.002	0.001	0.001	0.001	0.003	0.009	0.004	0.009	0.004	0.005	0.005	0.000	0.000	0.001	0.000	0.002	0.000
547860	4179800	0.004	0.004	0.001	0.001	0.001	0.001	0.002	0.006	0.003	0.005	0.003	0.003	0.003	0.000	0.000	0.001	0.000	0.001	0.000
547980	4179760	0.001	0.001	0.001	0.001	0.001	0.001	0.004	0.015	0.007	0.014	0.007	0.008	0.008	0.000	0.000	0.000	0.000	0.003	0.000
547740	4179820	0.005	0.005	0.001	0.001	0.001	0.001	0.001	0.002	0.001	0.002	0.001	0.001	0.001	0.000	0.000	0.001	0.000	0.000	0.000
547860	4179820	0.004	0.003	0.001	0.001	0.001	0.001	0.001	0.004	0.002	0.004	0.002	0.002	0.002	0.000	0.000	0.001	0.000	0.001	0.000
547980	4179780	0.001	0.001	0.001	0.001	0.001	0.001	0.003	0.011	0.005	0.011	0.005	0.006	0.006	0.000	0.000	0.000	0.000	0.002	0.000
548000	4179760	0.001	0.001	0.001	0.001	0.001	0.001	0.003	0.012	0.006	0.011	0.006	0.006	0.006	0.000	0.000	0.000	0.000	0.002	0.000
547980	4179720	0.001	0.001	0.001	0.001	0.001	0.001	0.004	0.013	0.006	0.012	0.006	0.007	0.007	0.000	0.000	0.000	0.000	0.003	0.000
547980	4179740	0.001	0.001	0.001	0.001	0.001	0.001	0.003	0.012	0.006	0.011	0.006	0.006	0.006	0.000	0.000	0.000	0.000	0.002	0.000
547980	4179700	0.001	0.001	0.001	0.001	0.001	0.001	0.004	0.012	0.006	0.012	0.006	0.006	0.006	0.000	0.000	0.000	0.000	0.002	0.000
547980	4179680	0.001	0.001	0.001	0.001	0.001	0.001	0.003	0.011	0.005	0.011	0.005	0.006	0.006	0.000	0.000	0.000	0.000	0.002	0.000
548000	4179720	0.001	0.001	0.001	0.001	0.001	0.001	0.003	0.011	0.005	0.010	0.005	0.006	0.006	0.000	0.000	0.000	0.000	0.002	0.000
548000	4179700	0.001	0.001	0.001	0.001	0.001	0.001	0.003	0.011	0.005	0.010	0.005	0.006	0.006	0.000	0.000	0.000	0.000	0.002	0.000
548000	4179740	0.001	0.001	0.001	0.001	0.001	0.001	0.003	0.010	0.005	0.010	0.005	0.005	0.005	0.000	0.000	0.000	0.000	0.002	0.000
547860	4179840	0.003	0.003	0.001	0.001	0.001	0.001	0.001	0.003	0.001	0.003	0.001	0.001	0.001	0.000	0.000	0.001	0.000	0.001	0.000
547760	4179840	0.003	0.003	0.001	0.001	0.001	0.001	0.000	0.002	0.001	0.002	0.001	0.001	0.001	0.000	0.000	0.001	0.000	0.000	0.000
547700	4179820	0.003	0.002	0.001	0.001	0.001	0.001	0.000	0.001	0.001	0.001	0.001	0.001	0.001	0.000	0.000	0.001	0.000	0.000	0.000
547840	4179860	0.003	0.003	0.001	0.001	0.001	0.001	0.001	0.002	0.001	0.002	0.001	0.001	0.001	0.000	0.000	0.001	0.000	0.000	0.000
547740	4179840	0.003	0.002	0.001	0.001	0.001	0.001	0.000	0.002	0.001	0.001	0.001	0.001	0.001	0.000	0.000	0.001	0.000	0.000	0.000
547860	4179860	0.003	0.002	0.001	0.001	0.001	0.001	0.001	0.002	0.001	0.002	0.001	0.001	0.001	0.000	0.000	0.001	0.000	0.000	0.000
547980	4179100	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.033	0.000	0.000	0.000	0.000	0.007
547980	4179080	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.033	0.000	0.000	0.000	0.000	0.007
548000	4179100	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.023	0.000	0.000	0.000	0.000	0.005
548000	4179060	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.023	0.000	0.000	0.000	0.000	0.005
548000	4179120	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.022	0.000	0.000	0.000	0.000	0.004
548000	4179040	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.023	0.000	0.000	0.000	0.000	0.005
548000	4179080	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.022	0.000	0.000	0.000	0.000	0.004
548000	4179020	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.019	0.000	0.000	0.000	0.000	0.004
548000	4179140	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.015	0.000	0.000	0.000	0.000	0.003
548020	4179080	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.015	0.000	0.000	0.000	0.000	0.003
547440	4179600	0.000	0.000	0.005	0.003	0.004	0.004	0.000	0.001	0.001	0.002	0.001	0.001	0.001	0.000	0.000	0.000	0.001	0.000	0.000
547540	4179680	0.001	0.000	0.004	0.003	0.003	0.003	0.000	0.001	0.001	0.001	0.001	0.001	0.001	0.000	0.000	0.000	0.001	0.000	0.000
547500	4179660	0.000	0.000	0.004	0.003	0.003	0.003	0.000	0.001	0.001	0.001	0.001	0.001	0.001	0.000	0.000	0.000	0.001	0.000	0.000
547440	4179520	0.000	0.000	0.004	0.003	0.003	0.003	0.000	0.001	0.000	0.001	0.000	0.000	0.000	0.000	0.000	0.000	0.001	0.000	0.000

UCSF Parnassus Heights LRDP

Initial Phase of LRDP (2030)

Mitigated Construction Cancer Risk Calculations for Daycare and School Receptors

Solver was used to maximize the exposure

Haul Truck Trip Adjustment Factor to Model

	One Way (miles)					
	ISA	RAB	HDMC	IAH1	IAH2	
CalEEMod, Haul	20	20	20	20	20	*haul truck trip distance as modeled in CalEEMod*
CalEEMod, Vend	7.3	7.3	7.3	7.3	7.3	*vendor trip distance as modeled in CalEEMod*
AERMOD	0.52	0.52	0.52	0.52	0.19	
% in Dispersion Model, Haul	3%	3%	3%	3%	1%	
% in Dispersion Model, Vend	7%	7%	7%	7%	3%	

Construction Emissions, *as represented in AERMOD*

					Total Mitigated DPM (tons)				Total Mitigated DPM (g/s)			
	Year	Start Date	Stop Date	Duration (Days)	Offroad	Haul/Vend1	Haul/Vend2	Idle	Offroad	Haul1	Haul2	Idle
Irving Street Arrival	2022	3/1/2022	12/31/2022	306	2.40E-03	5.74E-06	--	1.77E-06	8.24E-05	1.97E-07	--	6.07E-08
	2023	1/1/2023	11/30/2023	334	2.24E-03	4.29E-06	--	0.00E+00	7.04E-05	1.35E-07	--	0.00E+00
Research and Academic Building	2022	3/1/2022	12/31/2022	306	6.63E-03	1.08E-04	--	6.40E-05	2.27E-04	3.70E-06	--	2.20E-06
	2023	1/1/2023	12/31/2023	365	4.57E-03	5.30E-05	--	0.00E+00	1.31E-04	1.52E-06	--	0.00E+00
	2024	1/1/2024	12/31/2024	366	5.13E-03	5.08E-05	--	0.00E+00	1.47E-04	1.46E-06	--	0.00E+00
	2025	1/1/2025	12/31/2025	365	5.11E-03	4.87E-05	--	0.00E+00	1.47E-04	1.40E-06	--	0.00E+00
New Hospital	2023	6/1/2023	12/31/2023	214	2.85E-03	0.00E+00	--	0.00E+00	1.40E-04	0.00E+00	--	0.00E+00
	2024	1/1/2024	12/31/2024	366	9.67E-03	9.48E-05	--	8.89E-05	2.77E-04	2.72E-06	--	2.55E-06
	2025	1/1/2025	12/31/2025	365	4.59E-03	1.74E-04	--	0.00E+00	1.32E-04	5.00E-06	--	0.00E+00
	2026	1/1/2026	12/31/2026	365	9.18E-03	3.32E-04	--	0.00E+00	2.64E-04	9.55E-06	--	0.00E+00
	2027	1/1/2027	12/31/2027	365	4.59E-03	1.59E-04	--	0.00E+00	1.32E-04	4.57E-06	--	0.00E+00
	2028	1/1/2028	12/31/2028	366	5.09E-03	1.52E-04	--	0.00E+00	1.46E-04	4.35E-06	--	0.00E+00
	2029	1/1/2029	12/31/2029	365	5.11E-03	1.46E-04	--	0.00E+00	1.47E-04	4.20E-06	--	0.00E+00
Initial phase of Aldea Housing Densification	2028	1/3/2028	12/31/2028	364	4.54E-03	1.96E-05	7.17E-06	2.89E-06	1.31E-04	5.67E-07	2.07E-07	8.35E-08
	2029	1/1/2029	1/11/2029	11	2.00E-05	0.00E+00	0.00E+00	0.00E+00	1.91E-05	0.00E+00	0.00E+00	0.00E+00

		Daycare1		Daycare2		Daycare3		School1	School2	School3	School4
Name		Lucia Child Care Center		ABC Bay Area Child Care		Kirkham Child Care Center		Clarendon Alternative Elementary	Independence High	Stepping Stones Preschool	Haight Ashbury Community Nursery School
Max Exposure (years)		5		5		5		7	5	4	4
Exposure Duration	Year	0<2	2<9	0<2	2<9	0<2	2<9	2<16	2<16	2<16	2<16
Irving Street Arrival	2022	306.00	0.00	306.00	0.00	306.00	0.00	306.00	306.00	306.00	306.00
	2023	334.00	0.00	334.00	0.00	334.00	0.00	334.00	334.00	334.00	334.00
Research and Academic Building	2022	306.00	0.00	306.00	0.00	306.00	0.00	306.00	306.00	306.00	306.00
	2023	365.00	0.00	365.00	0.00	365.00	0.00	365.00	365.00	365.00	365.00
	2024	59.00	307.00	59.00	307.00	59.00	307.00	366.00	366.00	366.00	366.00
	2025	0.00	365.00	0.00	365.00	0.00	365.00	365.00	365.00	365.00	365.00
New Hospital	2023	214.00	0.00	214.00	0.00	214.00	0.00	214.00	214.00	214.00	214.00
	2024	366.00	0.00	366.00	0.00	366.00	0.00	366.00	366.00	366.00	366.00
	2025	180.00	185.00	180.00	185.00	180.00	185.00	365.00	365.00	365.00	365.00
	2026	0.00	365.00	0.00	365.00	0.00	365.00	365.00	365.00	365.00	365.00
	2027	0.00	365.00	0.00	365.00	0.00	365.00	365.00	365.00	151.00	151.00
	2028	0.00	181.00	0.00	181.00	0.00	181.00	366.00	151.00	0.00	0.00
	2029	0.00	0.00	0.00	0.00	0.00	0.00	365.00	0.00	0.00	0.00
Initial phase of Aldea Housing Densification	2028	364.00	0.00	364.00	0.00	364.00	0.00	364.00	364.00	364.00	364.00
	2029	11.00	0.00	11.00	0.00	11.00	0.00	11.00	11.00	11.00	11.00
		730.00	1096.0	730	1096	730	1096	2556.00	1826.00	1461	1461.00

Risk Factors

			Daycare		School
	Abbreviation	UOM	0<2	2<9	2<16
8HR Breathing Rate (95th %'ile, moderate intensity)	BR	L/kg-day	1200	640	520
Fraction Of Time At Home	FAH	unitless	0.33	0.33	0.33
Exposure Frequency	EF	days/year	0.68	0.68	0.49
Age Sensitivity Factor	ASF	unitless	10	3	3
Inhalation Absorption Factor	A	unitless	1	1	1
Modeling Adjustment Factor	MAF	unitless	1.4	1.4	1.4
Conversion Factor	CF_1	m^3/L	0.001	0.001	0.001
Conversion Factor	CF_2	$\mu g/m^3$	0.001	0.001	0.001
Cancer Potency Factor (diesel exhaust)	CPF	$mg/kg\text{-}day^{-1}$	1.1	1.1	1.1
Averaging Time (for residential exposure)	AT	years	70.00	70.00	70.00

Intake Factor for Inhalation, IF ($m^3/kg\text{-}day$)

			Daycare1		Daycare2		Daycare3		School1	School2	School3	School4
	Year	Equation	0<2	2<9	0<2	2<9	0<2	2<9	2<16	2<16	2<16	2<16
Irving Street Arrival	2022		0.045	0.000	0.045	0.000	0.045	0.000	0.004	0.004	0.004	0.004
	2023		0.050	0.000	0.050	0.000	0.050	0.000	0.005	0.005	0.005	0.005
Research and Academic Building	2022		0.045	0.000	0.045	0.000	0.045	0.000	0.004	0.004	0.004	0.004
	2023		0.054	0.000	0.054	0.000	0.054	0.000	0.005	0.005	0.005	0.005
	2024		0.009	0.007	0.009	0.007	0.009	0.007	0.005	0.005	0.005	0.005
	2025		0.000	0.009	0.000	0.009	0.000	0.009	0.005	0.005	0.005	0.005
New Hospital	2023	BR*FAH*EF*	0.032	0.000	0.032	0.000	0.032	0.000	0.003	0.003	0.003	0.003
	2024	ED*ASF*A*	0.054	0.000	0.054	0.000	0.054	0.000	0.005	0.005	0.005	0.005
	2025	MAF*CF/AT	0.027	0.004	0.027	0.004	0.027	0.004	0.005	0.005	0.005	0.005
	2026		0.000	0.009	0.000	0.009	0.000	0.009	0.005	0.005	0.005	0.005
	2027		0.000	0.009	0.000	0.009	0.000	0.009	0.005	0.005	0.002	0.002
	2028		0.000	0.004	0.000	0.004	0.000	0.004	0.005	0.002	0.000	0.000
	2029		0.000	0.000	0.000	0.000	0.000	0.000	0.005	0.000	0.000	0.000
Initial phase of Aldea Housing Densification	2028		0.054	0.000	0.054	0.000	0.054	0.000	0.005	0.005	0.005	0.005

	2029		0.002	0.000	0.002	0.000	0.002	0.000	0.000	0.000	0.000	0.000

Risk Calculation Part 1, R1

			Daycare1		Daycare2		Daycare3		School1	School2	School3	School4
	Year	Equation	0<2	2<9	0<2	2<9	0<2	2<9	2<16	2<16	2<16	2<16
Irving Street Arrival	2022		5.00E-05	0.00E+00	5.00E-05	0.00E+00	5.00E-05	0.00E+00	4.68E-06	4.68E-06	4.68E-06	4.68E-06
	2023		5.46E-05	0.00E+00	5.46E-05	0.00E+00	5.46E-05	0.00E+00	5.11E-06	5.11E-06	5.11E-06	5.11E-06
Research and Academic Building	2022		5.00E-05	0.00E+00	5.00E-05	0.00E+00	5.00E-05	0.00E+00	4.68E-06	4.68E-06	4.68E-06	4.68E-06
	2023		5.97E-05	0.00E+00	5.97E-05	0.00E+00	5.97E-05	0.00E+00	5.59E-06	5.59E-06	5.59E-06	5.59E-06
	2024		9.65E-06	8.03E-06	9.65E-06	8.03E-06	9.65E-06	8.03E-06	5.60E-06	5.60E-06	5.60E-06	5.60E-06
	2025		0.00E+00	9.55E-06	0.00E+00	9.55E-06	0.00E+00	9.55E-06	5.59E-06	5.59E-06	5.59E-06	5.59E-06
New Hospital	2023		3.50E-05	0.00E+00	3.50E-05	0.00E+00	3.50E-05	0.00E+00	3.27E-06	3.27E-06	3.27E-06	3.27E-06
	2024	IF*CPF*CF	5.98E-05	0.00E+00	5.98E-05	0.00E+00	5.98E-05	0.00E+00	5.60E-06	5.60E-06	5.60E-06	5.60E-06
	2025		2.94E-05	4.84E-06	2.94E-05	4.84E-06	2.94E-05	4.84E-06	5.59E-06	5.59E-06	5.59E-06	5.59E-06
	2026		0.00E+00	9.55E-06	0.00E+00	9.55E-06	0.00E+00	9.55E-06	5.59E-06	5.59E-06	5.59E-06	5.59E-06
	2027		0.00E+00	9.55E-06	0.00E+00	9.55E-06	0.00E+00	9.55E-06	5.59E-06	5.59E-06	2.31E-06	2.31E-06
	2028		0.00E+00	4.73E-06	0.00E+00	4.73E-06	0.00E+00	4.73E-06	5.60E-06	2.31E-06	0.00E+00	0.00E+00
	2029		0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	5.59E-06	0.00E+00	0.00E+00	0.00E+00
Initial phase of Aldea Housing Densification	2028		5.95E-05	0.00E+00	5.95E-05	0.00E+00	5.95E-05	0.00E+00	5.57E-06	5.57E-06	5.57E-06	5.57E-06
	2029		1.80E-06	0.00E+00	1.80E-06	0.00E+00	1.80E-06	0.00E+00	1.68E-07	1.68E-07	1.68E-07	1.68E-07

Diesel Particulate Matter concentration, C_{DPM} (ug/m^3)

		ISA		RAB				HDMC							IAH	
X (UTM)	Y (UTM	2022	2023	2022	2023	2024	2025	2023	2024	2025	2026	2027	2028	2029	2028	2029
547880	4178580	8.96E-06	7.65E-06	3.28E-05	1.87E-05	2.09E-05	2.09E-05	2.11E-05	4.25E-05	2.05E-05	4.09E-05	2.04E-05	2.25E-05	2.27E-05	1.31E-04	1.76E-05
547900	4178580	8.82E-06	7.54E-06	3.21E-05	1.83E-05	2.04E-05	2.04E-05	2.06E-05	4.16E-05	2.01E-05	4.01E-05	2.00E-05	2.20E-05	2.22E-05	1.34E-04	1.73E-05
547920	4178580	8.75E-06	7.47E-06	3.21E-05	1.83E-05	2.05E-05	2.05E-05	2.06E-05	4.16E-05	2.01E-05	4.01E-05	2.00E-05	2.21E-05	2.22E-05	1.47E-04	1.70E-05
547860	4178600	9.24E-06	7.89E-06	3.33E-05	1.90E-05	2.12E-05	2.12E-05	2.14E-05	4.32E-05	2.08E-05	4.16E-05	2.08E-05	2.29E-05	2.30E-05	1.40E-04	1.94E-05
547880	4178600	9.11E-06	7.78E-06	3.26E-05	1.86E-05	2.08E-05	2.07E-05	2.09E-05	4.23E-05	2.04E-05	4.08E-05	2.04E-05	2.24E-05	2.25E-05	1.40E-04	1.91E-05
547900	4178600	8.96E-06	7.65E-06	3.17E-05	1.81E-05	2.02E-05	2.02E-05	2.04E-05	4.12E-05	1.99E-05	3.97E-05	1.98E-05	2.18E-05	2.19E-05	1.42E-04	1.89E-05
547920	4178600	8.88E-06	7.58E-06	3.19E-05	1.82E-05	2.03E-05	2.03E-05	2.04E-05	4.13E-05	1.99E-05	3.98E-05	1.99E-05	2.19E-05	2.20E-05	1.48E-04	1.85E-05
547880	4178620	9.31E-06	7.95E-06	3.29E-05	1.88E-05	2.10E-05	2.10E-05	2.12E-05	4.27E-05	2.06E-05	4.12E-05	2.06E-05	2.27E-05	2.28E-05	1.51E-04	2.09E-05
547900	4178620	9.19E-06	7.85E-06	3.25E-05	1.85E-05	2.07E-05	2.07E-05	2.09E-05	4.22E-05	2.04E-05	4.07E-05	2.03E-05	2.24E-05	2.25E-05	1.52E-04	2.05E-05
547880	4178640	9.56E-06	8.16E-06	3.38E-05	1.93E-05	2.16E-05	2.15E-05	2.17E-05	4.39E-05	2.12E-05	4.23E-05	2.11E-05	2.33E-05	2.34E-05	1.64E-04	2.28E-05
547900	4178640	9.43E-06	8.06E-06	3.34E-05	1.91E-05	2.13E-05	2.13E-05	2.15E-05	4.33E-05	2.09E-05	4.18E-05	2.09E-05	2.30E-05	2.31E-05	1.63E-04	2.24E-05
547920	4178640	9.31E-06	7.95E-06	3.31E-05	1.89E-05	2.11E-05	2.11E-05	2.12E-05	4.28E-05	2.07E-05	4.13E-05	2.06E-05	2.27E-05	2.29E-05	1.64E-04	2.19E-05
547880	4178660	9.79E-06	8.36E-06	3.44E-05	1.96E-05	2.19E-05	2.19E-05	2.21E-05	4.46E-05	2.15E-05	4.30E-05	2.15E-05	2.37E-05	2.38E-05	1.79E-04	2.50E-05
547900	4178660	9.64E-06	8.24E-06	3.37E-05	1.92E-05	2.15E-05	2.15E-05	2.16E-05	4.37E-05	2.11E-05	4.22E-05	2.11E-05	2.32E-05	2.33E-05	1.78E-04	2.46E-05
547920	4178660	9.51E-06	8.12E-06	3.33E-05	1.90E-05	2.12E-05	2.11E-05	2.13E-05	4.30E-05	2.08E-05	4.15E-05	2.07E-05	2.28E-05	2.29E-05	1.78E-04	2.41E-05
547900	4178680	9.88E-06	8.44E-06	3.43E-05	1.96E-05	2.19E-05	2.18E-05	2.20E-05	4.44E-05	2.15E-05	4.29E-05	2.14E-05	2.36E-05	2.37E-05	1.95E-04	2.72E-05
547920	4178680	9.74E-06	8.32E-06	3.39E-05	1.93E-05	2.16E-05	2.16E-05	2.17E-05	4.38E-05	2.12E-05	4.22E-05	2.11E-05	2.32E-05	2.34E-05	1.94E-04	2.66E-05
547940	4178680	9.61E-06	8.20E-06	3.35E-05	1.91E-05	2.13E-05	2.13E-05	2.13E-05	4.31E-05	2.08E-05	4.16E-05	2.08E-05	2.29E-05	2.30E-05	1.96E-04	2.61E-05
547220	4179660	0.000	0.000	0.001	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
547240	4179660	0.000	0.000	0.001	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
547220	4179680	0.000	0.000	0.001	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
547240	4179680	0.000	0.000	0.001	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
547160	4179700	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
547180	4179700	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
547160	4179720	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
547180	4179720	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
548260	4179620	0.000	0.000	0.001	0.000	0.000	0.000	0.001	0.002	0.001	0.002	0.001	0.001	0.001	0.000	0.000
548280	4179620	0.000	0.000	0.001	0.000	0.000	0.000	0.001	0.002	0.001	0.002	0.001	0.001	0.001	0.000	0.000
548260	4179640	0.000	0.000	0.001	0.000	0.000	0.000	0.001	0.002	0.001	0.002	0.001	0.001	0.001	0.000	0.000
548280	4179640	0.000	0.000	0.001	0.000	0.000	0.000	0.001	0.002	0.001	0.002	0.001	0.001	0.001	0.000	0.000

Risk Calculation Part 2

$R1*\sum C_{DPM}$				
ISA	RAB	HDMC	IAH	
8.11E-05	4.91E-04	1.02E-03	7.30E-04	Clarendon Alternative Elementary
7.98E-05	4.80E-04	9.95E-04	7.47E-04	Clarendon Alternative Elementary
7.92E-05	4.82E-04	9.97E-04	8.22E-04	Clarendon Alternative Elementary
8.36E-05	4.98E-04	1.03E-03	7.84E-04	Clarendon Alternative Elementary
8.24E-05	4.88E-04	1.01E-03	7.84E-04	Clarendon Alternative Elementary
8.10E-05	4.76E-04	9.85E-04	7.94E-04	Clarendon Alternative Elementary
8.03E-05	4.77E-04	9.88E-04	8.29E-04	Clarendon Alternative Elementary
8.42E-05	4.94E-04	1.02E-03	8.46E-04	Clarendon Alternative Elementary
8.31E-05	4.87E-04	1.01E-03	8.48E-04	Clarendon Alternative Elementary
8.65E-05	5.07E-04	1.05E-03	9.15E-04	Clarendon Alternative Elementary
8.54E-05	5.01E-04	1.04E-03	9.12E-04	Clarendon Alternative Elementary
8.43E-05	4.96E-04	1.03E-03	9.20E-04	Clarendon Alternative Elementary
8.86E-05	5.15E-04	1.07E-03	9.99E-04	Clarendon Alternative Elementary
8.73E-05	5.06E-04	1.05E-03	9.94E-04	Clarendon Alternative Elementary
8.60E-05	4.98E-04	1.03E-03	9.96E-04	Clarendon Alternative Elementary
8.94E-05	5.14E-04	1.06E-03	1.09E-03	Clarendon Alternative Elementary
8.82E-05	5.08E-04	1.05E-03	1.08E-03	Clarendon Alternative Elementary
8.69E-05	5.02E-04	1.03E-03	1.09E-03	Clarendon Alternative Elementary
1.16E-03	8.65E-03	6.67E-03	2.23E-04	Independence High
1.25E-03	9.53E-03	7.03E-03	2.29E-04	Independence High
1.14E-03	8.06E-03	6.14E-03	2.18E-04	Independence High
1.22E-03	8.84E-03	6.48E-03	2.24E-04	Independence High
9.06E-04	5.86E-03	4.14E-03	1.98E-04	Stepping Stones Preschool
9.66E-04	6.34E-03	4.36E-03	2.03E-04	Stepping Stones Preschool
8.82E-04	5.52E-03	3.91E-03	1.94E-04	Stepping Stones Preschool
9.40E-04	5.95E-03	4.11E-03	1.98E-04	Stepping Stones Preschool
3.88E-03	1.16E-02	3.50E-02	5.79E-04	Haight Ashbury Community Nursery School
3.71E-03	1.11E-02	3.25E-02	5.88E-04	Haight Ashbury Community Nursery School
4.13E-03	1.15E-02	3.61E-02	5.36E-04	Haight Ashbury Community Nursery School
3.91E-03	1.09E-02	3.33E-02	5.44E-04	Haight Ashbury Community Nursery School

Diesel Particulate Matter concentration, C_{DPM} (ug/m^3)

		ISA		RAB				HDMC							IAH	
X (UTM)	Y (UTM	2022	2023	2022	2023	2024	2025	2023	2024	2025	2026	2027	2028	2029	2028	2029
547540	4179680	0.001	0.001	0.005	0.003	0.003	0.003	0.000	0.001	0.001	0.001	0.001	0.001	0.001	0.000	0.000
547560	4179680	0.001	0.001	0.006	0.004	0.004	0.004	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.000	0.000
547540	4179660	0.001	0.000	0.008	0.005	0.005	0.005	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.000	0.000
547560	4179660	0.001	0.001	0.011	0.006	0.007	0.007	0.001	0.001	0.001	0.002	0.001	0.001	0.001	0.000	0.000
547200	4179140	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
547220	4179140	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
547460	4179400	0.000	0.000	0.001	0.001	0.001	0.001	0.000	0.001	0.000	0.001	0.000	0.000	0.000	0.000	0.000
547480	4179400	0.000	0.000	0.001	0.001	0.001	0.001	0.000	0.001	0.000	0.001	0.000	0.000	0.000	0.000	0.000

Risk Calculation Part 2

$R1*\sum C_{DPM}$				
ISA	RAB	HDMC	IAH	
5.97E-02	5.16E-01	1.21E-01	3.46E-03	Lucia Child Care Center
6.57E-02	6.41E-01	1.39E-01	3.53E-03	Lucia Child Care Center
5.49E-02	8.41E-01	1.35E-01	3.61E-03	Lucia Child Care Center
5.93E-02	1.10E+00	1.57E-01	3.69E-03	Lucia Child Care Center
5.03E-03	2.85E-02	2.24E-02	4.18E-03	ABC Bay Area Child Care
5.16E-03	2.88E-02	2.27E-02	4.37E-03	ABC Bay Area Child Care
1.14E-02	1.49E-01	6.23E-02	5.24E-03	Kirkham Child Care Center
1.09E-02	1.48E-01	6.50E-02	5.49E-03	Kirkham Child Care Center

UCSF Parnassus Heights LRDP

Initial Phase of LRDP (2030)

Mitigated Construction Annual PM2.5 Concentration by Construction Year

Haul Truck Trip Adjustment Factor to Model

	One Way (miles)					
	ISA	RAB	HDMC	IAH1	IAH2	
CalEEMod, Haul	20	20	20	20	20	*haul truck trip distance as modeled in CalEEMod*
CalEEMod, Vend	7.3	7.3	7.3	7.3	7.3	*vendor trip distance as modeled in CalEEMod*
AERMOD	0.52	0.52	0.52	0.52	0.19	
% in Dispersion Model, Haul	3%	3%	3%	3%	1%	
% in Dispersion Model, Vend	7%	7%	7%	7%	3%	

Construction Emissions, *as applied to AERMOD results*

				Total Mitigated PM2.5 (tons)				Total Mitigated PM2.5 (g/s)			
	Year	Start Date	Stop Date	Offroad	Haul/Vend1	Haul/Vend2	Idle	Offroad	Haul1	Haul2	Idle
Irving Street Arrival	2022	3/1/2022	12/31/2022	2.40E-03	5.47E-06	--	1.69E-06	6.90E-05	1.57E-07	--	4.87E-08
	2023	1/1/2023	11/30/2023	2.24E-03	4.29E-06	--	0.00E+00	6.44E-05	1.24E-07	--	0.00E+00
Research and Academic Building	2022	3/1/2022	12/31/2022	6.63E-03	1.03E-04	--	6.12E-05	1.91E-04	2.98E-06	--	1.76E-06
	2023	1/1/2023	12/31/2023	4.57E-03	5.01E-05	--	0.00E+00	1.31E-04	1.44E-06	--	0.00E+00
	2024	1/1/2024	12/31/2024	5.13E-03	4.87E-05	--	0.00E+00	1.48E-04	1.40E-06	--	0.00E+00
	2025	1/1/2025	12/31/2025	5.11E-03	4.65E-05	--	0.00E+00	1.47E-04	1.34E-06	--	0.00E+00
New Hospital	2023	6/1/2023	12/31/2023	2.85E-03	0.00E+00	--	0.00E+00	8.20E-05	0.00E+00	--	0.00E+00
	2024	1/1/2024	12/31/2024	9.67E-03	9.06E-05	--	8.51E-05	2.78E-04	2.61E-06	--	2.45E-06
	2025	1/1/2025	12/31/2025	4.59E-03	1.67E-04	--	0.00E+00	1.32E-04	4.80E-06	--	0.00E+00
	2026	1/1/2026	12/31/2026	9.18E-03	3.18E-04	--	0.00E+00	2.64E-04	9.14E-06	--	0.00E+00
	2027	1/1/2027	12/31/2027	4.59E-03	1.52E-04	--	0.00E+00	1.32E-04	4.36E-06	--	0.00E+00
	2028	1/1/2028	12/31/2028	5.09E-03	1.45E-04	--	0.00E+00	1.46E-04	4.18E-06	--	0.00E+00
	2029	1/1/2029	12/31/2029	5.11E-03	1.40E-04	--	0.00E+00	1.47E-04	4.01E-06	--	0.00E+00
Initial phase of Aldea Housing Densification	2028	1/3/2028	12/31/2028	4.54E-03	1.87E-05	6.81E-06	2.77E-06	1.31E-04	5.37E-07	1.96E-07	7.97E-08
	2029	1/1/2029	1/11/2029	2.00E-05	0.00E+00	0.00E+00	0.00E+00	5.75E-07	0.00E+00	0.00E+00	0.00E+00

Diesel Particulate Matter concentration, C_{DPM} (ug/m^3)

Max by Project

		ISA		RAB				HDMC							IAH		ISA	RAB	HDMC	IAH
X (UTM)	Y (UTM	2022	2023	2022	2023	2024	2025	2023	2024	2025	2026	2027	2028	2029	2028	2029				
547980	4179080	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.033	0.000	0.000	0.000	0.000	0.033
547980	4179100	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.033	0.000	0.000	0.000	0.000	0.033
548000	4179040	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.023	0.000	0.000	0.000	0.000	0.023
548000	4179060	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.023	0.000	0.000	0.000	0.000	0.023
548000	4179100	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.023	0.000	0.000	0.000	0.000	0.023
548000	4179080	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.022	0.000	0.000	0.000	0.000	0.022
548000	4179120	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.022	0.000	0.000	0.000	0.000	0.022
547560	4179660	0.001	0.000	0.009	0.006	0.007	0.007	0.000	0.001	0.001	0.002	0.001	0.001	0.001	0.000	0.000	0.001	0.009	0.002	0.000
547520	4179640	0.000	0.000	0.009	0.006	0.007	0.007	0.000	0.001	0.001	0.002	0.001	0.001	0.001	0.000	0.000	0.000	0.009	0.002	0.000
548000	4179020	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.019	0.000	0.000	0.000	0.000	0.019
547540	4179660	0.000	0.000	0.007	0.005	0.005	0.005	0.000	0.001	0.001	0.001	0.001	0.001	0.001	0.000	0.000	0.000	0.007	0.001	0.000
547980	4179760	0.001	0.001	0.001	0.001	0.001	0.001	0.004	0.015	0.007	0.014	0.007	0.008	0.008	0.000	0.000	0.001	0.001	0.015	0.000
548000	4179140	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.015	0.000	0.000	0.000	0.000	0.015
548020	4179080	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.015	0.000	0.000	0.000	0.000	0.015
547500	4179640	0.000	0.000	0.006	0.004	0.005	0.005	0.000	0.001	0.001	0.001	0.001	0.001	0.001	0.000	0.000	0.000	0.006	0.001	0.000
547980	4179720	0.001	0.001	0.001	0.001	0.001	0.001	0.004	0.012	0.006	0.012	0.006	0.007	0.007	0.000	0.000	0.001	0.001	0.012	0.000
547980	4179700	0.001	0.001	0.001	0.001	0.001	0.001	0.004	0.012	0.006	0.012	0.006	0.006	0.006	0.000	0.000	0.001	0.001	0.012	0.000
548000	4179760	0.001	0.001	0.001	0.001	0.001	0.001	0.003	0.012	0.006	0.011	0.006	0.006	0.006	0.000	0.000	0.001	0.001	0.012	0.000
547980	4179740	0.001	0.001	0.001	0.001	0.001	0.001	0.003	0.012	0.006	0.011	0.006	0.006	0.006	0.000	0.000	0.001	0.001	0.012	0.000
547980	4179780	0.001	0.001	0.001	0.001	0.001	0.001	0.003	0.011	0.005	0.011	0.005	0.006	0.006	0.000	0.000	0.001	0.001	0.011	0.000
547980	4179680	0.001	0.001	0.001	0.001	0.001	0.001	0.003	0.011	0.005	0.011	0.005	0.006	0.006	0.000	0.000	0.001	0.001	0.011	0.000
547560	4179680	0.001	0.001	0.005	0.004	0.004	0.004	0.000	0.001	0.001	0.001	0.001	0.001	0.001	0.000	0.000	0.001	0.005	0.001	0.000
547520	4179660	0.000	0.000	0.005	0.004	0.004	0.004	0.000	0.001	0.001	0.001	0.001	0.001	0.001	0.000	0.000	0.000	0.005	0.001	0.000
547440	4179580	0.000	0.000	0.005	0.004	0.004	0.004	0.000	0.001	0.001	0.001	0.001	0.001	0.001	0.000	0.000	0.000	0.005	0.001	0.000
548000	4179700	0.001	0.001	0.001	0.001	0.001	0.001	0.003	0.011	0.005	0.010	0.005	0.006	0.006	0.000	0.000	0.001	0.001	0.011	0.000
548000	4179720	0.001	0.001	0.001	0.001	0.001	0.001	0.003	0.011	0.005	0.010	0.005	0.006	0.006	0.000	0.000	0.001	0.001	0.011	0.000
547460	4179620	0.000	0.000	0.005	0.003	0.004	0.004	0.000	0.001	0.001	0.001	0.001	0.001	0.001	0.000	0.000	0.000	0.005	0.001	0.000
548000	4179740	0.001	0.001	0.001	0.001	0.001	0.001	0.003	0.010	0.005	0.010	0.005	0.005	0.005	0.000	0.000	0.001	0.001	0.010	0.000
547440	4179540	0.000	0.000	0.005	0.003	0.004	0.004	0.000	0.001	0.000	0.001	0.000	0.000	0.000	0.000	0.000	0.000	0.005	0.001	0.000
547480	4179640	0.000	0.000	0.005	0.003	0.004	0.004	0.000	0.001	0.001	0.001	0.001	0.001	0.001	0.000	0.000	0.000	0.005	0.001	0.000
547860	4179780	0.004	0.004	0.002	0.001	0.001	0.001	0.003	0.009	0.004	0.009	0.004	0.005	0.005	0.000	0.000	0.004	0.002	0.009	0.000
547860	4179800	0.004	0.004	0.001	0.001	0.001	0.001	0.002	0.006	0.003	0.005	0.003	0.003	0.003	0.000	0.000	0.004	0.001	0.006	0.000
547740	4179820	0.005	0.005	0.001	0.001	0.001	0.001	0.001	0.002	0.001	0.002	0.001	0.001	0.001	0.000	0.000	0.005	0.001	0.002	0.000
547860	4179820	0.004	0.003	0.001	0.001	0.001	0.001	0.001	0.004	0.002	0.004	0.002	0.002	0.002	0.000	0.000	0.004	0.001	0.004	0.000
547760	4179840	0.003	0.003	0.001	0.001	0.001	0.001	0.000	0.002	0.001	0.002	0.001	0.001	0.001	0.000	0.000	0.003	0.001	0.002	0.000
547860	4179840	0.003	0.003	0.001	0.001	0.001	0.001	0.001	0.003	0.001	0.003	0.001	0.001	0.001	0.000	0.000	0.003	0.001	0.003	0.000
547700	4179820	0.003	0.002	0.001	0.001	0.001	0.001	0.000	0.001	0.001	0.001	0.001	0.001	0.001	0.000	0.000	0.003	0.001	0.001	0.000
547740	4179840	0.003	0.002	0.001	0.001	0.001	0.001	0.000	0.002	0.001	0.001	0.001	0.001	0.001	0.000	0.000	0.003	0.001	0.002	0.000
547840	4179860	0.003	0.003	0.001	0.001	0.001	0.001	0.001	0.002	0.001	0.002	0.001	0.001	0.001	0.000	0.000	0.003	0.001	0.002	0.000

AIR Operational HRA Calculations

UCSF Parnassus Heights LRDP

Initial Phase of LRDP (2030)

Summary of Operational Cancer Risk, Hazard Index, and annual average $PM_{2.5}$ concentration

Operation Cancer Risk

Receptor Type	UTM E	UTM N	Background	Project	Cumulative	Location
Resident	547980	4179600	9.68	0.26	9.94	Edgewood Ave
Resident, onsite hall	547600	4179700	23.21	0.04	23.25	3rd Ave Housing
School	548260	4179640	33.34	0.00	33.35	Haight Ashbury Community Nursery School
Day Care	547480	4179400	9.50	0.01	9.51	Kirkham Child Care Center

Operational Chronic Hazard Index, unitless

Receptor Type	UTM E	UTM N	Background	Project	Cumulative	Location
Resident	547980	4179580	4.44	0.00	4.44	Edgewood Ave
Resident, onsite hall	547600	4179700	2.41	0.00	2.41	3rd Ave Housing
School	548260	4179620	2.01	0.00	2.01	Haight Ashbury Community Nursery School
Day Care	547560	4179660	3.82	0.00	3.82	Lucia Child Care Center

Operational Acute Hazard Index, unitless

Receptor Type	UTM E	UTM N	Background	Project	Cumulative	Location
Resident	547980	4179520	NA	0.00	0.00	Edgewood Ave
Resident, onsite hall	547600	4179720	NA	0.00	0.00	3rd Ave Housing
School	547240	4179660	NA	0.00	0.00	Independence High
Day Care	547560	4179660	NA	0.00	0.00	Lucia Child Care Center

Operational $PM_{2.5}$ Concentration, ug/m^3

Receptor Type	UTM E	UTM N	Background	Project	Cumulative	
Resident	547980	4179580	8.33	0.01	8.34	Edgewood Ave
Resident, onsite hall	547600	4179780	8.33	0.00	8.33	145 Irving St
School	548260	4179620	8.59	0.00	8.59	Haight Ashbury Community Nursery School
Day Care	547480	4179400	8.22	0.00	8.22	Kirkham Child Care Center

UCSF Parnassus Heights LRDP
Initial Phase of LRDP (2030)
Operational Inhalation Cancer Risk for Residential Child to Adult Receptor

Risk = ∑[Dose *CFP *ASF *ED /AT * FAH]
where,
Dose= C * {BR/BW} *A * EF * 10^{-6}
CFP = Cancer Potency Factor
ASF = Age sentivity factor
ED = Exposure duration
AT = Averaging time, 70 yrs
FAH = Fraction of time at home
Cair = Pollutant concentration
{BR/BW} = Daily Breathing Rate
A = Inhalation absorption factor
EF = Exposure Frequency
i = age bin groups

Equations Rearranged
Risk = C * CPF * ∑ [{BR/BW} * A * EF * ASF * ED /AT * FAH * 10^{-6}]

Riskinputspart1 / Risk calculations part 1

Age Bin	BR/BW (L/kg-day)	A	EF	FAH	ED/AT	ASF	CF1 (ug/mg)	CF1 (L/m^3)	$\{BR/BW\}_i$ * A * EF * ASF_i * ED_i/AT * FAH_i * 10^{-6}
3rd Trimester	361	1	0.96	1	0.00	10	1.00E-03	1.00E-03	1.24E-05
0<2	1090	1	0.96	1	0.03	10	1.00E-03	1.00E-03	2.99E-04
2<16	745	1	0.96	0.72	0.20	3	1.00E-03	1.00E-03	3.09E-04
16<30	335	1	0.96	0.73	0.20	1	1.00E-03	1.00E-03	4.69E-05
								total	**6.67E-04**

PollutantConcentrationsbySource / Risk calculations part 2

Unique Identifier	UTM X	UTM Y	EDG: DPM (CPF 1.1) (ug/m^3)	PCUP: PAH (as benzo(a)pyrene) (CPF 3.9) (ug/m^3)	Cancer Risk (per million) EDG	FH	PCUP	Total	Receptor Type Determination
547780_4179620	547780	4179620	8.08E-04	1.66E-08	0.59	0.10	0.00	0.70	campus
547800 4179620	547800	4179620	7.69E-04	1.12E-08	0.56	0.11	0.00	0.67	campus
547760 4179620	547760	4179620	7.60E-04	2.70E-08	0.56	0.09	0.01	0.66	campus
547780 4179640	547780	4179640	7.36E-04	2.12E-08	0.54	0.09	0.00	0.64	campus
547820 4179620	547820	4179620	7.19E-04	9.40E-09	0.53	0.11	0.00	0.63	campus
547800 4179640	547800	4179640	7.14E-04	1.36E-08	0.52	0.09	0.00	0.62	campus
547760 4179640	547760	4179640	6.87E-04	3.17E-08	0.50	0.08	0.01	0.59	campus
547820 4179640	547820	4179640	6.76E-04	1.02E-08	0.50	0.09	0.00	0.59	campus
547840 4179620	547840	4179620	6.62E-04	8.68E-09	0.49	0.10	0.00	0.59	campus
547780 4179600	547780	4179600	6.41E-04	1.27E-08	0.47	0.10	0.00	0.57	campus
547800 4179600	547800	4179600	6.23E-04	9.51E-09	0.46	0.10	0.00	0.56	campus
547840 4179640	547840	4179640	6.33E-04	1.02E-08	0.46	0.09	0.00	0.56	campus
547820 4179600	547820	4179600	5.94E-04	7.48E-09	0.44	0.10	0.00	0.54	campus
547860 4179620	547860	4179620	5.84E-04	8.26E-09	0.43	0.10	0.00	0.53	campus
547760 4179600	547760	4179600	5.84E-04	2.06E-08	0.43	0.09	0.00	0.52	campus
547860 4179640	547860	4179640	5.83E-04	1.00E-08	0.43	0.09	0.00	0.52	campus
547840 4179600	547840	4179600	5.58E-04	6.82E-09	0.41	0.10	0.00	0.51	campus
547820 4179660	547820	4179660	5.15E-04	1.38E-08	0.38	0.08	0.00	0.46	campus
547800 4179660	547800	4179660	5.15E-04	1.50E-08	0.38	0.08	0.00	0.46	campus
547840 4179660	547840	4179660	5.10E-04	1.44E-08	0.37	0.08	0.00	0.46	campus
547780 4179660	547780	4179660	5.01E-04	2.21E-08	0.37	0.07	0.00	0.45	campus
547860 4179600	547860	4179600	4.76E-04	6.27E-09	0.35	0.09	0.00	0.44	campus
547860 4179660	547860	4179660	4.86E-04	2.14E-08	0.36	0.08	0.00	0.44	campus
547760 4179660	547760	4179660	4.47E-04	3.26E-08	0.33	0.07	0.01	0.40	campus
547880 4179640	547880	4179640	4.23E-04	1.29E-08	0.31	0.09	0.00	0.40	campus
547740 4179620	547740	4179620	4.21E-04	3.97E-08	0.31	0.08	0.01	0.40	campus
547880 4179620	547880	4179620	4.13E-04	8.18E-09	0.30	0.09	0.00	0.39	campus
547740 4179640	547740	4179640	4.09E-04	4.34E-08	0.30	0.07	0.01	0.38	campus
547880 4179660	547880	4179660	3.87E-04	2.91E-08	0.28	0.08	0.01	0.37	campus
547820 4179580	547820	4179580	3.76E-04	5.66E-09	0.28	0.09	0.00	0.37	campus
547800 4179580	547800	4179580	3.73E-04	8.84E-09	0.27	0.09	0.00	0.37	campus
547840 4179580	547840	4179580	3.72E-04	4.53E-09	0.27	0.09	0.00	0.36	campus
547780 4179580	547780	4179580	3.61E-04	1.28E-08	0.26	0.09	0.00	0.35	campus
547840 4179680	547840	4179680	3.78E-04	3.25E-08	0.28	0.07	0.01	0.35	campus
547860 4179680	547860	4179680	3.67E-04	5.23E-08	0.27	0.07	0.01	0.35	campus
547880 4179600	547880	4179600	3.38E-04	5.84E-09	0.25	0.08	0.00	0.33	campus
547820 4179680	547820	4179680	3.47E-04	1.92E-08	0.25	0.07	0.00	0.32	campus
547760 4179580	547760	4179580	3.17E-04	1.85E-08	0.23	0.08	0.00	0.32	campus
547860 4179580	547860	4179580	3.22E-04	4.02E-09	0.24	0.08	0.00	0.32	campus
547880 4179680	547880	4179680	3.12E-04	6.06E-08	0.23	0.07	0.01	0.31	campus
547740 4179600	547740	4179600	3.07E-04	3.27E-08	0.23	0.08	0.01	0.31	campus
547800 4179680	547800	4179680	3.08E-04	1.73E-08	0.23	0.06	0.00	0.29	campus
547900 4179640	547900	4179640	2.92E-04	1.16E-08	0.21	0.07	0.00	0.29	campus
547960 4179600	547960	4179600	2.52E-04	2.53E-07	0.18	0.05	0.05	0.29	campus
547860 4179700	547860	4179700	2.81E-04	8.49E-08	0.21	0.06	0.02	0.28	campus
547900 4179660	547900	4179660	2.82E-04	2.80E-08	0.21	0.07	0.01	0.28	campus
547840 4179700	547840	4179700	2.82E-04	6.14E-08	0.21	0.06	0.01	0.28	campus
547740 4179660	547740	4179660	2.85E-04	4.33E-08	0.21	0.06	0.01	0.28	campus
547960 4179580	547960	4179580	2.32E-04	2.67E-07	0.17	0.05	0.05	0.27	campus
547960 4179620	547960	4179620	2.60E-04	1.43E-07	0.19	0.05	0.03	0.27	campus
547900 4179680	547900	4179680	2.64E-04	5.64E-08	0.19	0.06	0.01	0.27	campus
547980 4179600	547980	4179600	2.40E-04	1.71E-07	0.18	0.05	0.03	0.26	pot. res.
547880 4179700	547880	4179700	2.45E-04	9.46E-08	0.18	0.06	0.02	0.26	campus
547880 4179580	547880	4179580	2.47E-04	4.01E-09	0.18	0.07	0.00	0.25	campus
547960 4179640	547960	4179640	2.52E-04	9.13E-08	0.18	0.05	0.02	0.25	campus
547980 4179620	547980	4179620	2.49E-04	1.17E-07	0.18	0.05	0.02	0.25	pot. res.
547900 4179700	547900	4179700	2.43E-04	9.18E-08	0.18	0.05	0.02	0.25	campus
547780 4179680	547780	4179680	2.57E-04	2.03E-08	0.19	0.06	0.00	0.25	campus
547980 4179580	547980	4179580	2.24E-04	1.97E-07	0.16	0.05	0.04	0.25	pot.res.
547980 4179640	547980	4179640	2.43E-04	8.38E-08	0.18	0.05	0.02	0.24	pot.res.
547960 4179560	547960	4179560	2.03E-04	2.33E-07	0.15	0.04	0.05	0.24	campus
547960 4179660	547960	4179660	2.44E-04	6.52E-08	0.18	0.05	0.01	0.24	campus
547820 4179700	547820	4179700	2.41E-04	3.36E-08	0.18	0.05	0.01	0.24	campus
548000 4179620	548000	4179620	2.35E-04	8.33E-08	0.17	0.05	0.02	0.23	pot. res.
547900 4179720	547900	4179720	2.17E-04	1.26E-07	0.16	0.05	0.03	0.23	campus
548000 4179600	548000	4179600	2.28E-04	1.09E-07	0.17	0.05	0.02	0.23	pot. res.
547880 4179720	547880	4179720	2.13E-04	1.25E-07	0.16	0.05	0.03	0.23	campus
547860 4179720	547860	4179720	2.17E-04	1.10E-07	0.16	0.05	0.02	0.23	campus
547980 4179660	547980	4179660	2.33E-04	6.34E-08	0.17	0.05	0.01	0.23	pot. res.
548000 4179640	548000	4179640	2.32E-04	6.54E-08	0.17	0.04	0.01	0.23	pot. res.
547980 4179560	547980	4179560	1.98E-04	1.83E-07	0.15	0.04	0.04	0.23	pot.res.
548000 4179580	548000	4179580	2.13E-04	1.23E-07	0.16	0.04	0.02	0.22	pot.res.
547960 4179680	547960	4179680	2.29E-04	5.20E-08	0.17	0.05	0.01	0.22	campus
547840 4179560	547840	4179560	2.11E-04	2.85E-09	0.15	0.07	0.00	0.22	campus
548020 4179620	548020	4179620	2.23E-04	7.74E-08	0.16	0.04	0.02	0.22	pot. res.
548020 4179600	548020	4179600	2.17E-04	9.18E-08	0.16	0.04	0.02	0.22	pot. res.
548020 4179640	548020	4179640	2.24E-04	6.28E-08	0.16	0.04	0.01	0.22	pot. res.
547900 4179740	547900	4179740	2.00E-04	1.40E-07	0.15	0.04	0.03	0.22	campus
547820 4179560	547820	4179560	1.98E-04	4.55E-09	0.15	0.07	0.00	0.22	campus
548000 4179660	548000	4179660	2.23E-04	5.40E-08	0.16	0.04	0.01	0.22	pot. res.
547840 4179720	547840	4179720	2.10E-04	8.21E-08	0.15	0.05	0.02	0.22	campus
547980 4179680	547980	4179680	2.17E-04	5.38E-08	0.16	0.04	0.01	0.21	pot. res.
548020 4179580	548020	4179580	2.04E-04	1.04E-07	0.15	0.04	0.02	0.21	pot. res.
547960 4179700	547960	4179700	2.16E-04	4.72E-08	0.16	0.04	0.01	0.21	campus
547880 4179740	547880	4179740	1.90E-04	1.43E-07	0.14	0.04	0.03	0.21	campus
548040 4179620	548040	4179620	2.12E-04	6.67E-08	0.16	0.04	0.01	0.21	pot. res.
548020 4179660	548020	4179660	2.16E-04	5.35E-08	0.16	0.04	0.01	0.21	pot. res.
548040 4179600	548040	4179600	2.07E-04	7.77E-08	0.15	0.04	0.02	0.21	pot. res.
548040 4179640	548040	4179640	2.14E-04	5.59E-08	0.16	0.04	0.01	0.21	pot. res.
547760 4179680	547760	4179680	2.03E-04	3.06E-08	0.15	0.05	0.01	0.21	campus
548000 4179560	548000	4179560	1.92E-04	1.25E-07	0.14	0.04	0.03	0.21	pot. res.
547960 4179540	547960	4179540	1.79E-04	1.57E-07	0.13	0.04	0.03	0.20	campus
547800 4179560	547800	4179560	1.77E-04	8.66E-09	0.13	0.07	0.00	0.20	campus
548000 4179680	548000	4179680	2.08E-04	4.98E-08	0.15	0.04	0.01	0.20	pot. res.
548040 4179660	548040	4179660	2.08E-04	5.04E-08	0.15	0.04	0.01	0.20	pot. res.
547980 4179700	547980	4179700	2.04E-04	5.17E-08	0.15	0.04	0.01	0.20	pot. res.
547980 4179540	547980	4179540	1.78E-04	1.46E-07	0.13	0.04	0.03	0.20	pot. res.
547740 4179580	547740	4179580	1.71E-04	2.60E-08	0.13	0.07	0.00	0.20	campus
548040 4179580	548040	4179580	1.94E-04	8.34E-08	0.14	0.04	0.02	0.20	pot. res.
548060 4179640	548060	4179640	2.04E-04	5.17E-08	0.15	0.04	0.01	0.20	pot. res.
548060 4179620	548060	4179620	2.01E-04	5.77E-08	0.15	0.04	0.01	0.20	pot. res.
548020 4179560	548020	4179560	1.87E-04	1.05E-07	0.14	0.04	0.02	0.20	pot. res.
547900 4179760	547900	4179760	1.80E-04	1.30E-07	0.13	0.04	0.03	0.20	campus
548020 4179680	548020	4179680	2.01E-04	5.03E-08	0.15	0.04	0.01	0.20	pot. res.
548060 4179600	548060	4179600	1.96E-04	6.21E-08	0.14	0.04	0.01	0.20	pot. res.
547860 4179740	547860	4179740	1.79E-04	1.22E-07	0.13	0.04	0.03	0.20	campus
548060 4179660	548060	4179660	2.00E-04	4.86E-08	0.15	0.04	0.01	0.19	pot. res.
547960 4179720	547960	4179720	1.93E-04	5.36E-08	0.14	0.04	0.01	0.19	campus
547800 4179700	547800	4179700	1.89E-04	2.15E-08	0.14	0.05	0.00	0.19	campus
548000 4179700	548000	4179700	1.95E-04	4.89E-08	0.14	0.04	0.01	0.19	pot. res.
548080 4179640	548080	4179640	1.95E-04	5.07E-08	0.14	0.04	0.01	0.19	pot. res.
547880 4179760	547880	4179760	1.72E-04	1.28E-07	0.13	0.04	0.03	0.19	campus
548040 4179680	548040	4179680	1.94E-04	4.76E-08	0.14	0.04	0.01	0.19	pot. res.
548080 4179620	548080	4179620	1.91E-04	5.34E-08	0.14	0.04	0.01	0.19	pot. res.
548080 4179660	548080	4179660	1.92E-04	4.78E-08	0.14	0.04	0.01	0.19	pot. res.
548000 4179540	548000	4179540	1.73E-04	1.05E-07	0.13	0.04	0.02	0.19	pot. res.
548060 4179580	548060	4179580	1.84E-04	6.41E-08	0.13	0.04	0.01	0.19	pot. res.
548040 4179560	548040	4179560	1.79E-04	8.07E-08	0.13	0.04	0.02	0.19	pot. res.
548080 4179600	548080	4179600	1.85E-04	5.60E-08	0.14	0.04	0.01	0.19	pot. res.
547980 4179720	547980	4179720	1.86E-04	5.49E-08	0.14	0.04	0.01	0.19	pot. res.
548020 4179700	548020	4179700	1.88E-04	4.80E-08	0.14	0.04	0.01	0.19	pot. res.
547820 4179720	547820	4179720	1.78E-04	5.05E-08	0.13	0.04	0.01	0.18	campus
548100 4179640	548100	4179640	1.87E-04	5.02E-08	0.14	0.04	0.01	0.18	pot. res.
547780 4179560	547780	4179560	1.49E-04	1.24E-08	0.11	0.07	0.00	0.18	campus
548060 4179680	548060	4179680	1.86E-04	4.58E-08	0.14	0.04	0.01	0.18	pot. res.
548020 4179540	548020	4179540	1.71E-04	9.61E-08	0.13	0.04	0.02	0.18	pot. res.
548100 4179620	548100	4179620	1.83E-04	5.26E-08	0.13	0.04	0.01	0.18	pot. res.
548100 4179660	548100	4179660	1.86E-04	4.77E-08	0.14	0.04	0.01	0.18	pot. res.
547960 4179740	547960	4179740	1.75E-04	7.14E-08	0.13	0.04	0.02	0.18	campus
548000 4179720	548000	4179720	1.79E-04	5.31E-08	0.13	0.04	0.01	0.18	pot. res.
548100 4179600	548100	4179600	1.77E-04	5.43E-08	0.13	0.04	0.01	0.18	pot. res.
548040 4179700	548040	4179700	1.81E-04	4.56E-08	0.13	0.04	0.01	0.18	pot. res.
548080 4179580	548080	4179580	1.75E-04	5.62E-08	0.13	0.04	0.01	0.18	pot. res.

Fume Hoods and PCUP concentrations (ug/m^3); CPF (mg/kg-day)$^{-1}$ given in brackets

Unique Identifier	FH: Arsenic [12]	FH: Benzene [0.1]	FH: Benzidine [500]	FH: Benzyl chloride [0.17]	FH: Cadmium [15]	FH: Carbon tetrachloride [0.15]	FH: Chloroform [0.019]	FH: Chromium (VI) [510]	FH: Dioxane, 1,4- [0.027]	FH: Ethyl Benzene [0.0087]	FH: Ethylene dibromide [0.25]	FH: Ethylene dichloride [0.072]	FH: Formaldehyde [0.021]	FH: Hydrazine [0.0049]	FH: Methylene bis (2-chloroaniline) 4 4'- [1.5]	FH: Methylene chloride [0.0035]	FH: Nickel [0.91]	FH: PAH (as benzo(a)pyrene) [3.9]	FH: Vinyl chloride [0.27]	PCUP: 1,3-Butadiene [0.6]	PCUP: Acetaldehyde [0.01]	PCUP: Benzene [0.1]	PCUP: Ethyl Benzene [0.0087]	PCUP: Formaldehyde [0.021]	PCUP: Naphthalene [0.12]	PCUP: Propylene oxide [0.013]
547780_4179620	1.77E-10	2.63E-05	0.00E+00	6.03E-08	2.64E-08	8.11E-05	5.52E-03	3.22E-10	3.88E-05	1.69E-05	2.18E-05	2.43E-06	1.30E-04	1.20E-06	0.00E+00	7.05E-03	0.00E+00	3.54E-13	0.00E+00	6.51E-09	6.32E-07	1.49E-06	5.42E-07	2.11E-04	2.86E-08	4.39E-07
547800 4179620	1.82E-10	2.70E-05	0.00E+00	6.20E-08	2.71E-08	8.32E-05	5.66E-03	3.30E-10	3.99E-05	1.73E-05	2.24E-05	2.50E-06	1.33E-04	1.24E-06	0.00E+00	7.24E-03	0.00E+00	3.63E-13	0.00E+00	4.18E-09	4.11E-07	9.49E-07	3.59E-07	1.35E-04	2.00E-08	2.82E-07
547760 4179620	1.61E-10	2.40E-05	0.00E+00	5.50E-08	2.41E-08	7.39E-05	5.03E-03	2.93E-10	3.54E-05	1.54E-05	1.99E-05	2.22E-06	1.18E-04	1.10E-06	0.00E+00	6.43E-03	0.00E+00	3.23E-13	0.00E+00	1.10E-08	1.06E-06	2.53E-06	8.97E-07	3.60E-04	4.54E-08	7.41E-07
547780 4179640	1.58E-10	2.35E-05	0.00E+00	5.37E-08	2.35E-08	7.22E-05	4.91E-03	2.87E-10	3.46E-05	1.50E-05	1.94E-05	2.17E-06	1.16E-04	1.07E-06	0.00E+00	6.28E-03	0.00E+00	3.15E-13	0.00E+00	8.68E-09	8.34E-07	1.99E-06	7.05E-07	2.83E-04	3.54E-08	5.86E-07
547820 4179620	1.81E-10	2.69E-05	0.00E+00	6.17E-08	2.70E-08	8.29E-05	5.64E-03	3.29E-10	3.97E-05	1.73E-05	2.23E-05	2.49E-06	1.33E-04	1.23E-06	0.00E+00	7.20E-03	0.00E+00	3.62E-13	0.00E+00	3.49E-09	3.43E-07	7.88E-07	3.01E-07	1.12E-04	1.69E-08	2.35E-07
547800 4179640	1.63E-10	2.42E-05	0.00E+00	5.55E-08	2.43E-08	7.46E-05	5.07E-03	2.96E-10	3.57E-05	1.55E-05	2.00E-05	2.24E-06	1.19E-04	1.11E-06	0.00E+00	6.48E-03	0.00E+00	3.26E-13	0.00E+00	5.33E-09	5.17E-07	1.21E-06	4.45E-07	1.73E-04	2.35E-08	3.59E-07
547760 4179640	1.45E-10	2.16E-05	0.00E+00	4.96E-08	2.17E-08	6.66E-05	4.53E-03	2.64E-10	3.19E-05	1.39E-05	1.79E-05	2.00E-06	1.07E-04	9.90E-07	0.00E+00	5.79E-03	0.00E+00	2.91E-13	0.00E+00	1.32E-08	1.26E-06	3.03E-06	1.06E-06	4.32E-04	5.22E-08	8.90E-07
547820 4179640	1.63E-10	2.42E-05	0.00E+00	5.55E-08	2.43E-08	7.46E-05	5.07E-03	2.96E-10	3.57E-05	1.55E-05	2.00E-05	2.24E-06	1.19E-04	1.11E-06	0.00E+00	6.48E-03	0.00E+00	3.26E-13	0.00E+00	3.80E-09	3.74E-07	8.63E-07	3.28E-07	1.23E-04	1.83E-08	2.56E-07
547840 4179620	1.77E-10	2.63E-05	0.00E+00	6.02E-08	2.63E-08	8.09E-05	5.51E-03	3.21E-10	3.88E-05	1.69E-05	2.17E-05	2.43E-06	1.30E-04	1.20E-06	0.00E+00	7.04E-03	0.00E+00	3.53E-13	0.00E+00	3.23E-09	3.17E-07	7.27E-07	2.78E-07	1.03E-04	1.56E-08	2.17E-07
547780 4179600	1.74E-10	2.59E-05	0.00E+00	5.93E-08	2.59E-08	7.96E-05	5.42E-03	3.16E-10	3.81E-05	1.66E-05	2.14E-05	2.39E-06	1.28E-04	1.18E-06	0.00E+00	6.92E-03	0.00E+00	3.48E-13	0.00E+00	4.72E-09	4.64E-07	1.09E-06	4.07E-07	1.54E-04	2.27E-08	3.18E-07
547800 4179600	1.80E-10	2.68E-05	0.00E+00	6.14E-08	2.68E-08	8.25E-05	5.61E-03	3.27E-10	3.95E-05	1.72E-05	2.22E-05	2.47E-06	1.32E-04	1.23E-06	0.00E+00	7.17E-03	0.00E+00	3.60E-13	0.00E+00	3.38E-09	3.36E-07	7.73E-07	3.00E-07	1.10E-04	1.76E-08	2.28E-07

UCSF Parnassus Heights LRDP
Initial Phase of LRDP (2030)
Operational Inhalation Cancer Risk for Daycare and School Receptors

Risk = $\sum[Dose_i * CFP * ASF_i * ED_i/AT * FAH_i]$

where,

Dose = C_{air} * {BR/BW} *A * EF * 10^{6}
CFP = Cancer Potency Factor
ASF = Age sentivity factor
ED = Exposure duration
AT = Averaging time, 70 yrs
FAH = Fraction of time at home
Cair = Pollutant concentration
{BR/BW} = Daily Breathing Rate
A = Inhalation absorption factor
EF = Exposure Frequency
i = age bin groups

Equations Rearranged
Risk = $C_{air} * CPF * \sum [\{BR/BW\}_i * A * EF * ASF_i * ED_i /AT * FAH_i * 10^{-6}]$

Risk inputs part 1 | Risk calculations part 1

Daycare/School	Age Bin	BR/BW (L/kg-day)	A	EF	FAH	ED/AT	ASF	CF1 (ug/mg)	CF1 (L/m^3)	$\{BR/BW\}_i$ * A * EF * ASF_i * ED_i/AT * FAH_i * 10^6
Lucia Child Care Center	0<2	1200	1	0.68	0.33	0.03	10	1.00E-03	1.00E-03	7.69E-05
	2<9	640	1	0.68	0.33	0.07	3	1.00E-03	1.00E-03	3.08E-05
									total	**1.08E-04**
ABC Bay Area Child Care	0<2	1200	1	0.68	0.33	0.03	10	1.00E-03	1.00E-03	7.69E-05
	2<9	640	1	0.68	0.33	0.07	3	1.00E-03	1.00E-03	3.08E-05
									total	**1.08E-04**
Kirkham Child Care Center	0<2	1200	1	0.68	0.33	0.03	10	1.00E-03	1.00E-03	7.69E-05
	2<9	640	1	0.68	0.33	0.07	3	1.00E-03	1.00E-03	3.08E-05
									total	**1.08E-04**
Clarendon Alternative Elementary	2<16	520	1	0.49	0.33	0.10	3	1.00E-03	1.00E-03	2.52E-05
									total	**2.52E-05**
Independence High	2<16	520	1	0.49	0.33	0.07	3	1.00E-03	1.00E-03	1.80E-05
									total	**1.80E-05**
Stepping Stones Preschool	2<16	520	1	0.49	0.33	0.06	3	1.00E-03	1.00E-03	1.44E-05
									total	**1.44E-05**
Haight Ashbury Community Nursery School	2<16	520	1	0.49	0.33	0.06	3	1.00E-03	1.00E-03	1.44E-05
									total	**1.44E-05**

Pollutant Concentrations by Source

Unique Identifier	Emission Source		EDG	Fume Hoods							
	CPF (mg/kg-day)$^{-1}$		1.1	12	0.1	500	0.17	15	0.15	0.019	510
	UTM X	UTM Y	DPM (ug/m^3)	Arsenic (ug/m^3)	Benzene (ug/m^3)	Benzidine (ug/m^3)	Benzyl chloride (ug/m^3)	Cadmium (ug/m^3)	Carbon tetrachloride (ug/m^3)	Chloroform (ug/m^3)	Chromium (VI) (ug/m^3)
547900 4178680	547900	4178680	9.70E-06	4.26E-12	6.34E-07	0.00E+00	1.45E-09	6.35E-10	1.95E-06	1.33E-04	7.75E-12
547920 4178680	547920	4178680	9.67E-06	4.25E-12	6.33E-07	0.00E+00	1.45E-09	6.34E-10	1.95E-06	1.32E-04	7.73E-12
547940 4178680	547940	4178680	9.64E-06	4.24E-12	6.31E-07	0.00E+00	1.45E-09	6.32E-10	1.94E-06	1.32E-04	7.71E-12
547880 4178660	547880	4178660	9.49E-06	4.17E-12	6.20E-07	0.00E+00	1.42E-09	6.21E-10	1.91E-06	1.30E-04	7.58E-12
547900 4178660	547900	4178660	9.46E-06	4.16E-12	6.19E-07	0.00E+00	1.42E-09	6.20E-10	1.91E-06	1.30E-04	7.56E-12
547920 4178660	547920	4178660	9.43E-06	4.15E-12	6.18E-07	0.00E+00	1.41E-09	6.19E-10	1.90E-06	1.29E-04	7.55E-12
547880 4178640	547880	4178640	9.27E-06	4.07E-12	6.06E-07	0.00E+00	1.39E-09	6.07E-10	1.86E-06	1.27E-04	7.40E-12
547900 4178640	547900	4178640	9.22E-06	4.06E-12	6.04E-07	0.00E+00	1.38E-09	6.05E-10	1.86E-06	1.27E-04	7.38E-12
547920 4178640	547920	4178640	9.18E-06	4.06E-12	6.03E-07	0.00E+00	1.38E-09	6.05E-10	1.86E-06	1.26E-04	7.37E-12
547880 4178620	547880	4178620	9.10E-06	3.97E-12	5.91E-07	0.00E+00	1.35E-09	5.92E-10	1.82E-06	1.24E-04	7.22E-12
547900 4178620	547900	4178620	9.05E-06	3.96E-12	5.89E-07	0.00E+00	1.35E-09	5.90E-10	1.81E-06	1.23E-04	7.20E-12
547860 4178600	547860	4178600	8.91E-06	3.89E-12	5.79E-07	0.00E+00	1.33E-09	5.80E-10	1.78E-06	1.21E-04	7.07E-12
547880 4178600	547880	4178600	8.88E-06	3.88E-12	5.77E-07	0.00E+00	1.32E-09	5.78E-10	1.78E-06	1.21E-04	7.05E-12
547900 4178600	547900	4178600	8.86E-06	3.87E-12	5.76E-07	0.00E+00	1.32E-09	5.77E-10	1.77E-06	1.21E-04	7.03E-12
547920 4178600	547920	4178600	8.78E-06	3.86E-12	5.75E-07	0.00E+00	1.32E-09	5.76E-10	1.77E-06	1.20E-04	7.02E-12
547880 4178580	547880	4178580	8.64E-06	3.79E-12	5.64E-07	0.00E+00	1.29E-09	5.65E-10	1.74E-06	1.18E-04	6.89E-12
547900 4178580	547900	4178580	8.61E-06	3.77E-12	5.62E-07	0.00E+00	1.29E-09	5.63E-10	1.73E-06	1.18E-04	6.86E-12
547920 4178580	547920	4178580	8.55E-06	3.77E-12	5.61E-07	0.00E+00	1.29E-09	5.62E-10	1.73E-06	1.17E-04	6.85E-12
547240 4179660	547240	4179660	1.55E-05	7.10E-12	1.06E-06	0.00E+00	2.42E-09	1.06E-09	3.25E-06	2.21E-04	1.29E-11
547220 4179660	547220	4179660	1.49E-05	6.85E-12	1.02E-06	0.00E+00	2.33E-09	1.02E-09	3.14E-06	2.13E-04	1.24E-11
547240 4179680	547240	4179680	1.48E-05	6.77E-12	1.01E-06	0.00E+00	2.31E-09	1.01E-09	3.10E-06	2.11E-04	1.23E-11
547220 4179680	547220	4179680	1.43E-05	6.55E-12	9.75E-07	0.00E+00	2.23E-09	9.77E-10	3.00E-06	2.04E-04	1.19E-11
547180 4179700	547180	4179700	1.29E-05	5.91E-12	8.80E-07	0.00E+00	2.02E-09	8.82E-10	2.71E-06	1.84E-04	1.08E-11
547180 4179720	547180	4179720	1.25E-05	5.72E-12	8.52E-07	0.00E+00	1.95E-09	8.53E-10	2.62E-06	1.78E-04	1.04E-11
547160 4179700	547160	4179700	1.25E-05	5.76E-12	8.57E-07	0.00E+00	1.96E-09	8.58E-10	2.64E-06	1.79E-04	1.05E-11
547160 4179720	547160	4179720	1.21E-05	5.58E-12	8.30E-07	0.00E+00	1.90E-09	8.32E-10	2.56E-06	1.74E-04	1.01E-11
548260 4179620	548260	4179620	1.21E-04	4.19E-11	6.24E-06	0.00E+00	1.43E-08	6.25E-09	1.92E-05	1.31E-03	7.62E-11
548280 4179620	548280	4179620	1.17E-04	4.06E-11	6.04E-06	0.00E+00	1.38E-08	6.05E-09	1.86E-05	1.26E-03	7.38E-11
548260 4179640	548260	4179640	1.22E-04	4.11E-11	6.11E-06	0.00E+00	1.40E-08	6.12E-09	1.88E-05	1.28E-03	7.47E-11
548280 4179640	548280	4179640	1.18E-04	3.97E-11	5.91E-06	0.00E+00	1.35E-08	5.92E-09	1.82E-05	1.24E-03	7.22E-11
547560 4179660	547560	4179660	7.88E-06	5.03E-11	7.48E-06	0.00E+00	1.71E-08	7.50E-09	2.30E-05	1.57E-03	9.14E-11
547560 4179680	547560	4179680	7.94E-06	3.34E-11	4.96E-06	0.00E+00	1.14E-08	4.97E-09	1.53E-05	1.04E-03	6.07E-11
547540 4179660	547540	4179660	9.22E-06	2.66E-11	3.96E-06	0.00E+00	9.07E-09	3.97E-09	1.22E-05	8.29E-04	4.84E-11
547540 4179680	547540	4179680	8.52E-06	2.04E-11	3.04E-06	0.00E+00	6.96E-09	3.04E-09	9.35E-06	6.36E-04	3.71E-11
547220 4179140	547220	4179140	1.60E-05	7.67E-12	1.14E-06	0.00E+00	2.62E-09	1.14E-09	3.52E-06	2.39E-04	1.40E-11
547200 4179140	547200	4179140	1.54E-05	7.65E-12	1.14E-06	0.00E+00	2.61E-09	1.14E-09	3.50E-06	2.38E-04	1.39E-11
547480 4179400	547480	4179400	4.20E-05	1.81E-11	2.69E-06	0.00E+00	6.16E-09	2.69E-09	8.28E-06	5.63E-04	3.29E-11
547460 4179400	547460	4179400	4.04E-05	1.77E-11	2.64E-06	0.00E+00	6.04E-09	2.64E-09	8.12E-06	5.52E-04	3.22E-11

Unique Identifier	Fume Hoods										
	0.027	0.0087	0.25	0.072	0.021	0.0049	1.5	0.0035	0.91	3.9	0.27
	Dioxane, 1,4- (ug/m^3)	Ethyl Benzene (ug/m^3)	Ethylene dibromide (ug/m^3)	Ethylene dichloride (ug/m^3)	Formaldehyde (ug/m^3)	Hydrazine (ug/m^3)	Methylene bis (2-chloroaniline), 4,4'- (ug/m^3)	Methylene chloride (ug/m^3)	Nickel (ug/m^3)	PAH (as benzo(a)pyrene) (ug/m^3)	Vinyl chloride (ug/m^3)
547900 4178680	9.35E-07	4.07E-07	5.24E-07	5.86E-08	3.13E-06	2.90E-08	0.00E+00	1.70E-04	0.00E+00	8.52E-15	0.00E+00
547920 4178680	9.33E-07	4.06E-07	5.23E-07	5.84E-08	3.12E-06	2.89E-08	0.00E+00	1.69E-04	0.00E+00	8.50E-15	0.00E+00
547940 4178680	9.30E-07	4.05E-07	5.22E-07	5.83E-08	3.11E-06	2.89E-08	0.00E+00	1.69E-04	0.00E+00	8.48E-15	0.00E+00
547880 4178660	9.14E-07	3.98E-07	5.13E-07	5.73E-08	3.06E-06	2.84E-08	0.00E+00	1.66E-04	0.00E+00	8.34E-15	0.00E+00
547900 4178660	9.12E-07	3.97E-07	5.12E-07	5.72E-08	3.05E-06	2.83E-08	0.00E+00	1.66E-04	0.00E+00	8.32E-15	0.00E+00
547920 4178660	9.10E-07	3.96E-07	5.11E-07	5.71E-08	3.05E-06	2.83E-08	0.00E+00	1.65E-04	0.00E+00	8.30E-15	0.00E+00
547880 4178640	8.93E-07	3.88E-07	5.01E-07	5.59E-08	2.99E-06	2.77E-08	0.00E+00	1.62E-04	0.00E+00	8.14E-15	0.00E+00
547900 4178640	8.91E-07	3.88E-07	5.00E-07	5.58E-08	2.98E-06	2.76E-08	0.00E+00	1.62E-04	0.00E+00	8.12E-15	0.00E+00
547920 4178640	8.90E-07	3.87E-07	4.99E-07	5.57E-08	2.98E-06	2.76E-08	0.00E+00	1.62E-04	0.00E+00	8.11E-15	0.00E+00
547880 4178620	8.71E-07	3.79E-07	4.89E-07	5.46E-08	2.91E-06	2.70E-08	0.00E+00	1.58E-04	0.00E+00	7.94E-15	0.00E+00
547900 4178620	8.69E-07	3.78E-07	4.87E-07	5.44E-08	2.91E-06	2.70E-08	0.00E+00	1.58E-04	0.00E+00	7.92E-15	0.00E+00
547860 4178600	8.54E-07	3.71E-07	4.79E-07	5.35E-08	2.86E-06	2.65E-08	0.00E+00	1.55E-04	0.00E+00	7.78E-15	0.00E+00
547880 4178600	8.51E-07	3.70E-07	4.77E-07	5.33E-08	2.85E-06	2.64E-08	0.00E+00	1.55E-04	0.00E+00	7.76E-15	0.00E+00
547900 4178600	8.49E-07	3.69E-07	4.76E-07	5.32E-08	2.84E-06	2.63E-08	0.00E+00	1.54E-04	0.00E+00	7.74E-15	0.00E+00
547920 4178600	8.47E-07	3.69E-07	4.75E-07	5.31E-08	2.83E-06	2.63E-08	0.00E+00	1.54E-04	0.00E+00	7.72E-15	0.00E+00
547880 4178580	8.31E-07	3.62E-07	4.66E-07	5.21E-08	2.78E-06	2.58E-08	0.00E+00	1.51E-04	0.00E+00	7.58E-15	0.00E+00
547900 4178580	8.28E-07	3.60E-07	4.64E-07	5.19E-08	2.77E-06	2.57E-08	0.00E+00	1.50E-04	0.00E+00	7.55E-15	0.00E+00
547920 4178580	8.27E-07	3.60E-07	4.64E-07	5.18E-08	2.77E-06	2.57E-08	0.00E+00	1.50E-04	0.00E+00	7.54E-15	0.00E+00
547240 4179660	1.56E-06	6.77E-07	8.73E-07	9.75E-08	5.21E-06	4.83E-08	0.00E+00	2.83E-04	0.00E+00	1.42E-14	0.00E+00
547220 4179660	1.50E-06	6.53E-07	8.43E-07	9.41E-08	5.03E-06	4.66E-08	0.00E+00	2.73E-04	0.00E+00	1.37E-14	0.00E+00
547240 4179680	1.48E-06	6.46E-07	8.33E-07	9.30E-08	4.97E-06	4.61E-08	0.00E+00	2.70E-04	0.00E+00	1.35E-14	0.00E+00
547220 4179680	1.44E-06	6.25E-07	8.06E-07	9.00E-08	4.81E-06	4.46E-08	0.00E+00	2.61E-04	0.00E+00	1.31E-14	0.00E+00
547180 4179700	1.30E-06	5.64E-07	7.28E-07	8.13E-08	4.34E-06	4.03E-08	0.00E+00	2.36E-04	0.00E+00	1.18E-14	0.00E+00
547180 4179720	1.26E-06	5.46E-07	7.04E-07	7.87E-08	4.20E-06	3.90E-08	0.00E+00	2.28E-04	0.00E+00	1.14E-14	0.00E+00
547160 4179700	1.26E-06	5.50E-07	7.09E-07	7.91E-08	4.23E-06	3.92E-08	0.00E+00	2.29E-04	0.00E+00	1.15E-14	0.00E+00
547160 4179720	1.22E-06	5.32E-07	6.87E-07	7.67E-08	4.09E-06	3.80E-08	0.00E+00	2.22E-04	0.00E+00	1.12E-14	0.00E+00
548260 4179620	9.20E-06	4.00E-06	5.16E-06	5.76E-07	3.08E-05	2.85E-07	0.00E+00	1.67E-03	0.00E+00	8.38E-14	0.00E+00
548280 4179620	8.90E-06	3.87E-06	4.99E-06	5.58E-07	2.98E-05	2.76E-07	0.00E+00	1.62E-03	0.00E+00	8.12E-14	0.00E+00
548260 4179640	9.01E-06	3.92E-06	5.05E-06	5.65E-07	3.01E-05	2.80E-07	0.00E+00	1.64E-03	0.00E+00	8.21E-14	0.00E+00
548280 4179640	8.71E-06	3.79E-06	4.89E-06	5.46E-07	2.91E-05	2.70E-07	0.00E+00	1.58E-03	0.00E+00	7.94E-14	0.00E+00
547560 4179660	1.10E-05	4.80E-06	6.19E-06	6.91E-07	3.69E-05	3.42E-07	0.00E+00	2.00E-03	0.00E+00	1.01E-13	0.00E+00
547560 4179680	7.32E-06	3.18E-06	4.11E-06	4.59E-07	2.45E-05	2.27E-07	0.00E+00	1.33E-03	0.00E+00	6.67E-14	0.00E+00
547540 4179660	5.84E-06	2.54E-06	3.27E-06	3.66E-07	1.95E-05	1.81E-07	0.00E+00	1.06E-03	0.00E+00	5.32E-14	0.00E+00
547540 4179680	4.48E-06	1.95E-06	2.51E-06	2.81E-07	1.50E-05	1.39E-07	0.00E+00	8.13E-04	0.00E+00	4.08E-14	0.00E+00
547220 4179140	1.68E-06	7.33E-07	9.44E-07	1.05E-07	5.63E-06	5.22E-08	0.00E+00	3.06E-04	0.00E+00	1.53E-14	0.00E+00
547200 4179140	1.68E-06	7.30E-07	9.42E-07	1.05E-07	5.62E-06	5.21E-08	0.00E+00	3.05E-04	0.00E+00	1.53E-14	0.00E+00
547480 4179400	3.96E-06	1.72E-06	2.22E-06	2.48E-07	1.33E-05	1.23E-07	0.00E+00	7.20E-04	0.00E+00	3.61E-14	0.00E+00
547460 4179400	3.89E-06	1.69E-06	2.18E-06	2.44E-07	1.30E-05	1.21E-07	0.00E+00	7.06E-04	0.00E+00	3.55E-14	0.00E+00

Risk calculations part 2

Unique Identifier	PCUP								EDG	FH	PCUP	Total	Receptor Type Determination
	0.6	0.01	0.1	0.0087	0.021	0.12	0.013	3.9	Cancer Risk (per million)				
	1,3-Butadiene (ug/m^3)	Acetaldehyde (ug/m^3)	Benzene (ug/m^3)	Ethyl Benzene (ug/m^3)	Formaldehyde (ug/m^3)	Naphthalene (ug/m^3)	Propylene oxide (ug/m^3)	PAH (as benzo(a)pyrene) (ug/m^3)					
547900 4178680	1.40E-09	1.35E-07	3.30E-07	1.14E-07	4.68E-05	5.82E-09	9.41E-08	3.45E-09	0.00	0.00	0.00	0.00	Clarendon Alternative Elementary
547920 4178680	1.38E-09	1.33E-07	3.27E-07	1.13E-07	4.64E-05	5.76E-09	9.32E-08	3.42E-09	0.00	0.00	0.00	0.00	Clarendon Alternative Elementary
547940 4178680	1.37E-09	1.32E-07	3.24E-07	1.12E-07	4.60E-05	5.70E-09	9.23E-08	3.38E-09	0.00	0.00	0.00	0.00	Clarendon Alternative Elementary
547880 4178660	1.37E-09	1.32E-07	3.24E-07	1.12E-07	4.60E-05	5.72E-09	9.24E-08	3.39E-09	0.00	0.00	0.00	0.00	Clarendon Alternative Elementary
547900 4178660	1.36E-09	1.31E-07	3.22E-07	1.12E-07	4.57E-05	5.68E-09	9.18E-08	3.37E-09	0.00	0.00	0.00	0.00	Clarendon Alternative Elementary
547920 4178660	1.35E-09	1.30E-07	3.20E-07	1.11E-07	4.53E-05	5.63E-09	9.11E-08	3.34E-09	0.00	0.00	0.00	0.00	Clarendon Alternative Elementary
547880 4178640	1.34E-09	1.29E-07	3.17E-07	1.10E-07	4.50E-05	5.59E-09	9.03E-08	3.31E-09	0.00	0.00	0.00	0.00	Clarendon Alternative Elementary
547900 4178640	1.33E-09	1.28E-07	3.14E-07	1.09E-07	4.45E-05	5.53E-09	8.95E-08	3.28E-09	0.00	0.00	0.00	0.00	Clarendon Alternative Elementary
547920 4178640	1.31E-09	1.26E-07	3.11E-07	1.07E-07	4.41E-05	5.48E-09	8.85E-08	3.24E-09	0.00	0.00	0.00	0.00	Clarendon Alternative Elementary
547880 4178620	1.32E-09	1.27E-07	3.12E-07	1.08E-07	4.43E-05	5.50E-09	8.89E-08	3.26E-09	0.00	0.00	0.00	0.00	Clarendon Alternative Elementary
547900 4178620	1.31E-09	1.26E-07	3.09E-07	1.07E-07	4.38E-05	5.45E-09	8.81E-08	3.23E-09	0.00	0.00	0.00	0.00	Clarendon Alternative Elementary
547860 4178600	1.30E-09	1.25E-07	3.06E-07	1.06E-07	4.35E-05	5.40E-09	8.73E-08	3.20E-09	0.00	0.00	0.00	0.00	Clarendon Alternative Elementary
547880 4178600	1.29E-09	1.24E-07	3.05E-07	1.06E-07	4.33E-05	5.38E-09	8.69E-08	3.19E-09	0.00	0.00	0.00	0.00	Clarendon Alternative Elementary
547900 4178600	1.29E-09	1.24E-07	3.04E-07	1.05E-07	4.31E-05	5.35E-09	8.67E-08	3.17E-09	0.00	0.00	0.00	0.00	Clarendon Alternative Elementary
547920 4178600	1.27E-09	1.22E-07	2.99E-07	1.04E-07	4.25E-05	5.27E-09	8.53E-08	3.12E-09	0.00	0.00	0.00	0.00	Clarendon Alternative Elementary
547880 4178580	1.25E-09	1.21E-07	2.97E-07	1.03E-07	4.21E-05	5.23E-09	8.45E-08	3.10E-09	0.00	0.00	0.00	0.00	Clarendon Alternative Elementary
547900 4178580	1.25E-09	1.20E-07	2.95E-07	1.02E-07	4.18E-05	5.20E-09	8.41E-08	3.08E-09	0.00	0.00	0.00	0.00	Clarendon Alternative Elementary
547920 4178580	1.23E-09	1.19E-07	2.91E-07	1.01E-07	4.13E-05	5.12E-09	8.29E-08	3.04E-09	0.00	0.00	0.00	0.00	Clarendon Alternative Elementary
547240 4179660	2.22E-09	2.13E-07	5.25E-07	1.81E-07	7.45E-05	9.08E-09	1.50E-07	5.43E-09	0.00	0.00	0.00	0.00	Independence High
547220 4179660	2.17E-09	2.08E-07	5.12E-07	1.76E-07	7.27E-05	8.85E-09	1.46E-07	5.29E-09	0.00	0.00	0.00	0.00	Independence High
547240 4179680	2.17E-09	2.09E-07	5.14E-07	1.77E-07	7.29E-05	8.89E-09	1.47E-07	5.32E-09	0.00	0.00	0.00	0.00	Independence High
547220 4179680	2.12E-09	2.04E-07	5.01E-07	1.72E-07	7.11E-05	8.66E-09	1.43E-07	5.18E-09	0.00	0.00	0.00	0.00	Independence High
547180 4179700	2.00E-09	1.92E-07	4.72E-07	1.62E-07	6.69E-05	8.15E-09	1.35E-07	4.87E-09	0.00	0.00	0.00	0.00	Stepping Stones Preschool
547180 4179720	1.97E-09	1.90E-07	4.66E-07	1.60E-07	6.61E-05	8.06E-09	1.33E-07	4.82E-09	0.00	0.00	0.00	0.00	Stepping Stones Preschool
547160 4179700	1.95E-09	1.87E-07	4.61E-07	1.58E-07	6.54E-05	7.95E-09	1.32E-07	4.76E-09	0.00	0.00	0.00	0.00	Stepping Stones Preschool
547160 4179720	1.93E-09	1.86E-07	4.56E-07	1.57E-07	6.47E-05	7.89E-09	1.30E-07	4.72E-09	0.00	0.00	0.00	0.00	Stepping Stones Preschool
548260 4179620	1.35E-08	1.29E-06	3.18E-06	1.10E-06	4.51E-04	5.53E-08	9.07E-07	3.30E-08	0.00	0.00	0.00	0.00	Haight Ashbury Community Nursery School
548280 4179620	1.31E-08	1.26E-06	3.09E-06	1.07E-06	4.38E-04	5.37E-08	8.82E-07	3.20E-08	0.00	0.00	0.00	0.00	Haight Ashbury Community Nursery School
548260 4179640	1.31E-08	1.26E-06	3.09E-06	1.06E-06	4.38E-04	5.35E-08	8.81E-07	3.20E-08	0.00	0.00	0.00	0.00	Haight Ashbury Community Nursery School
548280 4179640	1.27E-08	1.22E-06	3.00E-06	1.03E-06	4.26E-04	5.21E-08	8.57E-07	3.11E-08	0.00	0.00	0.00	0.00	Haight Ashbury Community Nursery School
547560 4179660	4.81E-09	4.65E-07	1.14E-06	3.96E-07	1.61E-04	2.04E-08	3.24E-07	1.20E-08	0.00	0.00	0.00	0.01	Lucia Child Care Center
547560 4179680	4.83E-09	4.66E-07	1.14E-06	3.96E-07	1.62E-04	2.02E-08	3.26E-07	1.20E-08	0.00	0.00	0.00	0.00	Lucia Child Care Center
547540 4179660	4.43E-09	4.27E-07	1.05E-06	3.64E-07	1.48E-04	1.87E-08	2.98E-07	1.10E-08	0.00	0.00	0.00	0.00	Lucia Child Care Center
547540 4179680	4.35E-09	4.20E-07	1.03E-06	3.57E-07	1.46E-04	1.82E-08	2.94E-07	1.08E-08	0.00	0.00	0.00	0.00	Lucia Child Care Center
547220 4179140	2.82E-09	2.71E-07	6.67E-07	2.29E-07	9.46E-05	1.15E-08	1.90E-07	6.87E-09	0.00	0.00	0.00	0.00	ABC Bay Area Child Care
547200 4179140	2.87E-09	2.76E-07	6.79E-07	2.33E-07	9.64E-05	1.17E-08	1.94E-07	7.00E-09	0.00	0.00	0.00	0.00	ABC Bay Area Child Care
547480 4179400	6.25E-09	6.02E-07	1.48E-06	5.10E-07	2.10E-04	2.59E-08	4.22E-07	1.54E-08	0.00	0.00	0.00	0.01	Kirkham Child Care Center
547460 4179400	6.05E-09	5.82E-07	1.43E-06	4.94E-07	2.03E-04	2.50E-08	4.08E-07	1.49E-08	0.00	0.00	0.00	0.01	Kirkham Child Care Center

UCSF Parnassus Heights LRDP

Initial Phase of LRDP (2030)

Operational Inhalation Chronic Hazard Index for Residential Receptor

Chronic Hazard Quotient = Annual Average Concentration / Chronic REL

Pollutant Concentrations by Source

Unique Identifier	UTM X	UTM Y	DPM (ug/m3)	Arsenic (ug/m3)	Benzene (ug/m3)	Cadmium (ug/m3)	arbon tetrachlori (ug/m3)	Chloroform (ug/m3)	Chromium (VI) (ug/m3)	loroethylene (ug/m3)	Dioxane, 1,4- (ug/m3)	Ethylene dibromide (ug/m3)	thylene dichlori (ug/m3)	Formaldehyde (ug/m3)	Hydrazine (ug/m3)	ganese and compo (ug/m3)	rcury and compou (ug/m3)	Mercuric chloride (ug/m3)	ethylene chlori (ug/m3)	Nickel (ug/m3)	EthylBenzen (ug/m3)	Acetaldehyde (ug/m3)	Acrolein (ug/m3)	Ammonia (ug/m3)	Benzene (ug/m3)	13-Butadiene (ug/m3)	Ethyl benzene (ug/m3)	Formaldehyde (ug/m3)	Hexane (ug/m3)	Naphthalene (ug/m3)	Propylene oxide (ug/m3)	Toluene (ug/m3)	Xylene (ug/m3)	Total Hazard Index	Receptor Type Determination
Emission Source			EDG	Fume Hoods																		PCUP													
Chronic REL (ug/m3)			5	0.015	3	0.02	40	300	0.2	70	3000	0.8	400	9	0.2	0.09	0.03	0.03	400	0.014	2000	140	0.35	200	3	2	2000	9	7000	9	30	300	700		
547960 4179580	547960	4179580	2.32E-04	8.26E-11	1.23E-05	1.23E-08	3.78E-05	2.57E-03	1.50E-10	0.00E+00	1.81E-05	1.02E-05	1.14E-06	6.06E-05	5.62E-07	2.10E-09	0.00E+00	8.41E-12	3.29E-03	0.00E+00	7.89E-06	1.04E-05	1.93E-06	1.25E-02	2.57E-05	1.08E-07	8.85E-06	3.64E-03	5.20E-07	4.48E-07	7.31E-06	2.85E-07	1.85E-05	0.00	campus
547960 4179600	547960	4179600	2.52E-04	8.64E-11	1.29E-05	1.29E-08	3.96E-05	2.69E-03	1.57E-10	0.00E+00	1.90E-05	1.06E-05	1.19E-06	6.34E-05	5.88E-07	2.20E-09	0.00E+00	8.80E-12	3.44E-03	0.00E+00	8.25E-06	9.79E-06	1.84E-06	1.18E-02	2.40E-05	1.01E-07	8.35E-06	3.41E-03	5.37E-07	4.31E-07	6.83E-06	2.67E-07	1.75E-05	0.00	campus
547960 4179560	547960	4179560	2.03E-04	7.67E-11	1.14E-05	1.14E-08	3.51E-05	2.39E-03	1.39E-10	0.00E+00	1.68E-05	9.44E-06	1.05E-06	5.63E-05	5.22E-07	1.95E-09	0.00E+00	7.81E-12	3.05E-03	0.00E+00	7.32E-06	9.32E-06	1.68E-06	1.10E-02	2.30E-05	9.74E-08	7.82E-06	3.27E-03	3.82E-07	3.83E-07	6.57E-06	2.53E-07	1.62E-05	0.00	campus
547980 4179580	547980	4179580	2.24E-04	7.84E-11	1.17E-05	1.17E-08	3.59E-05	2.44E-03	1.42E-10	0.00E+00	1.72E-05	9.64E-06	1.08E-06	5.75E-05	5.33E-07	1.99E-09	0.00E+00	7.98E-12	3.12E-03	0.00E+00	7.48E-06	7.70E-06	1.42E-06	9.23E-03	1.89E-05	8.01E-08	6.53E-06	2.69E-03	3.80E-07	3.30E-07	5.40E-06	2.09E-07	1.36E-05	0.00	pot res
547980 4179560	547980	4179560	1.98E-04	7.36E-11	1.09E-05	1.10E-08	3.37E-05	2.29E-03	1.34E-10	0.00E+00	1.61E-05	9.06E-06	1.01E-06	5.40E-05	5.01E-07	1.87E-09	0.00E+00	7.49E-12	2.93E-03	0.00E+00	7.02E-06	7.26E-06	1.32E-06	8.63E-03	1.79E-05	7.58E-08	6.11E-06	2.54E-03	3.16E-07	3.02E-07	5.11E-06	1.97E-07	1.27E-05	0.00	pot res
547980 4179600	547980	4179600	2.40E-04	8.10E-11	1.21E-05	1.21E-08	3.71E-05	2.53E-03	1.47E-10	0.00E+00	1.78E-05	9.97E-06	1.11E-06	5.95E-05	5.52E-07	2.06E-09	0.00E+00	8.25E-12	3.23E-03	0.00E+00	7.73E-06	6.62E-06	1.24E-06	7.98E-03	1.62E-05	6.86E-08	5.64E-06	2.30E-03	3.52E-07	2.89E-07	4.63E-06	1.79E-07	1.18E-05	0.00	pot res
547960 4179540	547960	4179540	1.79E-04	6.94E-11	1.03E-05	1.04E-08	3.18E-05	2.16E-03	1.26E-10	0.00E+00	1.52E-05	8.55E-06	9.55E-07	5.10E-05	4.73E-07	1.77E-09	0.00E+00	7.07E-12	2.77E-03	0.00E+00	6.63E-06	6.39E-06	1.13E-06	7.48E-03	1.58E-05	6.72E-08	5.31E-06	2.24E-03	2.10E-07	2.52E-07	4.53E-06	1.72E-07	1.09E-05	0.00	campus
547960 4179620	547960	4179620	2.60E-04	8.83E-11	1.31E-05	1.32E-08	4.05E-05	2.75E-03	1.61E-10	0.00E+00	1.94E-05	1.09E-05	1.21E-06	6.48E-05	6.01E-07	2.25E-09	0.00E+00	9.00E-12	3.52E-03	0.00E+00	8.43E-06	5.49E-06	1.04E-06	6.66E-03	1.34E-05	5.67E-08	4.70E-06	1.90E-03	3.20E-07	2.46E-07	3.82E-06	1.48E-07	9.86E-06	0.00	campus
547880 4179740	547880	4179740	1.90E-04	7.05E-11	1.05E-05	1.05E-08	3.23E-05	2.20E-03	1.28E-10	0.00E+00	1.55E-05	8.68E-06	9.69E-07	5.18E-05	4.80E-07	1.79E-09	0.00E+00	7.18E-12	2.81E-03	0.00E+00	6.73E-06	5.86E-06	1.03E-06	6.84E-03	1.46E-05	6.18E-08	4.86E-06	2.07E-03	1.80E-07	2.29E-07	4.16E-06	1.61E-07	9.99E-06	0.00	campus
547900 4179740	547900	4179740	2.00E-04	7.24E-11	1.08E-05	1.08E-08	3.32E-05	2.26E-03	1.32E-10	0.00E+00	1.59E-05	8.91E-06	9.95E-07	5.32E-05	4.93E-07	1.84E-09	0.00E+00	7.37E-12	2.88E-03	0.00E+00	6.91E-06	5.78E-06	1.01E-06	6.72E-03	1.44E-05	6.10E-08	4.78E-06	2.04E-03	1.59E-07	2.22E-07	4.12E-06	1.58E-07	9.79E-06	0.00	campus
547980 4179540	547980	4179540	1.78E-04	6.73E-11	1.00E-05	1.00E-08	3.08E-05	2.10E-03	1.22E-10	0.00E+00	1.48E-05	8.29E-06	9.26E-07	4.94E-05	4.58E-07	1.71E-09	0.00E+00	6.86E-12	2.68E-03	0.00E+00	6.43E-06	5.92E-06	1.05E-06	6.96E-03	1.46E-05	6.21E-08	4.94E-06	2.08E-03	2.14E-07	2.37E-07	4.18E-06	1.60E-07	1.02E-05	0.00	pot res
547900 4179720	547900	4179720	2.17E-04	8.17E-11	1.22E-05	1.22E-08	3.74E-05	2.55E-03	1.49E-10	0.00E+00	1.79E-05	1.01E-05	1.12E-06	6.00E-05	5.56E-07	2.08E-09	0.00E+00	8.32E-12	3.26E-03	0.00E+00	7.80E-06	5.20E-06	9.03E-07	6.04E-03	1.29E-05	5.49E-08	4.29E-06	1.84E-03	1.41E-07	1.99E-07	3.70E-06	1.41E-07	8.79E-06	0.00	campus
547880 4179720	547880	4179720	2.13E-04	8.24E-11	1.23E-05	1.23E-08	3.77E-05	2.57E-03	1.50E-10	0.00E+00	1.81E-05	1.01E-05	1.13E-06	6.04E-05	5.61E-07	2.10E-09	0.00E+00	8.38E-12	3.28E-03	0.00E+00	7.86E-06	5.14E-06	9.01E-07	5.99E-03	1.28E-05	5.41E-08	4.26E-06	1.81E-03	1.56E-07	2.00E-07	3.65E-06	1.41E-07	8.75E-06	0.00	campus

UCSF Parnassus Heights LRDP
Initial Phase of LRDP (2030)
Operational Inhalation Acute Hazard Index for Residential Receptor

Acute Hazard Quotient = 1-hour Max Concentration / Acute REL

Pollutant Concentrations by Source

Unique Identifier	Emission Source		Fume Hoods													PCUP										Total Hazard Index	Receptor Type Determination	
	Chronic REL (ug/m^3)		0.2	27	240	1900	150	3000	55	0.6	0.6	14000	0.2	120	180000	470	2.5	3200	27	660	55	470	3100	37000	22000			
	UTM X	UTM Y	Arsenic (ug/m^3)	Benzene (ug/m^3)	Benzyl chloride (ug/m^3)	arbon tetrachlorid (ug/m^3)	Chloroform (ug/m^3)	Dioxane, 1,4- (ug/m^3)	ormaldehyd (ug/m^3)	ercury and compoun (ug/m^3)	Mercuric chloride (ug/m^3)	ethylene chlori (ug/m^3)	Nickel (ug/m^3)	ulfuric acid/Oleu (ug/m^3)	Vinyl chloride (ug/m^3)	Acetaldehyde (ug/m^3)	Acrolein (ug/m^3)	Ammonia (ug/m^3)	Benzene (ug/m^3)	1,3-Butadiene (ug/m^3)	Formaldehyde (ug/m^3)	NO2 (ug/m^3)	Propylene oxide (ug/m^3)	Toluene (ug/m^3)	Xylene (ug/m^3)			
547640 4179660	547640	4179660	5.12E-09	7.61E-04	1.74E-06	2.34E-03	1.59E-01	1.12E-03	3.75E-03	0.00E+00	5.21E-10	2.04E-01	0.00E+00	5.83E-05	0.00E+00	1.02E-04	1.79E-05	1.19E-01	2.51E-04	1.07E-06	3.57E-02	4.87E-02	7.20E-05	2.76E-06	1.74E-04	0.00	Campus	
547660_4179660	547660	4179660	4.51E-09	6.71E-04	1.54E-06	2.07E-03	1.41E-01	9.90E-04	3.31E-03	0.00E+00	4.59E-10	1.80E-01	0.00E+00	5.14E-05	0.00E+00	1.09E-04	1.92E-05	1.27E-01	2.70E-04	1.15E-06	3.84E-02	5.18E-02	7.74E-05	2.97E-06	1.86E-04	0.00	Campus	
547640_4179640	547640	4179640	4.94E-09	7.35E-04	1.68E-06	2.26E-03	1.54E-01	1.08E-03	3.63E-03	0.00E+00	5.03E-10	1.97E-01	0.00E+00	5.63E-05	0.00E+00	9.25E-05	1.66E-05	1.09E-01	2.28E-04	9.68E-07	3.24E-02	4.77E-02	6.53E-05	2.50E-06	1.60E-04	0.00	Campus	
547640_4179680	547640	4179680	4.96E-09	7.38E-04	1.69E-06	2.27E-03	1.55E-01	1.09E-03	3.64E-03	0.00E+00	5.05E-10	1.98E-01	0.00E+00	5.65E-05	0.00E+00	8.91E-05	1.57E-05	1.04E-01	2.21E-04	9.37E-07	3.14E-02	4.22E-02	6.32E-05	2.43E-06	1.52E-04	0.00	Campus	
547620_4179640	547620	4179640	5.12E-09	7.62E-04	1.75E-06	2.35E-03	1.60E-01	1.12E-03	3.76E-03	0.00E+00	5.21E-10	2.04E-01	0.00E+00	5.83E-05	0.00E+00	8.11E-05	1.44E-05	9.52E-02	2.01E-04	8.52E-07	2.85E-02	4.00E-02	5.74E-05	2.20E-06	1.39E-04	0.00	Campus	
547660_4179680	547660	4179680	4.34E-09	6.45E-04	1.48E-06	1.99E-03	1.35E-01	9.51E-04	3.18E-03	0.00E+00	4.41E-10	1.73E-01	0.00E+00	4.94E-05	0.00E+00	9.99E-05	1.76E-05	1.17E-01	2.47E-04	1.05E-06	3.51E-02	4.71E-02	7.09E-05	2.69E-06	1.70E-04	0.00	Campus	
547640_4179700	547640	4179700	4.96E-09	7.38E-04	1.69E-06	2.27E-03	1.55E-01	1.09E-03	3.64E-03	0.00E+00	5.05E-10	1.98E-01	0.00E+00	5.65E-05	0.00E+00	8.14E-05	1.41E-05	9.43E-02	2.02E-04	8.60E-07	2.88E-02	3.62E-02	5.80E-05	2.24E-06	1.37E-04	0.00	Campus	
547620_4179660	547620	4179660	4.91E-09	7.30E-04	1.67E-06	2.25E-03	1.53E-01	1.08E-03	3.60E-03	0.00E+00	5.00E-10	1.95E-01	0.00E+00	5.59E-05	0.00E+00	7.85E-05	1.39E-05	9.21E-02	1.94E-04	8.24E-07	2.76E-02	3.86E-02	5.56E-05	2.13E-06	1.35E-04	0.00	Campus	
547660_4179640	547660	4179640	4.00E-09	5.96E-04	1.37E-06	1.83E-03	1.25E-01	8.78E-04	2.94E-03	0.00E+00	4.08E-10	1.59E-01	0.00E+00	4.56E-05	0.00E+00	1.03E-04	1.83E-05	1.21E-01	2.54E-04	1.08E-06	3.61E-02	5.11E-02	7.27E-05	2.78E-06	1.77E-04	0.00	Campus	
547600_4179640	547600	4179640	5.47E-09	8.14E-04	1.87E-06	2.51E-03	1.71E-01	1.20E-03	4.02E-03	0.00E+00	5.57E-10	2.18E-01	0.00E+00	6.23E-05	0.00E+00	5.45E-05	9.64E-06	6.38E-02	1.35E-04	5.73E-07	1.92E-02	2.65E-02	3.86E-05	1.49E-06	9.33E-05	0.00	Campus	
547620_4179620	547620	4179620	4.53E-09	6.75E-04	1.55E-06	2.08E-03	1.41E-01	9.95E-04	3.33E-03	0.00E+00	4.62E-10	1.81E-01	0.00E+00	5.16E-05	0.00E+00	7.83E-05	1.39E-05	9.18E-02	1.94E-04	8.23E-07	2.76E-02	3.83E-02	5.55E-05	2.15E-06	1.34E-04	0.00	Campus	
547620_4179540	547620	4179540	5.50E-09	8.18E-04	1.87E-06	2.52E-03	1.71E-01	1.21E-03	4.03E-03	0.00E+00	5.60E-10	2.19E-01	0.00E+00	6.26E-05	0.00E+00	5.00E-05	8.75E-06	5.83E-02	1.24E-04	5.27E-07	1.76E-02	2.32E-02	3.55E-05	1.34E-06	8.50E-05	0.00	Campus	
547620_4179680	547620	4179680	4.91E-09	7.30E-04	1.67E-06	2.25E-03	1.53E-01	1.08E-03	3.60E-03	0.00E+00	5.00E-10	1.95E-01	0.00E+00	5.59E-05	0.00E+00	6.64E-05	1.17E-05	7.75E-02	1.65E-04	6.99E-07	2.34E-02	3.13E-02	4.71E-05	1.81E-06	1.13E-04	0.00	Campus	
547600 4179540	547600	4179540	5.06E-09	7.53E-04	1.73E-06	2.32E-03	1.58E-01	1.11E-03	3.71E-03	0.00E+00	5.15E-10	2.02E-01	0.00E+00	5.76E-05	0.00E+00	5.67E-05	9.90E-06	6.60E-02	1.41E-04	5.98E-07	2.00E-02	2.61E-02	4.03E-05	1.56E-06	9.62E-05	0.00	Campus	
547960 4179560	547960	4179560	2.66E-09	3.96E-04	9.08E-07	1.22E-03	8.30E-02	5.84E-04	1.95E-03	0.00E+00	2.71E-10	1.06E-01	0.00E+00	3.03E-05	0.00E+00	1.19E-04	2.24E-05	1.44E-01	2.92E-04	1.23E-06	4.14E-02	7.34E-02	8.29E-05	3.28E-06	2.13E-04	0.00	Campus	
547960 4179600	547960	4179600	2.96E-09	4.41E-04	1.01E-06	1.36E-03	9.24E-02	6.50E-04	2.18E-03	0.00E+00	3.02E-10	1.18E-01	0.00E+00	3.37E-05	0.00E+00	1.09E-04	2.04E-05	1.31E-01	2.68E-04	1.13E-06	3.80E-02	6.59E-02	7.60E-05	3.05E-06	1.94E-04	0.00	Campus	
547960 4179540	547960	4179540	2.41E-09	3.59E-04	8.22E-07	1.10E-03	7.51E-02	5.29E-04	1.77E-03	0.00E+00	2.45E-10	9.60E-02	0.00E+00	2.74E-05	0.00E+00	1.24E-04	2.28E-05	1.48E-01	3.06E-04	1.29E-06	4.34E-02	7.04E-02	8.68E-05	3.45E-06	2.18E-04	0.00	Campus	
547520 4179540	547520	4179540	5.51E-09	8.20E-04	1.88E-06	2.52E-03	1.72E-01	1.21E-03	4.04E-03	0.00E+00	5.61E-10	2.19E-01	0.00E+00	6.27E-05	0.00E+00	3.64E-05	6.49E-06	4.28E-02	9.02E-05	3.83E-07	1.28E-02	1.81E-02	2.58E-05	9.93E-07	6.27E-05	0.00	Campus	
547960 4179580	547960	4179580	2.86E-09	4.25E-04	9.74E-07	1.31E-03	8.90E-02	6.26E-04	2.10E-03	0.00E+00	2.91E-10	1.14E-01	0.00E+00	3.25E-05	0.00E+00	1.09E-04	2.07E-05	1.32E-01	2.68E-04	1.13E-06	3.80E-02	6.90E-02	7.59E-05	3.04E-06	1.96E-04	0.00	Campus	
547640 4179540	547640	4179540	5.17E-09	7.69E-04	1.76E-06	2.37E-03	1.61E-01	1.13E-03	3.80E-03	0.00E+00	5.26E-10	2.06E-01	0.00E+00	5.89E-05	0.00E+00	4.53E-05	7.93E-06	5.28E-02	1.12E-04	4.78E-07	1.60E-02	2.10E-02	3.22E-05	1.22E-06	7.70E-05	0.00	Campus	
547520 4179560	547520	4179560	5.48E-09	8.15E-04	1.87E-06	2.51E-03	1.71E-01	1.20E-03	4.02E-03	0.00E+00	5.58E-10	2.18E-01	0.00E+00	6.24E-05	0.00E+00	3.60E-05	6.40E-06	4.23E-02	8.90E-05	3.77E-07	1.26E-02	1.79E-02	2.55E-05	9.80E-07	6.18E-05	0.00	Campus	
547960 4179520	547960	4179520	2.34E-09	3.48E-04	7.97E-07	1.07E-03	7.28E-02	5.13E-04	1.72E-03	0.00E+00	2.38E-10	9.31E-02	0.00E+00	2.66E-05	0.00E+00	1.26E-04	2.24E-05	1.48E-01	3.12E-04	1.32E-06	4.43E-02	6.23E-02	8.93E-05	3.44E-06	2.17E-04	0.00	Campus	
547600 4179660	547600	4179660	4.94E-09	7.35E-04	1.68E-06	2.26E-03	1.54E-01	1.08E-03	3.63E-03	0.00E+00	5.03E-10	1.97E-01	0.00E+00	5.63E-05	0.00E+00	5.02E-05	8.79E-06	5.85E-02	1.25E-04	5.29E-07	1.77E-02	2.33E-02	3.57E-05	1.37E-06	8.53E-05	0.00	Campus	
547640 4179620	547640	4179620	3.56E-09	5.30E-04	1.21E-06	1.63E-03	1.11E-01	7.81E-04	2.61E-03	0.00E+00	3.62E-10	1.42E-01	0.00E+00	4.05E-05	0.00E+00	8.83E-05	1.57E-05	1.04E-01	2.19E-04	9.26E-07	3.11E-02	4.44E-02	6.24E-05	2.44E-06	1.52E-04	0.00	Campus	
547660 4179700	547660	4179700	3.26E-09	4.84E-04	1.11E-06	1.49E-03	1.01E-01	7.14E-04	2.39E-03	0.00E+00	3.31E-10	1.30E-01	0.00E+00	3.71E-05	0.00E+00	9.64E-05	1.66E-05	1.12E-01	2.39E-04	1.02E-06	3.41E-02	4.20E-02	6.88E-05	2.61E-06	1.62E-04	0.00	Campus	
547660 4179600	547660	4179600	3.61E-09	5.37E-04	1.23E-06	1.65E-03	1.12E-01	7.91E-04	2.65E-03	0.00E+00	3.67E-10	1.44E-01	0.00E+00	4.11E-05	0.00E+00	8.42E-05	1.49E-05	9.87E-02	2.09E-04	8.85E-07	2.96E-02	4.10E-02	5.97E-05	2.30E-06	1.44E-04	0.00	Campus	
547540 4179580	547540	4179580	5.14E-09	7.65E-04	1.75E-06	2.36E-03	1.60E-01	1.13E-03	3.78E-03	0.00E+00	5.24E-10	2.05E-01	0.00E+00	5.86E-05	0.00E+00	3.98E-05	7.06E-06	4.67E-02	9.83E-05	4.18E-07	1.40E-02	1.96E-02	2.82E-05	1.08E-06	6.83E-05	0.00	Campus	
547600 4179680	547600	4179680	4.70E-09	6.99E-04	1.60E-06	2.15E-03	1.46E-01	1.03E-03	3.45E-03	0.00E+00	4.78E-10	1.87E-01	0.00E+00	5.35E-05	0.00E+00	5.20E-05	9.04E-06	6.04E-02	1.29E-04	5.50E-07	1.84E-02	2.35E-02	3.71E-05	1.43E-06	8.80E-05	0.00	Campus	
547520 4179520	547520	4179520	5.29E-09	7.87E-04	1.80E-06	2.42E-03	1.65E-01	1.16E-03	3.88E-03	0.00E+00	5.38E-10	2.11E-01	0.00E+00	6.02E-05	0.00E+00	3.37E-05	5.99E-06	3.95E-02	8.31E-05	3.53E-07	1.18E-02	1.67E-02	2.38E-05	9.08E-07	5.79E-05	0.00	Campus	
547520 4179500	547520	4179500	5.35E-09	7.96E-04	1.82E-06	2.45E-03	1.67E-01	1.17E-03	3.92E-03	0.00E+00	5.44E-10	2.13E-01	0.00E+00	6.09E-05	0.00E+00	3.13E-05	5.56E-06	3.68E-02	7.74E-05	3.29E-07	1.10E-02	1.54E-02	2.22E-05	8.47E-07	5.38E-05	0.00	Campus	
547640 4179520	547640	4179520	4.71E-09	7.01E-04	1.61E-06	2.16E-03	1.47E-01	1.03E-03	3.46E-03	0.00E+00	4.80E-10	1.88E-01	0.00E+00	5.36E-05	0.00E+00	4.82E-05	8.36E-06	5.59E-02	1.20E-04	5.10E-07	1.70E-02	2.15E-02	3.44E-05	1.31E-06	8.15E-05	0.00	Campus	
547640 4179600	547640	4179600	3.41E-09	5.07E-04	1.16E-06	1.56E-03	1.06E-01	7.47E-04	2.50E-03	0.00E+00	3.47E-10	1.36E-01	0.00E+00	3.88E-05	0.00E+00	8.40E-05	1.49E-05	9.86E-02	2.08E-04	8.83E-07	2.96E-02	4.12E-02	5.95E-05	2.29E-06	1.44E-04	0.00	Campus	
547660 4179620	547660	4179620	3.21E-09	4.78E-04	1.09E-06	1.47E-03	1.00E-01	7.04E-04	2.36E-03	0.00E+00	3.27E-10	1.28E-01	0.00E+00	3.66E-05	0.00E+00	8.93E-05	1.59E-05	1.05E-01	2.21E-04	9.37E-07	3.14E-02	4.49E-02	6.31E-05	2.46E-06	1.54E-04	0.00	Campus	
547600 4179620	547600	4179620	4.07E-09	6.05E-04	1.39E-06	1.86E-03	1.27E-01	8.92E-04	2.98E-03	0.00E+00	4.14E-10	1.62E-01	0.00E+00	4.63E-05	0.00E+00	6.22E-05	1.10E-05	7.29E-02	1.54E-04	6.54E-07	2.19E-02	3.01E-02	4.41E-05	1.70E-06	1.06E-04	0.00	Campus	
547700 4179640	547700	4179640	2.14E-09	3.19E-04	7.31E-07	9.82E-04	6.68E-02	4.70E-04	1.57E-03	0.00E+00	2.18E-10	8.53E-02	0.00E+00	2.44E-05	0.00E+00	1.18E-04	2.07E-05	1.37E-01	2.91E-04	1.24E-06	4.14E-02	5.58E-02	8.34E-05	3.20E-06	2.01E-04	0.00	Campus	
547620 4179700	547620	4179700	4.38E-09	6.52E-04	1.49E-06	2.01E-03	1.37E-01	9.61E-04	3.22E-03	0.00E+00	4.46E-10	1.75E-01	0.00E+00	4.99E-05	0.00E+00	5.29E-05	9.20E-06	6.14E-02	1.32E-04	5.58E-07	1.87E-02	2.39E-02	3.77E-05	1.45E-06	8.95E-05	0.00	Campus	
547680 4179660	547680	4179660	2.47E-09	3.68E-04	8.43E-07	1.13E-03	7.71E-02	5.43E-04	1.82E-03	0.00E+00	2.52E-10	9.85E-02	0.00E+00	2.82E-05	0.00E+00	1.07E-04	1.89E-05	1.26E-01	2.66E-04	1.13E-06	3.78E-02	5.11E-02	7.62E-05	2.92E-06	1.83E-04	0.00	Campus	
547680 4179680	547680	4179680	2.49E-09	3.71E-04	8.49E-07	1.14E-03	7.76E-02	5.46E-04	1.83E-03	0.00E+00	2.54E-10	9.92E-02	0.00E+00	2.84E-05	0.00E+00	1.08E-04	1.86E-05	1.25E-01	2.67E-04	1.14E-06	3.80E-02	4.76E-02	7.68E-05	2.90E-06	1.82E-04	0.00	Campus	
547580 4179660	547580	4179660	4.53E-09	6.74E-04	1.54E-06	2.07E-03	1.41E-01	9.93E-04	3.32E-03	0.00E+00	4.61E-10	1.80E-01	0.00E+00	5.16E-05	0.00E+00	4.76E-05	8.33E-06	5.55E-02	1.18E-04	5.01E-07	1.68E-02	2.22E-02	3.38E-05	1.31E-06	8.09E-05	0.00	Campus	
547660 4179580	547660	4179580	3.38E-09	5.02E-04	1.15E-06	1.55E-03	1.05E-01	7.41E-04	2.48E-03	0.00E+00	3.44E-10	1.35E-01	0.00E+00	3.85E-05	0.00E+00	8.06E-05	1.41E-05	9.39E-02	2.00E-04	8.50E-07	2.84E-02	3.73E-02	5.73E-05	2.19E-06	1.37E-04	0.00	Campus	
547520 4179580	547520	4179580	4.86E-09	7.23E-04	1.66E-06	2.22E-03	1.51E-01	1.07E-03	3.57E-03	0.00E+00	4.95E-10	1.93E-01	0.00E+00	5.53E-05	0.00E+00	3.63E-05	6.45E-06	4.26E-02	8.97E-05	3.81E-07	1.27E-02	1.80E-02	2.57E-05	9.83E-07	6.23E-05	0.00	Campus	
547580 4179640	547580	4179640	4.53E-09	6.73E-04	1.54E-06	2.07E-03	1.41E-01	9.93E-04	3.32E-03	0.00E+00	4.61E-10	1.80E-01	0.00E+00	5.15E-05	0.00E+00	4.54E-05	8.00E-06	5.31E-02	1.13E-04	4.78E-07	1.60E-02	2.17E-02	3.22E-05	1.24E-06	7.75E-05	0.00	Campus	
547600 4179720	547600	4179720	4.53E-09	6.74E-04	1.54E-06	2.07E-03	1.41E-01	9.93E-04	3.32E-03	0.00E+00	4.61E-10	1.80E-01	0.00E+00	5.15E-05	0.00E+00	4.47E-05	7.74E-06	5.18E-02	1.11E-04	4.73E-07	1.58E-02	1.97E-02	3.19E-05	1.22E-06	7.54E-05	0.00	3rd Ave Housing	Res Hall
547580 4179540	547580	4179540	4.62E-09	6.88E-04	1.58E-06	2.12E-03	1.44E-01	1.01E-03	3.39E-03	0.00E+00	4.71E-10	1.84E-01	0.00E+00	5.26E-05	0.00E+00	4.13E-05	7.30E-06	4.84E-02	1.02E-04	4.34E-07	1.45E-02	2.00E-02	2.93E-05	1.13E-06	7.07E-05	0.00	Campus	
547540 4179560	547540	4179560	4.69E-09	6.98E-04	1.60E-06	2.15E-03	1.46E-01	1.03E-03	3.44E-03	0.00E+00	4.77E-10	1.87E-01	0.00E+00	5.34E-05	0.00E+00	3.93E-05	6.99E-06	4.62E-02	9.73E-05	4.13E-07	1.38E-02	1.95E-02	2.78E-05	1.07E-06	6.75E-05	0.00	campus	
547620 4179600	547620	4179600	3.24E-09	4.82E-04	1.10E-06	1.48E-03	1.01E-01	7.10E-04	2.38E-03	0.00E+00	3.30E-10	1.29E-01	0.00E+00	3.69E-05	0.00E+00	8.08E-05	1.43E-05	9.47E-02	2.00E-04	8.50E-07	2.85E-02	3.92E-02	5.73E-05	2.20E-06	1.38E-04	0.00	campus	
547640 4179500	547640	4179500	4.13E-09	6.14E-04	1.41E-06	1.89E-03	1.29E-01	9.06E-04	3.03E-03	0.00E+00	4.20E-10	1.64E-01	0.00E+00	4.70E-05	0.00E+00	5.53E-05	9.60E-06	6.42E-02	1.37E-04	5.83E-07	1.95E-02	2.49E-02	3.93E-05	1.50E-06	9.35E-05	0.00	campus	
547720 4179640	547720	4179640	2.28E-09	3.39E-04	7.76E-07	1.04E-03	7.09E-02	4.99E-04	1.67E-03	0.00E+00	2.32E-10	9.06E-02	0.00E+00	2.59E-05	0.00E+00	1.08E-04	1.90E-05	1.26E-01	2.68E-04	1.14E-06	3.81E-02	5.14E-02	7.68E-05	2.95E-06	1.85E-04	0.00	campus	
547680 4179640	547680	4179640	2.24E-09	3.34E-04	7.65E-07	1.03E-03	6.99E-02	4.92E-04	1.65E-03	0.00E+00	2.28E-10	8.94E-02	0.00E+00	2.56E-05	0.00E+00	1.08E-04	1.92E-05	1.27E-01	2.67E-04	1.14E-06	3.80E-02	5.36E-02	7.66E-05	2.94E-06	1.86E-04	0.00	campus	
547600 4179580	547600	4179580	3.49E-09	5.20E-04	1.19E-06	1.60E-03	1.09E-01	7.66E-04	2.56E-03	0.00E+00	3.56E-10	1.39E-01	0.00E+00	3.98E-05	0.00E+00	7.10E-05	1.25E-05	8.28E-02	1.76E-04	7.48E-07	2.50E-02	3.34E-02	5.04E-05	1.95E-06	1.21E-04	0.00	campus	
547860 4179640	547860	4179640	3.12E-09	4.65E-04	1.06E-06	1.43E-03	9.73E-02	6.85E-04	2.29E-03	0.00E+00	3.18E-10	1.24E-01	0.00E+00	3.56E-05	0.00E+00	8.06E-05	1.47E-05	9.57E-02	1.97E-04	8.41E-07	2.80E-02	4.35E-02	5.67E-05	2.10E-06	1.41E-04	0.00	campus	
547600 4179700	547600	4179700	4.20E-09	6.25E-04	1.43E-06	1.92E-03	1.31E-01	9.21E-04	3.08E-03	0.00E+00	4.27E-10	1.67E-01	0.00E+00	4.78E-05	0.00E+00	4.93E-05	8.50E-06	5.70E-02	1.23E-04	5.22E-07	1.75E-02	2.13E-02	3.52E-05	1.34E-06	8.30E-05	0.00	3rd Ave Housing	Res Hall
547820 4179620	547820	4179620	3.19E-09	4.74E-04	1.09E-06	1.46E-03	9.93E-02	6.99E-04	2.34E-03	0.00E+00	3.24E-10	1.27E-01	0.00E+00	3.63E-05	0.00E+00	7.79E-05	1.40E-05	9.21E-02	1.91E-04	8.16E-07	2.71E-02	4.03E-02	5.50E-05	2.01E-06	1.35E-04	0.00	campus	
547840 4179620	547840	4179620	3.20E-09	4.77E-04	1.09E-06	1.47E-03	9.99E-02	7.03E-04	2.35E-03	0.00E+00	3.26E-10	1.28E-01	0.00E+00	3.65E-05	0.00E+00	7.68E-05	1.40E-05	9.15E-02	1.87E-04	8.01E-07	2.65E-02	4.21E-02	5.40E-05	1.94E-06	1.35E-04	0.00	campus	
547620 4179580	547620	4179580	3.37E-09	5.01E-04	1.15E-06	1.54E-03	1.05E-01	7.38E-04	2.47E-03	0.00E+00	3.43E-10	1.34E-01	0.00E+00	3.83E-05	0.00E+00	7.26E-05	1.27E-05	8.47E-02	1.80E-04	7.64E-07	2.56E-02	3.42E-02	5.15E-05	1.97E-06	1.24E-04	0.00	campus	
547620 4179720	547620	4179720	4.15E-09	6.18E-04	1.42E-06	1.90E-03	1.29E-01	9.11E-04	3.05E-03	0.00E+00	4.23E-10	1.65E-01	0.00E+00	4.73E-05	0.00E+00	4.98E-05	8.72E-06	5.80E-02	1.24E-04	5.25E-07	1.76E-02	2.32E-02	3.54E-05	1.36E-06	8.47E-05	0.00	campus	
547640 4179560	547640	4179560	3.65E-09	5.43E-04	1.25E-06	1.67E-03	1.14E-01	8.01E-04	2.68E-03	0.00E+00	3.72E-10	1.45E-01	0.00E+00	4.16E-05	0.00E+00	6.44E-05	1.13E-05	7.51E-02	1.60E-04	6.79E-07	2.27E-02	3.00E-02	4.58E-05	1.74E-06	1.10E-04	0.00	campus	
547720 4179660	547720	4179660	2.16E-09	3.21E-04	7.36E-07	9.89E-04	6.73E-02	4.74E-04	1.59E-03	0.00E+00	2.20E-10	8.60E-02	0.00E+00	2.46E-05	0.00E+00	1.08E-04	1.87E-05	1.25E-01	2.67E-04	1.14E-06	3.79E-02	4.86E-02	7.66E-05	2.90E-06	1.82E-04	0.00	campus	
547660 4179540	547660	4179540	4.28E-09	6.36E-04	1.46E-06	1.96E-03	1.33E-01	9.38E-04	3.14E-03	0.00E+00	4.35E-10	1.70E-01	0.00E+00	4.87E-05	0.00E+00	4.56E-05	7.97E-06	5.31E-02	1.13E-04	4.81E-07	1.61E-02	2.11E-02	3.24E-05	1.24E-06	7.75E-05	0.00	campus	
547800 4179620	547800	4179620	3.09E-09	4.60E-04	1.05E-06	1.42E-03	9.64E-02	6.79E-04	2.27E-03	0.00E+00	3.15E-10	1.23E-01	0.00E+00	3.52E-05	0.00E+00	7.95E-05	1.42E-05	9.37E-02	1.95E-04	8.33E-07	2.77E-02	4.05E-02	5.61E-05	2.07E-06	1.37E-04	0.00	campus	
547680 4179700	547680	4179700	2.92E-09	4.35E-04	9.96E-07	1.34E-03	9.10E-02	6.41E-04	2.14E-03	0.00E+00	2.97E-10	1.16E-01	0.00E+00	3.33E-05	0.00E+00	8.47E-05	1.46E-05	9.80E-02	2.10E-04	8.95E-07	2.99E-02	3.70E-02	6.04E-05	2.29E-06	1.43E-04	0.00	campus	
547860 4179620	547860	4179620	3.23E-09	4.80E-04	1.10E-06	1.48E-03	1.01E-01	7.08E-04	2.37E-03	0.00E+00	3.28E-10	1.28E-01	0.00E+00	3.67E-05	0.00E+00	7.48E-05	1.37E-05	8.93E-02	1.81E-04	7.79E-07	2.58E-02	4.14E-02	5.25E-05	1.85E-06	1.31E-04	0.00	campus	
547840 4179640	547840	4179640	3.05E-09	4.54E-04	1.04E-06	1.40E-03	9.50E-02	6.69E-04	2.24E-03	0.00E+00	3.10E-10	1.21E-01	0.00E+00	3.47E-05	0.00E+00	7.92E-05	1.44E-05	9.41E-02	1.94E-04	8.27E-07	2.75E-02	4.27E-02	5.57E-05	2.07E-06	1.38E-04	0.00	campus	
547660 4179520	547660	4179520	4.14E-09	6.16E-04	1.41E-06	1.90E-03	1.29E-01	9.09E-04	3.04E-03	0.00E+00	4.22E-10	1.65E-01	0.00E+00	4.72E-05	0.00E+00	4.80E-05	8.31E-06	5.56E-02	1.19E-04	5.07E-07	1.69E-02	2.14E-02	3.42E-05	1.30E-06	8.10E-05	0.00	campus	
547680 4179720	547680	4179720	3.04E-09	4.52E-04	1.04E-06	1.39E-03	9.46E-02	6.66E-04	2.23E-03	0.00E+00	3.09E-10	1.21E-01	0.00E+00	3.46E-05	0.00E+00	7.98E-05	1.38E-05	9.25E-02	1.98E-04	8.44E-07	2.82E-02	3.52E-02	5.69E-05	2.15E-06	1.35E-04	0.00	campus	
547700 4179660	547700	4179660	2.05E-09	3.05E-04	6.98E-07	9.38E-04	6.38E-02	4.49E-04	1.50E-03	0.00E+00	2.09E-10	8.16E-02	0.00E+00	2.33E-05	0.00E+00	1.08E-04	1.89E-05	1.26E-01	2.67E-04	1.14E-06	3.80E-02	4.97E-02	7.67E-05	2.90E-06	1.83E-04	0.00	campus	
547980 4179520	547980	4179520	2.30E-09	3.42E-04	7.84E-07	1.05E-03	7.16E-02	5.04E-04	1.69E-03	0.00E+00	2.34E-10	9.15E-02	0.00E+00	2.62E-05	0.00E+00	9.86E-05	1.79E-05	1.17E-01	2.44E-04	1.03E-06	3.46E-02	5.29E-02	6.95E-05	2.70E-06	1.72E-04	0.00	pot. res.	
547540 4179600	547540	4179600	4.40E-09	6.55E-04	1.50E-06	2.02E-03	1.37E-01	9.66E-04	3.23E-03	0.00E+00	4.48E-10	1.75E-01	0.00E+00	5.02E-05	0.00E+00	3.87E-05	6.88E-06	4.55E-02	9.58E-05	4.06E-07	1.36E-02	1.92E-02	2.74E-05	1.06E-06	6.65E-05	0.00	campus	
547700 4179720	547700	4179720	2.70E-09	4.02E-04	9.22E-07	1.24E-03	8.43E-02	5.93E-04	1.99E-03	0.00E+00	2.75E-10	1.08E-01	0.00E+00	3.08E-05	0.00E+00	8.93E-05	1.54E-05	1.03E-01	2.21E-04	9.45E-07	3.14E-02	3.82E-02	6.37E-05	2.34E-06	1.50E-04	0.00	campus	
547980 4179540	547980	4179540	2.37E-09	3.53E-04	8.08E-07	1.09E-03	7.39E-02	5.20E-04	1.74E-03	0.00E+00	2.41E-10	9.44E-02	0.00E+00	2.70E-05	0.00E+00	9.50E-05	1.77E-05	1.14E-01	2.34E-04	9.85E-07	3.31E-02	5.65E-02	6.64E-05	2.61E-06	1.69E-04	0.00	pot. res.	
547980 4179560	547980	4179560	2.58E-09	3.84E-04	8.80E-07	1.18E-03	8.05E-02	5.67E-04	1.90E-03	0.00E+00	2.63E-10	1.03E-01	0.00E+00	2.94E-05	0.00E+00	8.86E-05	1.66E-05	1.07E-01	2.18E-04	9.18E-07	3.09E-02	5.35E-02	6.19E-05	2.44E-06	1.58E-04	0.00	pot. res.	
547820 4179640	547820	4179640	2.99E-09	4.45E-04	1.02E-06	1.37E-03	9.32E-02	6.56E-04	2.19E-03	0.00E+00	3.04E-10	1.19E-01	0.00E+00	3.41E-05	0.00E+00	7.79E-05	1.40E-05	9.19E-02	1.91E-04	8.16E-07	2.72E-02	3.96E-02	5.50E-05	2.04E-06	1.35E-04	0.00	campus	
547600 4179600	547600	4179600	3.37E-09	5.01E-04	1.15E-06	1.54E-03	1.05E-01	7.38E-04	2.47E-03	0.00E+00	3.43E-10	1.34E-01	0.00E+00	3.83E-05	0.00E+00	6.55E-05	1.16E-05	7.67E-02	1.62E-04	6.89E-07	2.31E-02	3.18E-02	4.64E-05	1.78E-06	1.12E-04	0.00	campus	
547860 4179660	547860	4179660	2.88E-09	4.29E-04	9.83E-07	1.32E-03	8.98E-02	6.32E-04	2.12E-03	0.00E+00	2.94E-10	1.15E-01	0.00E+00	3.28E-05	0.00E+00	7.80E-05	1.41E-05	9.25E-02	1.91E-04	8.15E-07	2.71E-02	4.15E-02	5.49E-05	2.05E-06	1.36E-04	0.00	campus	
547880 4179620	547880	4179620	3.13E-09	4.65E-04	1.07E-06	1.43E-03	9.74E-02	6.86E-04	2.29E-03	0.00E+00	3.18E-10	1.25E-01	0.00E+00	3.56E-05	0.00E+00	7.11E-05	1.32E-05	8.53E-02	1.71E-04	7.39E-07	2.44E-02	4.06E-02	4.98E-05	1.71E-06	1.26E-04	0.00	campus	
547500 4179540	547500	4179540	4.45E-09	6.62E-04	1.52E-06	2.04E-03	1.39E-01	9.76E-04	3.27E-03	0.00E+00	4.53E-10	1.77E-01	0.00E+00	5.07E-05	0.00E+00	3.29E-05	5.87E-06	3.87E-02	8.15E-05	3.46E-07	1.16E-02	1.65E-02	2.33E-05	8.99E-07	5.67E-05	0.00	campus	
547640 4179580	547640	4179580	2.98E-09	4.43E-04	1.01E-06	1.36E-03	9.27E-02	6.53E-04	2.18E-03	0.00E+00	3.03E-10	1.19E-01	0.00E+00	3.39E-05	0.00E+00	7.57E-05	1.33E-05	8.84E-02	1.88E-04	7.97E-07	2.67E-02	3.57E-02	5.38E-05	2.07E-06	1.29E-04	0.00	campus	
547600 4179560	547600	4179560	3.00E-09	4.46E-04	1.02E-06	1.37E-03	9.33E-02	6.57E-04	2.20E-03	0.00E+00	3.05E-10	1.19E-01	0.00E+00	3.41E-05	0.00E+00	7.51E-05	1.31E-05	8.75E-02	1.86E-04	7.92E-07	2.65E-02	3.48E-02	5.34E-05	2.05E-06	1.28E-04	0.00	campus	
547840 4179600	547840	4179600	3.18E-09	4.73E-04	1.08E-06	1.46E-03	9.90E-02	6.97E-04	2.33E-03	0.00E+00	3.23E-10	1.27E-01	0.00E+00	3.62E-05	0.00E+00	6.93E-05	1.29E-05	8.32E-02	1.66E-04	7.19E-07	2.36E-02	4.02E-02	4.85E-05	1.64E-06	1.23E-04	0.00	campus	
547880 4179640	547880	4179640	2.99E-09	4.46E-04	1.02E-06	1.37E-03	9.33E-02	6.57E-04	2.20E-03	0.00E+00	3.05E-10	1.19E-01	0.00E+00	3.41E-05	0.00E+00	7.35E-05	1.36E-05	8.81E-02	1.79E-04	7.64E-07	2.54E-02	4.22E-02	5.15E-05	1.89E-06	1.30E-04	0.00	campus	
547620 4179560	547620	4179560	3.02E-09	4.49E-04	1.03E-06	1.38E-03	9.41E-02	6.63E-04	2.22E-03	0.00E+00	3.08E-10	1.20E-01	0.00E+00	3.44E-05	0.00E+00	7.39E-05	1.29E-05	8.61E-02	1.83E-04	7.79E-07	2.61E-02	3.43E-02	5.25E-05	2.01E-06	1.26E-04	0.00	campus	
547780 4179620	547780	4179620	2.80E-09	4.16E-04	9.53E-07	1.28E-03	8.71E-02	6.13E-04	2.05E-03	0.00E+00	2.85E-10	1.11E-01	0.00E+00	3.18E-05	0.00E+00	8.01E-05	1.43E-05	9.41E-02	1.97E-04	8.41E-07	2.80E-02	3.97E-02	5.67E-05	2.10E-06	1.38E-04	0.00	campus	
547820 4179600	547820	4179600	3.15E-09	4.68E-04	1.07E-06	1.44E-03	9.81E-02	6.90E-04	2.31E-03	0.00E+00	3.20E-10	1.25E-01	0.00E+00	3.58E-05	0.00E+00	6.95E-05	1.28E-05	8.30E-02	1.68E-04	7.24E-07	2.39E-02	3.86E-02	4.88E-05	1.72E-06	1.22E-04	0.00	campus	
547660 4179500	547660	4179500	3.78E-09	5.62E-04	1.29E-06	1.73E-03	1.18E-01	8.29E-04	2.77E-03	0.00E+00	3.85E-10	1.51E-01	0.00E+00	4.30E-05	0.00E+00	5.16E-05	8.97E-06	5.99E-02	1.28E-04	5.45E-07	1.83E-02	2.33E-02	3.67E-05	1.43E-06	8.73E-05	0.00	campus	
547580 4179680	547580	4179680	3.94E-09	5.86E-04	1.34E-06	1.80E-03	1.23E-01	8.64E-04	2.89E-03	0.00E+00	4.01E-10	1.57E-01	0.00E+00	4.49E-05	0.00E+00	4.67E-05	8.15E-06	5.43E-02	1.16E-04	4.92E-07	1.65E-02	2.15E-02	3.32E-05	1.28E-06	7.92E-05	0.00	campus	
547560 4179580	547560	4179580	4.06E-09	6.04E-04	1.38E-06	1.86E-03	1.26E-01	8.90E-04	2.98E-03	0.00E+00	4.13E-10	1.62E-01	0.00E+00	4.62E-05	0.00E+00	4.23E-05	7.49E-06	4.96E-02	1.05E-04	4.45E-07	1.49E-02	2.06E-02	3.00E-05	1.15E-06	7.25E-05	0.00	campus	
547800 4179640	547800	4179640	2.88E-09	4.28E-04	9.80E-07	1.32E-03	8.96E-02	6.31E-04	2.11E-03	0.00E+00	2.93E-10	1.15E-01	0.00E+00	3.27E-05	0.00E+00	7.61E-05	1.35E-05	8.94E-02	1.87E-04	8.00E-07	2.66E-02	3.73E-02	5.39E-05	1.99E-06	1.31E-04	0.00	campus	
547700 4179620	547700	4179620	2.14E-09	3.19E-04	7.31E-07	9.82E-04	6.68E-02	4.70E-04	1.57E-03	0.00E+00	2.18E-10	8.54E-02	0.00E+00	2.44E-05	0.00E+00	9.64E-05	1.72E-05	1.14E-01	2.38E-04	1.01E-06	3.38E-02	4.87E-02	6.82E-05	2.61E-06	1.66E-04	0.00	campus	
547660 4179720	547660	4179720	3.04E-09	4.52E-04	1.04E-06	1.39E-03	9.47E-02	6.67E-04	2.23E-03	0.00E+00	3.09E-10	1.21E-01	0.00E+00	3.46E-05	0.00E+00	7.10E-05	1.24E-05	8.25E-02	1.76E-04	7.49E-07	2.51E-02	3.22E-02	5.05E-05	1.94E-06	1.20E-04	0.00	campus	
547480 4179540	547480	4179540	4.39E-09	6.54E-04	1.50E-06	2.01E-03	1.37E-01	9.64E-04	3.22E-03	0.00E+00	4.47E-10	1.75E-01	0.00E+00	5.00E-05	0.00E+00	3.10E-05	5.52E-06	3.64E-02	7.66E-05	3.25E-07	1.09E-02	1.56E-02	2.19E-05	8.45E-07	5.33E-05	0.00	campus	
547660 4179560	547660	4179560	3.11E-09	4.63E-04	1.06E-06	1.43E-03	9.71E-02	6.83E-04	2.29E-03	0.00E+00	3.17E-10	1.24E-01	0.00E+00	3.55E-05	0.00E+00	6.83E-05	1.20E-05	7.97E-02	1.69E-04	7.20E-07	2.40E-02	3.18E-02	4.86E-05	1.84E-06	1.16E-04	0.00	campus	
547500 4179520	547500	4179520	4.38E-09	6.52E-04	1.49E-06	2.01E-03	1.37E-01	9.62E-04	3.22E-03	0.00E+00	4.46E-10	1.75E-01	0.00E+00	4.99E-05	0.00E+00	3.12E-05	5.55E-06	3.67E-02	7.70E-05	3.27E-07	1.09E-02	1.56E-02	2.21E-05	8.44E-07	5.36E-05	0.00	campus	
547960 4179620	547960	4179620	2.94E-09	4.38E-04	1.00E-06	1.35E-03	9.17E-02	6.45E-04	2.16E-03	0.00E+00	3.00E-10	1.17E-01	0.00E+00	3.35E-05	0.00E+00	7.06E-05	1.32E-05	8.51E-02	1.73E-04	7.32E-07	2.46E-02	4.23E-02	4.94E-05	1.92E-06	1.26E-04	0.00	campus	
547980 4179580	547980	4179580	2.75E-09	4.08E-04	9.36E-07	1.26E-03	8.56E-02	6.02E-04	2.02E-03	0.00E+00	2.80E-10	1.09E-01	0.00E+00	3.13E-05	0.00E+00	7.59E-05	1.41E-05	9.13E-02	1.87E-04	7.87E-07	2.65E-02	4.52E-02	5.31E-05	2.11E-06	1.35E-04	0.00	pot. res.	
547860 4179600	547860	4179600	3.14E-09	4.68E-04	1.07E-06	1.44E-03	9.79E-02	6.89E-04	2.31E-03	0.00E+00	3.20E-10	1.25E-01	0.00E+00	3.58E-05	0.00E+00	6.62E-05	1.24E-05	7.98E-02	1.58E-04	6.86E-07	2.24E-02	3.91E-02	4.62E-05	1.50E-06	1.18E-04	0.00	campus	
547680 4179580	547680	4179580	2.51E-09	3.73E-04	8.56E-07	1.15E-03	7.82E-02	5.51E-04	1.84E-03	0.00E+00	2.56E-10	9.99E-02	0.00E+00	2.86E-05	0.00E+00	8.47E-05	1.48E-05	9.86E-02	2.10E-04	8.92E-07	2.98E-02	3.92E-02	6.02E-05	2.29E-06	1.44E-04	0.00	campus	
547800 4179600	547800	4179600	2.97E-09	4.43E-04	1.01E-06	1.36E-03	9.27E-02	6.52E-04	2.18E-03	0.00E+00	3.03E-10	1.18E-01	0.00E+00	3.39E-05	0.00E+00	7.01E-05	1.29E-05	8.38E-02	1.71E-04	7.30E-07	2.43E-02	3.93E-02	4.92E-05	1.80E-06	1.23E-04	0.00	campus	
547980 4179600	547980	4179600	2.82E-09	4.20E-04	9.62E-07	1.29E-03	8.80E-02	6.19E-04	2.07E-03	0.00E+00	2.87E-10	1.12E-01	0.00E+00	3.21E-05	0.00E+00	7.29E-05	1.36E-05	8.77E-02	1.79E-04	7.56E-07	2.54E-02	4.34E-02	5.10E-05	2.01E-06	1.29E-04	0.00	pot. res.	
547880 4179660	547880	4179660	2.95E-09	4.40E-04	1.01E-06	1.35E-03	9.21E-02	6.48E-04	2.17E-03	0.00E+00	3.01E-10	1.18E-01	0.00E+00	3.36E-05	0.00E+00	7.01E-05	1.29E-05	8.38E-02	1.71E-04	7.30E-07	2.43E-02	3.97E-02	4.92E-05	1.82E-06	1.23E-04	0.00	campus	
547540 4179520	547540	4179520	4.17E-09	6.21E-04	1.42E-06	1.91E-03	1.30E-01	9.16E-04	3.06E-03	0.00E+00	4.25E-10	1.66E-01	0.00E+00	4.75E-05	0.00E+00	3.53E-05	6.27E-06	4.15E-02	8.74E-05	3.71E-07	1.24E-02	1.74E-02	2.50E-05	9.57E-07	6.06E-05	0.00	campus	
547960 4179500	547960	4179500	2.24E-09	3.34E-04	7.65E-07	1.03E-03	6.99E-02	4.92E-04	1.65E-03	0.00E+00	2.28E-10	8.93E-02	0.00E+00	2.55E-05	0.00E+00	9.07E-05	1.61E-05	1.06E-01	2.25E-04	9.53E-07	3.19E-02	4.46E-02	6.42E-05	2.48E-06	1.56E-04	0.00	campus	
547540 4179540	547540	4179540	4.00E-09	5.95E-04	1.36E-06	1.83E-03	1.25E-01	8.77E-04	2.93E-03	0.00E+00	4.07E-10	1.59E-01	0.00E+00	4.55E-05	0.00E+00	3.88E-05	6.89E-06	4.55E-02	9.59E-05	4.07E-07	1.36E-02	1.92E-02	2.74E-05	1.05E-06	6.66E-05	0.00	campus	
547480 4179560	547480	4179560	4.29E-09	6.38E-04	1.46E-06	1.97E-03	1.34E-01	9.41E-04	3.15E-03	0.00E+00	4.37E-10	1.71E-01	0.00E+00	4.89E-05	0.00E+00	3.02E-05	5.37E-06	3.55E-02	7.48E-05	3.17E-07	1.06E-02	1.50E-02	2.14E-05	8.24E-07	5.19E-05	0.00	campus	
547780 4179600	547780	4179600	2.86E-09	4.25E-04	9.75E-07	1.31E-03	8.91E-02	6.27E-04	2.10E-03	0.00E+00	2.91E-10	1.14E-01	0.00E+00	3.26E-05	0.00E+00	7.06E-05	1.29E-05	8.41E-02	1.73E-04	7.35E-07	2.45E-02	3.89E-02	4.96E-05	1.86E-06	1.24E-04	0.00	campus	
547560 4179480	547560	4179480	3.96E-09	5.90E-04	1.35E-06	1.82E-03	1.24E-01	8.70E-04	2.91E-03	0.00E+00	4.04E-10	1.58E-01	0.00E+00	4.51E-05	0.00E+00	3.89E-05	6.79E-06	4.53E-02	9.67E-05	4.10E-07	1.37E-02	1.79E-02	2.77E-05	1.07E-06	6.60E-05	0.00	campus	
547700 4179680	547700	4179680	2.04E-09	3.03E-04	6.94E-07	9.33E-04	6.35E-02	4.47E-04	1.49E-03	0.00E+00	2.07E-10	8.11E-02	0.00E+00	2.32E-05	0.00E+00	9.55E-05	1.65E-05	1.10E-01	2.37E-04	1.01E-06	3.37E-02	4.13E-02	6.81E-05	2.58E-06	1.61E-04	0.00	campus	
547580 4179580	547580	4179580	3.48E-09	5.18E-04	1.19E-06	1.59E-03	1.09E-01	7.64E-04	2.56E-03	0.00E+00	3.55E-10	1.39E-01	0.00E+00	3.97E-05	0.00E+00	5.27E-05	9.24E-06	6.14E-02	1.31E-04	5.55E-07	1.86E-02	2.47E-02	3.74E-05	1.44E-06	8.97E-05	0.00	campus	
547680 4179500	547680	4179500	3.45E-09	5.13E-04	1.18E-06	1.58E-03	1.07E-01	7.56E-04	2.53E-03	0.00E+00	3.51E-10	1.37E-01	0.00E+00	3.93E-05	0.00E+00	5.41E-05	9.43E-06	6.29E-02	1.33E-04	5.71E-07	1.90E-02	2.45E-02	3.85E-05	1.42E-06	9.17E-05	0.00	campus	
547720 4179620	547720	4179620	2.32E-09	3.45E-04	7.91E-07	1.06E-03	7.23E-02	5.09E-04	1.70E-03	0.00E+00	2.36E-10	9.24E-02	0.00E+00	2.64E-05	0.00E+00	8.55E-05	1.53E-05	1.01E-01	2.11E-04	8.96E-07	3.00E-02	4.36E-02	6.04E-05	2.33E-06	1.48E-04	0.00	campus	
547540 4179480	547540	4179480	4.00E-09	5.95E-04	1.36E-06	1.83E-03	1.25E-01	8.77E-04	2.93E-03	0.00E+00	4.07E-10	1.59E-01	0.00E+00	4.55E-05	0.00E+00	3.64E-05	6.38E-06	4.25E-02	9.05E-05	3.84E-07	1.29E-02	1.70E-02	2.59E-05	1.00E-06	6.20E-05	0.00	campus	
547580 4179620	547580	4179620	3.68E-09	5.48E-04	1.26E-06	1.69E-03	1.15E-01	8.08E-04	2.70E-03	0.00E+00	3.75E-10	1.47E-01	0.00E+00	4.20E-05	0.00E+00	4.46E-05	7.89E-06	5.23E-02	1.11E-04	4.69E-07	1.57E-02	2.16E-02	3.16E-05	1.22E-06	7.64E-05	0.00	campus	
547560 4179540	547560	4179540	3.83E-09	5.70E-04	1.30E-06	1.75E-03	1.19E-01	8.40E-04	2.81E-03	0.00E+00	3.90E-10	1.52E-01	0.00E+00	4.36E-05	0.00E+00	4.01E-05	7.11E-06	4.70E-02	9.91E-05	4.21E-07	1.41E-02	1.97E-02	2.84E-05	1.09E-06	6.87E-05	0.00	campus	
547680 4179740	547680	4179740	2.80E-09	4.16E-04	9.54E-07	1.28E-03	8.72E-02	6.14E-04	2.05E-03	0.00E+00	2.85E-10	1.11E-01	0.00E+00	3.19E-05	0.00E+00	7.02E-05	1.22E-05	8.14E-02	1.74E-04	7.42E-07	2.48E-02	3.11E-02	5.00E-05	1.90E-06	1.19E-04	0.00	campus	
547780 4179640	547780	4179640	2.66E-09	3.96E-04	9.08E-07	1.22E-03	8.30E-02	5.85E-04	1.96E-03	0.00E+00	2.71E-10	1.06E-01	0.00E+00	3.03E-05	0.00E+00	7.35E-05	1.29E-05	8.57E-02	1.81E-04	7.74E-07	2.57E-02	3.43E-02	5.22E-05	1.91E-06	1.25E-04	0.00	campus	
547560 4179560	547560	4179560	3.74E-09	5.56E-04	1.27E-06	1.71E-03	1.16E-01	8.19E-04	2.74E-03	0.00E+00	3.80E-10	1.49E-01	0.00E+00	4.25E-05	0.00E+00	4.16E-05	7.39E-06	4.89E-02	1.03E-04	4.37E-07	1.47E-02	2.05E-02	2.95E-05	1.14E-06	7.14E-05	0.00	campus	
547840 4179660	547840	4179660	2.67E-09	3.97E-04	9.10E-07	1.22E-03	8.32E-02	5.85E-04	1.96E-03	0.00E+00	2.72E-10	1.06E-01	0.00E+00	3.04E-05	0.00E+00	7.18E-05	1.32E-05	8.57E-02	1.75E-04	7.47E-07	2.49E-02	4.02E-02	5.04E-05	1.88E-06	1.26E-04	0.00	campus	
547560 4179600	547560	4179600	3.73E-09	5.56E-04	1.27E-06	1.71E-03	1.16E-01	8.19E-04	2.74E-03	0.00E+00	3.80E-10	1.49E-01	0.00E+00	4.25E-05	0.00E+00	4.17E-05	7.39E-06	4.89E-02	1.03E-04	4.37E-07	1.46E-02	2.05E-02	2.95E-05	1.13E-06	7.15E-05	0.00	campus	
547720 4179720	547720	4179720	2.30E-09	3.42E-04	7.83E-07	1.05E-03	7.16E-02	5.04E-04	1.69E-03	0.00E+00	2.34E-10	9.14E-02	0.00E+00	2.61E-05	0.00E+00	8.50E-05	1.46E-05	9.82E-02	2.09E-04	9.00E-07	2.97E-02	3.61E-02	6.07E-05	2.16E-06	1.43E-04	0.00	campus	
547680 4179540	547680	4179540	3.39E-09	5.04E-04	1.15E-06	1.55E-03	1.06E-01	7.43E-04	2.49E-03	0.00E+00	3.45E-10	1.35E-01	0.00E+00	3.86E-05	0.00E+00	5.15E-05	8.97E-06	5.99E-02	1.28E-04	5.43E-07	1.82E-02	2.35E-02	3.66E-05	1.39E-06	8.73E-05	0.00	campus	
547560 4179520	547560	4179520	3.89E-09	5.78E-04	1.32E-06	1.78E-03	1.21E-01	8.53E-04	2.85E-03	0.00E+00	3.96E-10	1.55E-01	0.00E+00	4.43E-05	0.00E+00	3.64E-05	6.44E-06	4.26E-02	9.01E-05	3.83E-07	1.28E-02	1.77E-02	2.58E-05	9.92E-07	6.23E-05	0.00	campus	
547500 4179560	547500	4179560	4.02E-09	5.98E-04	1.37E-06	1.84E-03	1.25E-01	8.82E-04	2.95E-03	0.00E+00	4.10E-10	1.60E-01	0.00E+00	4.58E-05	0.00E+00	3.23E-05	5.74E-06	3.79E-02	7.99E-05	3.39E-07	1.14E-02	1.60E-02	2.29E-05	8.79E-07	5.55E-05	0.00	campus	
547680 4179520	547680	4179520	3.64E-09	5.41E-04	1.24E-06	1.67E-03	1.13E-01	7.98E-04	2.67E-03	0.00E+00	3.70E-10	1.45E-01	0.00E+00	4.14E-05	0.00E+00	4.32E-05	7.52E-06	5.02E-02	1.08E-04	4.55E-07	1.53E-02	1.98E-02	3.07E-05	1.22E-06	7.31E-05	0.00	campus	
547520 4179600	547520	4179600	3.84E-09	5.71E-04	1.31E-06	1.76E-03	1.20E-01	8.43E-04	2.82E-03	0.00E+00	3.91E-10	1.53E-01	0.00E+00	4.37E-05	0.00E+00	3.63E-05	6.46E-06	4.27E-02	8.99E-05	3.81E-07	1.28E-02	1.81E-02	2.57E-05	9.95E-07	6.25E-05	0.00	campus	
547640 4179720	547640	4179720	2.99E-09	4.45E-04	1.02E-06	1.37E-03	9.31E-02	6.55E-04	2.19E-03	0.00E+00	3.04E-10	1.19E-01	0.00E+00	3.40E-05	0.00E+00	6.12E-05	1.07E-05	7.14E-02	1.52E-04	6.44E-07	2.16E-02	2.87E-02	4.35E-05	1.68E-06	1.04E-04	0.00	campus	

UCSF Parnassus Heights LRDP

Initial Phase of LRDP (2030)

Operational Annual Average $PM_{2.5}$ Exposure for Residential Receptor

For fume hoods, conservatively assume the following chemicals contribute to $PM_{2.5}$ emissions:

- Arsenic and compounds
- Benzidine
- Benzyl chloride
- Cadmium and compounds
- Chromium (VI)
- Hydrazine
- Manganese and compounds
- Mercuric chloride
- Nickel and compounds
- Sulfates
- Vinyl chloride
- Copper

Pollutant Concentrations by Source

	Emission Source		EDG	Fume Hoods												PCUP	Annual $PM_{2.5}$ Concentration (ug/m³)	Receptor Type Determination
	UTM X	UTM Y	$PM_{2.5}$ (ug/m³)	Arsenic (ug/m³)	Benzidine (ug/m³)	Benzyl chloride (ug/m³)	Cadmium (ug/m³)	Chromium (VI) (ug/m³)	Hydrazine (ug/m³)	ganese and compo (ug/m³)	Mercuric chloride (ug/m³)	Nickel (ug/m³)	Sulfates (ug/m³)	Vinyl chloride (ug/m³)	Copper (ug/m³)	$PM_{2.5}$ (ug/m³)		
547960_4179580	547960	4179580	2.32E-04	8.26E-11	0.00E+00	2.82E-08	1.23E-08	1.50E-10	5.62E-07	2.10E-09	8.41E-12	0.00E+00	0.00E+00	0.00E+00	1.20E-09	7.36E-03	0.01	campus
547960 4179600	547960	4179600	2.52E-04	8.64E-11	0.00E+00	2.95E-08	1.29E-08	1.57E-10	5.88E-07	2.20E-09	8.80E-12	0.00E+00	0.00E+00	0.00E+00	1.26E-09	6.96E-03	0.01	campus
547960 4179560	547960	4179560	2.03E-04	7.67E-11	0.00E+00	2.61E-08	1.14E-08	1.39E-10	5.22E-07	1.95E-09	7.81E-12	0.00E+00	0.00E+00	0.00E+00	1.12E-09	6.48E-03	0.01	campus
547980 4179580	547980	4179580	2.24E-04	7.84E-11	0.00E+00	2.67E-08	1.17E-08	1.42E-10	5.33E-07	1.99E-09	7.98E-12	0.00E+00	0.00E+00	0.00E+00	1.14E-09	5.42E-03	0.01	pot. res.
547980 4179560	547980	4179560	1.98E-04	7.36E-11	0.00E+00	2.51E-08	1.10E-08	1.34E-10	5.01E-07	1.87E-09	7.49E-12	0.00E+00	0.00E+00	0.00E+00	1.07E-09	5.07E-03	0.01	pot. res.
547980 4179600	547980	4179600	2.40E-04	8.10E-11	0.00E+00	2.76E-08	1.21E-08	1.47E-10	5.52E-07	2.06E-09	8.25E-12	0.00E+00	0.00E+00	0.00E+00	1.18E-09	4.69E-03	0.00	pot. res.
547960 4179540	547960	4179540	1.79E-04	6.94E-11	0.00E+00	2.37E-08	1.04E-08	1.26E-10	4.73E-07	1.77E-09	7.07E-12	0.00E+00	0.00E+00	0.00E+00	1.01E-09	4.38E-03	0.00	campus
547980 4179540	547980	4179540	1.78E-04	6.73E-11	0.00E+00	2.30E-08	1.00E-08	1.22E-10	4.58E-07	1.71E-09	6.86E-12	0.00E+00	0.00E+00	0.00E+00	9.80E-10	4.08E-03	0.00	pot. res.
547880 4179740	547880	4179740	1.90E-04	7.05E-11	0.00E+00	2.40E-08	1.05E-08	1.28E-10	4.80E-07	1.79E-09	7.18E-12	0.00E+00	0.00E+00	0.00E+00	1.03E-09	4.02E-03	0.00	campus
547960 4179620	547960	4179620	2.60E-04	8.83E-11	0.00E+00	3.01E-08	1.32E-08	1.61E-10	6.01E-07	2.25E-09	9.00E-12	0.00E+00	0.00E+00	0.00E+00	1.29E-09	3.91E-03	0.00	campus
547900 4179740	547900	4179740	2.00E-04	7.24E-11	0.00E+00	2.47E-08	1.08E-08	1.32E-10	4.93E-07	1.84E-09	7.37E-12	0.00E+00	0.00E+00	0.00E+00	1.05E-09	3.94E-03	0.00	campus
547900 4179760	547900	4179760	1.80E-04	6.35E-11	0.00E+00	2.17E-08	9.47E-09	1.15E-10	4.32E-07	1.62E-09	6.47E-12	0.00E+00	0.00E+00	0.00E+00	9.24E-10	3.66E-03	0.00	campus
547880 4179760	547880	4179760	1.72E-04	6.27E-11	0.00E+00	2.14E-08	9.34E-09	1.14E-10	4.27E-07	1.60E-09	6.38E-12	0.00E+00	0.00E+00	0.00E+00	9.11E-10	3.61E-03	0.00	campus
547900 4179720	547900	4179720	2.17E-04	8.17E-11	0.00E+00	2.79E-08	1.22E-08	1.49E-10	5.56E-07	2.08E-09	8.32E-12	0.00E+00	0.00E+00	0.00E+00	1.19E-09	3.53E-03	0.00	campus
547880 4179720	547880	4179720	2.13E-04	8.24E-11	0.00E+00	2.81E-08	1.23E-08	1.50E-10	5.61E-07	2.10E-09	8.38E-12	0.00E+00	0.00E+00	0.00E+00	1.20E-09	3.51E-03	0.00	campus
548000 4179560	548000	4179560	1.92E-04	7.13E-11	0.00E+00	2.43E-08	1.06E-08	1.30E-10	4.85E-07	1.81E-09	7.26E-12	0.00E+00	0.00E+00	0.00E+00	1.04E-09	3.44E-03	0.00	pot. res.
548000 4179580	548000	4179580	2.13E-04	7.54E-11	0.00E+00	2.57E-08	1.12E-08	1.37E-10	5.13E-07	1.92E-09	7.68E-12	0.00E+00	0.00E+00	0.00E+00	1.10E-09	3.40E-03	0.00	pot. res.
547860 4179740	547860	4179740	1.79E-04	6.80E-11	0.00E+00	2.32E-08	1.01E-08	1.24E-10	4.63E-07	1.73E-09	6.92E-12	0.00E+00	0.00E+00	0.00E+00	9.89E-10	3.41E-03	0.00	campus
547980 4179620	547980	4179620	2.49E-04	8.18E-11	0.00E+00	2.79E-08	1.22E-08	1.49E-10	5.57E-07	2.08E-09	8.33E-12	0.00E+00	0.00E+00	0.00E+00	1.19E-09	3.20E-03	0.00	pot. res.
547920 4179780	547920	4179780	1.47E-04	5.37E-11	0.00E+00	1.83E-08	8.00E-09	9.76E-11	3.65E-07	1.37E-09	5.47E-12	0.00E+00	0.00E+00	0.00E+00	7.81E-10	3.20E-03	0.00	campus
547860 4179720	547860	4179720	2.17E-04	8.22E-11	0.00E+00	2.80E-08	1.22E-08	1.49E-10	5.59E-07	2.09E-09	8.37E-12	0.00E+00	0.00E+00	0.00E+00	1.20E-09	3.09E-03	0.00	campus
547900 4179780	547900	4179780	1.54E-04	5.63E-11	0.00E+00	1.92E-08	8.39E-09	1.02E-10	3.83E-07	1.43E-09	5.73E-12	0.00E+00	0.00E+00	0.00E+00	8.19E-10	3.15E-03	0.00	campus
547860 4179760	547860	4179760	1.54E-04	6.06E-11	0.00E+00	2.07E-08	9.04E-09	1.10E-10	4.13E-07	1.54E-09	6.17E-12	0.00E+00	0.00E+00	0.00E+00	8.82E-10	3.15E-03	0.00	campus
547940 4179780	547940	4179780	1.39E-04	5.25E-11	0.00E+00	1.79E-08	7.82E-09	9.54E-11	3.57E-07	1.34E-09	5.34E-12	0.00E+00	0.00E+00	0.00E+00	7.63E-10	3.10E-03	0.00	campus
548000 4179600	548000	4179600	2.28E-04	7.79E-11	0.00E+00	2.65E-08	1.16E-08	1.42E-10	5.30E-07	1.98E-09	7.93E-12	0.00E+00	0.00E+00	0.00E+00	1.13E-09	2.99E-03	0.00	pot. res.
548020 4179560	548020	4179560	1.87E-04	6.87E-11	0.00E+00	2.34E-08	1.02E-08	1.25E-10	4.67E-07	1.75E-09	6.99E-12	0.00E+00	0.00E+00	0.00E+00	9.99E-10	2.91E-03	0.00	pot. res.
548000 4179540	548000	4179540	1.73E-04	6.58E-11	0.00E+00	2.24E-08	9.82E-09	1.20E-10	4.48E-07	1.68E-09	6.70E-12	0.00E+00	0.00E+00	0.00E+00	9.58E-10	2.92E-03	0.00	pot. res.
548020 4179580	548020	4179580	2.04E-04	7.24E-11	0.00E+00	2.47E-08	1.08E-08	1.32E-10	4.93E-07	1.84E-09	7.37E-12	0.00E+00	0.00E+00	0.00E+00	1.05E-09	2.86E-03	0.00	pot. res.
547940 4179800	547940	4179800	1.24E-04	4.79E-11	0.00E+00	1.63E-08	7.14E-09	8.71E-11	3.26E-07	1.22E-09	4.88E-12	0.00E+00	0.00E+00	0.00E+00	6.97E-10	2.94E-03	0.00	pot. res.
547880 4179780	547880	4179780	1.53E-04	5.65E-11	0.00E+00	1.93E-08	8.42E-09	1.03E-10	3.85E-07	1.44E-09	5.75E-12	0.00E+00	0.00E+00	0.00E+00	8.22E-10	2.89E-03	0.00	campus
547960 4179800	547960	4179800	1.27E-04	4.75E-11	0.00E+00	1.62E-08	7.09E-09	8.64E-11	3.24E-07	1.21E-09	4.84E-12	0.00E+00	0.00E+00	0.00E+00	6.91E-10	2.90E-03	0.00	pot. res.
547960 4179780	547960	4179780	1.39E-04	5.22E-11	0.00E+00	1.78E-08	7.78E-09	9.49E-11	3.55E-07	1.33E-09	5.31E-12	0.00E+00	0.00E+00	0.00E+00	7.59E-10	2.85E-03	0.00	campus
547880 4179700	547880	4179700	2.45E-04	9.78E-11	0.00E+00	3.33E-08	1.46E-08	1.78E-10	6.66E-07	2.49E-09	9.96E-12	0.00E+00	0.00E+00	0.00E+00	1.42E-09	2.65E-03	0.00	campus
547920 4179800	547920	4179800	1.20E-04	4.79E-11	0.00E+00	1.63E-08	7.14E-09	8.70E-11	3.26E-07	1.22E-09	4.87E-12	0.00E+00	0.00E+00	0.00E+00	6.96E-10	2.76E-03	0.00	campus
547960 4179520	547960	4179520	1.55E-04	6.11E-11	0.00E+00	2.08E-08	9.10E-09	1.11E-10	4.16E-07	1.55E-09	6.22E-12	0.00E+00	0.00E+00	0.00E+00	8.88E-10	2.68E-03	0.00	campus
548020 4179540	548020	4179540	1.71E-04	6.38E-11	0.00E+00	2.17E-08	9.51E-09	1.16E-10	4.34E-07	1.62E-09	6.49E-12	0.00E+00	0.00E+00	0.00E+00	9.27E-10	2.66E-03	0.00	pot. res.
547900 4179700	547900	4179700	2.43E-04	9.32E-11	0.00E+00	3.18E-08	1.39E-08	1.69E-10	6.35E-07	2.37E-09	9.49E-12	0.00E+00	0.00E+00	0.00E+00	1.36E-09	2.58E-03	0.00	campus
547960 4179640	547960	4179640	2.52E-04	8.66E-11	0.00E+00	2.95E-08	1.29E-08	1.57E-10	5.89E-07	2.20E-09	8.82E-12	0.00E+00	0.00E+00	0.00E+00	1.26E-09	2.50E-03	0.00	campus
547980 4179520	547980	4179520	1.53E-04	5.99E-11	0.00E+00	2.04E-08	8.93E-09	1.09E-10	4.08E-07	1.53E-09	6.10E-12	0.00E+00	0.00E+00	0.00E+00	8.71E-10	2.59E-03	0.00	pot. res.
548020 4179600	548020	4179600	2.17E-04	7.45E-11	0.00E+00	2.54E-08	1.11E-08	1.35E-10	5.07E-07	1.90E-09	7.58E-12	0.00E+00	0.00E+00	0.00E+00	1.08E-09	2.53E-03	0.00	pot. res.
547840 4179740	547840	4179740	1.63E-04	6.61E-11	0.00E+00	2.25E-08	9.86E-09	1.20E-10	4.50E-07	1.68E-09	6.73E-12	0.00E+00	0.00E+00	0.00E+00	9.62E-10	2.52E-03	0.00	campus
547980 4179780	547980	4179780	1.37E-04	5.07E-11	0.00E+00	1.73E-08	7.56E-09	9.23E-11	3.45E-07	1.29E-09	5.17E-12	0.00E+00	0.00E+00	0.00E+00	7.38E-10	2.53E-03	0.00	pot. res.
547860 4179700	547860	4179700	2.81E-04	1.02E-10	0.00E+00	3.47E-08	1.52E-08	1.85E-10	6.93E-07	2.59E-09	1.04E-11	0.00E+00	0.00E+00	0.00E+00	1.48E-09	2.38E-03	0.00	campus
547940 4179820	547940	4179820	1.09E-04	4.31E-11	0.00E+00	1.47E-08	6.42E-09	7.84E-11	2.93E-07	1.10E-09	4.39E-12	0.00E+00	0.00E+00	0.00E+00	6.27E-10	2.49E-03	0.00	pot. res.
547900 4179800	547900	4179800	1.25E-04	4.83E-11	0.00E+00	1.65E-08	7.20E-09	8.78E-11	3.29E-07	1.23E-09	4.92E-12	0.00E+00	0.00E+00	0.00E+00	7.02E-10	2.45E-03	0.00	campus
547980 4179800	547980	4179800	1.27E-04	4.67E-11	0.00E+00	1.59E-08	6.96E-09	8.49E-11	3.18E-07	1.19E-09	4.75E-12	0.00E+00	0.00E+00	0.00E+00	6.79E-10	2.44E-03	0.00	pot. res.
547980 4179640	547980	4179640	2.43E-04	8.00E-11	0.00E+00	2.73E-08	1.19E-08	1.45E-10	5.44E-07	2.04E-09	8.14E-12	0.00E+00	0.00E+00	0.00E+00	1.16E-09	2.30E-03	0.00	pot. res.
548000 4179620	548000	4179620	2.35E-04	7.80E-11	0.00E+00	2.66E-08	1.16E-08	1.42E-10	5.31E-07	1.99E-09	7.94E-12	0.00E+00	0.00E+00	0.00E+00	1.13E-09	2.29E-03	0.00	pot. res.
547840 4179720	547840	4179720	2.10E-04	7.95E-11	0.00E+00	2.71E-08	1.19E-08	1.45E-10	5.41E-07	2.02E-09	8.10E-12	0.00E+00	0.00E+00	0.00E+00	1.16E-09	2.30E-03	0.00	campus
547860 4179780	547860	4179780	1.30E-04	5.32E-11	0.00E+00	1.81E-08	7.93E-09	9.67E-11	3.62E-07	1.35E-09	5.41E-12	0.00E+00	0.00E+00	0.00E+00	7.74E-10	2.37E-03	0.00	pot. res.
548040 4179580	548040	4179580	1.94E-04	6.96E-11	0.00E+00	2.37E-08	1.04E-08	1.27E-10	4.74E-07	1.77E-09	7.09E-12	0.00E+00	0.00E+00	0.00E+00	1.01E-09	2.30E-03	0.00	pot. res.
547840 4179760	547840	4179760	1.30E-04	5.82E-11	0.00E+00	1.98E-08	8.67E-09	1.06E-10	3.96E-07	1.48E-09	5.92E-12	0.00E+00	0.00E+00	0.00E+00	8.46E-10	2.32E-03	0.00	campus
547960 4179820	547960	4179820	1.11E-04	4.26E-11	0.00E+00	1.45E-08	6.35E-09	7.74E-11	2.90E-07	1.08E-09	4.33E-12	0.00E+00	0.00E+00	0.00E+00	6.19E-10	2.32E-03	0.00	pot. res.
548040 4179560	548040	4179560	1.79E-04	6.66E-11	0.00E+00	2.27E-08	9.93E-09	1.21E-10	4.53E-07	1.70E-09	6.78E-12	0.00E+00	0.00E+00	0.00E+00	9.69E-10	2.23E-03	0.00	pot. res.
547980 4179760	547980	4179760	1.55E-04	5.74E-11	0.00E+00	1.96E-08	8.55E-09	1.04E-10	3.91E-07	1.46E-09	5.84E-12	0.00E+00	0.00E+00	0.00E+00	8.34E-10	2.23E-03	0.00	pot. res.
548020 4179620	548020	4179620	2.23E-04	7.43E-11	0.00E+00	2.53E-08	1.11E-08	1.35E-10	5.06E-07	1.89E-09	7.56E-12	0.00E+00	0.00E+00	0.00E+00	1.08E-09	2.13E-03	0.00	pot. res.
548040 4179600	548040	4179600	2.07E-04	7.15E-11	0.00E+00	2.44E-08	1.07E-08	1.30E-10	4.86E-07	1.82E-09	7.28E-12	0.00E+00	0.00E+00	0.00E+00	1.04E-09	2.14E-03	0.00	pot. res.
547920 4179820	547920	4179820	1.05E-04	4.30E-11	0.00E+00	1.47E-08	6.42E-09	7.82E-11	2.93E-07	1.10E-09	4.38E-12	0.00E+00	0.00E+00	0.00E+00	6.26E-10	2.23E-03	0.00	pot. res.
548000 4179520	548000	4179520	1.50E-04	5.88E-11	0.00E+00	2.01E-08	8.77E-09	1.07E-10	4.01E-07	1.50E-09	5.99E-12	0.00E+00	0.00E+00	0.00E+00	8.56E-10	2.17E-03	0.00	pot. res.
548020 4179520	548020	4179520	1.49E-04	5.74E-11	0.00E+00	1.96E-08	8.56E-09	1.04E-10	3.91E-07	1.46E-09	5.84E-12	0.00E+00	0.00E+00	0.00E+00	8.35E-10	2.11E-03	0.00	pot. res.
548040 4179540	548040	4179540	1.65E-04	6.21E-11	0.00E+00	2.12E-08	9.26E-09	1.13E-10	4.23E-07	1.58E-09	6.32E-12	0.00E+00	0.00E+00	0.00E+00	9.04E-10	2.05E-03	0.00	pot. res.
548000 4179780	548000	4179780	1.34E-04	4.94E-11	0.00E+00	1.68E-08	7.36E-09	8.98E-11	3.36E-07	1.26E-09	5.03E-12	0.00E+00	0.00E+00	0.00E+00	7.18E-10	2.09E-03	0.00	pot. res.
547880 4179800	547880	4179800	1.24E-04	4.83E-11	0.00E+00	1.65E-08	7.21E-09	8.79E-11	3.29E-07	1.23E-09	4.92E-12	0.00E+00	0.00E+00	0.00E+00	7.03E-10	2.08E-03	0.00	campus
548000 4179760	548000	4179760	1.52E-04	5.62E-11	0.00E+00	1.92E-08	8.38E-09	1.02E-10	3.83E-07	1.43E-09	5.72E-12	0.00E+00	0.00E+00	0.00E+00	8.17E-10	2.03E-03	0.00	pot. res.
547960 4179740	547960	4179740	1.75E-04	6.36E-11	0.00E+00	2.17E-08	9.49E-09	1.16E-10	4.33E-07	1.62E-09	6.48E-12	0.00E+00	0.00E+00	0.00E+00	9.26E-10	2.01E-03	0.00	campus
547980 4179820	547980	4179820	1.13E-04	4.16E-11	0.00E+00	1.42E-08	6.20E-09	7.56E-11	2.83E-07	1.06E-09	4.24E-12	0.00E+00	0.00E+00	0.00E+00	6.05E-10	1.97E-03	0.00	pot. res.
548040 4179620	548040	4179620	2.12E-04	7.12E-11	0.00E+00	2.43E-08	1.06E-08	1.29E-10	4.85E-07	1.81E-09	7.25E-12	0.00E+00	0.00E+00	0.00E+00	1.04E-09	1.84E-03	0.00	pot. res.
548000 4179800	548000	4179800	1.25E-04	4.54E-11	0.00E+00	1.55E-08	6.76E-09	8.25E-11	3.09E-07	1.15E-09	4.62E-12	0.00E+00	0.00E+00	0.00E+00	6.60E-10	1.91E-03	0.00	pot. res.
548000 4179640	548000	4179640	2.32E-04	7.64E-11	0.00E+00	2.61E-08	1.14E-08	1.39E-10	5.20E-07	1.95E-09	7.78E-12	0.00E+00	0.00E+00	0.00E+00	1.11E-09	1.80E-03	0.00	pot. res.
547960 4179660	547960	4179660	2.44E-04	8.38E-11	0.00E+00	2.86E-08	1.25E-08	1.52E-10	5.71E-07	2.13E-09	8.54E-12	0.00E+00	0.00E+00	0.00E+00	1.22E-09	1.78E-03	0.00	campus
547880 4179680	547880	4179680	3.12E-04	1.20E-10	0.00E+00	4.08E-08	1.78E-08	2.18E-10	8.15E-07	3.05E-09	1.22E-11	0.00E+00	0.00E+00	0.00E+00	1.74E-09	1.69E-03	0.00	campus
547840 4179700	547840	4179700	2.82E-04	1.00E-10	0.00E+00	3.41E-08	1.49E-08	1.82E-10	6.82E-07	2.55E-09	1.02E-11	0.00E+00	0.00E+00	0.00E+00	1.46E-09	1.71E-03	0.00	campus
547980 4179740	547980	4179740	1.69E-04	6.16E-11	0.00E+00	2.10E-08	9.19E-09	1.12E-10	4.20E-07	1.57E-09	6.27E-12	0.00E+00	0.00E+00	0.00E+00	8.96E-10	1.81E-03	0.00	pot. res.
547980 4179660	547980	4179660	2.33E-04	7.76E-11	0.00E+00	2.64E-08	1.16E-08	1.41E-10	5.28E-07	1.97E-09	7.90E-12	0.00E+00	0.00E+00	0.00E+00	1.13E-09	1.74E-03	0.00	pot. res.
548020 4179640	548020	4179640	2.24E-04	7.30E-11	0.00E+00	2.49E-08	1.09E-08	1.33E-10	4.97E-07	1.86E-09	7.44E-12	0.00E+00	0.00E+00	0.00E+00	1.06E-09	1.73E-03	0.00	pot. res.

Appendix BIO
Biological Resources Appendix

TABLE BIO-1
SPECIAL-STATUS SPECIES WITH POTENTIAL TO OCCUR ON THE CAMPUS SITE

Name	Listing Status	General Habitat Requirements	Potential for Species Occurrence Within the Campus Site
Invertebrates			
Western bumble bee (B*ombus occidentalis*)	--/CaT	Found in any area with sufficient flowers for nutrition, and underground burrows for nest for the queen.	**Moderate.** Suitable foraging habitat is present on Mt. Sutro.
San Bruno elfin butterfly (*Callophrys mossii bayensis*)	FE/--	Coastal, mountainous areas with grassy ground cover, mainly in the vicinity of San Bruno Mountain, San Mateo County. Colonies are located on steep, north-facing slopes within the fog belt. Larval host plant is *Sedum spathulifolium*.	**Low.** Host plant not present within campus site.
Monarch butterfly (*Danaus plexippus plexippus)*	--/-- overwintering sites protected	Monarch butterfly breeding and larval habitat is on milkweed plants in open fields and meadows. During winter colonies stay in eucalyptus, Monterey cypress and other trees in California and at high altitudes in Mexico.	**Moderate (overwintering).** Suitable overwintering habitat is present in eucalyptus trees of Mt. Sutro reserve. There are several records of this species wintering in eucalyptus groves in San Francisco including Golden Gate Park, the Presidio, Fort Mason, and Telegraph Hill.
Bay checkerspot butterfly (*Euphydryas editha bayensis*)	FT/--	Found on shallow, serpentine-derived soil. The primary larvae host plant is dwarf plantain (*Plantago erecta*). When this plant dries, purple owl's clover (*Castilleja densiflora* or *C. exserta*) is the secondary host plant.	**Low.** Host plant not present within campus site.
Mission blue butterfly (*Icaricia icarioides missionensis*)	FE/--	Host plants are silver lupine (*Lupinus albifrons*), summer lupine (*Lupinus formosus*), and varicolor lupine *(Lupinus variicolor*). Historical distribution encompassed coastal scrub/grassland habitat of the northern San Francisco Peninsula and Marin County. Remaining populations found in only a few locations: Marin Headlands, Skyline ridges, San Bruno Mountain, and at Twin Peaks.	**Low.** Host plant not present within campus site.
Callippe silverspot butterfly (*Speyeria callippe callippe*)	FE/--	Hostplant is *Viola pedunculata*. Most adults found on East-facing slopes; males congregate on hilltops in search of females.	**Low.** Host plant not present within campus site.
Amphibians			
California giant salamander (*Dicamptodon ensatus*)	--/SSC	Vernal or temporary pools in annual grasslands, or open stages of woodlands. Typically adults use mammal burrows.	**Not Present.** Suitable aquatic habitat is not present on the campus site.
California red-legged frog (*Rana draytonii*)	FT/SSC	Streams, freshwater pools, and ponds with overhanging vegetation. Also found in woods adjacent to streams. Requires permanent or ephemeral water sources such as reservoirs and slow moving streams and needs pools of >0.5 m depth for breeding.	**Not Present.** Suitable aquatic habitat is not present ion the campus site.
Foothill yellow-legged frog (*Rana boylii*)	--/CaE	Partly-shaded, shallow streams & riffles with a rocky substrate in a variety of habitats; requires at least some cobble-sized substrate for egg-laying.	**Not Present.** Suitable aquatic habitat is not present on the campus site.
Reptiles			
Western pond turtle (*Actinemys marmorata*)	--/SSC	Ponds, marshes, rivers, streams, and irrigation ditches with aquatic vegetation <6,000' in elevation. Require basking sites and upland habitat for egg laying (sandy banks and open, grassy fields)	**Not Present.** Suitable aquatic habitat is not present on the campus site.

TABLE BIO-1 (CONTINUED)
SPECIAL-STATUS SPECIES WITH POTENTIAL TO OCCUR ON THE CAMPUS SITE

Name	Listing Status	General Habitat Requirements	Potential for Species Occurrence Within the Campus Site
Birds			
Short-eared owl (*Asio flammeus*)	--/SSC	Found in swamp lands, both fresh and salt; lowland meadows; irrigated alfalfa fields. Tule patches/tall grass needed for nesting/daytime seclusion. Nests on dry ground in depression concealed in vegetation.	**Low.** Suitable marsh or meadow habitat is not present on the campus site.
Burrowing owl (*Athene cunicularia*)	--/SSC	Nests and forages in low-growing grasslands with burrowing mammals.	**Not Present.** Suitable open habitat is not present on the campus site.
Western snowy plover (*Charadrius alexandrines nivosus*)	FT/SSC	Sandy beaches, salt pond levees & shores of large alkali lakes. Needs sandy, gravelly or friable soils for nesting.	**Not Present.** Shoreline habitat is not present on the campus site.
Northern harrier (*Circus hudsonius*)	--/SSC	Nests on ground in shrubby vegetation, usually at marsh edge; nest built of a large mound of sticks in wet areas.	**Not Present.** Suitable marsh habitat is not present on the campus site.
Yellow rail (*Coturnicops noveboracensis*)	--/SSC	Nests in shallow marshes and wet meadows in north-central North American; winters near coast in drier marshes, deep grass and rice fields.	**Low.** Suitable open habitat is not present on the campus site.
White-tailed kite (*Elanus leucurus*)	--/CFP	Nests in shrubs and trees adjacent to grasslands, forages over grasslands and agricultural lands	**Low.** Suitable open habitat not present on the campus site.
American peregrine falcon (*Falco peregrinus anatum*)	BCC/CFP	Nest consists of a scrape or a depression on rock, cliff or building ledge over an open site. Catches prey in flight, including small birds, bats or mammals.	**Moderate.** May nest on tall buildings and forage in surrounding area.
California black rail (*Laterallus jamaicensis*)	BCC/ST/CFP	Found in salt, brackish and freshwater marsh with dense vegetation for nesting habitat.	**Not Present.** Suitable marsh habitat is not present on the campus site.
Saltmarsh common yellowthroat (*Geothlypis trichas sinuosa*)	BCC/SSC	Requires thick, continuous cover down to water surface for foraging; tall grasses, tule patches, willows for nesting.	**Not Present.** Suitable marsh habitat is not present on the campus site.
Alameda song sparrow (*Melospiza melodia pusillula*)	BCC/SSC	Salt marshes. Inhabits *Sarcocornia* marshes; nests low in *Grindelia* bushes (high enough to escape high tides) and in *Sarcocornia*.	**Not Present.** Suitable marsh habitat is not present ion the campus site.
San Pablo song sparrow (*Melospiza melodia samuelis*)	BCC/SSC	Inhabits tidal sloughs in the *Salicornia* marshes; nests in *Grindelia* bordering slough channels.	**Not Present.** Suitable marsh habitat is not present on the campus site.
Bank swallow (*Riparia riparia*)	--/FT	Requires vertical banks/cliffs with fine-textured/sandy soils near streams, rivers, lakes, ocean to dig nesting holes.	**Low.** Suitable nesting habitat not found on the campus site, but may fly over.
Ridgway's rail [California clapper rail] (*Rallus obsoletus*)	FE/SE/CFP	Found in salt and brackish marsh with well-defined tidal channels and dense growth of pickleweed; feeds on invertebrates in mud-bottomed sloughs.	**Not Present.** Suitable marsh habitat is not present on the campus site.
California least tern (*Sternula antillarum browni*)	FE/SE/CFP	Breeds on shores of San Francisco Bay; nests are situated on barren to sparsely vegetated places near water, normally on sandy or gravelly substrates or abandoned salt flats.	**Not Present.** Suitable sandy or gravelly habitat is not present on the campus site.
Yellow-headed blackbird (*Xanthocephalus xanthocephalus*)	--/SSC	Nests in cattail marshes with nests attached to marsh vegetation. Colonial nesters, often sharing their habitat closely with red-winged blackbird (*Agelaius phoeniceus*).	**Not Present.** Suitable marsh habitat is not present on the campus site.

TABLE BIO-1 (CONTINUED)
SPECIAL-STATUS SPECIES WITH POTENTIAL TO OCCUR ON THE CAMPUS SITE

Name	Listing Status	General Habitat Requirements	Potential for Species Occurrence Within the Campus Site
Birds (cont.)			
Northern spotted owl (*Strix occidentalis caurina*)	FT/ST	In California, the northern spotted owl inhabits a mix of old and younger forests, featuring dense canopy closure of mature trees, abundant logs, standing snags, and live trees with broken tops.	**Not Present.** Campus site is outside this species' known range.
Mammals			
Pallid bat (*Antrozous pallidus*)	--/SSC	Grasslands, shrublands, woodlands, and forests at lower elevations Common in arid regions with rocky outcroppings, particularly near water. Roosts in rock crevices, buildings, and under bridges. Very sensitive to disturbance.	**Low**. Suitable roosting habitat present in disused buildings on Mt. Sutro. This species was not detected during 2009 surveys in San Francisco parks (Krauel, 2009). Not expected to breed but may be present on a transient basis.
Hoary bat (*Lasiurus cinereus*)	--/--/WBWG Medium	Prefers open habitats or habitat mosaics, with access to trees for cover & open areas or habitat edges for feeding. Roosts in dense foliage of medium to large trees. Feeds primarily on moths. Requires water.	**Moderate**. Suitable roosting habitat present in large trees of Mt. Sutro Open Space Reserve, and has been recorded within 1 mile (CDFW, 2019). Not expected to breed but may be present on a transient basis.
Western red bat (*Lasiurus blossevillii*)	WBWG High	Roosts primarily in trees, 2-40 ft above ground, from sea level up through mixed conifer forests. Prefers habitat edges & mosaics with trees that are protected from above & open below with open areas for foraging.	**Moderate**. Suitable roosting habitat present in trees of Mt. Sutro Open Space Reserve. Known to roost in trees of Golden Gate Park (Krauel, 2009).
Townsend's big-eared bat (*Corynorhinus townsendii*)	--/SSC	Roosts in caves and cave-like habitats, with colonies occurring in areas dominated by exposed, cavity forming rock and/or historic mining districts. They prefer open roosting areas, not cracks or crevices, in forests, chaparral, grassland, desert or scrub areas.	**Low.** Suitable roosting habitat is present on walls and ceilings of disused buildings, but species is sensitive to human disturbance. Recorded in Twin Peaks in 2005.
Big free-tailed bat (*Nyctinomops macrotis*)	--/SSC	Roosts in buildings, caves, and occasionally in holes in trees, also in crevices in high cliffs or rock outcrops. Resident in southwestern U.S., occasional records in the region.	**Low.** Species is not resident in northern California.
San Pablo vole (*Microtus californicus sanpabloensis*)	--/SSC	Constructs burrow in soft soil. Feeds on grasses, sedges and herbs. Forms a network of runways leading from the burrow	**Not Present.** Campus site is not within species' range.
Salt marsh harvest mouse (*Reithrodontomys raviventris*)	FE/SE/CFP	Pickleweed is primary habitat, but may occur in other marsh vegetation types and in adjacent upland areas. Does not burrow, builds loosely organized nests. Requires higher areas for flood escape.	**Not Present**. Suitable habitat is not present on the campus site.
Salt-marsh wandering shrew (*Sorex vagrans halicoetes*)	--/SSC	Medium high marsh 6-8 ft above sea level where abundant driftwood is scattered among pickleweed.	**Not Present**. Suitable habitat is not present on the campus site.
San Francisco dusky-footed woodrat *Neotoma fuscipes annectens*	--/SSC	Forest habitats of moderate canopy and moderate to dense understory. Constructs nests of shredded grass, leaves, and other material. May be limited by availability of nest-building materials	**Low.** Species is unlikely to nest along margins of Open Space near the campus site.
American badger (*Taxidea taxus*)	--/SSC	Herbaceous, shrub, and open stages of most habitats with dry, friable soils.	**Low.** Suitable open habitat not found on the campus site.

TABLE BIO-1 (CONTINUED)
SPECIAL-STATUS SPECIES WITH POTENTIAL TO OCCUR ON THE CAMPUS SITE

Name	Listing Status	General Habitat Requirements	Potential for Species Occurrence Within the Campus Site
Plants			
Franciscan onion (*Allium peninsulare* var. *franciscanum*)	--/--/1B.2	Cismontane woodland, valley and foothill grassland, on clay, volcanic, often serpentinite soils. May – June. 52 – 305 m.	**Low.** Suitable soils not found on the campus site.
Napa false indigo (*Amorpha californica var. napensis*)	--/--/1B.2	Observations recorded in Monterey County and San Francisco Bay Area. Broadleafed upland forest, chaparral, or cismontane woodland. Perennial deciduous shrub. April - July. 30 – 735m	**Low.** May occur in Open Space on Mt. Sutro.
Bent-flowered fiddleneck (*Amsinckia lunaris*)	--/--/1B.2	Observed in cismontane woodland, valley and foothill grassland, or coastal bluff scrub. March - June. 3 – 500m	**Low.** Campus site is outside species' known distribution.
Franciscan manzanita (*Arctostaphylos franciscana*)	FE/--/1B.1	Serpentine outcrops in chaparral. February - April. 30 – 215m	**Low.** Campus site is outside species' known distribution.
Mt. Tamalpais manzanita (*Arctostaphylos montana* ssp. *montana*)	--/--/1B.3	Observations recorded in Marin and Humboldt County. Chaparral, valley and foothill grassland. Perennial evergreen shrub. February - April. 150 – 680m	**Not Present.** Campus site is outside of species' known distribution.
Presidio manzanita (*Arctostaphylos montana* ssp. *ravenii*)	FE/SE/1B.1	Chaparral, coastal prairie, and coastal scrub in open and rocky serpentine slopes. February - March. 45 – 215 m	**Not Present.** Campus site is outside of species' known distribution.
Marin manzanita (*Arctostaphylos virgata*)	--/--/1B.2	Chaparral, mixed evergreen forest, redwood forest, closed-cone pine forest in Marin County on sandstone or granite. Perennial evergreen shrub. Endemic to CA. January - March. 1-800 m	**Not Present.** Campus site is outside of species' known distribution.
Marsh sandwort (*Arenaria paludicola*)	FE/SE/1B.1	Freshwater or brackish marsh, wetlands and riparian areas. May to August. 3 – 170 m.	**Not Present.** Suitable habitat not present on campus site.
Alkali-milk vetch (*Astragalus tener* var. *tener*)	--/--/1B.2	Alkali playa and flats, valley, annual, and foothill grassland, vernal pools, low ground, and flooded lands. March – June. 1-170 m	**Not Present.** Suitable habitat not present on campus site.
Thurber's reed grass (*Calamagrostis crassiglumis*)	--/--/2B.1	Freshwater wetlands, wetland-riparian. Perennial rhizomatous herb May - August. 10-60 m	**Not Present.** Suitable habitat not present on campus site.
Tiburon mariposa –lily (*Calochortus tiburonensis*)	--/--/1B.1	Valley and foothill grassland on open, rocky, slopes in serpentine grassland. March – June. 50-150 m	**Not Present.** Endemic to Ring Mtn. Preserve on the Tiburon Peninsula.
Bristly sedge (*Carex comosa*)	--/--/2B.1	Lake margins, freshwater wetlands, edges of water. May-September -5-1620 m	**Not Present.** Local occurrence is historical. Suitable habitat not present on campus site.
Northern meadow sedge (*Carex praticola*)	--/--/2B.2	Moist to wet meadows and seeps. Perennial herb. May – July. 0-3200 m	**Not Present.** Local occurrence is historical. Suitable habitat not present on campus site.

**TABLE BIO-1 (CONTINUED)
SPECIAL-STATUS SPECIES WITH POTENTIAL TO OCCUR ON THE CAMPUS SITE**

Name	Listing Status	General Habitat Requirements	Potential for Species Occurrence Within the Campus Site
Plants (cont.)			
Tiburon paintbrush (*Castilleja affinis* var. *neglecta*)	FE/ST/1B.2	Open serpentine grassland slopes. Perennial herb (hemiparasitic). April – June. 60-400 m	**Not Present.** Suitable habitat not present on campus site.
Pappose tarplant (*Centromadia parryi* ssp. *parryi*)	--/--/1B.2	Chaparral, coastal prairie, meadows and seeps, marshes and swamps (salt), valley and foothill grassland (mesic), often alkaline. May – November. 0 - 420 m.	**Not Present.** Suitable habitat not present on campus site.
Point Reyes bird's-beak (*Chloropyron maritimum* ssp. *palustre*)	--/--/1B.2	Recorded from San Luis Obispo County north to Humboldt County. Coastal salt marsh, wetland-riparian. Annual herb (hemiparasitic). June – October. 0 – 10 m.	**Not Present.** Suitable habitat not present on campus site.
San Francisco Bay spineflower (*Chorizanthe cuspidata* var. *cuspidata*)	--/--/1B.2	Observed as far south as Monterey County, but most recordings are in the San Francisco Bay Area. Coastal Strand, Coastal Prairie, Northern Coastal Scrub. Annual herb.	**Not Present.** Suitable habitat not present on campus site.
San Francisco Bay spineflower (*Chorizanthe robusta* var. *robusta*)	FE/--/1B.1	Dune, openings in coastal strands, maritime coastal scrub, valley and foothill grassland, in sandy or gravelly areas. Annual herb. April to September. 3 – 300 m.	**Not Present.** Suitable habitat is not present on campus site.
Franciscan thistle (*Cirsium andrewsii*)	--/--/1B.2	Found in mesic, sometimes serpentinite. Broadleafed upland forest, coastal bluff scrub, coastal prairie, and coastal scrub in mesic areas, sometimes serpentinite. Perennial herb. March – July. 0 – 150 m.	**Not Present.** Suitable habitat is not present on campus site.
Mt. Tamalpais thistle (*Cirsium hydrophilum* var. *vaseyi*)	--/--/1B.2	Observations recorded in San Francisco and Marin County in mixed evergreen forest, chaparral, wetland-riparian seeps, sometimes serpentinite. Perennial herb. May – August. 240 – 620 m.	**Low.** May occur in Open Space on Mt. Sutro.
Compact cobwebby thistle (*Cirsium occidentale* var. *compactum*)	--/--/1B.2	Coastal strand, coastal prairie, chaparral, northern coastal scrub. Perennial herb. April – June. 5 – 150 m.	**Low.** Suitable habitat is minimal in the vicinity of the campus site.
Presidio clarkia (*Clarkia franciscana*)	FE/SE/1B.1	Serpentine outcrops in grassland or scrub. May – June. 20-305 m.	**Not Present.** Suitable habitat is not present on campus site.
Round-headed Chinese houses (*Collinsia corymbosa*)	--/--/1B.2	Coastal strand, dunes. Annual herb. April – June. 0 -20 m.	**Not Present.** Suitable habitat is not present on campus site.
San Francisco collinsia (*Collinsia multicolor*)	--/--/1B.2	Northern coastal scrub, closed-cone pine forest, sometimes serpentinite. March – May. 30 -250 m.	**Low.** Local records are historical (early 1900s); suitable habitat is limited on campus site.
Western leatherwood (*Dirca occidentalis*)	--/--/1B.2	Broadleafed upland forest, chaparral, closed-cone coniferous forest, cismontane woodland, north coast coniferous forest, riparian forest, riparian woodland. On brushy slopes, mesic sites; mostly in mixed evergreen & foothill woodland communities. 25-425 m.	**Low.** May occur in Open Space on Mt. Sutro.
Tiburon buckwheat (*Eriogonum luteolum* var. *caninum*)	--/--/1B.2	Observations recorded in the San Francisco Bay Area up to Mendocino County. Coastal prairie, chaparral, and valley grassland. Annual herb. May-September. 0-700m	**Not Present.** Suitable habitat is not present on campus site.

TABLE BIO-1 (CONTINUED)
SPECIAL-STATUS SPECIES WITH POTENTIAL TO OCCUR ON THE CAMPUS SITE

Name	Listing Status	General Habitat Requirements	Potential for Species Occurrence Within the Campus Site
Plants (cont.)			
Minute pocket moss (*Fissidens pauperculus*)	--/--/1B.2	Observations recorded along the west coast of California from Santa Cruz County to Del Norte, and east to Butte County. Moss grows on damp soil along the coast and dry streambeds/ streambanks in coniferous forests. 10 -1024 m.	**Not Present.** Suitable habitat is not present on campus site.
Marin checker lily (*Fritillaria lanceolata var. tristulis*)	--/--/1B.2	Perennial bulbiferous herb. Observations recorded in San Mateo and Marin County in canyons to riparian areas in northern coastal scrub, evergreen woodlands, and serpentine rock outcrops. February – May. 15-150m	**Low.** May occur in Open Space on Mt. Sutro. Local records from Twin Peaks in 2016.
Fragrant fritillary *Fritillaria liliacea*	--/--/1B.2	Coastal scrub, valley and foothill grassland, coastal prairie. Often on serpentine; usually on clay soils, in grassland. February- April. 3-410 m.	**Not Present.** Suitable habitat is not present on campus site.
Blue coast gilia (*Gilia capitata ssp. chamissonis*)	--/--/1B.1	Coastal dunes, coastal scrub. Annual herb, blooms. April – July. 2 – 200 m.	**Low.** Local occurrences are historical and suitable habitat is not present on campus site.
Diablo helianthella (*Helianthella castanea*)	--/--/1B.2	South Bay, East Bay, and North Bay in chaparral, foothill woodland, northern coastal scrub, riparian woodland and valley grassland, usually in rocky soils in partial shade. Perennial herb. Blooms March – June. 60 -1300 m.	**Not Present.** Suitable habitat is not present on campus site.
Congested-headed hayfield tarplant (*Hemizonia congesta* ssp. *congesta*)	--/--/1B.2	Recorded observations have been made as far south as Los Angeles County, but primarily found in the Bay Area, and along the west coast of California up to Del Norte. Also in El Dorado County. Grassy valleys and hills, often in fallow fields; sometimes along roadsides. April – November. 20-560 m.	**Low**. Suitable habitat on campus site area is limited.
Marin western flax (*Hesperolinon congestum*)	FT/ST/1B.1	Alameda, San Mateo, San Francisco, and Marin County with an additional observation recorded in Colusa County in chaparral and valley grassland. Annual herb. 60-370 m.	**Not Present.** Suitable habitat is not present on campus site.
Santa Cruz tarplant (*Holocarpha macradenia*)	FT/SE/1B.1	Monterey and Santa Cruz County, as well as the North Bay and East Bay in coastal prairie and valley grassland. Annual herb. June – October. 10-220 m.	**Not Present.** Suitable habitat is not present on campus site.
Thin-lobed horkelia (*Horkelia tenuiloba*)	--/--/1B.2	San Luis Obispo north to Mendocino County and east to Colusa County in chaparral, valley and foothill grassland, and sandy, mesic openings in upland forest. Perennial herb. 50 – 500 m.	**Not Present.** Suitable habitat is not present on campus site.
Small groundcone (*Kopsiopsis hookeri*)	--/--/2B.3	Recorded in counties along the west coast of California including; Santa Cruz, Marin, and Lake County to Del Norte County in redwood forest. Found in open woods, generally on *Gaultheria shallon.* Perennial rhizomatous herb (parasitic). April – August. 120-1435m	**Low**. Scattered redwood trees present on campus site, but species has not been observed in San Francisco.
San Francisco lessingia (*Lessingia germanorum*)	FE/SE/1B.1	Northern coastal scrub, dunes. Annual herb. July – November. 25 – 110 m.	**Not Present.** Suitable habitat is not present on campus site.

TABLE BIO-1 (CONTINUED)
SPECIAL-STATUS SPECIES WITH POTENTIAL TO OCCUR ON THE CAMPUS SITE

Name	Listing Status	General Habitat Requirements	Potential for Species Occurrence Within the Campus Site
Plants (cont.)			
Tamalpais lessingia (*Lessingia micradenia var. micradenia*)	--/--/1B.2	Marin and Lake County and chaparral and valley grassland. Usually on serpentine, in serpentine grassland or serpentine chaparral. Often on roadsides. Annual herb. June – October. 60-305 m	**Not Present.** Suitable habitat is not present on campus site.
Marsh microseris (*Microseris paludosa*)	--/--/1B.2	Found along the west coast from San Luis Obispo County to Mendocino County. Occurs in northern coastal scrub and closed-cone pine forest. Perennial herb. April – June. 5-300m	**Low.** Local occurrences are historical and habitat is limited on campus site.
White-rayed pentachaeta (*Pentachaeta bellidiflora*)	FE/SE/1B.1	Annual herb. Along the west coast from Monterey County to Marin County – none recorded in SF County, in valley grassland. March – May. 35-610m.	**Not Present.** Campus site is outside of species' range.
Choris' popcorn-flower (*Plagiobothrys chorisianus* var. *chorisianus*)	--/--/1B.2	Mesic sites in chaparral, coastal scrub, coastal prairie. 15-100 m.	**Not Present.** Suitable chaparral, scrub and coastal prairie habitat is not present on campus site.
Hairless popcornflower (*Plagiobothrys glaber*)	--/--/1A	South and East Bay, and Marin County in coastal salt marsh, wetland-riparian meadows, salt-marsh, coastal. Occurs almost always under natural conditions in wetlands. Annual herb. March – May. 5-125m.	**Not Present.** Presumed extinct in California.
North Coast semaphore grass (*Pleuropogon hooverianus*)	--/ST/1B.1	North Bay to Mendocino County. Farthest north in Del Norte County in mixed evergreen forest, north coastal coniferous forest, freshwater wetlands, wetland-riparian in meadows and vernal-pools. Usually occurs in wetlands, but occasionally found in non-wetlands. Perennial rhizomatous grass. April-June. 10 -671 m.	**Not Present.** Campus siteis outside of species' range.
Oregon polemonium (*Polemonium carneum*)	--/--/2B.2	Coastal prairie and scrub in lower montane coniferous forest. April – September. 0-1830m	**Not Present.** Suitable habitat is not present on campus site.
Adobe sanicle (*Sanicula maritima*)	--/--/1B.1	Occurs in chaparral, coastal prairie, meadows and seeps, and grassland in clay, serpentinite. Perennial herb. February – May. 30-240m.	**Not Present.** Local occurrences are historical and suitable habitat is not present on campus site.
Marin checkerbloom (*Sidalcea hickmanii* ssp.*virdis*)	--/--/1B.2	Serpentine soils in chaparral habitats. May – June. 50-430m.	**Not Present.** Suitable habitat is not present on campus site.
San Francisco campion (*Silene verecunda* ssp. *verecunda*)	--/--/1B.2	Sandy habitats in coastal bluff scrub, chaparral, coastal prairie, coastal scrub, and grassland. February – August. 30-645m	**Not Present.** Suitable habitat is not present on campus site.
Santa Cruz microseris (*Stebbinsoseris decipiens*)	--/--/1B.2	Monterey, Santa Cruz, and Marin County Coastal Prairie, Chaparral, Mixed Evergreen Forest, Closed-cone Pine Forest, Northern Coastal Scrub. Weak affinity to serpentine soil. Annual herb. April – May. 10-500m	**Not Present.** Campus site likely outside of species' range.

TABLE BIO-1 (CONTINUED)
SPECIAL-STATUS SPECIES WITH POTENTIAL TO OCCUR ON THE CAMPUS SITE

Name	Listing Status	General Habitat Requirements	Potential for Species Occurrence Within the Campus Site
Plants (cont.)			
Mt. Tamalpais jewelflower (*Streptanthus batrachopus*)	--/--/1B.3	Only found in the North Bay regions from Marin County to Mendocino and east to Colusa County. Chaparral, closed-cone pine forest. Annual herb. April – July. 335-670 m.	**Not Present.** Campus site is outside of species' range.
Tiburon jewelflower (*Streptanthus glandulosus* ssp. *niger*)	FE/SE/1B.1	Shallow, rocky serpentine slopes in grassland. May-June. 30-150m.	**Not Present.** Suitable habitat is not present on campus site.
Two-fork clover (*Trifolium amoenum*)	FE/--/1B.1	South Bay (Santa Clara/San Mateo), East Bay and North Bay in valley grassland, wetland-riparian. Sometimes on serpentine soil, open sunny sites, swales. Most recently sighted on roadside and eroding cliff face. Annual herb. April-June. 5-415m.	**Not Present.** Suitable habitat is not present on campus site.
Saline clover (*Trifolium hydrophilum*)	--/--/1B.2	Mesic, alkaline sites. April-June. 1-335 m.	**Not Present.** Suitable habitat is not present on campus site.
San Francisco owl's-clover (*Triphysaria floribunda*)	--/--/1B.2	Usually serpentinite conditions in coastal prairie and scrub, and grassland. April-June. 10-160 m.	**Not Present.** Suitable habitat is not present on campus site.
Coastal triquetrella (*Triquetrella californica*)	--/--/1B.2	Grows within 30m of the coast in coastal scrub, grasslands and in open gravels on roadsides, hillsides, rocky slopes, and fields. On gravel or thin soil over outcrops. Moss. 10-100 m.	**Moderate.** Known occurrences in local area and limited suitable habitat present.

STATUS CODES:

USFWS (U.S. Fish and Wildlife Service)
FE = Listed as Endangered by the Federal Government
FT = Listed as Threatened by the Federal Government.
FC = Listed as Candidate
BCC = USFWS Bird of Conservation Concern

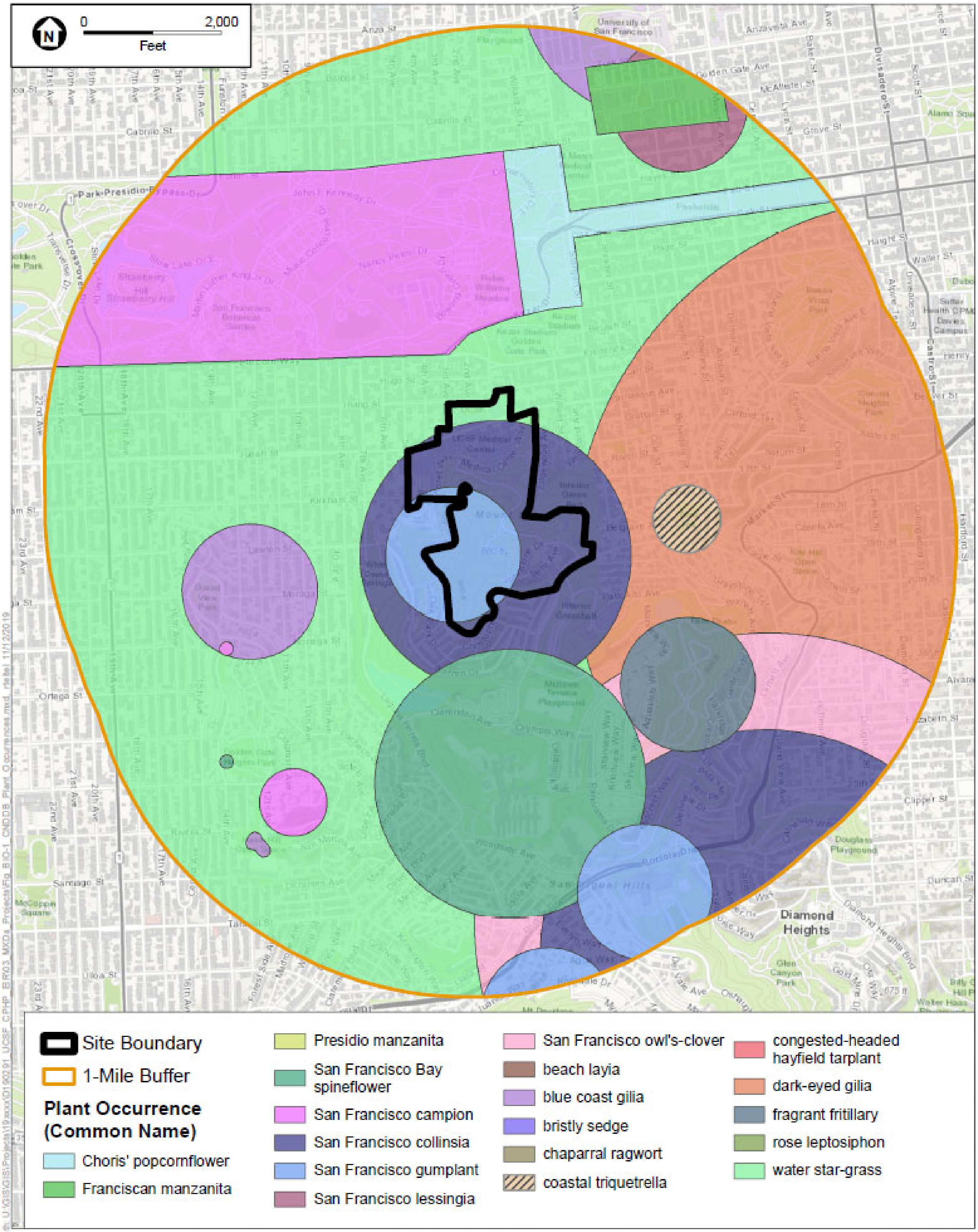
CDFW (California Department of Fish and Wildlife)
SE = Listed as Endangered by the State of California
ST = Listed as Threatened by the State of California
CaE = Candidate Endangered by the State of California
CaT = Candidate Threatened by the State of California
CFP = California Fully Protected species
SSC = Species of Special Concern
WBWG = Western Bat Working Group

California Rare Plant Rank
Rank 1A=Plants presumed extinct in California
Rank 1B=Plants rare, Threatened, or Endangered in California and elsewhere
Rank 2= Plants rare, Threatened, or Endangered in California but more common elsewhere
Rank 3= Plants about which more information is needed
Rank 4= Plants of limited distribution
An extension reflecting the level of threat to each species is appended to each rarity category as follows:
.1 – Seriously endangered in California
.2 – Fairly endangered in California
.3 – Not very endangered in California

POTENTIAL TO OCCUR CATEGORIES:

Not Present = The campus site and/or immediate vicinity does not support suitable habitat for a particular species. Campus site may be outside of the species' known range.
Low Potential = The campus site and/or immediate vicinity only provides limited habitat. The species' known range may be outside of the plan area.
Moderate Potential = The campus site and/or immediate vicinity provide suitable habitat.
High Potential = The campus site and/or immediate vicinity provides ideal habitat conditions or the species has been observed.

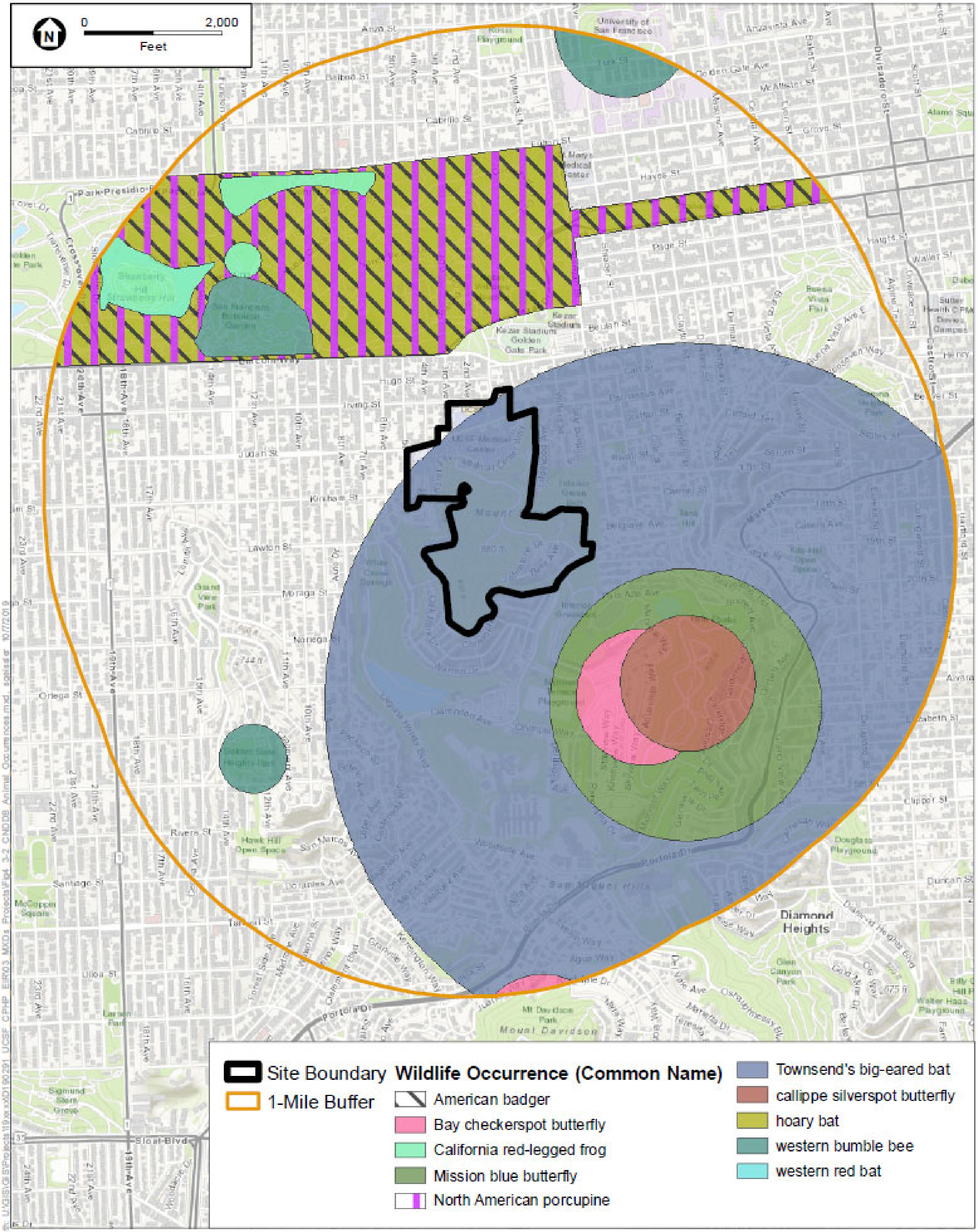
SOURCES: CDFW 2019; CNPS 2019; USFWS 2019



SOURCE: ESRI, CNDDB, 2019.

UCSF Comprehensive Parnassus Heights Plan EIR

Figure BIO-1
CNDDB Plant Occurrences



SOURCE: ESRI, CNDDB, 2019.

UCSF Comprehensive Parnassus Heights Plan EIR

Figure BIO-2
CNDDB Wildlife Occurences

This page intentionally left blank

Appendix CUL
Cultural Resources Appendix

TABLE CUL-1
INVENTORY OF EXTANT BUILDINGS AND CULTURAL LANDSCAPES ON UCSF PARNASSUS HEIGHTS CAMPUS

Building Name	Year Built (Source)	Eligibility (Source)	Proposed Action Under 2014 LRDP	Proposed Action Under CPHP
Kalmanovitz Library	1991 (aerial photos)	Not evaluated		
Millberry Union	1955 (Carey & Co., 2011)	NR[a] and CR[b] (Carey & Co., 2011)	Renovation	Demolition
Millberry Union Garage	1955 (aerial photos)	Not evaluated		Demolition
Medical Building 1 (Ambulatory Care Center or ACC)	1972 (Carey & Co., 2011)	Not eligible (Carey & Co., 2011)		Addition
Lucia Child Care Center	1978 (Carey & Co., 2011)	Not eligible (Carey & Co., 2011)		Demolition
UC Hall	1917 (Carey & Co., 2003)	CR (Carey & Co., 2003)	Seismic retrofit and renovation	Demolition
Dental Clinics	1979 (Carey & Co., 2011)	NR and CR with Criteria Consideration G (Carey & Co., 2011)		Demolition
Koret Vision Research	1986 (Carey & Co., 2011)	Not evaluated (Carey & Co. 2011)	Demolition	Demolition
Kirkham Child Care Center	2009 (Carey & Co., 2011)	Not evaluated (Carey & Co., 2011)		Demolition
Proctor	1956 (Carey & Co., 2003 and 2011)	Not eligible (Carey & Co., 2003)	Demolition	Demolition
Clinical Sciences	1933 (Page & Turnbull, 2005)	CR (Page & Turnbull, 2005)		
School of Nursing	1979 (Carey & Co., 2011), 1972 (UCSF, 2019)	Not eligible (Carey & Co., 2011)		Demolition
Dolby Regeneration Medicine	2010 (aerial photos)	Not evaluated		
Saunders Court (cultural landscape)	1967 (Carey & Co. 2011)	Presumed eligible for NR and CR (Carey & Co. 2011)	Renovation	Alteration/ expansion
Mount Sutro Open Space Reserve (cultural landscape)	1886 (Knapp & VerPlanck, 2013)	CR (Knapp & VerPlanck, 2013)	Continued management	
Health Sciences Instruction and Research (HSIR) West	1966 (Carey & Co. 2011), 1964 (UCSF, 2019)	Presumed eligible for NR and CR (Carey & Co. 2011)		Renovation
HSIR East	1966 (Carey & Co. 2011), 1964 (UCSF, 2019)	Presumed eligible for NR and CR (Carey & Co. 2011)		Renovation
Medical Sciences	1954 (Carey & Co. 2011)	NR and CR (Carey & Co., 2011)		Renovation
Moffitt Hospital	1955 (Carey & Co. 2003)	Not eligible (Carey & Co. 2003)	Renovation	Demolition (variant)
Long Hospital	1982 (Carey & Co. 2011)	Not eligible (Carey & Co., 2011)	Addition	
Langley Porter Psychiatric Institute (LPPI)	1943 (Graves, 2019a), 1941 (UCSF, 2019)	NR and CR (Graves, 2019a)	Demolition	Demolition
Pump House	Ca. 1990 (aerial photos)	Not evaluated		
LPPI Butler	1964 (Carey & Co. 2011)	Not eligible (Carey & Co. 2011)	Demolition	
LPPI Outpatient Clinic (OPC)	1979 (Carey & Co. 2011)	Not eligible (Carey & Co. 2011)	Demolition	

TABLE CUL-1 (CONTINUED)
INVENTORY OF EXTANT BUILDINGS AND CULTURAL LANDSCAPES ON UCSF PARNASSUS HEIGHTS CAMPUS

Building Name	Year Built (Source)	Eligibility (Source)	Proposed Action Under 2014 LRDP	Proposed Action Under CPHP
LPPI Paint Shop/Hut	1966 (Carey & Co., 2011)	Not eligible (Carey & Co., 2011)	Demolition	
Central Utility Plant	1998 (aerial photos)	Not evaluated		
Parnassus Services	2005 (aerial photos)	Not evaluated		
Environmental Health and Safety (EHS)	1971 (Carey & Co., 2011)	Not eligible (Carey & Co., 2011)	Demolition	
Environmental Health and Safety Annex (Annex)	1953 (Carey & Co., 2011)	Not eligible (Carey & Co., 2011)		
Potential Third Avenue Historic District		NR and CR (Carey & Co., 2011)		
1320 Third Avenue	1911 (Carey & Co., 2011), 1912 (UCSF, 2019)	Contributor		
1322-24 Third Avenue	1911 (Carey & Co., 2011)	Non-contributor		
1326 Third Avenue	1911 (Carey & Co., 2011), 1912 (UCSF, 2019)	Contributor		
1332 Third Avenue	1911 (Carey & Co., 2011), 1915 (UCSF, 2019)	Contributor		
1338 Third Avenue	1910 (Carey & Co., 2011), 1913 (UCSF, 2019)	Contributor		
1344 Third Avenue	1910 (Carey & Co., 2011), 1912 (UCSF, 2019)	Contributor		
1350 Third Avenue	1911 (Carey & Co., 2011), 1912 (UCSF, 2019)	Contributor		
1356 Third Avenue	1911 (Carey & Co., 2011)	Contributor		
1362 Third Avenue	1909 (Carey & Co. 2011)	Contributor		
145 Irving Street Apartments	2006 (aerial photos)	Not evaluated		
1420 Fifth Avenue	1911 (Carey & Co., 2011)	Not eligible (Carey & Co., 2011)		
1422-24 Fifth Avenue	1922 (Carey & Co., 2011), 1915 (UCSF, 2019)	NR and CR (Carey & Co., 2011)		
1428 Fifth Avenue	1909 (Carey & Co., 2011), 1915 (UCSF, 2019)	Not eligible (Carey & Co., 2011)		
1432-34 Fifth Avenue	1910 (Carey & Co., 2011), 1911 (UCSF, 2019)	NR and CR (Carey & Co., 2011)		
1440 Fifth Avenue	1911 (UCSF, 2019)	Not evaluated		
1442 Fifth Avenue	1911 (Carey & Co., 2011)	Not eligible (Carey & Co., 2011)		
1452 Fifth Avenue	1909 (Carey & Co., 2011), 1920 (UCSF, 2019)	Not eligible (Carey & Co., 2011)		
1454 Fifth Avenue	1909 (Carey & Co., 2011), 1911 (UCSF, 2019)	Not eligible (Carey & Co., 2011)		
1460 Fifth Avenue	1912 (Carey & Co., 2011), 1911 (UCSF, 2019)	Not eligible (Carey & Co., 2011)		
1464 Fifth Avenue	1912 (Carey & Co., 2011), 1911 (UCSF, 2019)	Not eligible (Carey & Co., 2011)		
1468 Fifth Avenue	1948 (Carey & Co., 2011), 1920 (UCSF, 2019)	NR and CR (Carey & Co., 2011)		

TABLE CUL-1 (CONTINUED)
INVENTORY OF EXTANT BUILDINGS AND CULTURAL LANDSCAPES ON UCSF PARNASSUS HEIGHTS CAMPUS

Building Name	Year Built (Source)	Eligibility (Source)	Proposed Action Under 2014 LRDP	Proposed Action Under CPHP
1472-74 Fifth Avenue	1922 (Carey & Co., 2011)	Not eligible (Carey & Co., 2011)		
1478-80 Fifth Avenue	1924 (Carey & Co., 2011), 1923 (UCSF, 2019)	Not eligible (Carey & Co., 2011)		
1482 Fifth Avenue	1923 (Carey & Co., 2011), 1922 (UCSF, 2019)	Not eligible (Carey & Co., 2011)		
1486-88 Fifth Avenue	1924 (UCSF, 2019)	Not evaluated		
1490 Fifth Avenue	1909 (Carey & Co., 2011), 1905 (UCSF, 2019)	Not eligible (Carey & Co., 2011)		
50 Kirkham Street	1923 (Carey & Co., 2011)	Not eligible (Carey & Co., 2011)		
Faculty Alumni House (745 Parnassus Avenue)	1915 (Carey & Co., 2011)	NR and CR (Carey & Co., 2011)	Seismic retrofit	
Surge	1966 (Carey & Co., 2011)	Presumed eligible for NR and CR (Carey & Co., 2011)	Demolition	
Woods	1962 (Carey & Co., 2003)	Not eligible (Carey & Co., 2003)	Demolition	
University House (Chancellor's residence)	1966 (Carey & Co., 2011)	NR and CR (Carey & Co., 2011)		
Aldea San Miguel Housing Complex				
75 Behr Avenue	Ca. 1998-99 (UCSF, 2019)	Not evaluated		Demolition
80 Behr Avenue	Ca. 1998-99 (UCSF, 2019)	Not evaluated		Demolition
85 Behr Avenue	Ca. 1998-99 (UCSF, 2019)	Not evaluated		Demolition
90 Behr Avenue	Ca. 1998-99 (UCSF, 2019)	Not evaluated		Demolition
95 Behr Avenue	Ca. 1998-99 (UCSF, 2019)	Not evaluated		Demolition
Aldea San Miguel 8 (105 Behr Avenue)	1960 (Carey & Co., 2011)	NR and CR (Carey & Co., 2011)		Demolition
45 Johnstone Drive	Ca. 1998-99 (UCSF, 2019)	Not evaluated		Demolition
50 Johnstone Drive	Ca. 1998-99 (UCSF, 2019)	Not evaluated		Demolition
155 Johnstone Drive (Aldea Center on Mount Sutro)	2011 (UCSF, 2019)	Not evaluated		Demolition
Aldea San Miguel 12 (165 Johnstone Drive)	1960 (Carey & Co., 2011)	NR and CR (Carey & Co., 2011)		Demolition
Aldea San Miguel 10 (175 Johnstone Drive)	1960 (Carey & Co., 2011)	NR and CR (Carey & Co., 2011)		Demolition
20 Adolph Sutro Court	Ca. 1998-99 (UCSF, 2019)	Not evaluated		Demolition
30 Adolph Sutro Court	Ca. 1998-99 (UCSF, 2019)	Not evaluated		Demolition

NOTES:
[a] National Register of Historic Places
[b] California Register of Historical Resources

Appendix GHG
Greenhouse Gas Emissions Appendix

GHG Inventories

UCSF CPHP GHG Inventory

Year 2018 (Existing)

Mobile source from CalEEMod
(based on Adavant daily VMT of 298132 translated to annual VMT of 108818180)

	MT/Year		
CO2	**CH4**	**N2O**	**eCO2**
43,266.4325	2.3218	0.0000	43,324.4772

Electricity

From Spreadsheet: TCR 2018 Summary, State and Parn Utilities tab:

1. Parnasus Campus Demand (non-CUP)	739784.13 KWH	Total	
	57001 KWH	from PG&E	
	382981 KWH	from UCOP	
All other sources zero emission			
Total non-zero sources =	439982 KWh	=	439.982 MWh

From Spreadsheet: TCR 2018 Summary, 2018 GHG Estimates tab: Use market-based EF's as more conservative (less emissions under existing scenario)

PG&E Emissions Factor (bundled) = 0.095 MT CO2/MWhr
UCOP Emission Factor = 0.095 MT CO2/MWhr

Parnasus Campus (non-CUP) CO2 Emissions = 41.79829 MT CO2

CH4 emission factor = 0.0000150 From Spreadsheet: TCR 2018 Summary, 2018 GHG Estimates tab:
N2O Emission factor = 0.0000018 From Spreadsheet: TCR 2018 Summary, 2018 GHG Estimates tab:

CH4 GWP = 28
N2O GWP = 265

Parnasus Campus (non-CUP) eCO2 Emissions =

	MT/Year		
CO2	**CH4**	**N2O**	**eCO2**
41.80	0.01	0.00	42.19

2. CUP Power Demand = 1,869.00 MWh
CUP Emissions = 177.00 MT CO2 From Spreadsheet: TCR 2018 Summary, 2018 GHG Estimates tab (cell E61)

CUP eCO2 Emissions =

	MT/Year		
CO2	**CH4**	**N2O**	**eCO2**
177.00	0.03	0.00	205.93

Total Electricity GHG =

	MT/Year		
CO2	**CH4**	**N2O**	**eCO2**
218.80	0.03	0.00	248.12

Natural Gas from CUP
Based on UCSF Inventory for 2018

	MT/Year			
CO2	**CH4**	**N2O**	**eCO2**	
79510.16	1.35	3.29	79,514.80	From Spreadsheet: TCR 2018 Summary, 2018 GHG Estimates tab:

Natural Gas non-CUP
Demand (2018) = 125,792.29 Therms From Spreadsheet: TCR 2018 Summary, State and Parn Utilities tab (cell B11)

CO2 Emission Factor = 5.31E-03 MT/Therm From Spreadsheet: TCR 2018 Summary, 2018 GHG Estimates tab:
CH4 Emission Facor = 9.00E-08 MT/Therm
N2O Emission Factor = 9.00E-08 MT/Therm

	MT/Year		
CO2	**CH4**	**N2O**	**eCO2**
667.96	0.01	0.01	671.27

Water and Wastewater from CalEEMod
(based on default demand for 3.9 million gsf of hospital use)

	MT/Year		
CO2	**CH4**	**N2O**	**eCO2**
155.2558	15.9463	0.3765	666.1171

Solid Waste calculated in CalEEMod
(Based on Waste Generation Rate of 1,600 tpy cited in Utility Section Analysis for non-diverted waste to landfill)

	MT/Year		
CO2	**CH4**	**N2O**	**eCO2**
324.7855	19.1943	0.0000	804.6424

Total Existing GHG = 125,229.43

UCSF CPHP GHG Inventory

Year 2050 (with CPHP)

Mobile source from CalEEMod
(based on Adavant daily VMT of 579024 translated to annual VMT of 211343760)

MT/Year			
CO_2	**CH_4**	**N_2O**	**eCO_2**
54,991.4811	1.8726	0.0000	55,038.2970

Electricity
UCSF Net Zero electricity in 2050

MT/Year			
CO_2	**CH_4**	**N_2O**	**eCO_2**
0.00	-	-	0.00

Natural Gas from CUP
Based on UCSF Inventory for 2018 and net increase in gsf
Increase in gsf = 61%

MT/Year			
CO_2	**CH_4**	**N_2O**	**eCO_2**
128011.35	2.17	5.30	128018.82

Natural Gas from non-CUP
Based on UCSF Inventory for 2018 and net increase in gsf
Increase in gsf = 61%

MT/Year			
CO_2	**CH_4**	**N_2O**	**eCO_2**
1075.41	0.02	0.02	1080.75

Water and Wastewater from CalEEMod
(based on default demand for 6.0 million gsf of hospital use)

MT/Year			
CO_2	**CH_4**	**N_2O**	**eCO_2**
238.8551	24.5327	0.5793	1,024.7955

Solid Waste calculated in CalEEMod
(Based on Waste Generation Rate of 1,600 tpy cited in Utility Section Analysis for non-diverted waste to landfill)

MT/Year			
CO_2	**CH_4**	**N_2O**	**eCO_2**
452.2639	26.7280	0.0000	1,120.4646

Construction (based on Initial Phase projects and hospital CalEEMod output)

CO_2	**CH_4**	**N_2O**	**eCO_2**
350.97	**0.01**	**0**	**351.25**

Total Campus-wide with CPHP GHG = 186,634.39

Increase with CPHP = 61,404.96

GHG Emissions - Construction

Construction - First Phase and new Hospital

	From CalEEMod	Year	CO2 (MT)
Aldea		2028	430.0915
		2029	1.783
Irving Street Arrival			
		2022	165.0553
		2023	142.818
RAB			
		2022	804.807
		2023	497.193
		2024	544.4323
		2025	537.4497
Hospital		2024	1,114.17
		2025	1,046.54
		2026	2,065.56
		2027	1,020.37
		2028	1,082.93
		2029	1,076.05
	Total		10529.25
	Amortized 30 years		350.9749

Appendix GHGRS
Greenhouse Gas Reduction Strategy Update

UCSF Climate Action Plan

& Greenhouse Gas Reduction Strategy

University of California, San Francisco

July 2020

Table of Contents

List of Tables

List of Figures

1 Background and Objectives

This document is an update of the 2014 *Long Range Development Plan* (LRDP) Greenhouse Gas Reduction Strategy Reduction Strategy and the subsequent 2017 UCSF Climate Action Plan & Greenhouse Gas Reduction Strategy. The 2014 document was prepared to ensure that the LRDP is implemented in alignment with the UC Sustainable Practices Policy[1]; in particular the policies on greenhouse gases (GHGs), to fulfill the GHG reduction requirements of the State of California (AB 32)[2], and, to allow for CEQA analysis of the necessary actions to meet University policy while implementing the projects outlined in the campus 2014 LRDP as amended.

UC San Francisco (UCSF) has prepared this update to reflect changes that have occurred since 2014 and 2017 in both the goals outlined in the UC Sustainable Practices Policy and, in the addition of new campus projects unforeseen at the time of LRDP adoption. The plan also updates the underlying quantitative analyses.

Relevant changes since 2014 include:

- As of June 2015, the UC Sustainable Practices Policy required each campus to develop strategies for meeting the following UC goals: 1. Climate neutrality from scope 1 and 2 sources by 2025, 2. Climate neutrality from specific scope 3 sources by 2050 or sooner.
- The University of California began directly supplying electricity under a wholesale power program as part of the initiative to achieve carbon neutrality by 2025. Specifically making Clean Carbon free electricity (0 lbs/CO_2/MWh) available to its individual campuses in 2019.[3]
- Voluntary purchase of carbon offsets at UCSF beginning in 2018. Revisions to policy on the purchase of carbon offsets to mitigate GHG emissions starting in 2020.[4]
- Five amendments to the 2014 LRDP to accommodate campus projects unforeseen or not fully developed at the time of 2014 LRDP:
    - LRDP Amendment 1 – 2016. Accommodating the development of a 28,000 gsf child care facility accommodating 272 children at Mission Bay Block 18.[5]

---

[1] UC Office of the President (UCOP). http://policy.ucop.edu/doc/3100155/Sustainable%20Practices

[2] State of California. www.leginfo.ca.gov/pub/05-06/bill/asm/ab_0001-0050/ab_32_bill_20060927_chaptered.pdf

[3] https://www.universityofcalifornia.edu/press-room/university-california-supply-electricity-select-campuses-medical-centers

[4] https://ucop.edu/carbon-neutrality-initiative/_files/overcoming-barriers-to-carbon-neutrality.pdf

[5] https://campusplanning.ucsf.edu/sites/campusplanning.ucsf.edu/files/reports/2014%20Long%20Range%20Development%20Plan%20Amendment%20%231%20-%20Revised%20Mission%20Bay%20Functional%20Zone%20Map_0.pdf

- LRDP Amendment 2 – 2017. Detailing the programming for the 343,000 gsf research/office building on Mission Bay block 33.[6]
- LRDP Amendment 3 - 2017. Construction of a 150,000 gross square feet psychiatry building at 2130 Third Street to replace the LPPI facility located on Parnassus Heights.[7]
- LRDP Amendment 4 - 2017. Allowing for construction of a 360,000 gsf 610-unit student housing complex on 2 acres of land on Minnesota Street south of Mission Bay.[8]
- LRDP Amendment 5 – 2019. An acquisition of a 70 Unit housing building at 2130 Post adjacent to Mount Zion.[9]

- The development of the Comprehensive Parnassus Heights Plan (CPHP). A proposal that would provide for development of approximately 2.04 million gsf of net new building space with significant new clinical, research, and housing facilities at that campus site.

This *GHG Reduction Strategy*:

- Consolidates GHG reduction efforts already underway and planned by UCSF over the life of the LRDP (through 2035); and reflects the growth planned at Parnassus under the Comprehensive Parnassus Heights Plan (through 2050)
- Quantifies the impact on GHG emissions of projected land use as represented by the LRDP as amended
- Reflects and reinforces the policy direction regarding GHG reduction provided by the regular ongoing public meetings with the UCSF campus community and the annual reporting to the UC Regents
- Creates a framework for the ongoing monitoring and revision of this Greenhouse Gas Reduction Strategy; and
- Helps streamline California Environmental Quality Act (CEQA) review of future campus development projects as consistent with the LRDP growth projections and the GHG reduction policies and programs contained in the GHG Reduction Strategy.

This *GHG Reduction Strategy* has been prepared in accordance with CEQA Guidelines Section §15183.5, which specifically addresses how lead agencies can analyze and mitigate GHGs at a programmatic level and streamline environmental review of future projects that are consistent with the policies and programs

[6] https://regents.universityofcalifornia.edu/regmeet/jan17/f5.pdf
[7] https://regents.universityofcalifornia.edu/regmeet/may17/f3.pdf
[8] https://regents.universityofcalifornia.edu/regmeet/may17/f5.pdf
[9] https://campusplanning.ucsf.edu/sites/campusplanning.ucsf.edu/files/reports/Action%20Item-Post%20Street%20Faculty%20Housing-%20Approved%20budg%2Bfin%2Bdes%2BCEQA%2BLRDPAmend.pdf

contained in this *GHG Reduction Strategy*. Development of this strategy was also informed by the Governor's Office of Policy and Research (OPR) *CEQA Guidelines*[10] and its technical advisory on CEQA and Climate Change,[11] and by the Bay Area Air Quality Management District (BAAQMD*) California Environmental Quality Act Air Quality Guidelines*.

For UCSF, with land use authority over a significant urban area, adoption of campus-wide plan policies and programs for reducing GHG emissions is an effective way to reduce the cumulative impact of UCSF operations on climate change, and to streamline later project-specific CEQA reviews. The *GHG Reduction Strategy* is intended to minimize the effects of GHGs at a programmatic level across the UCSF Mount Zion and Mission Bay campus sites through the year 2035 and the Parnassus Heights campus site through 2050. It is designed to be a "qualified" strategy under the streamlining provisions of CEQA Guidelines §15183.5, to provide CEQA coverage of GHG emissions for future development projects that are consistent with LRDP growth projections and the policies and strategies that are contained in the *GHG Reduction Strategy*. As future individual projects are proposed, project-specific environmental review documents can tier from or incorporate by reference the programmatic environmental review of the LRDP and *GHG Reduction Strategy*, to determine if the project's GHG impact is cumulatively considerable. Future environmental documents that rely on the *GHG Reduction Strategy* for cumulative impact analysis of GHGs must identify the requirements specified in the *GHG Reduction Strategy* that apply to the project, and, if those requirements are not otherwise binding and enforceable, incorporate those requirements as mitigation measures applicable to the project. The procedure for determining if a future project is consistent with the LRDP and *GHG Reduction Strategy* is presented in Section 7.0: CEQA Project Review.

The essential requirements of a qualified *GHG Reduction Strategy*, under CEQA Guidelines §15183.5 and as interpreted by OPR and BAAQMD are as follows:

- Quantify greenhouse gas emissions, both existing and projected over a specified time period, resulting from activities within a defined geographic area, using accepted accounting protocols
- Establish a level, based on substantial evidence, below which the contribution to GHG emissions from activities covered by the strategy would not be cumulatively considerable
- Identify and analyze the GHG emissions resulting from specific actions or categories of actions anticipated within the geographical area
- Specify GHG reduction measures and performance standards, that, substantial evidence demonstrates, if implemented on a project-by-project basis, will collectively achieve the specified emissions target
- Establish a mechanism by which to monitor the plan's progress toward achieving its targets and one which will trigger required amendment if the plan is not achieving specified levels; and
- Be adopted in a public process following environmental review

UCSF's existing *Climate Action Plan*, dated December 2009, established a 1990 baseline, which in turn informs a 2020 campus-wide target (consistent with AB 32 and the *UC Sustainable Practices Policy*), It

[10] Governor's Office of Policy and Research (OPR), *CEQA Guidelines*, 2014. http://opr.ca.gov/s_ceqaguidelines.php
[11] OPR, *CEQA and Climate Change: Addressing Climate Change Through California Environmental Quality Act (CEQA) Review*, 2008. http://opr.ca.gov/docs/june08-ceqa.pdf

forecast emissions through 2020, and included a comprehensive set of prescriptive GHG reduction measures. The *2009 Climate Action Plan* did not undergo CEQA review and it was not adopted in a public process; in addition, it does not include a clear monitoring plan for tracking GHG emissions reductions and adjusting the plan over time to meet the 2020 target.

When the LRDP was adopted in 2014, qualified GHG reduction strategies were constructed around target year 2020, since that is the AB 32 planning horizon. In 2016, the Legislature passed SB 32, which codifies a 2030 GHG emissions reduction target of 40 percent below 1990 levels. In 2018, Governor Brown signed executive order B-55-18 establishing a statewide goal to achieve carbon neutrality as soon as possible, and no later than 2045. The UC Sustainable Practices Policy require each campus to develop strategies for meeting climate neutrality for scope 1 and 2 sources by 2025, and scope 3 by 2050. This *GHG Reduction Strategy* provides a framework for meeting the goals and maintaining qualification going forward.[12]

With respect to environmental review of the LRDP and, LRDP amendments (the "projects"), the *GHG Reduction Strategy* is intended to ensure that UCSF can answer "no" to the following questions regarding "Greenhouse Gas Emissions" in the Environmental Checklist Form (Appendix G) of the *CEQA Guidelines*:

- VII.a. Will the project generate GHG emissions, either directly or indirectly, that may have a significant impact on the environment?
- VII.b. Will the project conflict with an applicable plan, policy or regulation adopted for the purpose of reducing the emissions of GHGs?

The *GHG Reduction Strategy* will require revision over time in response to changes in GHG regulations; changes to existing or planned State, UC, or UCSF GHG reduction programs and policies; or development patterns that diverge from the assumptions made when the LRDP was adopted and/or last amended. Circumstances that may lead to revision of the *GHG Reduction Strategy* are outlined in Section 6.0: Implementation and Monitoring.

[12] http://www.arb.ca.gov/cc/scopingplan/document/updatedscopingplan2013.htm

2 Policy and Regulatory Setting

This UCSF *GHG Reduction Strategy* addresses applicable federal, state, regional, local, UC system-wide, and UCSF-specific policies and regulations in effect as of 2020. These are outlined in the following sections.

2.1 Policies and Plans of the Board of Regents of the University of California and University of California Office of the President

In 2007, the Chancellor of UCSF signed the *American College and University President's Climate Commitment* (ACUPCC)[13] to complete an emissions inventory, set target dates and interim milestones for becoming climate-neutral,[14] take steps to reduce GHG emissions, and prepare public progress reports. The University of California Office of the President (UCOP) has established the goals of reducing GHG emissions to 2000 levels by 2014; 1990 levels by 2020; and achieving climate neutrality from scope 1 and 2 sources by 2025. These goals pertain to Scope 1 and Scope 2[15] emissions of the six Kyoto greenhouse gases originating from sources specified in the ACUPCC,[16] and include a target for climate neutrality for Scope 3 emissions from business airline travel and commuting by UCSF staff and students by 2050. The *Sustainable Practices Policy* of the Board of Regents of the University of California (Regents) and the UCOP specifies that these goals will be pursued while maintaining the primary research and education mission of the University.

As outlined in UCSF's *Climate Action Plan* of 2009, the Regents approved and UC President issued the *Sustainable Practices Policy* in 2004, which committed UC to implementing actions intended to minimize the University's impact on the environment and reduce the University's dependence on non-renewable energy. A section on climate was added to the policy in 2007. The policy was most recently revised in July 1, 2019, and now includes updates to the areas of green building design, clean energy, climate protection, sustainable transportation, sustainable building operations, zero waste, sustainable procurement, sustainable foodservice, sustainable water systems and Sustainability at UC Health. The UC *Sustainable Practices Policy* will continue to be updated over time. [17]

---

[13] American College & University Presidents' Climate Commitment, 2007. www.presidentsclimatecommitment.org/about/commitment

[14] Climate neutrality is defined as the University having a net-zero impact on the Earth's climate; it will be achieved by minimizing GHG emissions as much as possible and by using other measures to mitigate the remaining GHG emissions (*UCSF Climate Action Plan*, December 2009).

[15] For a definition of Scope 1, Scope 2 and Scope 3 GHG emissions, see Section 3.0: "UCSF GHG Emissions Inventory and Forecasts".

[16] The six greenhouse gases identified in the Kyoto Protocol/ACUPCC are carbon dioxide (CO_2), methane (CH_4), nitrous oxide (N_2O), sulfur hexafluoride (SF_6), hydrofluorocarbons (HFCs), and perfluorocarbons (PFCs / C_XF_Y). These are the same six greenhouse gases identified in CEQA Section 15364.5.

[17] The current version of the Policy is available at: http://policy.ucop.edu/doc/3100155/Sustainable%20Practices

The *Sustainable Practices Policy* sets the following additional requirements and goals relevant to GHG emissions reduction:

New Buildings

- All new building projects, other than acute care facilities, shall be designed, constructed, and commissioned to outperform the CBC energy-efficiency standards by at least 20% or meet the whole-building energy performance targets. The University will strive to design, construct, and commission buildings that outperform CBC energy efficiency standards by 30% or more, or meet the stretch whole-building energy performance targets.
- Acute care/hospital facilities and medical office buildings shall be designed, constructed, and commissioned to outperform ASHRAE 90.1 - 2010 by at least 30% or meet the whole-building energy performance targets;
- No new building or major renovation that is approved after June 30, 2019 shall use onsite fossil fuel combustion (e.g., natural gas) for space and water heating (except those projects connected to an existing campus central thermal infrastructure).
- All new buildings will achieve a USGBC LEED "Silver" certification at a minimum. All new buildings will strive to achieve certification at a USGBC LEED "Gold" rating or higher, whenever possible within the constraints of program needs and standard budget parameters.
- All new building projects will achieve at least two points within the available credits in LEED-BD+C's Water Efficiency category.

Renovated Buildings

- Major Renovations of buildings are defined as projects that require 100% replacement of mechanical, electrical and plumbing systems and replacement of over 50% of all non-shell areas (interior walls, doors, floor coverings and ceiling systems) shall at a minimum comply with III.A.4 or III.A.5, above. Such projects shall outperform CBC Title 24, Part 6, currently in effect, by 20%. This does not apply to acute care facilities.
- Acute care facilities and medical office buildings undertaking major renovations as defined above will outperform ASHRAE 90.1- 2010 by 30%.
- Renovation projects with a project cost of $5 million or greater that do not constitute a Major Renovation, shall at a minimum achieve a LEED-ID+C Certified rating and register with the utilities' Savings by Design program, if eligible. This does not apply to acute care facilities.

Clean Energy

- Energy Efficiency: Each location will implement energy efficiency actions in buildings and infrastructure systems to reduce the location's energy use intensity by an average of least 2 percent annually.
- On-campus Renewable Electricity: Campuses and health locations will install additional on-site renewable electricity supplies and energy storage systems whenever cost-effective and/or supportive of the location's Climate Action Plan or other goals.
- Off-campus Clean Electricity: By 2025, each campus and health location will obtain 100% clean electricity. By 2018, the University's Wholesale Power Program will provide 100% clean electricity to participating locations.

- On-campus Combustion: By 2025, at least 40% of the natural gas combusted on-site at each campus and health location will be biogas. This goal may be realized when supply and transport of biogas is financially feasible and CARB certification available.

Climate Protection
Each campus and the UC Office of the President will develop strategies for meeting the following UC goals:
- Climate neutrality from scope 1 and 2 sources by 2025
- Climate neutrality from specific scope 3 sources (as defined by Second Nature's Carbon Commitment)
- Reduce greenhouse gas (GHG) emissions to 1990 levels by 2020, pursuant to the California Global Warming Solutions Act of 2006.

Sustainable Transportation
- Each location will reduce GHG emissions from its fleet and report annually on its progress. Locations shall implement strategies to reduce fleet emissions and improve fuel efficiency of all university-owned or operated fleet vehicles and equipment where practical options exist through acquisition and fleet operation protocols. By 2025, zero emission vehicles or hybrid vehicles shall account for at least 50%of all new light-duty vehicle acquisitions.
- The University recognizes that single-occupant vehicle (SOV) commuting is a primary contributor to commute GHG emissions and localized transportation impacts.
- By 2025, each location shall strive to reduce its percentage of employees and students commuting by SOV by 10% relative to its 2015 SOV commute rates;
- By 2050, each location shall strive to have no more 40% of its employees and no more than 30% of all employees and students commuting to the location by SOV.
- Consistent with the State of California goal of increasing alternative fuel – specifically electric – vehicle usage, the University shall promote purchases and support investment in alternative fuel infrastructure at each location.
- By 2025, each location shall strive to have at least 4.5% of commuter vehicles be ZEV.
- By 2050, each location shall strive to have at least 30% of commuter vehicles be ZEV.
- Each location will develop a business-case analysis for any proposed parking structures serving University affiliates or visitors to campus to document how a capital investment in parking aligns with each campus' Climate Action Plans and/or sustainable transportation policies.

Sustainable Building Operations for Campuses
- Each campus will submit for certification one pilot building at a LEED-O+M "Certified" level or higher.
- Each campus shall register a master site to certify campus-wide LEED-O+M credits and prerequisites to streamline the certification of multiple buildings through the LEED-O+M rating system by July 1, 2015. Each campus shall certify their campus-wide credits as soon as possible after the master site has been registered.
- Each campus shall seek to certify as many buildings as possible through the LEED-O+M rating system, within budgetary constraints and eligibility limitations.

- All locations shall implement an ongoing Green Lab Assessment Program supported by a department on campus to assess operational sustainability of research groups and the laboratories and other research spaces they use by Summer 2018.
- At least one staff or faculty member from the location must have the role of managing the Green Lab Assessment Program.
- Any green lab assessment programs and related efforts will adhere to all relevant UC, state and national policies and laws. Safety will never be compromised to accommodate sustainability goals.
- All locations shall submit a UC Green Laboratories Action Plan by Summer 2018.

Zero Waste

- The University prioritizes waste reduction in the following order: reduce, reuse, and then recycle and compost.
- The University supports the integration of waste, climate and other sustainability goals, including the reduction of embodied carbon in the supply chain through the promotion of a circular economy and the management of organic waste to promote atmospheric carbon reduction. In support of this goal, waste reporting will include tracking estimated scope 3 greenhouse gas emissions.
- The University will reduce per capita total municipal solid waste generation at all locations other than health locations as follows:
    - Reduce waste generation per capita to Fiscal Year (FY) 2015/16 levels by 2020
    - Reduce waste generation by 25% per capita from FY2015/16 levels by 2025
    - Reduce waste generation by 50% per capita from FY2015/16 levels by 2030
- The University will achieve zero waste by 2020 at all locations other than health locations. Minimum compliance for zero waste is 90% diversion of municipal solid waste from landfill.
- By 2020, the University will prohibit the sale, procurement or distribution of packaging foam, such as food containers and packaging material, other than that utilized for laboratory supply or medical packaging and products. The University seeks to reduce, reuse and find alternatives for packaging foam used for laboratory and medical packaging products. No packaging foam or expanded polystyrene shall be used in foodservice facilities for takeaway containers.

Sustainable Procurement

- The University values the health and wellbeing of its students, staff, faculty, visitors, and suppliers. The University seeks to provide healthy and accessible conditions for the communities it serves and this will be considered as a fundamental factor when making procurement decisions. Where functional alternatives to harmful products or impacts exist, they are to be strongly preferred.
- The University prioritizes waste reduction in the following order: reduce, reuse, and then recycle. Accordingly, sustainable procurement will look to reduce unnecessary purchasing first, then prioritize purchase of surplus or multiple use products, before looking at recyclable or compostable products.

The University's sustainable purchasing requirements are:

- 100% compliance with Required Level Green Spend criteria within three fiscal years of the addition of those products and/or product categories to the Guidelines.
- 25% Green Spend as a total percentage of spend per product category; target to be reached within three fiscal years after a category is added to the Guidelines.

- 25% Economically and Socially Responsible Spend as a total percentage of addressable spend; target to be reached within five fiscal years of adoption of this section in the Guidelines.

The University's sustainable purchasing reporting requirements are:
- Reporting on percent Green Spend beginning at the close of the first full Fiscal Year after a category is added to the Guidelines.
- Reporting on percent Economically and Socially Responsible Spend beginning at the close of Fiscal Year 2018/19.
- Reporting on percent Sustainable Spend will be piloted by UCOP beginning at the close of Fiscal Year 2018/19.

Each University's Procurement department will integrate sustainability into its processes and practices, including competitive solicitations, in order to satisfy the sustainable purchasing goals outlined above for products, as well as for the procurement of services. The University will do so by:
- Allocating a minimum of 15% of the points utilized in solicitation evaluations to sustainability criteria. Criteria may include, but is not limited to, sustainable product attributes, supplier diversity, supplier practices, contributions to health and wellbeing, and materials safety.
- Supporting outreach, education and providing equal access to small, diverse, and disadvantaged suppliers for all applicable University procurement opportunities.
- Comparing the Total Cost of Ownership when evaluating costs for goods and services in the selection of suppliers, whenever feasible.
- Targeting sustainable products and services for volume-discounted pricing to make less competitive or emerging sustainable products and services cost competitive with conventional products and services.
- Leveraging its purchasing power and market presence to develop sustainable product and service options where not already available.
- Requiring packaging for all products procured by the University be designed, produced, and distributed to the end user in a sustainable manner.
- Contracting with suppliers of products (e.g. electronics, furniture, lab consumables) that have established (preferably non-manufacturer specific) end-of-life reuse, recycling, and/or takeback programs at no extra cost to the University, and in compliance with applicable federal, state, and University regulations regarding waste disposal.
- Requiring sustainability related purchasing claims to be supported with UC recognized certifications and/or detailed information on proven benefits, durability, recycled content, and recyclability properties, in accordance with the Federal Trade Commission's Green Guides for the use of environmental marketing claims.
- Working with its suppliers to achieve greater transparency and sustainable outcomes throughout the supply chain. This may include maximizing the procurement of products that optimize use of resources from extraction through manufacturing and distribution.
- All procurement staff will consult the UC Sustainable Procurement Guidelines document for minimum mandatory sustainability requirements to be included in solicitations for a given product or service category.

Sustainable Foodservice Operations

- Food Procurement: Each campus and health location foodservice operation shall strive to procure 20% sustainable food products by the year 2020, while maintaining accessibility and affordability for all students and UC Health Location's foodservice patrons.
- Education: Each campus and health location shall provide patrons with access to educational materials that will help support their food choices.
- Engagement with External Stakeholders: Campus and health location departments, organizations, groups, and individuals shall engage in activities with their surrounding communities that support common goals regarding sustainable food systems.
- Sustainable Operations: Campus and health location foodservice operations shall strive to earn third party "green business" certifications for sustainable dining operations.
- Retail foodservice tenants will strive to meet the policies. above. Given the constraints faced by nationally-branded franchises that must purchase food through corporate contracts, location departments managing retail foodservice tenants will have the option of meeting the procuring 20% of all sustainable food products by the year 2020 policy by aggregating the purchases of all retail entities under the jurisdiction of a single operational unit on location.

Sustainable Water Systems

- Locations will reduce growth-adjusted potable water consumption 20% by 2020 and 36% by 2025, when compared to a three-year average baseline of FY2005/06, FY2006/07, and FY2007/08. Locations that achieve this target early are encouraged to set more stringent goals to further reduce potable water consumption. Each Campus shall strive to reduce potable water used for irrigation by converting to recycled water, implementing efficient irrigation systems, drought tolerant planting selections, and/or by removing turf.
- Each location will develop and maintain a Water Action Plan that identifies long term strategies for achieving sustainable water systems. Campuses will include quantification of total square feet of used turf and under-used turf areas on campus as well as a plan for phasing out un-used turf irrigated with potable water.
- Each campus shall identify existing single pass cooling systems and constant flow sterilizers and autoclaves in laboratories and develop a plan for replacement.
- New equipment requiring liquid cooling shall be connected to an existing recirculated building cooling water system, new local chiller vented to building exhaust or outdoors, or to the campus chilled water system through an intervening heat exchange system if available.
- Once through or single pass cooling systems shall not be allowed for softplumbed systems using flexible tubing and quick connect fittings for short term research settings.
- If no alternative to single pass cooling exists, water flow must be automated and controlled to avoid water waste.

Sustainability at UC Health

- Health locations will achieve Practice Greenhealth's award "Greenhealth Partner for Change". Locations will use the definitions in Practice Greenhealth to set medical-center-specific goals for waste diversion and reduction as well as water reduction.
- UC San Francisco Health and UCLA Health have the following targets:

  - By 2020, 50% of total solid waste diverted from landfill and incineration.
  - By 2020, 40lbs of total solid waste per Adjusted Patient Day.
- In line with campus targets, UCLA and UCSF Medical Centers will reduce growth-adjusted potable water consumption 20% by 2020 and 36% by 2025, when compared to a three-year average baseline of FY2005/06, FY2006/07, and FY2007/08.

2.2 UCSF Policy and Plans

UCSF has a robust program covering sustainability activities across the entire campus. Through its Office of Sustainability, UCSF has created work groups of campus stakeholders addressing sustainability in the following areas which have implications for GHG emissions: Carbon Climate Change, Water Conservation, Zero Waste, Green Building, Culture Shift, Sustainable Food, Toxics Reduction, Green Procurement, and Sustainable Operations. It has an active program to involve the campus community in reducing emissions.[18]

UCSF's Sustainability Governance consists of the Academic Senate Sustainability Committee and the Advisory Committee on Sustainability (UACS). The Academic Senate Sustainability Committee identifies faculty recommendations for improving sustainability at UCSF. The charge of the UACS is to:

- Annually examine UCSF’s effect on the environment from a comprehensive perspective;
- Evaluate existing UCSF policies, procedures, and programs that affect the environment;
- Serve as a coordinating body for groups or individuals concerned with sustainability issues; and
- Support reduction of greenhouse gas emissions to 1990 levels by 2020 and Carbon Neutrality by 2025

The University have been very active in UC’s Carbon Neutrality Initiative, with a particular focus on Carbon Offsets policy.[19] UCSF has had a subcommittee of faculty, staff, and fellows working in late 2019/ early 2020 to develop UCSF’s policy and internal guidance on purchasing future carbon offsets. These internal guidelines have been developed to ensure that any purchase of offsets for this purpose will result in additional, verified GHG emissions reductions from actions that align, as much as possible, with UC’s research, teaching, and public service mission. Specifically, any voluntary carbon offsets used by UCSF to mitigate GHG emissions will:

1. Be third-party verified by a major registry recognized by CARB such as CAR (Climate Action Reserve).
2. Be reported publicly and tracked through the Climate Registry (TCR) as required by UC policy. TCR is a non-profit organization governed by U.S. states and Canadian provinces and territories. UCSF’s TCR reports will be third-party verified and posted publicly.

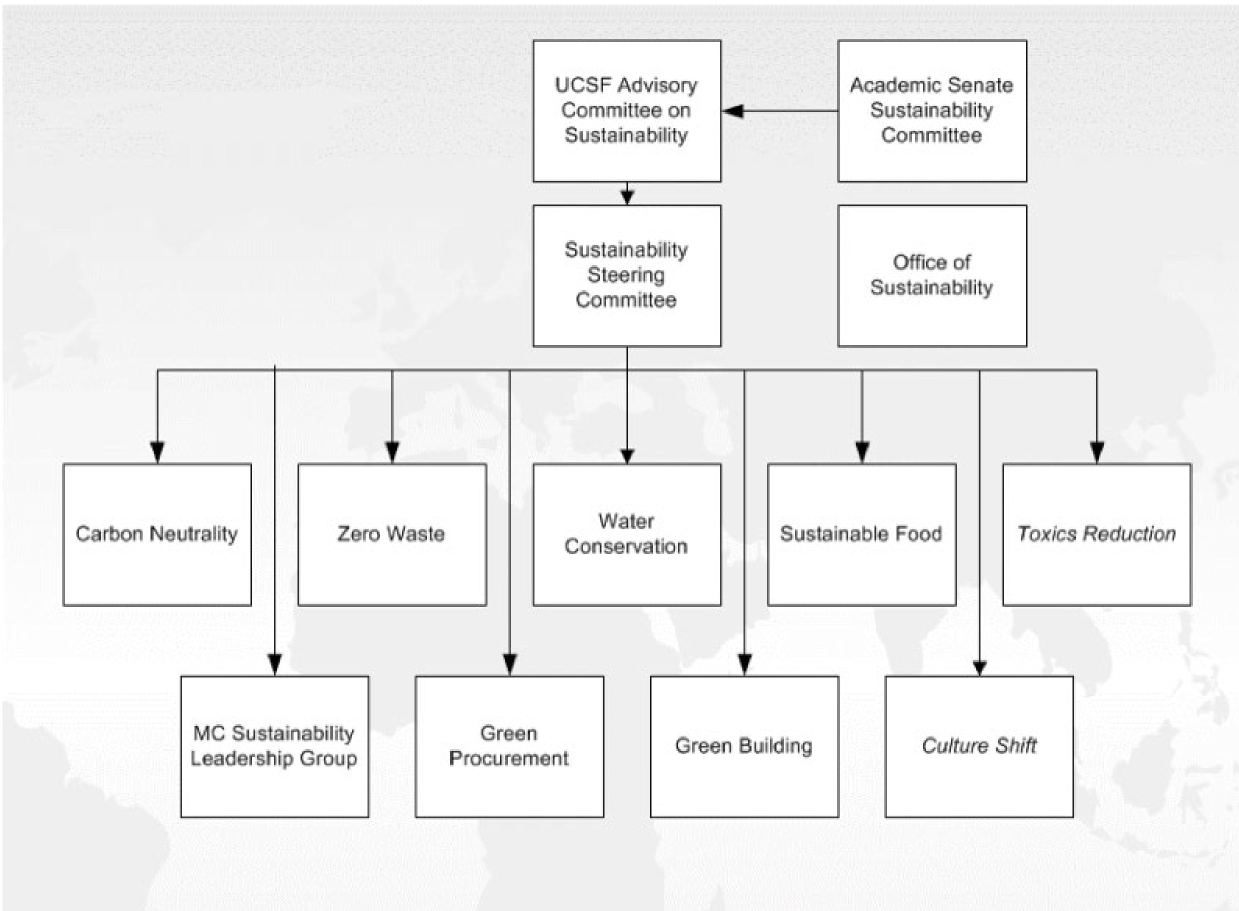
---

[18] https://sustainability.ucsf.edu/getinvolved

[19] https://www.ucop.edu/sustainability/uc-engagement/faculty-engagement/index.html

3. Follow UC's internal criteria for specific offsets types/technologies, projects, and co-benefits developed as part of the UC Carbon Neutrality Initiative in coordination with UC faculty and researchers with expertise in offset quality.

FIGURE 1: UCSF Sustainability Organizational Chart



UCSF includes a Sustainability Dashboard on its Living Green web-site that includes performance metrics for multiple issue areas including GHG emissions. UCSF also publishes an annual sustainability report on its web-site.[20]

UCSF Climate Action Plans

- As part of implementing the UC Sustainable Practices Policy, UCSF developed a Climate Action Plan in 2009, a long-term strategy for voluntarily meeting the State of California's goal for reducing GHG emissions to 1990 levels by 2020, pursuant to AB 32. In addition, as part of the 2014 LRDP, UCSF developed a GHG Reduction Strategy (GHGRS) to provide streamlined analysis under CEQA for future development projects. Both of these documents were updated in 2017, and now, to create a combined UCSF Climate Action Plan – GHGRS to reflect changes that have occurred since 2014 to

[20] https://sustainability.ucsf.edu/what_ucsf_is_doing_2

both the goals outlined in the UC Sustainable Practices Policy and, addition of new campus projects unforeseen at the time of LRDP adoption.

Specifically, this updated GHGRS includes strategies to meet UC goals to achieve climate neutrality from Scope 1 and Scope 2 emissions by 2025, and from Scope 3 emissions by 2050, incorporating the new proposed CPHP development at Parnassus Heights.

UC Strategic Energy Plan

The UC Strategic Energy Plan (SEP) was prepared in 2008 for all UC campuses, to fulfill a goal of UC's *Sustainable Practices Policy* to implement energy efficiency projects in existing buildings. The UCSF portion of the SEP analyzes energy use and GHG trends, and identifies potential energy efficiency retrofit projects for all buildings over 50,000 square feet at UCSF (primarily lighting, HVAC, commissioning and central plant measures). Energy savings, GHG emissions savings, and financial returns are estimated for hundreds of projects, which are grouped into Tier 1 (high priority) and Tier 2 (longer term planning) projects based on their energy savings and financial payback. The SEP project list is intended to be regularly updated every year by each campus to evaluate the feasibility of additional energy-saving measures. The current plan horizon runs to 2025.

Annual GHG Inventory Reporting

The UC *Sustainable Practices Policy* requires each campus to report a GHG emissions inventory to an independent reporting organization. Emissions are also reported to the UC Regents.

UCSF reported Scope 1 and Scope 2 emissions[21] for calendar-year 2008 to the California Climate Action Registry (CCAR). UCSF currently reports its annual Scope 1 and Scope 2 GHG emissions inventory to The Climate Registry (TCR). The most recent inventory reported to TCR was for calendar-year 2018. UCSF emissions inventories reported to outside agencies are verified by accredited independent auditors.

Since 2008, UCSF has also been required to report its annual Scope 1 emissions from the Parnassus Heights Central Utility Plant (PCUP) to the California Air Resources Board (CARB) under the AB 32 Reporting Rule. The PCUP is the only UCSF facility that reaches the threshold for required reporting of emissions to the CARB under AB 32 and federal regulations.

UCSF tracks and reports its progress towards meeting its GHG emissions goals in its Annual Sustainability Report.[22] USCF also reports to the UC Regents annually on its progress in meeting the goals in the UC *Sustainable Practices Policy*. (See Section 3 for more on UCSF's inventories and reporting.)

[21] For more information on UCSF's Scope 1, Scope 2, and Scope 3 GHG emissions, see Section 3.0: UCSF GHG Emissions Inventory and Forecasts.

[22] UCSF Office of Sustainability, Annual Sustainability Report, FY12-13: sustainability.ucsf.edu/what_ucsf_is_doing_2/annual_report_fy12_13

2.3 Federal Regulations

Under the Mandatory Reporting of Greenhouse Gases Rule (74 FR 56260) of the United States Environmental Protection Agency (USEPA or EPA), large emitters of GHGs are required to report their emissions annually to a public database. Under this rule, GHG emissions from the PCUP have been reported annually to the EPA since 2010.

2.4 State of California and Programs and Policies

California has promulgated a series of executive orders, laws, and regulations aimed at reducing both the level of GHGs in the atmosphere and emissions of GHGs from commercial and private activities within the State. The major components of California's climate protection initiative are reviewed below.

California Environmental Quality Act and Senate Bill 97

Under CEQA lead agencies are required to disclose the reasonably foreseeable adverse environmental effects of projects they are considering for approval. GHG emissions have the potential to adversely affect the environment because they contribute to global climate change. In turn, global climate change has the potential to raise sea levels, alter rainfall and snowfall, and affect habitat.

Senate Bill (SB) 97, signed in August 2007, acknowledges that climate change is a prominent environmental issue requiring analysis under CEQA. This bill directed the Governor's Office of Planning and Research (OPR) to prepare, develop, and transmit to the CNRA guidelines for the feasible mitigation of GHG emissions or the effects of GHG emissions, as required by CEQA, no later than July 1, 2009. The CNRA was required to certify or adopt those guidelines by January 1, 2010. On December 30, 2009, the CNRA adopted amendments to the State CEQA Guidelines, as required by SB 97. The State CEQA Guidelines amendments provide guidance to public agencies regarding the analysis and mitigation of the effects of GHG emissions in CEQA documents. The amendments became effective March 18, 2010.

State CEQA Guidelines

The State CEQA Guidelines are embodied in the California Code of Regulations (CCR), Public Resources Code, Division 13, starting with Section 21000. The current State CEQA Guidelines section 15064.4 specifically addresses the significance of GHG emissions, requiring a lead agency to make a "good-faith effort" to "describe, calculate or estimate" GHG emissions in CEQA environmental documents (CNRA, 2018b). Section 15064.4 further states that the analysis of GHG impacts should include consideration of (1) the extent to which the project may increase or reduce GHG emissions, (2) whether the project GHG emissions would exceed a threshold of significance that the lead agency determines applies to the project, and (3) the extent to which the project would comply with "regulations or requirements adopted to implement a statewide, regional, or local plan for the reduction or mitigation of greenhouse gas emissions (see, e.g., section 15183.5(b))."

The CEQA Guidelines also state that a project's incremental contribution to a cumulative effect is not cumulatively considerable if the project will comply with the requirements in a previously approved plan or mitigation program (including plans or regulations for the reduction of greenhouse gas emissions) that provides specific requirements that will avoid or substantially lessen the cumulative problem within the geographic area in which the project is located (State CEQA Guidelines section 15064(h)(3)).

The CEQA Guidelines do not require or recommend a specific analytical methodology or provide quantitative criteria for determining the significance of GHG emissions, nor do they set a numerical threshold of significance for GHG emissions. Section 15064.7(c) clarifies that "when adopting or using thresholds of significance, a lead agency may consider thresholds of significance previously adopted or recommended by other public agencies or recommended by experts, provided the decision of the lead agency to adopt such thresholds is supported by substantial evidence."

When GHG emissions are found to be significant, CEQA Guidelines section 15126.4(c) includes the following direction on measures to mitigate GHG emissions:

> 'Consistent with Section 15126.4(a), lead agencies shall consider feasible means, supported by substantial evidence and subject to monitoring or reporting, of mitigating the significant effects of greenhouse gas emissions. Measures to mitigate the significant effects of greenhouse gas emissions may include, among others:
>
> (1) Measures in an existing plan or mitigation program for the reduction of emissions that are required as part of the lead agency's decision;
>
> (2) Reductions in emissions resulting from a project through implementation of project features, project design, or other measures;
>
> (3) Off-site measures, including offsets that are not otherwise required, to mitigate a project's emissions;
>
> (4) Measures that sequester greenhouse gases; and
>
> (5) In the case of the adoption of a plan, such as a general plan, long range development plan, or plans for the reduction of greenhouse gas emissions, mitigation may include the identification of specific measures that may be implemented on a project-by project basis. Mitigation may also include the incorporation of specific measures or policies found in an adopted ordinance or regulation that reduces the cumulative effect of emissions."

State of California Executive Orders

Executive Order S-3-05.

In 2005, in recognition of California's vulnerability to the effects of climate change, then-Governor Arnold Schwarzenegger issued EO S-3-05, which set forth a series of target dates by which statewide emissions of GHGs would be progressively reduced, as follows:

- By 2010, reduce GHG emissions to 2000 levels;
- By 2020, reduce GHG emissions to 1990 levels; and
- By 2050, reduce GHG emissions to 80 percent below 1990 levels.

Executive Order S-1-07.

EO S-1-07, which was signed by then-Governor Schwarzenegger in 2007, proclaims that the transportation sector is the main source of GHG emissions in California, generating more than 40 percent of statewide emissions. It established a low carbon fuel standard (LCFS) with a goal to reduce the carbon intensity of transportation fuels sold in California by at least 10 percent by 2020.

In September 2018, CARB extended the LCFS program to 2030, making significant changes to the design and implementation of the program, including a doubling of the carbon intensity reduction to 20 percent by 2030.

Executive Orders S-14-08 and S-21-09.

In November 2008, then-Governor Schwarzenegger signed EO S-14-08, which expands the State's Renewable Portfolio Standard (RPS) to 33 percent renewable power by 2020. In September 2009, then-Governor Schwarzenegger continued California's commitment to the RPS by signing EO S-21-09, which directs CARB under its AB 32 authority to enact regulations to help the State meet its RPS goal of 33 percent renewable energy by 2020.

Executive Order S-13-08.

Governor Schwarzenegger signed EO S-13-08 on November 14, 2008. The order called on State agencies to develop California's first strategy to identify and prepare for expected climate impacts. As a result, the *2009 California Climate Adaptation Strategy (CAS)* report was developed to summarize the best known science on climate change impacts in the State to assess vulnerability and outline possible solutions that can be implemented within and across State agencies to promote resiliency. The State has also developed an Adaptation Planning Guide (CNRA, 2012) to provide a decision-making framework intended for use by local and regional stakeholders to aid in the interpretation of climate science and to develop a systematic rationale for reducing risks caused or exacerbated by climate change. The State's third major assessment on climate change explores local and statewide vulnerabilities to climate change, highlighting opportunities for taking concrete actions to reduce climate-change impacts.

Executive Order B-16-12.

In March 2012, Governor Jerry Brown issued an executive order establishing a goal of 1.5 million zero emission vehicles (ZEVs) on California roads by 2025. In addition to the ZEV goal, EO B-16-12 stipulated that by 2015 all major cities in California will have adequate infrastructure and be 'zero-emission vehicle ready'; that by 2020 the State will have established adequate infrastructure to support 1 million ZEVs; that by 2050, virtually all personal transportation in the State will be based on ZEVs, and that GHG emissions from the transportation sector will be reduced by 80 percent below 1990 levels.

Executive Order B-30-15. Governor Brown signed EO B-30-15 on April 29, 2015, which directed the following:

- Established a new interim statewide reduction target to reduce GHG emissions to 40 percent below 1990 levels by 2030.
- Ordered all State agencies with jurisdiction over sources of GHG emissions to implement measures to achieve reductions of GHG emissions to meet the 2030 and 2050 reduction targets.
- Directed CARB to update the Climate Change Scoping Plan to express the 2030 target in terms of million metric tons of carbon dioxide equivalent.

Executive Order B-48-18.

On January 26, 2018, Governor Brown issued an executive order establishing a goal of 5 million ZEVs on California roads by 2030.

Executive Order B-55-18.

On September 10, 2018, Governor Brown signed EO B-55-18, committing California to total, economy-wide carbon neutrality by 2045. EO B-55-18 directs CARB to work with relevant State agencies to develop a framework to implement and accounting that tracks progress toward this goal.

State of California Policy and Legislation

Assembly Bill 1493.

In 2002, then-Governor Gray Davis signed Assembly Bill (AB) 1493. AB 1493 requires that CARB develop and adopt, by January 1, 2005, regulations that achieve "the maximum feasible reduction of greenhouse gases emitted by passenger vehicles and light-duty trucks and other vehicles determined by CARB to be vehicles whose primary use is noncommercial personal transportation in the State."

To meet the requirements of AB 1493, in 2004 CARB approved amendments to the California Code of Regulations (CCR) adding GHG emissions standards to California's existing standards for motor vehicle emissions. All mobile sources are required to comply with these regulations as they are phased in from 2009 through 2016.

Because the Pavley standards (named for the bill's author, State Senator Fran Pavley) would impose stricter standards than those under the CAA, California applied to the USEPA for a waiver under the CAA. In 2008, the USEPA denied the application. In 2009, however, the USEPA granted the waiver. The waiver has been extended consistently since 2009; however, in 2018 the USEPA and NHTSA indicated their intent to revoke California's waiver, and prohibit future State emissions standards enacted under the CAA. As of April 2019, the waiver was still in place and the status of the federal government's revocation of the waiver was uncertain.

Senate Bills 1078 and 107.

SB 1078 (Chapter 516, Statutes of 2002) requires retail sellers of electricity, including investor-owned utilities and community choice aggregators, to provide at least 20 percent of their supply from renewable sources by 2017. SB 107 (Chapter 464, Statutes of 2006) changed the target date to 2010.

California Health and Safety Code, Division 25.5 – California Global Warming Solutions Act of 2006 – California Global Warming Solutions Act (Assembly Bill 32 and Senate Bill 32).

In September 2006, then-Governor Arnold Schwarzenegger signed the California Global Warming Solutions Act (AB 32). AB 32 establishes regulatory, reporting, and market mechanisms to achieve quantifiable reductions in GHG emissions and establishes a cap on statewide GHG emissions. AB 32 requires that statewide GHG emissions be reduced to 1990 levels by 2020. This reduction will be accomplished by enforcing a statewide cap on GHG emissions that will be phased in starting in 2012. To effectively implement the cap, AB 32 directs CARB to develop and implement regulations to reduce statewide GHG emissions from stationary sources. AB 32 specifies that regulations adopted in response to AB 1493 should be used to address GHG emissions from vehicles. However, AB 32 also includes language stating that if the AB 1493 regulations cannot be implemented, then CARB should develop new regulations to control vehicle GHG emissions under the authorization of AB 32.

In 2016, Senate Bill (SB) 32 and its companion bill AB 197 amended HSC Division 25.5 and established a new climate pollution reduction target of 40 percent below 1990 levels by 2030 and included provisions to ensure the benefits of State climate policies reach into disadvantaged communities.

Climate Change Scoping Plan.

A specific requirement of AB 32 was to prepare a Climate Change Scoping Plan for achieving the maximum technologically feasible and cost-effective GHG emission reduction by 2020. CARB developed and approved the initial Scoping Plan in 2008, outlining the regulations, market-based approaches, voluntary measures, policies, and other emission reduction programs that would be needed to meet the 2020 statewide GHG emission limit and initiate the transformations needed to achieve the State's long-range climate objectives (CARB, 2008).

The First Update to the Scoping Plan was approved by CARB in May 2014 and built upon the initial Scoping Plan with new strategies and recommendations. CARB approved the 2017 Climate Change Scoping Plan Update (2017 Scoping Plan Update) in December 2017. The 2017 Scoping Plan Update outlines the proposed framework of action for achieving the 2030 GHG target of 40 percent reduction in GHG emissions relative to 1990 levels (CARB, 2017). The 2017 Scoping Plan Update identifies key sectors of the State's implementation strategy, which includes improvements in low carbon energy, industry, transportation sustainability, natural and working lands, waste management, and water. Through a combination of data synthesis and modeling, CARB determined that the target statewide 2030 emissions limit is 260 $MMTCO_2e$, and that further commitments will need to be made to achieve an additional reduction of 50 $MMTCO_2e$ beyond current policies and programs. The cornerstone of the 2017 Scoping Plan Update is an expansion of the Cap-and-Trade program to meet the aggressive 2030 GHG emissions goal and ensure achievement of the 2030 limit set forth by EO B-30-15.

The 2017 Scoping Plan Update's strategy for meeting the State's 2030 GHG target incorporates the full range of legislative actions and State-developed plans that have relevance to the year 2030, including the following, described elsewhere in this section:

- Extending the low carbon fuel standard beyond 2020 and increasing the carbon intensity reduction requirement to at least 18 percent by 2030;
- SB 350, which increase renewables portfolio standard (RPS) to 50 percent and requires a doubling of energy efficiency for existing buildings by 2030;
- The 2016 Mobile Source Strategy to reduce emissions from mobile sources, including an 80 percent reduction in smog-forming emissions and a 45 percent reduction in diesel particulate matter from 2016 level in the South Coast Air Basin, a 45 percent reduction in GHG emissions, and a 50 percent reduction in the consumption of petroleum-based fuels;

- The Sustainable Freight Action Plan to improve freight efficiency and transition to zero emission freight handling technologies (described in more detail below);
- SB 1383, which requires a 50 percent reduction in anthropogenic black carbon and a 40 percent reduction in hydrofluorocarbon and methane emissions below 2013 levels by 2030; and
- Assembly Bill 398, which extends the State Cap-and-Trade Program through 2030.

In the 2017 Scoping Plan Update, CARB recommends statewide targets of no more than six metric tons CO_2e per capita by 2030 and no more than two metric tons CO_2e per capita by 2050. CARB acknowledges that because the statewide per capita targets are based on the statewide GHG emissions inventory that includes all emissions sectors in the State, it is appropriate for local jurisdictions to derive evidence-based local per-capita goals based on local emissions sectors and growth projections.

To demonstrate how a local jurisdiction can achieve their long-term GHG goals at the community plan level, CARB recommends developing a geographically-specific GHG reduction plan (i.e., climate action plan) consistent with the requirements of CEQA section 15183.5(b). A so-called "CEQA-qualified" GHG reduction plan, once adopted, can provide local governments with a streamlining tool for project-level environmental review of GHG emissions, provided there are adequate performance metrics for determining project consistency with the plan. Absent conformity with such a plan, CARB recommends "that projects incorporate design features and GHG reduction measures, to the degree feasible, to minimize GHG emissions. Achieving no net additional increase in GHG emissions, resulting in no contribution to GHG impacts, is an appropriate overall objective for new development" (CARB, 2017).[23] While acknowledging that recent land use development projects in California have demonstrated the feasibility to achieve zero net additional GHG emissions (e.g., Newhall Ranch Resource Management and Development Plan), the 2017 Scoping Plan Update states that "Achieving net zero increases in GHG emissions, resulting in no contribution to GHG impacts, may not be feasible or appropriate for every project, however, and the inability of a project to mitigate its GHG emissions to net zero does not imply the project results in a substantial contribution to the cumulatively significant environmental impact of climate change under CEQA. Lead agencies have the discretion to develop evidence-based numeric thresholds (mass emissions, per capita, or per service population) consistent with this Scoping Plan, the State's long-term GHG goals, and climate change science…To the degree a project relies on GHG mitigation measures, CARB recommends that lead agencies prioritize on-site design features that reduce emissions, especially from VMT, and direct investments in GHG reductions within the project's region that contribute potential air quality, health, and economic co-benefits locally" (CARB, 2017).[24]

Cap-and-Trade Program.

Initially authorized by the California Global Warming Solutions Act of 2006 (AB 32), and extended through the year 2030 with the passage of Assembly Bill 398 (2017), the California Cap-and-Trade Program is a core strategy that the State is using to meet its GHG reduction targets for 2020 and 2030, and ultimately achieve an 80 percent reduction from 1990 levels by 2050. CARB designed and adopted the California Cap-

[23] At pages 100 - 101.

[24] At page 102.

and-Trade Program to reduce GHG emissions from "covered entities"[25] (e.g., electricity generation, petroleum refining, cement production, and large industrial facilities that emit more than 25,000 metric tons CO_2e per year), setting a firm cap on statewide GHG emissions and employing market mechanisms to achieve reductions.[26] Under the Cap-and-Trade Program, an overall limit is established for GHG emissions from capped sectors. The statewide cap for GHG emissions from the capped sectors commenced in 2013. The cap declines over time. Facilities subject to the cap can trade permits to emit GHGs.[27]

Up to eight percent of a covered entity's compliance obligation can be met using carbon offset credits, which are created through the development of projects, such as renewable energy generation or carbon sequestration projects, that achieve a reduction of emissions or an increase in the removal of carbon from the atmosphere from activities not otherwise regulated, covered under the cap, or resulting from government incentives. Offsets are verified reductions of emissions whose ownership can be transferred to others. As required by AB 32, any reduction of GHG emissions used for compliance purposes must be real, permanent, quantifiable, verifiable, enforceable, and additional. California Carbon Offsets (CCOs) used to meet regulatory requirements must be quantified according to CARB-adopted methodologies, and CARB must adopt a regulation to verify and enforce the reductions. The criteria developed will ensure that the reductions are quantified accurately and are not double-counted within the system (CARB, 2008).[28]

If California's direct regulatory measures reduce GHG emissions more than expected, then the Cap-and-Trade Program will be responsible for relatively fewer emissions reductions. If California's direct regulatory measures reduce GHG emissions less than expected, then the Cap-and-Trade Program will require relatively more emissions reductions. In other words, the Cap-and-Trade Program can be adaptively managed by the State to ensure achievement of California's 2020 and 2030 GHG emissions reduction mandates, depending on whether other regulatory measures are more or less effective than anticipated.

Senate Bill 375.

Signed into law on October 1, 2008, SB 375 supplements GHG reductions from new vehicle technology and fuel standards with reductions from more efficient land use patterns and improved transportation. Under the law, CARB approved GHG reduction targets in February 2011 for California's 18 federally designated regional planning bodies, known as Metropolitan Planning Organizations (MPOs). CARB may update the targets every four years and must update them every eight years. MPOs in turn must demonstrate how their plans, policies and transportation investments meet the targets set by CARB

[25] "Covered Entity" means an entity within California that has one or more of the processes or operations and has a compliance obligation as specified in subarticle 7 of the Cap-and-Trade Regulation; and that has emitted, produced, imported, manufactured, or delivered in 2008 or any subsequent year more than the applicable threshold level specified in section 95812 (a) of the Regulation.

[26] 17 CCR §§ 95800 to 96023.

[27] See generally 17 CCR §§ 95811, 95812.

[28] Climate Reserve Tonnes (CRTs). When CRTs are transferred to a retirement account in the Reserve System, they are considered retired. Retirement accounts are permanent and locked to prevent a retired CRT from being transferred again.

through Sustainable Communities Strategy. The original target reductions for the Bay Area are a regional reduction of per-capita CO_2 emissions from cars and light-duty trucks by 7 percent by 2020 and by 15 percent by 2035, compared to a 2005 baseline. The year 2035 reduction target has since been revised in 2018 to reduce per capita vehicular GHG emissions 19 percent by 2035 from a 2005 baseline. ABAG addresses these goals in *Plan Bay Area*, which identifies Priority Development areas near transit options to reduce use of on-road vehicles.

Senate Bill X 1-2.

Senate Bill X 1-2, signed by Governor Brown in April 2011, enacted the California Renewable Energy Resources Act. The law obligates all California electricity providers, including investor-owned and publicly-owned utilities, to obtain at least 33 percent of their energy from renewable resources by the year 2020.

Advanced Clean Cars Program.

In January 2012, pursuant to Recommended Measures T-1 and T-4 of the Scoping Plan, CARB approved the Advanced Clean Cars Program, a new emissions-control program for model year 2017 through 2025.The program combines the control of smog, soot, and GHGs with requirements for greater numbers of zero-emission vehicles. By 2025, when the rules will be fully implemented, the new automobiles will emit 34 percent fewer global warming gases and 75 percent fewer smog-forming emissions.

The program also requires car manufacturers to offer for sale an increasing number of zero-emission vehicles (ZEVs) each year, including battery electric, fuel cell, and plug-in hybrid electric vehicles. In December 2012, CARB adopted regulations allowing car manufacturers to comply with California's GHG emissions requirements for model years 2017-2025 through compliance with the USEPA GHG requirements for those same model years.

Senate Bill 743.

In 2013, Governor Brown signed Senate Bill (SB) 743, which added Public Resources Code section 21099 to CEQA, to change the way that transportation impacts are analyzed under CEQA to better align local environmental review with statewide objectives to reduce GHG emissions, encourage infill mixed-use development in designated priority development areas, reduce regional sprawl development, and reduce VMT in California.[29]

As required under SB 743, OPR developed potential metrics to measure transportation impacts that may include, but are not limited to, vehicle miles traveled (VMT), VMT per capita, automobile trip generation rates, or automobile trips generated. The new VMT metric is intended replace the use of automobile delay and level of service (LOS) as the metric to analyze transportation impacts under CEQA. In its 2018 Technical Advisory on Evaluating Transportation Impacts in CEQA, OPR recommends different thresholds of significance for projects depending on land use types. For example, residential and office

[29] Steinberg. 2013. Available online at http://leginfo.legislature.ca.gov/faces/billNavClient.xhtml?bill_id=201320140SB743, accessed on March 10, 2017.

space projects must demonstrate a VMT level that is 15 percent less than that of existing development to determine whether the mobile-source GHG emissions associated with the project are consistent with statewide GHG reduction targets. With respect to retail land uses, any net increase of VMT may be sufficient to indicate a significant transportation impact (OPR, 2018b). In 2016, the City of San Francisco adopted local VMT metrics to implement the directive from SB 743.

Mobile Source Strategy (2016).

Implementing CARB's Mobile Source Strategy includes measures to reduce total light-duty VMT by 15 percent from the business-as-usual in 2050. The Mobile Source Strategy includes an expansion of the Advanced Clean Cars Program (which further increases the stringency of GHG emissions for all light-duty vehicles, and 4.2 million zero-emission and plug-in hybrid light-duty vehicles by 2030). It also calls for more stringent GHG requirements for light-duty vehicles beyond 2025 as well as GHG reductions from medium-duty and heavy-duty vehicles and increased deployment of zero-emission trucks primarily for class 3 – 7 "last mile" delivery trucks in California. Statewide, the Mobile Source Strategy would result in a 45 percent reduction in GHG emissions, and a 50 percent reduction in the consumption of petroleum-based fuels by 2030/2031.

California Sustainable Freight Action Plan (2016).

California Sustainable Freight Action Plan includes strategies to improve freight efficiency and transition to zero emission freight handling technologies. It includes goals to achieve 25 percent improvement of freight system efficiency by 2030, and to deploy over 100,000 freight vehicles and equipment capable of zero emission operation by 2030, and maximize near-zero emission freight vehicles and equipment powered by renewable energy by 2030 (Caltrans, 2016).

Senate Bill 350.

The Clean Energy and Pollution Reduction Act of 2015. SB 350 (Chapter 547, Statutes of 2015) was approved by Governor Brown on October 7, 2015. SB 350 increased the standards of the California Renewable Portfolio Standards (RPS) program by requiring that the amount of electricity generated and sold to retail customers per year from eligible renewable energy resources be increased from 33 percent to 50 percent by December 31, 2030. The Act requires the State Energy Resources Conservation and Development Commission to establish annual targets for statewide energy efficiency savings and demand reduction that will achieve a cumulative doubling of statewide energy efficiency savings in existing electricity and natural gas final end uses of retail customers by January 1, 2030.

Senate Bill 100.

On September 10, 2018, Governor Brown signed SB 100, establishing that 100 percent of all electricity in California must be obtained from renewable and zero-carbon energy resources by December 31, 2045. SB 100 also creates new standards for the RPS goals that were established by SB 350 in 2015. Specifically, the bill increases required energy from renewable sources for both investor-owned utilities and publicly-owned utilities from 50 percent to 60 percent by 2030. Incrementally, these energy providers must also have a renewable energy supply of 33 percent by 2020, 44 percent by 2024, and 52 percent by 2027. The updated RPS goals are considered achievable, since many California energy providers are already meeting or exceeding the RPS goals established by SB 350.

SB 1383 (Short-lived Climate Pollutants).

Senate Bill 1383, passed in 2016, requires statewide reductions in short-lived climate pollutants (SLCPs) across various industry sectors. The SLCPs covered under AB 1383 include methane, fluorinated gases, and black carbon – all GHGs with a much higher warming impact than carbon dioxide and with the potential to have detrimental effects on human health. SB 1383 requires CARB to adopt a strategy to reduce methane by 40 percent, hydrofluorocarbon gases by 40 percent, and anthropogenic black carbon by 50 percent below 2013 levels by 2030. The methane emission reduction goals include a 75 percent reduction in the level of statewide disposal of organic waste from 2014 levels by 2025.

California Assembly Bill 341. AB 341, which became law in 2011, establishes a new statewide goal of 75 percent recycling through source reduction, recycling, and composting by 2020, and changed the way that the State measures progress toward the 75 percent recycling goal, focusing on source reduction, recycling and composting. AB 341 also requires all businesses and public entities that generate 4 cubic yards or more of waste per week to have a recycling program in place. The purpose of the law is to reduce GHG emissions by diverting commercial solid waste to recycling efforts and expand the opportunity for additional recycling services and recycling manufacturing facilities in California (CalRecycle, 2019).

California Assembly Bill 1826. AB 1826, known as the Commercial Organic Waste Recycling Law, became effective on January 1, 2016, and requires businesses and multi-family complexes (with 5 units or more) that generate specified amounts of organic waste (compost) to arrange for organics collection services. The law phases in the requirements on businesses with full implementation realized in 2019:

- *First Tier*: Commencing in April 2016, the first tier of affected businesses included those that generate eight or more cubic yards of organic materials per week.
- *Second Tier*: In January 2017, the affected businesses expanded to include those that generate four or more cubic yards of organic materials per week.
- *Third Tier*: In January 2019, the affected businesses are further expanded to include those that generate four or more cubic yards of commercial solid waste per week.

State of California Building Codes

California Building and Energy Efficiency Standards (Title 24).

The CEC first adopted Energy Efficiency Standards for Residential and Nonresidential Buildings (CCR, Title 24, Part 6) in 1978 in response to a legislative mandate to reduce energy consumption in the State. Although not originally intended to reduce GHG emissions, increased energy efficiency and reduced consumption of electricity, natural gas, and other fuels would result in fewer GHG emissions from residential and nonresidential buildings subject to the standard. The standards are updated periodically (typically every three years) to allow for the consideration and inclusion of new energy efficiency technologies and methods (CEC, 2016).

The current Title 24, Part 6 standards (2016 standards) were made effective on January 1, 2017. The next update to the Title 24 energy efficiency standards (2019 standards) goes into effect on January 1, 2020.

California Green Buildings Standards Code (CALGreen).

Part 11 of the Title 24 Building Energy Efficiency Standards is referred to as the California Green Building Standards (CALGreen) Code. CALGreen is intended to encourage more sustainable and environmentally friendly building practices, require low-pollution emitting substances that cause less harm to the environment, conserve natural resources, and promote the use of energy-efficient materials and equipment. Since 2011, the CALGreen Code is mandatory for all new residential and non-residential buildings constructed in the State. Such mandatory measures include energy efficiency, water conservation, material conservation, planning and design and overall environmental quality. The CALGreen Code was most recently updated in 2016 to include new mandatory measures for residential and nonresidential uses; the new measures took effect on January 1, 2017 (California Building Standards Commission, 2016).

2.5 Regional Plans and Policies

Bay Area Air Quality Management District

The Bay Area Air Quality Management District (BAAQMD) is the regional government agency that regulates stationary sources of air pollution within the nine San Francisco Bay Area counties. BAAQMD regulates GHG emissions through the following plans, programs, and guidelines.

Clean Air Plan.

BAAQMD and other air districts prepare clean air plans in accordance with the state and federal Clean Air Acts. On April 19, 2017, the BAAQMD Board of Directors adopted the 2017 Clean Air Plan Spare the Air, Cool the Climate, an update to the 2010 Clean Air Plan. The Clean Air Plan is a comprehensive plan that focuses on the closely-related goals of protecting public health and protecting the climate. Consistent with the State's GHG reduction targets, the plan lays the groundwork for a long-term effort to reduce Bay area GHG emissions 40 percent below 1990 levels by 2030 and 80 percent below 1990 levels by 2050.

As part of the Basin-Wide Methane Strategy outlined in the 2017 Clean Air Plan, the BAAQMD is currently developing a new regulation to address significant releases of methane in the Bay Area, called *Regulation 13, Rule 1: Significant Methane Releases*, which would serve as a general backstop rule to address releases of methane from regulated sources.

BAAQMD Climate Protection Program.

The BAAQMD established a climate protection program to reduce pollutants that contribute to global climate change and affect air quality in the San Francisco Bay Area Air Basin. The climate protection program includes measures that promote energy efficiency, reduce vehicle miles traveled, and develop alternative sources of energy, all of which assist in reducing emissions of GHG and in reducing air pollutants that affect the health of residents. The BAAQMD also seeks to support current climate protection programs in the region and to stimulate additional efforts through public education and outreach, technical assistance to local governments and other interested parties, and promotion of collaborative efforts among stakeholders.

BAAQMD CEQA Air Quality Guidelines.

The BAAQMD CEQA Air Quality Guidelines were prepared to assist in the evaluation of air quality impacts of projects and plans proposed within the Bay Area. The guidelines provide recommended procedures for evaluating potential air impacts during the environmental review process, consistent with CEQA requirements, and include recommended thresholds of significance, mitigation measures, and background air quality information. The guidelines also include recommended assessment methodologies for air toxics, odors, and greenhouse gas emissions. In June 2010, the BAAQMD's Board of Directors adopted CEQA thresholds of significance and an update of the CEQA Guidelines, which included significance thresholds for GHG emissions based on the emission reduction goals for 2020 articulated by the State Legislature in AB 32. The first threshold, 1,100 MT CO_2e per year, is a numeric emissions level below which a project's contribution to global climate change would be less than cumulatively considerable. For larger and mixed-use projects, the Guidelines state that emissions would be less than cumulatively significant if the project as a whole would result in an efficiency of 4.6 MT CO_2e per service population or better (BAAQMD, 2010).

On March 5, 2012, the Alameda County Superior Court issued a judgment finding that the BAAQMD had failed to comply with CEQA when it adopted the thresholds of significance in the BAAQMD CEQA Air Quality Guidelines. That decision was appealed to the Court of Appeal and one of the issues in the case has been decided by the California Supreme Court. The Supreme Court found that CEQA does not require an analysis of how existing environmental conditions will impact future residents or users of a proposed project, and remanded the case down for the lower court to decide remaining issues. Following the Superior Court order, the BAAQMD released revised *CEQA Air Quality Guidelines* in May of 2012 that include guidance on calculating air pollutant emissions, obtaining information regarding the health impacts of air pollutants, and identifying potential mitigation measures, and which set aside the significance thresholds. There was no challenge to BAAQMD's 2010 greenhouse gas emissions thresholds or the substantial evidence supporting those thresholds (BAAQMD, 2012). In May 2017, the Air District published a new version of the Guidelines, which included no changes to the quantitative greenhouse gas thresholds, but presented them as guidance and recommended that lead agencies consider the information to develop their own thresholds of significance.

Under BAAQMD's current *CEQA Air Quality Guidelines*, a local government may prepare and adopt a qualified GHG Reduction Strategy that is consistent with AB 32 goals. If a project is consistent with an adopted qualified GHG Reduction Strategy and General Plan that addresses the project's GHG emissions, it can be presumed that the project will not have significant GHG emissions under CEQA (BAAQMD, 2017a).

Metropolitan Transportation Commission/Association of Bay Area Governments Sustainable Communities Strategy

MTC is the federally recognized MPO for the nine county Bay Area. On July 18, 2013, the Plan Bay Area was jointly approved by ABAG's Executive Board and by MTC. The Plan includes the region's Sustainable Communities Strategy, as required under SB 375, and the 2040 Regional Transportation Plan. The Sustainable Communities Strategy lays out how the region will meet GHG reduction targets set by CARB. CARB's current targets call for the region to reduce per capita vehicular GHG emissions 10 percent by 2020 and 19 percent by 2035 from a 2005 baseline.[30] A central greenhouse gas reduction strategy of Plan Bay Area is the concentration of future growth within Priority Development Areas (PDAs) and Transit Priority Areas (TPAs). To be eligible for PDA designation, an area must be within an existing community, near existing or planned fixed transit or served by comparable bus service, and planned for more housing. To be eligible for PDA designation, an area must be within an existing community, near existing or planned fixed transit or served by comparable bus service, and planned for more housing. A TPA is an area within one-half mile of an existing or planned major transit stop such as a rail transit station, a ferry terminal served by transit, or the intersection of two or more major bus routes (MTC, 2013).

On July 26, 2017, MTC adopted Plan Bay Area 2040, a focused update that builds upon the growth pattern and strategies developed in the original Plan Bay Area but with updated planning assumptions that incorporate key economic, demographic and financial trends since the original plan was adopted (MTC, 2017).

2.6 City and County of San Francisco Plans and Policies

Pursuant to Article 9, Section 9 of the California State Constitution, UCSF is constitutionally exempt from local land use regulations whenever using property under its control in furtherance of its educational purposes. This authority includes University master planning and oversight of land uses and the development, maintenance and use of physical facilities under UCSF control. Thus, the following City plans and policies do not apply to UCSF and are presented for informational purposes only. The following is a general discussion of CCSF policy with respect to GHG emissions.

San Francisco Greenhouse Gas Reduction Ordinance

In May 2008, the CCSF adopted Ordinance No. 81-08 amending the San Francisco Environment Code to establish GHG emissions targets and departmental action plans and to authorize the San Francisco Department of the Environment to coordinate efforts to meet these targets. The City ordinance establishes the following GHG emissions reduction limits and target dates by which to achieve them: determine 1990 Citywide GHG emissions by 2008, the baseline level, with reference to which target reductions are set; reduce GHG emissions by 25 percent below 1990 levels by 2017; reduce GHG emissions by 40 percent below 1990 levels by 2025; and reduce GHG emissions by 80 percent below 1990 levels by 2050. The City's GHG reduction targets are consistent with—in fact, more ambitious than—those set forth in

[30] CARB, 2018. SB 375 Regional Greenhouse Gas Emissions Reduction Targets. Available: https://www.arb.ca.gov/cc/sb375/finaltargets2018.pdf. Accessed: March 11, 2019.

Governor Brown's recent Executive Order B-30-15 by targeting a 40 percent reduction by 2025 rather than a 40 percent reduction by 2030.

San Francisco Greenhouse Gas Reduction Strategy

San Francisco has developed a number of plans and programs to reduce the City's contribution to global climate change and to meet the goals of the City's Greenhouse Gas Reduction Ordinance. San Francisco's Greenhouse Gas Reduction Strategy documents its actions to pursue cleaner energy, energy conservation, and alternative transportation and solid waste policies. For instance, the City has implemented mandatory requirements and incentives that have measurably reduced GHG emissions including, but not limited to, increasing the energy efficiency of new and existing buildings, installation of solar panels on building roofs, implementation of a green building strategy, adoption of a zero waste strategy, a construction and demolition debris recovery ordinance, a solar energy generation subsidy, incorporation of alternative fuel vehicles in the City's transportation fleet (including buses), and a mandatory recycling and composting ordinance. The strategy also identifies 42 specific regulations for new development that would reduce a project's GHG emissions.

San Francisco's policies and programs have resulted in a reduction in GHG emissions to below 1990 levels, exceeding statewide AB 32 GHG reduction goals. San Francisco's GHG emissions in 2010 were 5.3 million metric tons CO_2e, which represents a 14.5 percent reduction in GHG emissions compared to 1990 levels (6.2 million metric tons CO_2e). The reduction is largely a result of reduced GHG emissions from the electricity sector, from 2.0 million metric tons CO_2e (1990) to 1.3 million metric tons CO_2e (2010), and the waste sector, from 0.5 million metric tons CO_2e (1990) to 0.2 million metric tons CO_2e (2010) (SF DOE, 2013).

UCSF sustainability staff actively engage with the SF Department of Environment to ensure that the university coordinates it activities on City initiatives that reduce GHG emissions.

3 UCSF GHG Emissions Inventory and Forecasts

UCSF has inventoried its campus-wide GHG emissions for many calendar years, including 1990, 2000, and every year since 2007,[31] using standard accounting protocols from the California Climate Action Registry (CCAR), The Climate Registry (TCR), the California Air Resources Board (CARB), and the United States Environmental Protection Agency (USEPA), as discussed in section 2. Reporting rules, protocols, and registries have evolved over this time, with the CCAR no longer active and TCR taking over as the leading national registry for voluntary reporting. As a major stationary source (greater than 25,000 metric tons (mt) CO_2e per year) and electric power producer, the Parnassus Central Utility Plant (PCUP) falls under state and federal reporting requirements. Since 2008, PCUP emissions have been reported to CARB under California's GHG Mandatory Reporting Regulation; and since 2010 PCUP emissions have been report to USEPA under the Greenhouse Gas Reporting Rule (74 FR 56260).

Organizational Boundary

All of the standardized GHG reporting protocols and methodologies require a clear delineation of the organizational and operational boundaries used to account for emissions in an inventory. The organizational boundary includes all facilities and GHG sources over which the reporting entity has management control. Management control can be defined in either financial or operational terms, but the boundary definition must be applied consistently across the organization. Through calendar year 2011, the UCSF inventory based its organizational boundary on the operational control criterion, which requires inclusion of all wholly-owned facilities, and all facilities for which UCSF has operational control through an operational lease or other means. Facilities with which UCSF has an affiliation agreement but not operational control, such as leased space at the City owned Zuckerberg San Francisco General Hospital (ZSFGH) or the federally owned Veterans Affairs Medical Center (VAMC), have reported their emissions separately through their own documents.

Starting with the 2012 GHG inventory reported to TCR, UCSF delineates its organizational boundary using the financial control criterion. Under financial control, UCSF reports emissions from facilities and sources that are wholly-owned, and from facilities and sources that are partially-owned but where UCSF retains financial control (e.g., through a capital or financial lease, or where majority ownership establishes management control). Due to this organizational boundary change, pre-2012 inventories in this *GHG Reduction Strategy* are presented with boundary adjustments to enable direct comparison with current and future inventories. Essentially, emissions associated with leased facilities are removed from the pre-2012 inventories.

Operational Boundary

The operational boundary describes the direct and indirect sources of GHG emissions included in the inventory. GHG reporting protocols generally break emissions down into three source categories related

[31] https://sustainability.ucsf.edu/what_ucsf_is_doing_2 And https://ucop.edu/sustainability/policy-areas/annual-reports.html

to the level of operational control exercised by the organization over the emission source. For UCSF, the following sources are included:

- Scope 1 Emissions – Direct emissions, including stationary combustion such as boilers, hydrofluorocarbon (HFC) refrigerant use, and some medical gases (anesthesia), as well as non-stationary combustion of fuels in University-owned vehicles.
- Scope 2 Emissions – Indirect stationary sources, including emissions from purchased electricity and purchased steam for leased facilities.
- Scope 3 Emissions – Other indirect emissions from business air travel and from commuting by students, faculty, and staff. Scope 3 is defined as emissions that are a consequence of the activities of the institution, but occur from sources not owned or controlled by the institution.

UC's *Sustainable Practices Policy* stipulates that each UC campus will annually inventory its GHG emissions in accordance with TCR requirements, to include Scope 1 and Scope 2 emissions as well as Scope 3 emissions from business air travel and from commuting by students, faculty and staff.[32] Inclusion of Scope 3 emissions is optional for TCR reporting, and when reported they are generally not third-party verified.

The standardized reporting methodology also incorporates protocols for carbon sequestration accounting – e.g., 'credits' for items such as institution-owned large tracts of forest land held as 'permanent' (100 year) open space. Although UCSF owns the Mount Sutro Open Space Reserve located at the Parnassus Heights campus site, UCSF GHG inventories do not account for carbon sequestration in the Reserve. Forest land policy, and the use of forestry carbon offsets are currently being discussed by UC at the system level. Future updates of UCSF's *Climate Action Plan* may include offsets attributable to forest management, either on University or third party owned land. The University has prepared a vegetation management plan to assess the health of the Mount Sutro forest, and manages the land while balancing multiple goals such as wildland fire prevention, bio-diversity, and carbon sequestration. If a significant change[33] in land use or a forest coverage occurs, the net change in sequestered carbon associated with that change would be evaluated and may be included in a future inventory.

<u>Establishing a Baseline</u>

There are different requirements for and varying guidance regarding the various reporting rules for establishing a GHG emissions baseline. BAAQMD's guidance for a qualified GHG reduction strategy is to set the baseline inventory as calendar-year 2008 or earlier. Important considerations in setting the baseline include the accuracy and completeness of underlying data, and the role of the baseline in forecasting future emissions and setting reduction targets.

---

[32] Although UCSF has in the past (e.g., 2009 Climate Action Plan) included estimates of Scope 3 emissions from wastewater treatment and off-site disposal of solid waste, UC policy does not require their inclusion in annual inventory reporting to the UC Regents or to TCR. Together, these sources accounted for approximately two percent of total emissions in UCSF's 1990 and 2008 inventories.

[33] Significant defined as more than 10% of the 61 acre reserve; i.e., more than 6.1 acres.

AB 32 requires the state to reduce GHG emission to 1990 levels by 2020. Since most communities and facilities covered under AB 32 do not have access to high quality data for estimating 1990 GHG emissions, CARB and the California Attorney General recommend that plan-level GHG reduction strategies target 2020 emissions at 15 percent below a 2008 (or earlier) baseline. (132,888 mt CO2e) From a statewide perspective, CARB has determined that 15 percent below 2008 is approximately equivalent to 1990 levels. [34] This approach to setting a 2020 target is supported by BAAQMD[35] and OPR, and represents current best practice for climate action plans and general plans adopted by cities and public agencies throughout California. (More on the GHG Reduction Strategy approach to setting future emission targets and establishing a CEQA threshold is provided in the next section.)

Inventory Results

Table 1 provides a summary of campus-wide GHG inventories for 1990, 2008, and 2018 (the most recently reported year). The inventories contain all sources within the operational boundary prescribed by UCOP's *Sustainable Practices Policy*, which includes all Scope 1 and Scope 2 emissions as well as Scope 3 emissions from business air travel and commuting by students, faculty and staff. A subtotal is provided for Scope 1 and Scope 2 emissions, reflecting the operational boundary associated with the UC President's carbon neutral initiative. The results show that total Scope 1, 2, and 3 GHG emissions increased from 109,817 mt CO_2e in 1990 to 156,339 mt CO_2e in 2008 (a 42 percent increase), and subsequently dropped to 158,372 mt CO_2e in 2018 – despite the opening of over 2 million gross square feet of new campus space since 2008.

TABLE 1: UCSF GHG Emissions Inventories (values in mt CO_2e)

Scope	Emission Category	1990	1990%	2008	2008%	2018	2018%
1	Buildings and Facilities – Natural Gas	44,923	40.9%	90,026	57.6%	80,420	50.8%
1	Buildings and Facilities – Other Fuels	114	0.1%	NA	NA	197	0.1%
1	UCSF Fleet	1,944	1.8%	3,200	2.0%	2,714	1.7%
1	Refrigerants and Medical Gases	3,500	3.2%	3,500	2.2%	1,656	1.0%
1	CCAR Acquisition Adjustment	10,178	9.3%	NA	NA	NA	NA
2	Buildings and Facilities - Electricity	24,529	22.3%	24,962	16.0%	29,108	18.4%
	Scope 1 and 2 Subtotal	*85,188*	*77.6%*	*121,688*	*77.8%*	*114,095*	*72.0%*
3	Business Air Travel	7,549	6.9%	12,582	8.0%	18,748	11.8%
3	Commute	17,080	15.6%	22,069	14.1%	25,529	16.1%
	Scope 1, 2, and 3 Total	109,817	100.0%	156,339	100.0%	158,372	100.0%

SOURCE: University of California, San Francisco (UCSF), *UCSF Climate Action Plan –Greenhouse Gas Reduction Strategy*, April 2017 and TCR 2018 Summary, 2019. 2018 inventory does not reflect 4,396 mt CO2e of offsets taken by UCSF. This allows equal comparison across years of un-offset emissions. Note that emissions reported in the Annual Sustainability Report only include Scope 3 mobile emissions under UCSF's control from employee air travel and commute. Emissions from travel by patients and visitors are not included in the GHGRS.

The following sections provide more detail on each inventory, highlighting similarities, differences, and data quality.

[34] In its Climate Change Scoping Plan of September 2008, CARB recommends that local governments adopt a GHG reduction target consistent with the State's commitment to reach 1990 levels by 2020. This is identified as equivalent to 15 percent below "current" levels.

[35] BAAQMD's CEQA Guidelines (updated May 2012)

<u>1990 Inventory</u>

UCSF's earliest GHG inventory (calendar year 1990) is largely based on actual 1990 activity data, but there are several sources for which accurate or complete data is not available, leaving a certain amount of uncertainty in the GHG emissions estimates for those sources. As mentioned in Section 2.2 and explained further below, this data reflects an adjustment made to the 1990 inventory as it appeared in the 2009 *Climate Action Plan* to correct for an accounting error discovered during development of this *GHG Reduction Strategy*; when the 1990 inventory was first developed, only half of the utility data was aggregated, so the initial 1990 emissions estimates for energy included in the 2009 *Climate Action Plan* were erroneously low. In Table 1, the adjusted values for natural gas and electricity emissions account for a full year of energy data. In addition, also as previously discussed, emissions from electricity used by leased buildings were removed from the calculations shown in Table 1 to maintain consistency with the organizational boundary change that was made starting with the 2012 inventory (from operational to financial control). The 1990 inventory has not been independently audited, nor has it been submitted to a GHG emissions registry.

The largest of the 1990 inventory contributing sectors, Buildings and Facilities natural gas (40.9 percent of total) and Buildings and Facilities electricity consumption (22.3 percent), are based on actual utility consumption data tracked in the billing system. However, the utility data represents fiscal year 1989-1990, which is an approximation of calendar-year 1990. Building records show that no significant development occurred on the campus that year.

The third-largest contributor to 1990 GHG emissions, the commute to work (15.6 percent of total), was estimated based on a comprehensive transportation survey that UCSF prepared in 1991, which accounts for both mode-split and trip lengths, as explained in the 2009 UCSF *Climate Action Plan*. Other sectors of this inventory, such as UCSF Fleet fuel consumption, did not have centralized record keeping in place in 1990, and were estimated based on an algorithm combining 2008 data scaled to the facility size and population at that time (i.e., fleet emissions are based on 2008 actual fuel consumption data scaled to the 1990 facility size and population). Similarly, 'Refrigerants and Medical Gases' emissions data are an estimate based on 2008 known usage scaled to the conditions that existed in 1990. (Medical gas use is largely dependent on hospital stays; UCSF did not experience a significant change in the size or use of inpatient clinical facilities between 1990 and 2008.)

Following standard GHG accounting protocol, the CCAR acquisition adjustment accounts for the transfer of historical emissions associated with land and buildings purchased by UCSF after 1990. This adjustment methodology is in place so that an institution that has goals related to meeting 1990 emissions levels can accurately account for enterprise-wide emissions source changes through time. In a series of acquisitions, starting in 1998, UCSF acquired a new 61-acre campus site in the formerly industrial Mission Bay South Redevelopment Area of San Francisco. The 1990 historical emissions from this acquired site are represented by the CCAR acquisition adjustment, and are now included in all UCSF inventories since 2008.

<u>2008 Inventory</u>

The 2008 GHG inventory was the first of the UCSF inventories to be audited by an accredited third-party verifier, providing a high degree of confidence in the accuracy and completeness of the underlying data and emissions calculations. The 2008 inventory (Scope 1 and Scope 2 emissions) was reported to the CCAR, while the 2008 emissions from the PCUP were reported to CARB under California's GHG Mandatory Reporting Regulation. The 2008 figures provided in Table 1 do not include emissions from electricity used by leased buildings; this is in order to maintain consistency with the organizational boundary change that was made starting with the 2012 inventory (from operational to financial control). Emissions associated with leased buildings are addressed in the City of San Francisco and CARB inventories.

As described in the 2009 *Climate Action Plan*, emissions estimates for all sectors included in the adjusted 2008 inventory are based on actual activity data (utility natural gas and electricity usage, fleet fuel consumption; etc.). As with the 1990 inventory, the Commute emissions estimate is based on a comprehensive transportation survey for 2008.

<u>2018 Inventory</u>

UCSF's latest GHG inventory (calendar-year 2018) was third-party verified and reported to TCR. The TCR Reporting Protocol requires quantification of all Scope 1 and Scope 2 emissions, while reporting of Scope 3 is optional. As mentioned previously, the organizational boundary change made in 2012 means that leased facilities are not included. The 2018 figures in Table 1 include the emissions reported to TCR, plus the Scope 3 emissions for business air travel and commuting by students, faculty, and staff, so as to match the operational boundaries used for the 1990 and 2008 inventories. In 2018, 85.1 percent of total emissions were associated with three sectors: Buildings and Facilities natural gas (50.8 percent of total), Buildings and Facilities electricity (18.4 percent), and Commute (16.1 percent).

<u>GHG Inventory Forecasts</u>

Consistent with the requirements for a qualified GHG reduction strategy, 2020, 2035 and 2050 forecasts of GHG emissions are based on campus energy-use trends, the anticipated impact of LRDP as amended by proposed developments, the anticipated impact of existing energy efficiency and GHG reduction programs, and compliance and implementation of the policies identified in Section 2 of this document.

Table 2 provides a summary of campus-wide GHG emissions inventories for 1990, 2008, 2015, and 2018 (current), along with the forecasts for 2020, 2035 and 2050. These forecasts are adjusted to incorporate the impact of state-wide measures for reducing transportation-related emissions, namely the Pavley bill (AB 1493), which addresses vehicle fuel efficiency, and the Low Carbon Fuel Standard (LCFS).

The University provides inventories and makes projections in two separate formats. The first is for Market Based Emissions reflecting actual emissions factors from the companies UCSF was able to purchase from in the marketplace. This is the methodology used to report to TCR per the *Sustainable Practices Policy*. The second methodology references generic Western Grid emissions factors for purchased electricity. It is used for comparative purposes as a conservative business-as-usual assessment when looking at multiple similar institutions.

TABLE 2: GHG Emissions History and Forecasts (2020) (values in mt CO_2e)

Market Based emission factors (Actual)		Inventories				Forecast		
Scope	**Emission Category**	1990	2008	2015	2018	2020	2035	2050
1	Building & Facilities - Natural Gas	44,923	90,026	79,889	80,420	83,386	102,528	140,000
1	Building & Facilities - Other Fuels	114	NA	112	197	NA	NA	NA
1	UCSF Fleet	1,944	3,200	2,787	2,714	2432	1359	1,578
1	Refrigerants and Medical Gases	3,500	3,500	1,212	1,656	1254	1550	1,800
1	CCAR Acquision adjustment	10,178	NA	NA	NA	NA	NA	NA
1	Building & Facilities - Electricity	24,529	24,962	29,546	10,776	13,491	NA	NA
	Scopes 1 & 2 Subtotal	85,188	121,688	113,546	95,763	100,563	105,437	143,377
3	Business Air Travel	7,549	12,582	13,385	18,748	14,009	17,257	20,035
3	Commute	17,080	22,069	24,698	25,529	22,167	27,771	32,241
	Scopes 1,2 & 3 Total	109,817	156,339	151,629	140,040	136,739	150,465	195,653

Western Grid Factors (Comparative)		Inventories				Forecast		
Scope	**Emission Category**	1990	2008	2015	2018	2020	2035	2050
1	Building & Facilities - Natural Gas	44,923	90,026	79,889	80,420	85,589	102,528	140,000
1	Building & Facilities - Other Fuels	114	NA	112	197	NA	NA	NA
1	UCSF Fleet	1,944	3,200	2,787	2,714	2432	1359	1,578
1	Refrigerants and Medical Gases	3,500	3,500	1,212	1,656	1254	1550	1,800
1	CCAR Acquision adjustment	10,178	NA	NA	NA	NA	NA	NA
1	Building & Facilities - Electricity	24,529	24,962	29,546	29,108	20,302	NA	NA
	Scopes 1 & 2 Subtotal	85,188	121,688	113,546	114,095	109,577	105,437	143,377
3	Business Air Travel	7,549	12,582	13,385	18,748	14,009	17,257	20,035
3	Commute	17,080	22,069	24,698	25,529	22,167	27,771	32,241
	Scopes 1,2 & 3 Total	109,817	156,339	151,629	158,372	145,753	150,465	195,653

**2018 inventory does not reflect 4,396 mtCo2e of offsets taken by UCSF. This allows equal comparison across years.*

Table 3 provides a summary of the LRDP building growth assumptions used in the GHG emissions forecasting, broken down by the five main campus sites covered by the LRDP. Table 3 has been updated to reflect the acquisition of the new sites that have occurred since the 2014 LRDP and reflects the sale of the Laurel Heights property. Table 3 also includes the projected new growth proposed for the Parnassus Heights campus site under the CPHP.

TABLE 3: UCSF Building Space Forecasts[36]

	Total Gross Square Feet (GSF)			
Campus Site	**2015**	**2020**	**2035**	**2050**
Mission Bay	3,059,700	3,652,500	5,933,900	5,933,900
Parnassus Heights	3,301,800	3,266,900	4,475,200	5,050,600
Mount Zion	776,200	777,100	948,700	948,700
Mission Center Building	290,700	290,800	390,700	390,700
Laurel Heights	362,800	362,800	-	-
Other UCSF Buildings	332,700	1,723,500	1,873,500	1,873,500
TOTAL SPACE	8,123,900	10,073,600	13,622,000	14,197,400

[36] The 2035 GSF estimate includes the Phase 2 Medical Center at Mission Bay

The projected impacts of the state's Renewables Portfolio Standard (RPS) and the UCSF utility funded partnership projects are incorporated into the 2020 and 2035 forecasts for energy-related emissions. Energy data for the past four years were analyzed by the UCSF Energy and Facilities teams to quantify energy use intensities (EUI) for buildings on each of the main campus sites and larger properties, as well as the impact of SEP projects on energy use intensity over the same time period. Table 4 provides a summary of the future energy use intensities forecasted for buildings at each of the campus sites, based on the analysis.

TABLE 4: UCSF Building Energy Use Intensities

Campus Site	Average energy use intensity in kbtu/ft2				Est % reduction per through 2050
	2012	**2020**	**2035**	**2050**	
Mission Bay	240.4	213.0	169.8	135.4	1.50%
Parnassus Heights	304.6	269.9	223.5	185.1	1.25%
Mount Zion	314.6	278.8	222.2	177.2	1.50%
MCB Mission Center Building	135.3	119.9	95.6	76.2	1.50%
Laurel Heights	53.2	47.1	NA	NA	1.50%
Other Sites	NA	213.0	169.8	135.4	1.50%

Average annual energy efficiency gains were calculated for each campus area. Because of UCSF's multisite distributed nature in the urban environment, age of existing facilities, and previous investments in cogeneration infrastructure, average energy use intensities vary widely across locations. This EUI information is used to inform the cost benefit analysis of making future investments in reducing emissions.

The 2014 GHG reduction strategy extrapolated planned reductions of EUI's in the future to proposed new buildings to calculate future emissions. This document updates the methodology to reflect the UCOP FOVEA tool for calculating future emissions.

Additional notes on forecasting methodology:

- UCSF Fleet emissions: Forecasts are based on the anticipated growth of student and staff populations by 2020, 2035 and 2050. Updated to reflect the 2019 UC Sustainable Practices Policy and the 2017 acquisition by UCSF of 15 full size electric shuttles buses for the fleet.
- Commute emissions: Forecasts are based on the anticipated growth of student and staff populations by 2020, 2035 and 2050.
- Refrigerants and Medical Gases: Forecasts are based on the anticipated growth of students, staff, patients, and visitors by 2020, 2035 and 2050.
- Solid Waste emissions: Forecasts are based on the anticipated growth of students, staff, patients, and visitors by 2020, 2035 and 2050.
- Adjustments for statewide transportation measures: Combined, AB 1493 (Pavley vehicle efficiency standards) and the LCFS are expected to reduce overall emissions from cars and light-duty trucks by approximately 20 percent by 2030. The adjusted forecasts assume that the entire UCSF fleet will be impacted by Pavley and the LCFS.

- Air travel emissions: Forecasts are based on the LRDP's anticipated growth of student and staff populations by 2020, 2035 and 2050, and then adjusted to account for the expected continuation of fuel efficiency improvements over time. A study by the Federal Aviation Administration (FAA)[37] reports that "Aircraft fuel efficiency has historically improved by about one percent per year. This trend is expected to continue for the foreseeable future."

[37] Federal Aviation Administration (FAA) Office of Environment and Energy, *Aviation & Emissions: A Primer*, 2005. Available at: http://www.faa.gov/regulations_policies/policy_guidance/envir_policy/media/AEPRIMER.pdf

4 GHG Targets and CEQA Thresholds of Significance

The UCSF *GHG Reduction Strategy* utilizes two approaches to establishing campus-wide GHG emissions targets that are consistent with both UC policy and State policy - AB 32, SB 32, Executive Order B-55-18 as well as other California policy on GHG emissions. Consistency with UC policy for setting emission targets for this plan consists of meeting 1990 levels by 2020; climate neutrality from scope 1 and 2 sources by 2025; and climate neutrality from specific scope 3 sources by 2050 or sooner. Consistency with State policy for setting emission targets for this plan consists of meeting 1990 levels by 2020; 40 percent below 1990 levels by 2030; and 80 percent below 1990 levels by 2050. As an CARB-covered entity, UCSF also has to maintain compliance with CARB's cap and trade program.

As discussed in Section 3 above, one approach to establish a baseline from which to measure targets using UCSF's 1990 emissions inventory (109,817 mt CO2e), while the other is based on UCSF's verified 2008 inventory, using the 15 percent downward adjustment recommended by CARB to account for emissions growth since 1990 (132,888 mt CO2e). Consistent with the policy of reducing emissions, UCSF's goal for the Parnassus Heights campus site is also that future annual unmitigated emissions not exceed its current 2018 emissions of 125,426 MT CO2e.

Table 5 summarizes the projected targets for the amount of emissions that are required to be mitigated as determined by these two methodologies. The actual quantities of emissions that will need to be mitigated each year will be calculated using the TCR annual inventories and the applicable policy in effect at that time. After all of the feasible onsite measures identified in the subsequent section are implemented, offsets will be purchased, as the final action to reach reduction targets, appropriate to the policy to be met, UC or State.

TABLE 5: UCSF Campus-wide GHG Emissions Targets (values in mt CO_2e)

			Based on 1990 Inventory Baseline				
	1990	**2018**	**2020**	**2025**	**2030**	**2035**	**2050**
Emissions (BAU) 1&2	85,188	95,763	100,563	102,186	103,809	105,437	143,377
Emissions (BAU) 1,2 & 3	109,817	125,426	136,739	141,310	145,881	150,465	195,653
AB32 / SB32 goal	109,817	-	109,817	87,854	65,890	54,909	21,963
Balance to mitigate/ offset	-	-	26,922	53,456	79,990	95,557	173,690
UC Policy Goal	109,817	-	109,817	39,124	66,668	45,028	0
Balance to mitigate/ offset	-	-	26,922	102,186	79,213	105,437	195,653
			Based on 2008 Inventory Baseline adjusted 15%				
	2008	**2018**	**2020**	**2025**	**2030**	**2035**	**2050**
Emissions (BAU) 1&2	103,435	95,763	100,563	102,186	103,809	105,437	143,377
Emissions (BAU) 1,2 & 3	132,888	125,426	136,739	141,310	145,881	150,465	195,653
AB32 / SB32 goal	132,888	-	132,888	106,311	79,733	66,444	26,578
Balance to mitigate/ offset	-	-	3,851	34,999	66,148	84,021	169,075

The 2035 and 2050 targets are shown as both the UC Policy goal and the amount needed to offset the full build-out of the LRDP as amended for the CPHP.

5 GHG Reduction Measures

This section describes the GHG reduction measures currently underway at UCSF, as well as those measures that are funded or to which UCSF is currently committed. The GHG reduction measures are organized into two major categories of Energy and Transportation, the areas the University most directly has control.

The *GHG Reduction Strategy* includes two categories of GHG reduction measures: those to which UCSF is currently committed to in terms of existing funding and/or implementation (called "Tier 1" measures); and those that currently committed to in terms of future funding but are in the planning or study stages (called "Tier 2" measures). A combination of Tier 1 and Tier 2 on-site reduction measures are not sufficient for UCSF to meet the future goals. Additional measures – purchasing REC's or offsets – are needed for UCSF to meet the 2025 UC Policy goal of climate neutrality for scope 1 and 2, and, scope 3 by 2050.

Figure 2 below shows the changes in UCSF GHG emissions over time. The grey area indicates historical emissions between 2007 and 2018 based on inventory results. The top line represents business-as-usual; the dotted line the goal. The colored wedges represent the future implementation of various Tier1 and Tier 2 measures described in sections below.

FIGURE 2: UCSF GHG Emissions Reduction Scenario

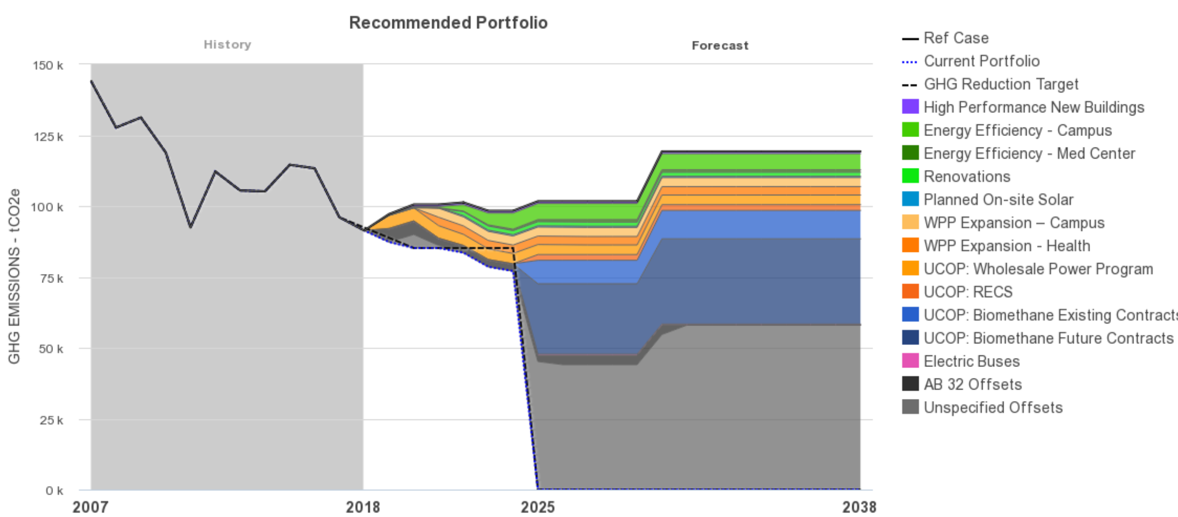


TABLE 6: Emissions Reductions Targets (values in mt CO_2e)

Item	Measure Description	Incremental Emissions Impact MTCO2e / yr
S_01	UCOP: Wholesale Power Program	-3,625
S_02	UCOP: RECS	-2,024
S_03	UCOP: Biomethane Existing Contracts	-9,399
S_04	UCOP: Biomethane Future Contracts	-28,196
S_05	High Performance New Buildings	-762
S_06	AB 32 Offsets	-1,815
S_07	WPP Expansion – Campus	-3,186
S_08	WPP Expansion - Health	-2,978
S_09	Energy Efficiency - Campus	-4,616
S_10	Energy Efficiency - Med Center	-663
S_14	Planned On-site Solar	-422
S_16	Electric Buses	-386
S_17	Renovations	-1,219

5.1 Tier 1 Measures

Table 7 below summarizes the significant Tier 1 strategies (comprised of programs, policies, and actions) that are expected to reduce GHG emissions between now and the planning horizon for the LRDP (2035) and CPHP (2050). Most of the programs and policies associated with these strategies are outlined in the 2009 *Climate Action Plan* and on the UCSF Office of Sustainability's web site. GHG reduction estimates associated with these measures, if not already incorporated into future emissions forecasts (e.g., EN1 – SEP Implementation), are provided for in 2035 and 2050. The following sections provide more detail about the key programs, policies and actions comprising each of the measures.

TABLE 7: UCSF Tier 1 GHG Reduction Measures

Strategy ID	Strategy Name	Annual GHG Reduction by 2020 (MT CO2e)	Annual GHG Reduction by 2035 (MT CO2e)
Energy			
EN1	Improve Energy Efficiency of Existing Buildings and Operations (SEP Implementation)	NA	NA
EN2	Green Building Standards	5,235	10,792
EN3.1	Renewable Energy Strategies: Onsite PV	128	377
EN3.2	Renewable Energy Strategies: Green power purchasing	-	6,721
EN3.3	Renewable Energy Strategies: Biogas purchasing	6,379	6,379
Transportation			
TR1	Reduce Vehicle Trips	1,137	2,561
TR2	Clean Vehicle Strategies	-	-
	Totals:	**12,878**	**26,830**

NOTES:

a - Impact of EN1 is already incorporated into the future GHG emissions forecasts

The following sections describe in more detail the implementing actions associated with each Tier 1 measure, and the GHG reductions expected to result from those actions.

5.2 Energy Measures

Strategy EN1: Improve Energy Efficiency of Existing Buildings and Operations (SEP Implementation)

Key Implementing Actions:

- Continue to revise and implement the SEP to achieve energy efficiency improvements consistent with the results of the past four years.
- Continue to participate in the system-wide UC/CSU Investor Owned Utility Energy Partnership.

Annual GHG reduction: 7,904 mt CO_2e

Implementation Timeframe/Status: In progress; to continue through 2035/2050.

Discussion: UCSF owns or leases space in 189 buildings throughout San Francisco, and energy consumption varies considerably by building use (among other variables, such as building age). For example, research and clinical, or complex space, comprises about 25 percent of UCSF assignable square footage but uses about 70 percent of the total energy consumed. The typical laboratory uses far more energy and water per square foot than the typical office building, due to intensive process and ventilation requirements.

Since the early 1990's UCSF has periodically written Strategic Energy Plans to identify and prioritize implementation of campus investments in energy efficiency projects for existing buildings and infrastructure. These energy efficiency plans, with three-year to seven-year timelines, examine all UCSF facilities for application of new efficiency technologies, implementation of best practices, and available financial incentive programs. Focused primarily on electrical and gas usage, the projects are expected to produce savings equal in value to investment costs within 10 years or less.

As of February 2020, there have been 28 SEP projects completed at UCSF with a total electric savings of 12,264,567 kWh, a total therm savings: 884,784 therms, and an annual utility cost savings: $2,625,108 (using FY1819 utility rates).

There are also 11 active projects SEP Projects with an estimated electric savings of 3,158,254 kWh, an estimated therm Savings of: 101,891 therms, and an estimated utility cost savings: $606,077 (using FY1819 utility rates).

Additionally, there are 48 projects actively under consideration in the planning and evaluation phase. The represent an estimated electric savings of 15,000,000 kWh, and an estimated therm Savings of: 976,000 therms. The current budget plan is for $22,000,000.

The SEP projects undertaken by UCSF over the past 20 years have contributed to a 35 percent reduction of GHGs compared to a business-as-usual scenario.

Utility funded partnership projects cover a wide variety of improvements, from changing lighting fixtures to building new power plants. Lighting and HVAC (Heating, Ventilation, and Air Conditioning) projects are particularly effective tools for achieving reductions. UCSF will continue to convert the remaining existing T12 and 32 watt T8 fluorescent light fixtures to 28 watt T8 lamps or LED's. Other projects include broader use of occupancy sensor controls, daylight harvesting (using daylight to offset the amount of electric lighting needed to properly light a space), and more energy-efficient stairwell fixtures. The replacement of lighting in parking structures is also being evaluated. HVAC improvements in the SEP include meeting basic efficiency standards for air handlers of 10hp and above by: controlling variable air volume with economizers, operating only the hours necessary, providing demand control ventilation where warranted, and controlling static pressure reset to optimize HVAC systems to actual operating conditions.

The SEP includes projects for upgrading laboratory fume hoods with more energy-efficient high-performance models. As explained in the 2009 *Climate Action Plan*, fume hoods use large amounts of energy, and if all of the fume hoods campus-wide[38] were retrofitted and operated to maximize energy efficiency, as much as 4,600 mt CO_2e per year could be avoided.

UCSF is a participant in the system-wide UC/CSU Investor Owned Utility Energy Partnership (the Partnership). The Partnership is designed to help campuses implement energy efficiency programs that decrease their energy use. The Partnership encourages energy-efficient operations and maintenance practices by offering incentives for equipment improvements, and offering training and providing tools to reduce energy consumption and peak demand. Over the past four years, energy efficiency strategies have reduced energy use across UCSF buildings by approximately 17 percent on a per-square-foot basis.

The buildings on the Parnassus campus site comprise the oldest space in the UCSF inventory. The average age of a buildings square foot at Mission Bay is 14 years old, the average age of a buildings square foot at Parnassus is 52 years old. As evidenced in Table 4: UCSF Building Energy Use Intensities, the newer buildings at Mission Bay are significantly less energy intense. Future implementation of SEP, and renewal of the older Parnassus space, is a critical component in the plan to allow UCSF to achieve climate neutrality.

The largest single SEP-type project undertaken by UCSF since 1990 has been the construction of the Parnassus Heights Central Utility Plant (PCUP). The PCUP is 12-MW cogeneration facility constructed between 1995 and 1997; it replaced a far less efficient 50-year-old facility that had significantly higher emissions per MWh. (fuel oil).

The PCUP cogeneration system is a highly efficient generator of energy that uses a single source of clean fuel (natural gas) to produce two energy products, electricity and heat. The heat is used locally for buildings, instead of being discarded as in a conventional electrical generation facility;

[38] Due to an increased awareness of risks associated with exposure to chemicals, and an expanding research program, the number of fume hoods has increased at UCSF from ~400 in 1990, to more than 750 in 2009. The operational energy cost of UCSF's 750 fume hoods is about $4.9 million dollars per year.

the captured heat can be used for either heating or cooling buildings. Further efficiencies are gained by the proximity of the cogeneration plant to the end user, both because transmission losses due to resistance are reduced and because supply can be more quickly matched to demand. Conventional energy production transmits electricity from remote generation sites with low efficiency rates (35 percent); when this is combined with the high efficiency rates (80 percent) of natural gas burned on-site in boilers, UCSF reaches an overall institutional efficiency rate of about 54 percent. In contrast, on-site cogeneration directly employs the thermal energy by-products associated with electricity production, and accompanied with much lower transmission losses, provides an overall institutional efficiency rate of about 76 percent. The UCSF cogeneration plant has 2 turbines. The turbine have undergone upgrades renovation to be more efficient and reduce emissions. UCSF is not proposing increasing the capacity of the turbine equipment in the facility when future upgrades occur to the emissions equipment.

As noted in the preceding section, the GHG-reducing impact of EN1 is already incorporated into the FOVEA future GHG emissions forecasts.

Strategy EN2: Green Building Standards

<u>Key Implementing Actions:</u>

- Exceed Title 24 energy requirements by at least 20 percent (for all new buildings and major renovations except acute care facilities); strive to achieve 30 percent improvement over Title 24. This requirement is maintained over time as Title 24 is revised.
- Pursuant to the UC *Sustainable Practices Policy*, design and build all new buildings (except for laboratory and acute care facilities) to a minimum standard that is equivalent to a LEED® Silver rating. Strive to achieve a standard equivalent to a LEED®-NC Gold rating or higher for all such projects whenever possible, within the constraints of program needs and standard budget parameters.
- Design the UCSF Phase 2 Medical Center at Mission Bay to LEED® Gold standards. (Facilities that are already constructed or are planned or under construction were designed to meet a LEED® Gold standard; future building projects are also expected to meet or exceed this standard.)
- Design the UCSF New Hospital at Parnassus to a minimum of LEED® Gold standards.
- Per the UC *Sustainable Practices Policy*, design all new UCSF laboratory buildings so as to meet Labs21 Environmental Performance Criteria (EPC).

<u>Annual GHG reduction by 2020:</u> 5,235 mt CO_2e
<u>Annual GHG reduction by 2035:</u> 10,792 mt CO_2e

<u>Implementation Timeframe/Status:</u> In progress; to continue through 2035/2050

<u>Discussion</u>: To improve energy efficiency of new buildings, UCSF relies on several available tools, programs and building codes. Title 24 of the California Energy Code enhances the energy efficiency requirements of all newly constructed buildings and major renovations. The 2019 Title 24 update, effective January 1, 2020, improves energy performance of new buildings

significantly, depending on the type of building and its intended use. Major renovations also benefit with respect to energy savings, though to a lesser degree.

The UC *Sustainable Practices Policy* states that the University of California shall incorporate the principles of energy efficiency and sustainability in all capital and renovation projects within budgetary constraints and programmatic requirements. Given the importance of energy efficiency to green building design, the University has set a goal for all new building projects, other than acute care facilities, to outperform the requirements of Title 24 energy-efficiency standards by at least 20 percent.[39]

UCSF is committed already to designing and building all new buildings (except for laboratory and acute care facilities, addressed separately below) so as to meet a minimum standard of sustainability that is equivalent to a LEED-NC Silver rating. In addition, and at the same time, UCSF will continue to strive to achieve a standard equivalent to a LEED-NC Gold rating or higher for such new buildings, whenever possible within the constraints of program needs and standard budget parameters. Over time, this will help achieve the energy savings and GHG emissions reductions associated with EN2, as well as providing the myriad long-term economic, social, and health benefits that accrue to the communities occupying green building spaces, compared with those in conventional buildings.

Central to its academic mission, research laboratories make up a large percentage of the new space developed by UCSF. These types of facilities, filled with specialized equipment, consume significantly more energy per square foot than the average building. Given the importance of specifically addressing sustainability in laboratory facilities, UCSF has also committed to designing all new laboratory buildings to a minimum standard equivalent to a LEED®-NC Silver rating and the Laboratories for the 21st Century (Labs21) Environmental Performance Criteria (EPC), as appropriate. The UCSF design process includes attention to energy efficiency for UCSF buildings that meet LEED® standards for New Construction (listed by standard achieved and year completed):

- Aldea Center on Mount Sutro, 2013 – Gold
- Cardiovascular Research Institute (CVRI), 2012 – Gold
- Dolby Regeneration Medicine, 2011 – Gold
- The Osher Center for Integrative Medicine, 2010 – Silver
- UCSF Medical Center at Mission Bay, 2014 – Gold
- UCSF Mission Hall, 2014 - Silver

UCSF buildings that meet LEED® standards for Existing Buildings Operations and Maintenance:

- Arthur and Toni Rembe Rock Hall (Rock Hall), 2009 – Silver

[39] Although the Title 24 building code does not apply to hospitals, new UCSF medical facilities must be designed to a LEED® Silver standard or higher, which achieves energy savings similar to Title 24. The Medical Center at Mission Bay is being designed to a LEED® Gold standard.

UCSF buildings that meet LEED® standards for Commercial Interiors:

- 1500 Owens Street (leased), third floor clinics, 2012 – Gold
- HSE5 Center for Bioengineering and Tissue Regeneration, 2012 – Gold
- Pharmaceutical Packaging Facility, 2011 – Gold
- HSE 15 S/D Craniofacial & Mesenchymal Biology Lab Renovation, 2010 – Gold
- MSB S1372 Anatomy Department Renovation, 2013 – Silver
- Campus Data Center, 2009 – Silver
- 654 Minnesota Street, 2009 – Certified
- HSW Dentistry Lab, 2005 - Certified

UCSF must ensure that all regulatory obligations are met when the University considers design or operational strategies for reducing GHG emission. Agencies such as the Joint Commission on the Accreditation of Healthcare Organizations (JCAHO), the Occupational Safety and Health Administration (OSHA), and the Institutional Animal Care and Use Committee (IACUC) often have safety protocols in place that constrain UCSF's ability to satisfy GHG reduction goals and simultaneously maintain an acceptable safety margin.

Strategy EN3.1: Renewable Energy: On-Site Solar PV

Key Implementing Actions:

- Build Solar Photovoltaic (PV) energy installation (750 kW) at Mission Bay Hospital; to be operational by 2025.
- Implement Priority 1 Solar PV projects (as determined by UCSF engineer) over the next 20 years.

Annual GHG reduction by 2020: 169 mt CO_2e
Annual GHG reduction by 2035: 864 mt CO_2e

Implementation Timeframe/Status: In progress; to continue through 2035/2050

Discussion: Planned and financed Solar PV installations expected to be operational by 2020 represent approximately 750 kW capacity, capable of displacing 128 mt CO_2e per year using conservative assumptions about PV panel efficiency and electrical productivity in San Francisco. Longer-term, additional solar PV projects deemed Priority 1 because of their financial payback potential are expected to add 1,465 kW for a total capacity of 2,215 kW, displacing approximately 377 mt CO_2e per year by 2035.

UCSF implemented 5 solar photovoltaic projects with over 2 MW capacity in 2018. UCSF now has installed solar panels at 8 owned buildings; UCSF Fresno, Parnassus Dental Clinics, Mission Hall (25A), Third Street Garage, Owens Street Garage, Genentech Hall, Aldea Community Center and Oyster Point. The University is evaluating installing panels at Rutter Center Garage, Mission Bay Hospital, and on surface parking lots. Table 8 details the cost per kWh. The current goal for projects is $0.14 to $0.16/kwh.

TABLE 8: UCSF cost per kWh of installed PPA Solar

		Block 18 & 15 - 1250 KW (dc) system		Block 18 only - 443 KW (dc) system	
Contract Term	**PPA Rate ($/kWh)**	**Total $ savings for entire PPA term (Low)**	**Total $ savings for entire PPA term (High)**	**Total $ savings for entire PPA term (Low)**	**Total $ savings for entire PPA term (High)**
20 year PPA	$0.160	-$89,000	$693,000	-$32,000	$ 250,000
25 year PPA	$0.146	$750,000	$2,000,000	$275,000	$ 770,000

Strategy EN3.2: Renewable Energy: Purchasing Green Electricity

Key Implementing Actions:

- Implement UC's Wholesale Electricity Program to increase the supply of low-carbon electricity sources through direct access suppliers;
- Continue, on an on-going basis, to pursue the possibility of increasing purchases of low carbon electrical power from the grid.

Annual GHG reduction by 2035: TBD – potentially 5,784, or, all electricity purchased by 2045

Implementation Timeframe/Status: In progress; to continue through 2035/2050

Discussion: The UC President's goal for UC to become carbon-neutral by 2025 means that UCSF needs to purchase 100% green power by 2024 or purchase additional offsets.
In support of this goal, the UCOP Wholesale Power Program has increased the supply of low-carbon electricity sources through UC's two Fresno-area solar projects as well as shorter term purchases from renewable and carbon-free resources. The ESU supply is carbon neutral as of 2019. Under the Wholesale Power Program, UC is its own registered Energy Service Provider. The Wholesale Power Program serves to stabilize UC's energy costs and provide an opportunity to procure larger proportions of carbon-free energy than would be otherwise available through traditional channels.

The program supplies power to approximately 500 electricity meters across the UC system, with a total 2019 gross load of roughly 261,000 MWh. The peak load ranges from 40 MW in February to 70 MW in September. Annual load has ranged from 260,000 to 305,000 MWh over the past five years of operation. UCSF purchases approximately 20% (44,771MWh) of the WPP resources.

As of 2018, the largest share of UCSF's outside electrical power purchases was from PG&E, one of the cleanest investor-owned large utilities in the country. PG&E is currently forecasting even lower average carbon content for its grid-supplied electricity as it moves towards the SB100 2045 goal of sourcing 100 percent of its electricity from renewable energy and other zero-carbon sources.

The City of San Francisco offers a Community Choice Aggregation program for retail accounts – Clean Power SF. In 2018 its 40% renewable plan was slightly cleaner than PG&E. In January 2018, UCSF switched 77 small bundled non-direct access accounts to Clean Power SF. It is analyzing the utility bills of new Clean Power SF accounts to identify appropriate candidates for the next phase of accounts to switch over. The University has committed to purchase SFPUC power for the new ZSFG Research and Academic Building currently under construction at that campus site.

UCSF is actively partnering with SFPUC to install infrastructure at Mission Bay under the Bay Corridor Transmission & Distribution (BCTD) program, allowing UCSF the opportunity to purchase 100% renewable Hetch Hetchy hydroelectric power for future projects at that campus site. The BCTD is currently under construction.[40]

This analysis assumes a 100% renewable rate by 2018 and zero carbon by 2020 for the power UCSF purchase from UCOP direct access. UCSF, being located in the City of San Francisco, is a potential customer of carbon free hydropower from the SFPUC. This analysis assumes UCSF can transfer the purchase of 30% of its purchases from PG&E to the SFPUC, however, no firm commitment has been made to date. The University has worked with the SFPUC to bring the infrastructure to Mission Bay Block 34, and is in preliminary discussions with serving the original north campus site with a new 15 kv line. Those decisions are expected in 2020.

This *GHG Reduction Strategy* uses PG&E's 2020 emission factor to forecast 2035 electricity-related GHG emissions (PG&E does not currently provide emission factor forecasts beyond 2020). After 2020, however, it is reasonable to assume that UCSF will continue to lower the average carbon content of its electricity supply due to cleaner electricity from PG&E, or by increasing its small allocation of clean Western Area Power Authority (WAPA) hydropower, or purchasing renewable power through its direct access supplier. The annual GHG reduction estimate for 2035 therefore assumes a significant percent reduction in the carbon content of grid-supplied electricity from 2020 to 2035/2050.

In 2019 CA Senate Bill 237 increased the direct access cap by 4000GWH. [41] The university currently has 55 buildings on direct access using clean power. The majority (52%) at Parnassus Heights. The increase provided for by SB237 provided allows the University to enter a lottery to add additional buildings to direct access.

[40] https://sfwater.org/modules/showdocument.aspx?documentid=14607

[41] https://leginfo.legislature.ca.gov/faces/billTextClient.xhtml?bill_id=201720180SB237

As a result, about 80 existing UC accounts (representing approximately 75,000 MWh of annual load) will join the WPP beginning in 2021.

TABLE 9: UCSF 2020 Direct Access accounts

SAID	Campus	Service Address	SAID	Campus	Service Address
2593518005	Parnassus	105 BEHR AVE	5996340298	Other	1569 SLOAT BLVD
9041330370	Parnassus	1320 3RD AVE	8835082005	Other	1855 FOLSOM ST
9092958467	Parnassus	1322 3RD AVE	9095507060	Other	1855 FOLSOM ST
3843410005	Parnassus	1326 3RD AVE	9095507030	Other	260 NEWHALL ST
7791330005	Parnassus	1332 3RD AVE	8772609005	Other	3333 CALIFORNIA ST
9095283212	Parnassus	1338 3RD AVE	1608421754	Other	606 FORBES BLVD
9093483363	Parnassus	1344 3RD AVE	1565022959	Other	612 FORBES BLVD
9096508637	Parnassus	1350 3RD AVE	9293662512	Other	620 FORBES BLVD
7499664005	Parnassus	1356 3RD AVE	1523728437	Other	626 FORBES BLVD
9093929796	Parnassus	1362 3RD AVE	1176999780	Other	654 MINNESOTA ST
8957947005	Parnassus	1442 5TH AVE	5855930005	Other	75 CRISP RD
9582770704	Parnassus	1450 3RD ST	5355941005	Mount Zion	1600 DIVISADERO ST
9098614366	Parnassus	1464 5TH AVE	7272605005	Mount Zion	1600 DIVISADERO ST
9874617005	Parnassus	1472 5TH AVE	7230938005	Mount Zion	1600 DIVISADERO ST
2169604659	Parnassus	1480 4TH ST	6855943005	Mount Zion	1600 DIVISADERO ST
1228878005	Parnassus	1480 5TH AVE	6772610005	Mount Zion	1657-75 SCOTT ST
9916283005	Parnassus	1482 5TH AVE	6730943005	Mount Zion	1701 DIVISADERO ST
5501759005	Parnassus	1500 5TH AVE	9095507075	Mount Zion	1725 SCOTT ST
679857784	Parnassus	1550 4TH ST	8710082005	Mount Zion	2200 POST ST
3103739005	Parnassus	165 JOHNSTONE DR	7424351005	Mount Zion	2255 POST ST
604633005	Parnassus	2ND & PARNASSUS NW	8397609005	Mount Zion	2330 POST ST
459139005	Parnassus	4TH & KIRKHAM NW	8647609005	Mount Zion	2340 SUTTER ST
1832989005	Parnassus	66 JOHNSTONE DR	8668415005	Mount Zion	2356 SUTTER ST
6760214005	Parnassus	745 PARNASSUS AVE	1990884306	Mount Zion	2375 POST ST
1791322005	Parnassus	JOHNSTONE DR OPP BEHR	6814276005	Mount Zion	2380 SUTTER ST
3878475005	Parnassus	W/S 4TH AVE 125' N	9903217147	Mount Zion	515 SPRUCE ST
2374656005	Parnassus	175 JOHNSTONE DR			
9095507140	Parnassus	25 MEDICAL CENTER WAY			
9096279728	Parnassus	50 KIRKHAM ST			

Strategy EN3.3: Renewable Energy: Purchasing Biogas and Renewable Energy Credits, Offsets

Key Implementing Actions:

- Purchase biogas for use at PCUP to reduce anthropogenic GHG emissions from the facility, if appropriate sources are available and approved by CARB.[42]

[42] https://ww3.arb.ca.gov/cc/reporting/ghg-rep/guidance/biomass.pdf

and https://ww2.arb.ca.gov/mrr-regulation - Section 95852 of the Cap-and-Trade Regulation

Annual GHG reduction by 2035: 652 mt CO_2e, or more if financially feasible

Implementation Timeframe/Status: The University is currently examining its options in the marketplace. Proposals have been solicited by UCOP, received and evaluated. UCSF continues to evaluate the cost/benefits of bio-gas against other emission reducing options in the marketplace.[43]

Discussion: CO_2 emissions from combustion of biogas are considered biogenic and represent a net-zero addition of GHG emissions to the atmosphere. The FOVEA analysis assumes UCSF purchasing 100,000 therms per month in 2024-2025 for use in the PCUP, which would avoid the production of approximately 652 mt CO_2e per year from combustion of natural gas.

TCR general reporting protocol allows for the use of Renewable Energy Credits (RECs). They represent the energy generated by renewable energy sources, such as solar, hydro, or wind power facilities. RECs represent the clean energy attributes of renewable electricity. RECs reduce Scope 2 emissions for purchased electricity. As of June 2017, RECs representing 8,138 MWh of renewable energy were retired on the University's behalf.

In 2018 UCSF also used 4,396 mt CO_2e of offsets in its emissions reporting with TCR. The offsets retired address Scope 1 emissions associated with natural gas combustion at the PCUP. Offsets can reduce Scope 1, 2, or 3 emissions, though the campus does not plan to use them as a substitute for RECs when RECs are available.

UCSF's practice is to accomplish its sustainability goals through reductions in direct emissions, the purchase of renewable electricity, and other local measures as identified above. Purchase of offsets are the final action to reach reduction targets. As part of UC's Carbon Neutrality Initiative, internal guidelines have been developed to ensure that any use of offsets for this purpose will result in additional, verified GHG emissions reductions from actions that align, as much as possible, with UC's research, teaching, and public service mission.

[43] https://www.ucsusa.org/sites/default/files/attach/2017/05/Promises-and-limits-of-Biomethane-factsheet.pdf

TABLE 10: Renewable energy credits (REC's) retired

UNIVERSITY OF CALIFORNIA

BERKELEY • DAVIS • IRVINE • LOS ANGELES • MERCED • RIVERSIDE • SAN DIEGO • SAN FRANCISCO   SANTA BARBARA • SANTA CRUZ

OFFICE OF THE PRESIDENT
Energy and Sustainability
1111 Broadway Street, Suite 1450
Oakland, California 94607
Phone: (510) 287-3360
Fax: (510) 987-0752

Dear James Hand,

This letter serves to document that Renewable Energy Certificates (RECs) have been retired on behalf of The University of California, San Francisco. The attached Western Electricity Coordinating Council (WECC) report was generated from Western Renewable Energy Generation Information System (WREGIS), Account Holder ID 1020 (The Regents of the University of California). The following table shows the quantity of RECs by Generator Name, WREGIS ID, Nameplate Capacity, Fuel Type, and Period of Generation.

Generator Name	WREGIS ID	Nameplate Capacity (MW)	Fuel Type	Quantity (MWh)	Period of Generation
Lewiston	W1108	0.438	Hydroelectric Water	8	4/1/16-12/31/16
Folsom Unit 1	W1156	66.2	Hydroelectric Water	381	1/1/16-12/31/16
Folsom Unit 2	W1157	66.2	Hydroelectric Water	412	1/1/16-12/31/16
Folsom Unit 3	W1158	66.2	Hydroelectric Water	542	1/1/16-12/31/16
New Melones Unit 1	W1159	150	Hydroelectric Water	250	2/1/16-11/30/16
New Melones Unit 1	W1160	150	Hydroelectric Water	225	3/1/16-12/31/16
Nimbus Plant (2)	W1161	13.4	Hydroelectric Water	149	1/1/16-12/31/16
J.F. Carr Unit 1	W1163	77.2	Hydroelectric Water	159	1/1/16-12/31/16
J.F. Carr Unit 2	W1164	77.2	Hydroelectric Water	139	1/1/16-11/30/16
Keswick Powerplant (3)	W1165	117	Hydroelectric Water	749	1/1/16-12/31/16
O'Neill (3)	W1167	12.6	Hydroelectric Water	20	5/1/16-8/31/16
Shasta Unit 1	W1168	142	Hydroelectric Water	844	1/1/16-12/31/16
Shasta Unit 2	W1169	142	Hydroelectric Water	618	1/1/16-9/30/16
Shasta Unit 3	W1170	142	Hydroelectric Water	793	1/1/16-12/31/16
Shasta Unit 4	W1171	142	Hydroelectric Water	786	1/1/16-12/31/16
Shasta Unit 5	W1172	142	Hydroelectric Water	888	1/1/16-12/31/16
Spring Creek Unit 1	W1173	90	Hydroelectric Water	78	1/1/16-12/31/16
Spring Creek Unit 2	W1174	90	Hydroelectric Water	358	1/1/16-12/31/16
Trinity Unit 1	W1175	70	Hydroelectric Water	210	4/1/16-8/31/16
Trinity Unit 2	W1176	70	Hydroelectric Water	414	1/1/16-12/31/16
Stampede (2)	W1177	3.60	Hydroelectric Water	9	1/1/16-9/30/16
Gianelli (2)	W1288	106	Hydroelectric Water	106	4/1/16-7/31/16
			TOTAL	**8,138**	

This information is provided in accordance with guidance regarding contractual instrument documentation provided in Chapter 14 of The Climate Registry General Reporting Protocol for the Voluntary Reporting Program Version 2.1. To the best of my knowledge, the renewable attributes have not been used to meet any federal, state or local renewable energy requirement, renewable portfolio standard, or other renewable energy mandate.

Cynthia Clark
Renewable Energy Manager
June 21, 2017
Oakland, CA

Attached: WECC Certificates in Retirement Subaccount

5.3 Transportation Measures

Strategy TR1: Reduce Vehicle Trips

Key Implementing Actions:[44]

- As development occurs under the LRDP, increase on-site amenities (such as child care, food services, banking, retail shops, laundry, fitness facilities), and limit parking for on-campus housing and staff.
- Add on-site housing for faculty and students.
- Enhance and expand existing car-share, vanpool, and carpool programs and incentives.
- Encourage departments to allow flexible work schedules and telecommuting.
- Implement LRDP plans to realign supply chain, warehousing, and deliveries so as to streamline all parts of the process and minimize truck trips.

Annual GHG reduction by 2020: incorporated into forecast: 1,137 mt CO_2e
Annual GHG reduction by 2035: incorporated into forecast: 2,561 mt CO_2e

Implementation Timeframe/Status: In progress; to continue through 2035/2050

Discussion: Reductions in UCSF GHG emissions attributable to transportation come from both local institutional actions and from technological and regulatory changes driven by the state and federal government. State and federal government actions to-date have focused on cleaner vehicle technologies, transportation system efficiency improvements, and land use policy. Actions taken by UCSF to address transportation-related GHG emissions have been aimed at reducing vehicle miles traveled (VMT), and include: implementation of various transportation demand management measures, improvements to the campus transportation system, and improving the jobs-to-housing balance. Emissions from transportation are greatly dependent on the length of trips, and the mode of travel used. Generally, bicycle and walking trips produce almost zero carbon emissions, and a trip on public transit produces about half the quantity of GHG emissions as would a comparable trip by private automobile.

As stated in the 2014 LRDP, key features of UCSF's existing TDM program include the following:

- 60 shuttles serving 17 locations, with over 2.5 million passengers per year
  15 full size electric busses, 60 alternate fuel/ hybrid vehicles added to the fleet since 2010.
- 30 vanpools that travel as far as Sacramento and operated using software which improves fuel consumption and safety
- 62 reserved carpool stalls at various sites

[44] Measure assumes implementation of Transportation Demand Management programs, as described in the *Transportation Demand Management Program Improvement Measures Evaluation* report by Fehr & Peers, August 30, 2012.

- 18 City CarShare vehicles with dedicated parking spaces, along with 1,500 UCSF members who can use these vehicles by scheduling their use on-line
- Over 1,900 UCSF users of the ZimRide online carpool matching program
- 972 bicycle parking spaces with another 100 planned at Mission Bay, as well as bike racks on shuttles, a cyclist shower program that allows bicyclists to use UCSF showers at a discount, and other bicycle-related benefits
- Bay Area Bike Share station at Mission Bay and other campus sites, where members have access to bicycles (and a regional network of stations)
- More than 400 off-street motorcycle parking stalls in garages and surface parking lots
- An "emergency ride home" program to encourage use of alternative modes of transportation
- Clipper Card (public transit pass) sales at easily accessible locations, including through UCSF's website
- Close to 1,800 UCSF employees participate in a pretax transit program, which saved UCSF employees over $700,000 on public transit commute costs

UCSF's shuttle system services all primary UCSF campuses, as well as select secondary campus locations, and is free to UCSF faculty, staff, students, patients, and visitors. On average, a total of 7,435 people ride the system daily, with demand for additional service growing by around five percent per year. The 2014 UCSF Shuttle Operations Study estimates a demand for 401 additional trips by 2020, and an additional 3,611 trips by 2035. The study also contains recommendations for expanding service lines to meet increasing demand as development occurs under the 2014 LRDP. New projections for use have been developed for the CPHP EIR.

UCSF faces considerable constraints outside of its control in developing affordable housing. Housing is an auxiliary enterprise of the University, serving as a support service to its primary educational mission; and therefore, by state law, it must be financially self-supporting. Land in San Francisco is extremely expensive to acquire, and UCSF has limitations on new development on vacant land it already owns (such as Aldea San Miguel at Parnassus). UCSF will continue to implement the goals of the 2005 Housing Master Plan to provide more reasonably priced housing for up to 1,400 individuals in targeted groups of the campus community.

Since the completion of the 2014 LRDP UCSF has constructed 610 student housing units south of Mission Bay which opened in late 2019/ early 2020. It also has an existing 70 unit faculty housing building under renovation near Mount Zion.

The CPHP proposes to add 762 new housing units at Parnassus by 2050, with an initial phase project under study to add a portion by 2030.

Strategy TR2: Expand Fleet of Clean Vehicles

Key Implementing Actions:

- Continue to incentivize UCSF departments to purchase fuel efficient vehicles (hybrid, electric, CNG) by waiving the annual permit fee of $1,932.00 per vehicle. This has been an effective strategy in encouraging departments to purchase fuel-efficient and alternative-fuel vehicles.

- Continue and expand use of low-emitting fuels and vehicles for shuttle system and across UCSF fleet of vehicles.

Annual GHG reduction by 2020: incorporated into forecast: 1 mt CO_2e
Annual GHG reduction by 2035: incorporated into forecast: 1,360 mt CO_2e

Implementation Timeframe/Status: In progress; to continue through 2035/2050

Discussion: In addition to vehicle miles traveled, transportation emissions are dependent on the type of fuel used to power vehicles. UCSF is gradually transitioning its vehicle fleet to alternative fuel vehicles and more fuel efficient vehicles. UCSF currently has 43 low-emitting alternative-fuel and hybrid vehicles, including cars, shuttles, golf carts, and trucks. The UCSF shuttle fleet is currently run mainly on diesel and gasoline; however, the University has purchased 15 full size electric shuttle buses to replace fossil fuel vehicles. An electric vehicle charging station for them was constructed at the Mission Bay campus. UCSF is considering additional electric shuttles for future vehicle replacements.

UCSF has also instituted programs and developed infrastructure to encourage commuters to use a mix of more fuel-efficient and alternative-fuel vehicles. The University offers an employee benefit program to encourage the purchase of EVs (electric vehicles).

The 2015 UCSF Commute Survey[45] indicated that the commuter vehicle fleet is composed of 12.6 percent fuel efficient and alternative fuel vehicles, including hybrid, electric, CNG and biodiesel fueled vehicles. The University has installed 18 electric-vehicle charging stations at Parnassus Heights, Mount Zion, and Mission Bay, and plans to install another 20 at Mission Bay in the Owens Street Garage plus 10 at other locations in the near future. UCSF also has 35 priority parking spaces reserved for fuel-efficient and low-carbon emitting vehicles.

Due to the concerted state effort to improve vehicle fuel efficiency (Pavley bill) and the lack of a current formal "green" or "clean fuel" vehicle replacement program at UCSF, no additional GHG reductions are associated with this measure.

5.4 Tier 2 Measures

As discussed previously and summarized in Figure 1, additional reductions beyond Tier 1 measures (summarized in Table 7) are needed over the planning horizon of the LRDP to meet the 2020, 2025, 2035, and 2050 GHG emission targets. Table 11 lists the Tier 2 measures that UCSF has identified to accomplish the additional reductions needed. The maximum potential reductions for each Tier 2 measure reflect the inventory forecasts for 2020 and 2035, and do not include the reductions expected from Tier 1 measures.

[45] UCSF Transportation Services Annual Commute Survey, UCSF Commute Survey Results 2009-2012.

TABLE 11: UCSF Tier 2 GHG Reduction Measures

Tier 2 Measure	Scope	GHG Inventory Category	Maximum potential reductions by 2020	Maximum potential reductions by 2035
Expand or intensify existing and planned programs for reducing direct emissions associated with stationary sources owned and controlled by UCSF	1	Buildings & Facilities - natural gas	85,589	87,668
Purchase more low-carbon biogas as a replacement for natural gas used by the PCUP	1	Buildings & Facilities - natural gas	85,589	87,668
Expand or intensify existing and planned programs for reducing direct emissions associated with mobile sources owned and controlled by UCSF	1	UCSF Fleet	2,432	2,718
Intensify energy conservation efforts to exceed the reductions of electricity-related emissions currently expected from implementation of the SEP	2	Buildings & Facilities - electricity	20,302	29,205
Purchase a greater percentage of grid-supplied electricity from renewable, low-carbon sources	2	Buildings & Facilities - electricity	20,302	29,205
Invest in renewable energy projects at UCSF or other UC campuses (e.g., where available land exists).	2	Buildings & Facilities - electricity	20,302	29,205
Invest in offsite projects that reduce GHG emissions, preferably within the UC system where the full range of benefits will be retained, to offset emissions in the UCSF emissions inventory.	all	LRDP Construction Emissions	unlimited	unlimited
Purchase accredited carbon offsets that can be used to offset emissions in the UCSF emissions inventory.	all	Buildings & Facilities - electricity	unlimited	unlimited

Tier 2 measures are at various stages in the planning process. Some combination of them, and offsets, will be sufficient to meet the 2020 goals identified in Table 5. Though UCSF is committed to meeting the other targets described in this document, as well as the goals of the UC President's 2025 Carbon Neutrality Initiative, the exact mix of these future actions to be taken by UCSF is dependent on both the results of CARB Scoping Plan Updates, and the recommendations identified in the (future) implementation plan by UCOP of the Presidents 2025 Carbon Neutrality Initiative and the *Sustainable Practices Policy*.

Because the majority of UCSF unmitigated GHG emissions stem from the combustion of natural gas at the PCUP, UCSF annually monitors for the potential to implement the best available control technology for reducing emissions of CO2 at this source. These include retrofitting carbon capture at the facility or using alternative fuel such as low- and zero-carbon hydrogen. Carbon capture uses a combination of technologies to capture the CO2 released by fossil fuel combustion. The latest 2019 UCSF study identified the current cost of carbon capture is 3x+ higher than reducing emissions by purchasing offsets. Carbon capture is an active field of research by UC scientists and many other institutions, future developments in this technology are expected to lower costs and revise the cost benefit analysis. The timeline for this reduction in cost is not clear. The incremental cost of carbon cost varies depending on parameters such as the choice of capture technology, the percentage of CO2 captured, the type of fossil fuel used, and the distance to and type of geologic storage location. Other than the initial capital costs to install the equipment, UCSF is not located adjacent to a geologic storage location.

Approximately 95% of current U.S. hydrogen production involves steam methane reforming (SMR) of natural gas, which releases carbon dioxide as a byproduct. Decarbonizing the production of hydrogen, with electrolysis using zero-carbon electricity from renewables, can generate zero-emission "green hydrogen;" that can be used directly in the existing PCUP to generate electricity with only minor modifications to the existing equipment.[46] Similarly, SMR of natural gas with carbon capture can generate low-emission "blue hydrogen", an environmentally superior product, with significantly lower emissions, when compared to burning natural gas.[47] Other than the initial capital costs to install or modify the equipment, there currently exists an imbalance in the location of UCSF's 2.3 million kwh of installed solar photovoltaic capacity (primarily Mission Bay), and the location where the capacity could be used to generate hydrogen. (Parnassus Heights).

[46] https://www.solarturbines.com/en_US/about-us/news-and-press-releases/converting-high-hydrogen-fuel-to-electricity.html

[47] https://climatecrisis.house.gov/sites/climatecrisis.house.gov/files/Climate%20Crisis%20Action%20Plan.pdf?utm_campaign=GR-2020-07-03-TWiW%20Email%20Short&utm_medium=email&utm_source=Eloqua

6 Implementation and Monitoring

Successful implementation of the measures described in the previous section nearly enable UCSF to achieve the 2020 GHG target. UCSF will need to purchase a small amount of offsets[48] in 2021 to close the gap for that 2020 goal. Deeper reductions provided by the Tier 2 measures; and the purchase of REC's and offsets by UCSF, enable UCSF to achieve the 2025, 2035 LRDP, and 2050 climate neutrality targets.

UCSF staff annually complete a rigorous cost benefit analysis, looking at a wide range of options, striving to get the largest impact in reducing emissions from deploying its financial and operational resources. Despite aggressive efforts towards reducing onsite energy use and increased purchase of renewable power, UCSF expects to still have emissions of about 146,000 mt CO_2e in 2025. In order to reach Carbon Neutrality, UCSF will need to procure additional REC's and offsets in 2025. The appropriate combination of these tools will need to be coordinated with UCOP.

Robust monitoring of campus-wide GHG emissions and the effectiveness of individual programs and policies are ongoing to ensure that UCSF is on track to meeting its other future targets, such as 2050, and to enable UCSF to tier CEQA analysis of future projects from this GHG Reduction Strategy, as described in Section 8.0

UCSF annually quantifies its GHG emissions and reports them to TCR and CARB. The annual verified emissions report for TCR, augmented by estimates of Scope 3 emissions from commuting and air travel will serve as the metric for comparison with both intermediate and 2050 targets.

Staff from the UCSF Office of Sustainability prepare annual reports to UCOP summarizing progress of the implementation of the *GHG Reduction Strategy*. The report evaluates the successes and challenges in implementing the *GHG Reduction Strategy* and evaluate progress toward GHG reduction targets. Staff will provide the status of program implementation (e.g., initiated, ongoing, completed), assess the effectiveness of the strategies and programs included in the Plan against the established objectives, and recommend adjustments to programs or tactics as needed. The annual report will also assess whether UCSF's actual growth and development is consistent with the forecasts made in the LRDP. If necessary, UCSF shall modify the geographic scope of the inventory and emissions targets accordingly.

An update of the *GHG Reduction Strategy* should occur at least every five years to ensure the strategy remains effective in reducing GHG emissions to the extent needed for achieving the 2025, 2035 and 2050 targets. In addition, the following situations occurring over the LRDP planning horizon will necessitate a revision to the *GHG Reduction Strategy*:

- A change in regulations affecting GHG targets or thresholds. The state is likely to legislate more new GHG reduction goal for post-2020. Currently, the *GHG Reduction Strategy* can only anticipate what that goal will be based on the current regulations. The BAAQMD may also develop new guidelines for CEQA as the state regulations are developed.
- A proposed new project that exceeds the total new square footage (summarized in Table 3)

[48] Actual number will not be known until calendar year 2020 is complete and verified by TCR. Due to pandemic, current estimate is for about 10,000 -15,000 mtCO2e.

- A change in the mix of proposed new project types (e.g., another new hospital beyond that envisioned for Mission Bay and Parnassus Heights) that would result in significantly higher energy use intensities than predicted and summarized in Table 4.
- An operational change at UCSF that results in a significant change in projected GHG emissions. UCSF may institute new policies or programs, or abandon current or planned programs, and by doing so, affect GHG emissions. The States regulation of UCSF ability to enter into long-term contracts to purchase a large amount of zero-carbon electricity is one example of such a possible change.
- The required monitoring of the *GHG Reduction Strategy* reveals that UCSF's GHG reduction programs are not reducing emissions adequately to meet its targets.

7 CEQA Project Review

Under CEQA, the effects of GHG emissions are considered a potentially significant environmental impact. In addressing climate change, CEQA provides a useful mechanism for local agencies to evaluate new development on a comprehensive basis rather than on an individual project basis. The CEQA Guidelines recognize this, and include a provision for streamlining the analysis of projects that are consistent with a more comprehensive plan for the reduction of GHG emissions (CEQA Guidelines, Section 15183.5). This *GHG Reduction Strategy* meets an important requirement of CEQA Guidelines Section 15183.5(b)(1) as a plan that analyzes cumulative GHG impacts. The GHG Reduction Plan uses established protocols, methodologies and forecasts of existing and future land uses to quantify existing and projected future GHG emissions within the plan area. It also establishes a reduction target based on California State law (AB 32, AB 32, SB 32, and Executive Order B-55-18), and lays out policies, actions, and performance standards that UCSF will enact and implement over time to reduce emissions. However, as demonstrated in this document, the current *GHG Reduction Strategy* does provide the emissions reductions needed to achieve the reduction targets identified in the UC Sustainable Practices Policy and in the state-mandated reduction target embodied in AB 32, SB 32, and EO B-55-18.

By implementing the Tier 1 measures along with a mix of the Tier 2 measures identified in Section 5.3, and purchasing offsets, UCSF will close the gap to meet the state law derived emissions target for 2020 and beyond, allowing it to utilize the CEQA streamlining provision in CEQA Guidelines Section 15183.5(b)(1). A future development project would be considered consistent with the revised *GHG Reduction Strategy* if it were consistent with the *GHG Reduction Strategy* assumptions regarding the amount and type of future development, and was consistent with the GHG reduction measures included in the revised *GHG Reduction Strategy*. Projects consistent with the revised *GHG Reduction Strategy*, including conformance with any performance measures applicable to the project, would not require additional GHG emissions analysis under CEQA Guidelines Sections 15064(h) and 15183.5(b)(2).[49]

7.1 Screening Project for Consistency with the GHG Reduction Strategy

In order to assist with determining project consistency with the *GHG Reduction Strategy*, a project consistency checklist is included in Table 12. This checklist is intended to provide the opportunity for individual projects to demonstrate that they are minimizing GHG emissions, while ensuring that new development at UCSF will achieve its 'fair share' of emissions reductions. The *GHG Reduction Strategy* stipulates a range of prescribed and planned GHG reductions measures for meeting the GHG reduction target. The project review checklist would screen projects for important GHG reduction measures that, when implemented, will provide confidence that the project will not impede UCSF's ability to meet its GHG emissions targets. This checklist may evolve over time as the mix of Tier 2 reduction measures is better defined and implemented.

[49] If there is substantial evidence that the effects of a particular project may be cumulatively considerable, notwithstanding the project's compliance with the qualified GHG Reduction Strategy, CEQA requires that an EIR be prepared.

For the project checklist to be valid, UCSF would need to ensure that total development does not exceed the following growth assumptions used to develop the emissions forecasts in this *GHG Reduction Strategy*.

TABLE 12: Growth assumptions

2050 total building space = 14,197,000 gross square feet (gsf), with campus specific growth limits provided in Table 3
2050 population of students + staff = 31,200
2050 population of students + staff + patients + visitors 45,400

Appendix HIA

Additional Information Regarding Potential Health Effects of Criteria Air Pollutant Emission Impacts

Prepared for
University of California San Francisco
San Francisco, California

Prepared by
Ramboll US Corporation
San Francisco, California

Project Number
1690017005

Date
June 2020

UCSF COMPREHENSIVE PARNASSUS HEIGHTS PLAN

ADDITIONAL INFORMATION REGARDING POTENTIAL HEALTH EFFECTS OF CRITERIA AIR POLLUTANT EMISSION IMPACTS

PARNASSUS HEIGHTS

SAN FRANCISCO, CALIFORNIA

CONTENTS

ATTACHMENTS

1. INTRODUCTION

This report presents an estimate of the potential health effects of the emissions of criteria pollutants that may result from the adoption and implementation of UCSF's Comprehensive Parnassus Heights Plan (CPHP) in San Francisco, California (referred to hereafter as "the Proposed Project" or "Project").

1.1 Friant Ranch Decision

As background for this evaluation, Environmental Impact Reports (EIRs) prepared pursuant to the California Environmental Quality Act (CEQA) have long evaluated project-related health effects of toxic air contaminants, such as diesel particulate matter (PM), through quantitative and/or qualitative means relative to air district-issued thresholds of significance. However, EIRs historically have not evaluated the specific health effects of project-related increases in criteria pollutants,[1] other than to note and summarize scientific literature regarding the general effect of those pollutants on health. Instead, in accordance with air district-issued thresholds of significance and industry standard practice at the time, CEQA analysis historically and traditionally focused on estimating project-related mass emissions totals for criteria pollutants and, in certain cases, conducting dispersion modeling to assess impacts on local ambient air quality concentrations.

In this report, Ramboll presents one method that correlates project-related mass emissions totals for criteria pollutants to estimated health-based consequences. More specifically, in order to estimate the health effects of the increases of criteria pollutants for the proposed Project, Ramboll applied a photochemical grid model (PGM) and Comprehensive Air Quality Model with extensions (CAMx) to estimate the increases in concentrations of ozone and $PM_{2.5}$ in the region as a result of the emissions of criteria and precursor pollutants from the Project. We then applied a U.S. Environmental Protection Agency (USEPA)-authored program, the Benefits Mapping and Analysis Program Community Edition (BenMAP-CE, herein referred to as "BenMAP"),[2] to estimate the resulting health effects from the small increases in concentration. Only the health effects of ozone and $PM_{2.5}$ are estimated, as those are the pollutants that USEPA uses in BenMAP to estimate the health effects of emissions of NOx, VOCs, CO, SO_2, and $PM_{2.5}$. Ozone and $PM_{2.5}$ have the most critical health effects and thus are the emissions evaluated to determine the Project's health effects.

1.2 Additional Evaluation

This analysis estimates the health effects of criteria pollutants and their precursors, specifically those that are evaluated by the USEPA in rulemaking setting the national ambient air quality standards: NOx, VOC [also known as reactive organic gases, or ROG, which are virtually the same as VOC with some slight differences],[3] CO, ozone, SO_2, and $PM_{2.5}$.

---

[1] Criteria pollutants are those pollutants with an air pollution standard or pollutants which are precursors to those with a standard. Pollutants with an air pollution standard include nitrogen dioxide, sulfur dioxide, ozone, carbon monoxide, particulate matter smaller than 2.5 microns in diameter and 10 microns in diameter ($PM_{2.5}$ and PM_{10}), and ozone. Precursor pollutants to criteria pollutants include oxides of nitrogen (NOx), oxides of sulfur (SOx), carbon monoxide (CO), and volatile organic compounds (VOCs).

[2] https://www.epa.gov/benmap/benmap-ce-manual-and-appendices.

[3] Reactive organic gas (ROG) emissions are quantified and modeled as VOCs in this assessment. ROG means total organic gases minus ARB's "exempt" compounds (e.g., methane, ethane, CFCs, etc.). ROG is similar, but not identical, to USEPA's term "VOC", which is based on USEPA's exempt list, which is slightly different from ARB's list.

Consistent with USEPA's assessment of health effects of PM, our health effects evaluation focuses on $PM_{2.5}$ and not PM_{10}[4] as $PM_{2.5}$ has a much larger body of evidence that this size fraction is associated with health effects due to the sources, composition, chemical properties and lifetime in the atmosphere (USEPA 2009). $PM_{2.5}$ is capable of penetrating deeper into the lungs because of their size compared to larger particles and this is believed to contribute to greater health effects. Consistent with USEPA health effects evaluations, the health effect functions in BenMAP for PM use fine particulate ($PM_{2.5}$) as the causal PM agent. NOx and VOCs are not criteria air pollutants but, in the presence of sunlight, they form ozone and contribute to the formation of secondary $PM_{2.5}$ and thus are analyzed here. As a conservative measure, SO_2 and CO are evaluated due to their small contribution to the formation of secondary $PM_{2.5}$ and ozone. The health effects from ozone and $PM_{2.5}$ are examined for this Project because the USEPA has determined that these criteria pollutants would have the greatest effect on human health. The emissions of other criteria pollutants and precursors, including VOC, NOx, CO, and SO_2, are analyzed in their contribution in the formation of ozone and secondary $PM_{2.5}$.

The evaluation presented herein serves to describe the potential health effects of the criteria pollutant emissions associated with the Project. This evaluation does not make a new significance determination.

[4] PM_{10} is defined as particulate matter with a nominal mean aerodynamic diameter less than or equal to 10 µm.

2. TECHNICAL APPROACH

The USEPA's air quality modeling guidelines (Appendix W[5]) and ozone and $PM_{2.5}$ modeling guidance[6] recommend using a PGM to estimate ozone and secondary $PM_{2.5}$ concentrations. The USEPA's modeling guidance does not recommend specific PGMs but provides procedures for determining an appropriate PGM on a case-by-case basis. Both the modeling guidelines and guidance note that the CAMx[7] and the Community Multiscale Air Quality (CMAQ[8]) PGMs have been used extensively in the past and would be acceptable PGMs. As such, the USEPA has prepared a memorandum[9] documenting the suitability for using CAMx and CMAQ for ozone and secondary $PM_{2.5}$ modeling of single-sources or group of sources.

The first step in the process is to run the PGM with appropriate information to assess the increases in ambient air concentrations that the Project emissions may cause. PGMs require a database of information, including the spatial allocation of emissions, in the area to be modeled. This includes both base (background/existing) emissions and Project emissions. The latest publicly available PGM database for Northern California was developed by the Bay Area Air Quality Management District (BAAQMD) in support of the 2000 Central California Ozone Study (CCOS),[10] and was adapted for this analysis. The model domain used is discussed further in Attachment B and encompasses an area of 740 kilometers (km) by 740 km centered around the Central Valley of California. The computational domain roughly extends from Shasta and Trinity counties at the north, to the northern portion of Los Angeles county to the south. The domain includes regions of the Pacific Ocean on its western portion and parts of Nevada on its eastern portion. This PGM database is tailored for Northern California using California-specific input tools (e.g., the EMission FACtors (EMFAC)[11] mobile source emissions model) and uses a high-resolution 4-km horizontal grid to better simulate meteorology and air quality in the complex terrain and coastal environment of California. Project emissions included NO_X, CO, SO_2, respirable (PM_{10}) and fine ($PM_{2.5}$) primary PM, and VOCs. As discussed above, NO_X and VOC are precursors to ozone and, along with SO_2, are also precursors to secondarily formed $PM_{2.5}$. CO also plays a smaller role in the formation of ozone and is thus conservatively evaluated here.

To estimate the potential outcome of the proposed Project's emissions on ambient air concentrations, the Project's annual emissions were added to the CAMx 4-km annual PGM modeling database.[12] Operational emissions from the Project were estimated as described in Draft EIR Section 4.2 Air Quality, and in Attachment A.[13] Incremental operational emissions

---

5 https://www3.epa.gov/ttn/scram/appendix_w/2016/AppendixW_2017.pdf.

6 https://www3.epa.gov/ttn/scram/guidance/guide/O3-PM-RH-Modeling_Guidance-2018.pdf.

7 http://www.camx.com/.

8 https://www.epa.gov/cmaq.

9 https://www3.epa.gov/ttn/scram/guidance/clarification/20170804-Photochemical_Grid_Model_Clarification_Memo.pdf.

10 http://www.baaqmd.gov/about-air-quality/research-and-data/research-and-modeling.

11 https://www.arb.ca.gov/emfac/.

12 BAAQMD performed WRF meteorological modeling for the CCOS 4-km domain and 2012 calendar year that has been processed by WRFCAMx to generate CAMx 2012 4-km meteorological inputs for the CCOS domain. The CMAQ 2012 emissions have been converted to the format used by CAMx using the CMAQ2CAMx processor.

13 To the extent that conservative inputs were used to estimate Project-related criteria pollutants and precursors, the analysis provided herein also is conservatively influenced by those inputs.

for year 2050, representing full buildout, were modeled so as to represent a potential worst-case year of impacts.[14] Potential impacts from the Initial Phase Projects, including Irving Street Arrival, Research and Academic Building, and initial Aldea housing densification, are qualitatively discussed in the results section below, as are potential impacts from construction of the Initial Phase Projects, including construction of the New Hospital.

For use in PGMs, each Project emissions source must be spatially distributed across the modeling grid cells so that they can be incorporated into the gridded emission inventory. The unmitigated incremental emission inventory for the Project at full buildout (year 2050) was used in the analysis. This includes architectural coatings, VOCs in consumer products, natural gas combustion, landscaping equipment, emergency generators, central utility plant (CUP), and emissions associated with motor vehicle use. The emissions from architectural coatings, consumer products, natural gas combustion, landscaping equipment, emergency generators, and CUP are located onsite, and were therefore allocated to the grid cells representing the Project site. The mobile source category includes both passenger vehicles and trucks which are spatially distributed in both the Project site's grid cells, as well as the offsite grid cells along primary travel routes. Annual emission estimates from the Project were spatially gridded, temporally allocated, and chemically speciated to be used for photochemical grid modelling using the Sparse Matrix Operator Kerner Emissions (SMOKE) emissions modelling system supported by the USEPA. The emissions inventory, spatial allocation, and SMOKE inputs and outputs are shown in Attachment A.

As discussed above, the Northern California 2000 CCOS modeling database was used for this Project. The Northern California 4-km PGM modeling database is based on a 2012 base meteorological year. The 2050 future year projections were used for this analysis, as described in Attachment A. The Project's emissions were isolated by the source apportionment tools in CAMx to obtain the incremental ozone and $PM_{2.5}$ concentration changes due to the Project's emissions. More details and inputs for the PGM modeling are included in Attachment B.

Following completion of the CAMx source apportionment modeling, Ramboll used the USEPA's BenMAP[15, 16] program to estimate the potential health effects of the Project's contribution to ozone and $PM_{2.5}$ concentrations. BenMAP uses the concentration estimates produced by CAMx, along with population and health effect concentration-response (C-R) functions, to estimate various health effects of the concentration increases. BenMAP has a wide history of applications by the USEPA and others, including for local-scale analysis[17] as needed for assessing the health effects of a project's emissions. We used the BenMAP health effects C-R functions that are typically used in national rulemaking, such as the health effects assessment[18] for the 2012 $PM_{2.5}$ National Ambient Air Quality Standard (NAAQS). The health endpoints used for $PM_{2.5}$ include mortality (all causes), hospital admissions (respiratory, asthma, cardiovascular), emergency room visits (asthma), and acute myocardial infarction (non-fatal). For ozone, the endpoints are mortality, emergency room

[14] Incremental average daily operational emissions in 2050 are higher than incremental average daily operational emissions from the Initial Phase Projects in year 2030, and higher than any maximum daily construction emissions from the Initial Phase Projects, and thus are considered the potential worst-case year of impacts.

[15] https://www.epa.gov/benmap/how-benmap-ce-estimates-health-and-economic-effects-air-pollution.

[16] https://www.epa.gov/sites/production/files/2015-04/documents/benmap-ce_user_manual_march_2015.pdf.

[17] https://www.epa.gov/benmap/benmap-ce-applications-articles-and-presentations#local.

[18] https://www3.epa.gov/ttn/naaqs/standards/pm/data/PM_RA_FINAL_June_2010.pdf.

visits (respiratory) and hospital admissions (respiratory). Details on the BenMAP inputs and outputs and definitions for the health effects are shown in Attachment C.

3. RESULTS

This section presents the results of the health effects analysis for the incremental increases in $PM_{2.5}$ and ozone resulting from primary and precursor emissions for these constituents. The results presented here describe the potential health effects of the criteria pollutant emissions associated with the Project, and the results themselves do not constitute a new significance determination.

There are a number of conservative assumptions built into this evaluation, beginning with the quantification of emissions themselves. These conservative assumptions include, but are not limited to, the following:

- Unmitigated emissions were conservatively modeled. Incorporation of reductions due to mitigation measures would result in lower health effect estimates;
- CPHP Mitigation Measures AIR-2a and 2b would require the implementation of additional TDM and other measures to reduce vehicle trips to the campus site. However, the reduction in PM_{10} and $PM_{2.5}$ emissions that would be achieved from the implementation of these measures cannot be reasonably estimated. Therefore, the results conservatively do not reflect vehicle miles traveled (VMT) reductions from these additional transportation demand management (TDM) measures;
- Assumption that health effects occur at any concentration, including small incremental concentrations (discussed further in Attachment C); and
- Assumption that all $PM_{2.5}$ is of equal toxicity (discussed further in Attachment C).

As such, results presented below are meant to represent an upper bound of potential health effects, and actual effects may be zero. For example, should health effects in fact only occur above a certain threshold, and the increment from the Project not cause an exceedance of that threshold, actual health effects could in fact be zero.

3.1 Potential Health Effects Associated with the Project

Overall, the estimated change in health effects from ozone and $PM_{2.5}$ associated with the Project's additional emissions are minimal relative to background incidences. Tables 3-1 and 3-2 below show the annual percent of background health incidence for $PM_{2.5}$ and Ozone health effects associated with the Project. The "background health incidence" is an estimate of the average number of people that suffer from some adverse health effect in a given population over a given period of time, in the absence of additional emissions from the Project. Health incidence rates and other health data are typically collected by the government as well as the World Health Organization. Background health incident rates presented in this report are over the full model domain, as defined in Attachment B, which has a projected population of 24,961,329 in 2050. Project-related health incidences occur both in closer proximity to Project emissions, particularly for $PM_{2.5}$ health effects (see Attachment B for maps of modeled concentration changes), or over a large area due to the regional nature of emission dispersion and photochemical reactions that occur, particularly for ozone health effects (concentration changes also shown in Attachment B). When taken into context, the small increase in incidences and the small percent of the number of background incidences indicate that these health effects are minimal in a developed environment.

Table 3-1. BenMAP-Estimated Annual Mean $PM_{2.5}$ Health Effects of the Project Emissions Across the Northern California Model Domain [1]

Health Endpoint[2]	Project Mean as Percent of Background Health Incidence (%) (Annual)	Background Health Incidence (Annual)
Emergency Room Visits, Asthma [0-99]	0.00078%	126,657
Mortality, All Cause [30-99]	0.00072%	327,475
Hospital Admissions, Asthma [0-64]	0.00049%	14,603
Hospital Admissions, All Cardiovascular (less Myocardial Infarctions) [65-99]	0.00011%	180,325
Hospital Admissions, All Respiratory [65-99]	0.00027%	155,122
Acute Myocardial Infarction, Nonfatal [18-24]	0.00030%	32
Acute Myocardial Infarction, Nonfatal [25-44]	0.00039%	1,657
Acute Myocardial Infarction, Nonfatal [45-54]	0.00036%	4,260
Acute Myocardial Infarction, Nonfatal [55-64]	0.00034%	8,464
Acute Myocardial Infarction, Nonfatal [65-99]	0.00032%	33,946

1 Health effects are shown terms of incidences of each health endpoint and how it compares to the base values (2050 base year health effect incidences or “background health incidence”). Health effects and background health incidences are across the Northern California model domain.
2 Affected age ranges are shown in square brackets.

Annual mean $PM_{2.5}$-related health effects attributed to Project-related increases in ambient air concentrations included asthma-related emergency room visits (0.99 incidences per year), asthma-related hospital admissions (0.07 incidences per year), all cardiovascular-related hospital admissions (not including myocardial infarctions) (0.20 incidences per year), all respiratory-related hospital admissions (0.42 incidences per year), mortality (2.36 incidences per year), and nonfatal acute myocardial infarction (0.16 incidences per year across all age groups).

Table 3-2. BenMAP-Estimated Annual Mean Ozone Health Effects of the Project Emissions Across the Northern California Model Domain[1]

Health Endpoint[2]	Project Mean as Percent of Background Health Incidence (%) (Annual)	Background Health Incidence (Annual)
Hospital Admissions, All Respiratory [65-99]	0.000066%	155,122
Mortality, Non-Accidental [0-99]	0.000027%	204,688
Emergency Room Visits, Asthma [0-17]	0.0011%	41,194
Emergency Room Visits, Asthma [18-99]	0.00089%	85,464

1 Health effects are shown terms of incidences of each health endpoint and how it compares to the base values (2050 base year health effect incidences, or "background health incidence"). Health effects and background health incidences are across the Northern California model domain.
2 Affected age ranges are shown in square brackets.

Annual mean ozone-related health effects attributed to Project-related increases in ambient air concentrations included respiratory-related hospital admissions (0.10 incidences per year), mortality (0.055 incidences per year), and asthma-related emergency room visits (0.47 incidences for ages 0-17 and 0.76 incidences for ages 18-99).

The health effects from ozone and $PM_{2.5}$ are minimal in light of background incidences. We did not quantify the potential health effects from other criteria air pollutants, consistent with how USEPA quantifies the health impacts and economic costs for criteria air pollutants (other than ozone and $PM_{2.5}$). Specifically, USEPA relies on studies that evaluate the health effects of $PM_{2.5}$ as a surrogate for general PM effects (including PM_{10}) in health effect assessments (e.g., USEPA, 2012). In addition, for NO_2, USEPA has noted that uncertainty remains regarding the independent effects of NO_2 from other air pollutants, including ozone and $PM_{2.5}$ (USEPA, 2016). Additionally, in 2017, USEPA concluded that a quantitative risk assessment was not supported for NO_2, stating that there were significant limitations in the available epidemiological studies including "the potential for co-pollutant confounding of the NO_2 association, potential bias due to exposure measurement error, and the shape of the concentration-response function." (USEPA, 2017)

3.2 Potential Health Effects Associated with Operation of the Initial Phase Projects [Irving Street Arrival, Research and Academic Building, and Initial Aldea Housing Densification]

Incremental operational emissions associated with the Initial Phase Projects were estimated for the year of buildout (2030) in the EIR. Initial Phase Projects include Irving Street Arrival, Research and Academic Building, and initial Aldea housing densification and do not include the New Hospital. Emissions associated with these projects include emissions from architectural coatings, VOCs in consumer products, landscaping equipment, emergency generators, CUP, and emissions associated with motor vehicle use. Details of these emissions are shown in Attachment A.

The potential health effects from the emissions associated with the Initial Phase Projects can be generally characterized using the full Project level modeling results and a comparison of total emissions. This is because the types and general spatial allocation of emissions is similar between the Initial Phase Projects and the full Project buildout. Emissions from the Initial Phase Projects would also be subject to similar meteorological and photochemical reaction conditions as the full Project assessment. Additionally, the exposed population at full buildout in 2050 is greater than the exposed population in 2030, due to project growth in the region. Therefore, linearly scaling full Project buildout health effects to estimate Initial Phase Projects health effects is conservative.

Concentrations changes, and thus health effects, from $PM_{2.5}$ are driven by primary $PM_{2.5}$ emissions (see Attachment B), with smaller contributions from NOx, VOC, and SO_2 resulting in secondary $PM_{2.5}$ formation. Based on a ratio of total $PM_{2.5}$ emissions from the full Project to Initial Phase Projects $PM_{2.5}$ emissions, approximate health effect results from $PM_{2.5}$ for the Initial Phase Projects would be approximately 80% lower than those from the full Project buildout.

Concentration changes, and thus health effects, from ozone are driven primarily by emissions of VOC and NOx, with some contribution from CO. Based on a ratio of total VOC and NOx emissions from the full Project to Initial Phase Projects VOC and NOx emissions, approximate health effect results from ozone for the Initial Phase Projects would be approximately 80% lower than those from the full Project buildout.

3.3 Potential Health Effects Associated with Construction [Initial Phase Projects and the New Hospital]

Construction emissions were quantified both for the Initial Phase Projects (Irving Street Arrival, Research and Academic Building, and initial Aldea housing densification) and the New Hospital for years 2022 through 2029. Details of phasing and sequencing in 2030 and beyond are not yet available and thus emissions, including potential overlapping construction and operational emissions, cannot be accurately quantified beyond that year. Details of these emissions are provided in Attachment A. As shown there, maximum daily emissions associated with construction activity are a fraction of incremental 2050 emissions evaluated under the full Project buildout, and thus any potential health effects resulting from such construction activity would be less than what has been modeled for the full Project buildout.

3.4 Uncertainty

Analyses that evaluate the changes in concentrations resulting from individual sources and the health impacts of increases or decreases in pollutants as a result of regulation on a localized basis are routinely done. This analysis does not tie the changes in concentration to a specific health effect in an individual; however, it does use scientific correlations of certain types of health effects from pollution to estimate effects on the population at large.

There is a degree of uncertainty in these results from a combination of the uncertainty in the emissions themselves, the change in concentration resulting from the PGM, and the uncertainty of the application of the C-R functions. All simulations of physical processes, whether ambient air concentrations or health effects from air pollution, have a level of uncertainty associated with them due to simplifying assumptions. The overall uncertainty is a combination of the uncertainty associated with each piece of the modeling study, in this case, the emissions quantification, the emissions model, the PGM, and BenMAP. While these results reflect a level of uncertainty, regulatory agencies, including the USEPA have judged that, even with the uncertainty, they provide sufficient information to the public to allow them to understand the potential health effects of increases or decreases in air pollution.

3.4.1 PGM Uncertainty

PGMs generally represent the state-of-the-science when the treatment of photochemically formed air pollution is required over multiple spatial scales (e.g., from single-source to continental). PGMs are part of a modeling system in which there are several other major components that determine model performance, including meteorology, emissions inventories (including background), and chemical mechanisms, all of which have associated uncertainties, as discussed further in Attachment B.

Despite these complexities and associated uncertainties, the USEPA recommends using PGMs for a variety of applications including State Implementation Plans and Regional Haze Planning, and CAMx or CMAQ specifically for single-source modeling of ozone and secondary $PM_{2.5}$. The USEPA believes that the relative change in the PGM-predicted concentrations (e.g., the incremental changes due to the emissions from a single-source) is more accurate and reliable than the total predicted concentrations (USEPA, 2018).

3.4.2 C-R Function Uncertainty

The approach and methodology of this analysis ensures that the uncertainty is of a conservative nature. In addition to the conservative assumptions built into the emissions noted above, there are a number of assumptions built into the application of C-R functions in BenMAP that may lead to an overestimation of health effects. For example, for all-cause mortality impacts from $PM_{2.5}$, these estimates are based on a single epidemiological study that found an association between $PM_{2.5}$ concentrations and mortality. While similar studies suggest that such an association exists, there remains uncertainty regarding a clear causal link. The USEPA has also stated that results from various studies have shown the importance of considering particle size, composition, and particle source in determining the health effects of PM (USEPA, 2009). Further, the USEPA (2009) found that studies have reported that particles from industrial sources and from coal combustion appear to be the most significant contributors to PM-related mortality, consistent with the findings by Rohr and Wyzga (2012) and others. This is particularly important to note here, as the majority of PM emissions generated from the Project are from brakewear, tirewear, and entrained roadway dust (see Attachment A), and not from combustion. Therefore, by not considering the relative toxicity of PM components, the results presented here are conservative.

For both the $PM_{2.5}$ and ozone health effects calculated, each of the pollutants may be a confounder of the other. That is, in studies that only evaluate health effects from $PM_{2.5}$ exposures, the observed health effects could actually be partly due to ozone, but are attributed fully to $PM_{2.5}$, yielding a higher effect estimate for $PM_{2.5}$. Thus, because C-R functions are from studies that evaluated the effects for each pollutant individually, but both air pollutants could actually contribute to the health effect outcomes evaluated, the overall impacts from each pollutant may be overstated.

Another uncertainty highlighted by the USEPA (2012) which applies to potential health effects from both $PM_{2.5}$ and ozone, is the assumption of a log-linear response between exposure and health effects, without consideration for a threshold concentration below which effects may not be measurable. Without consideration of a threshold concentration, any changes in air pollution are assumed to adversely affect health. The health effects estimation using this method presumes that effects seen at large concentration differences can be linearly scaled down to small concentration differences, with no consideration of potential threshold concentrations, below which health effects may not occur. In summary, health effects presented in this report are conservatively estimated, and the actual effects may be zero.

Additional discussion of the uncertainty associated with C-R functions and health effect estimates is included in Attachment C.

4. REFERENCES

Kelly, F.J., J.C. Fussell, 2007. Particulate Toxicity Ranking Report. Report Number 2/07. Environmental Research Group, Kings College, London.

Lippmann, M., L.C. Chen, 2009. Health effects of concentrated ambient air particulate matter (CAPs) and its components. *Crit. Rev. Toxicol*., 39, 865e913.

Rohr A.C., R.E. Wyzga, 2012. Attributing Health Effects to Individual Particulate Matter Constituents. *Atmos Environ*., 62, 130-152. doi:10.1016/j.atmosenv.07.036.

USEPA, 2009. Integrated Science Assessment (ISA) For Particulate Matter (Final Report, Dec 2009). U.S. Environmental Protection Agency, Washington, DC, EPA/600/R-08/139F, 2009. https://cfpub.epa.gov/ncea/isa/recordisplay.cfm?deid=216546

USEPA, 2010. Quantitative Health Risk Assessment for Particulate Matter. Office of Air Quality Planning and Standards, U.S. Environmental Protection Agency. EPA-452/R-10-005. June 2010. Available: https://www3.epa.gov/ttn/naaqs/standards/pm/data/PM_RA_FINAL_June_2010.pdf.

USEPA, 2012. Regulatory Impact Analysis for the Final Revisions to the National Ambient Air Quality Standards for Particulate Matter. U.S. Environmental Protection Agency, Washington, DC, EPA-452/R-12-005. https://www3.epa.gov/ttn/ecas/docs/ria/naaqs-pm_ria_final_2012-12.pdf.

USEPA, 2016. Integrated Science Assessment (ISA) For Oxides of Nitrogen – Health Criteria U.S. Environmental Protection Agency, Washington, DC, EPA/600/R-15/068. https://cfpub.epa.gov/ncea/isa/recordisplay.cfm?deid=310879

USEPA, 2017. Policy Assessment for the Review of the Primary National Ambient Air Quality Standards for Oxides of Nitrogen. U.S. Environmental Protection Agency, Washington, DC, EPA-452/R-17-003. https://www.epa.gov/sites/production/files/2017-04/documents/policy_assessment_for_the_review_of_the_no2_naaqs_-_final_report.pdf

USEPA. 2018. Modeling Guidance for Demonstrating Air Quality Goals for Ozone, PM2.5, and Regional Haze. U.S. Environmental Protection Agency, Office of Air Quality Planning and Standards, Air Assessment Division. Research Triangle Park, NC. EPA 454/R-18-009. November 29. https://www3.epa.gov/ttn/scram/guidance/guide/O3-PM-RH-Modeling_Guidance-2018.pdf.

ATTACHMENT A
EMISSIONS INVENTORY, SPATIAL ALLOCATION, AND SMOKE SETUP

1. INTRODUCTION

Operational emissions from the Project were estimated using the California Emissions Estimator Model (CalEEMod®) and Project-specific data, where available. The model employs widely accepted calculation methodologies for emission estimates combined with appropriate default data if site-specific information is not available.

Annual emission estimates from the Project need to be spatially gridded, temporally allocated, and chemically speciated to be used for photochemical grid modeling. The Sparse Matrix Operator Kerner Emissions (SMOKE) emissions modeling system (Coats, 1996; Coats and Houyoux, 1996)[19] is used for this process.

2. PROJECT EMISSIONS AND SPATIAL ALLOCATION

Emissions were estimated for the Project to support the photochemical grid model (PGM) and are allocated into 4 km x 4 km grid cells. This section describes those emissions and how they were spatially allocated.

2.1 Project Emissions and Spatial Allocation

For use in PGMs, emissions must be spatially allocated over the area so that they can be incorporated into the baseline gridded emission inventory, as developed by the Bay Area Air Quality Management District (BAAQMD), and adapted for this analysis as discussed in Attachment B. The average daily 2050 incremental emission inventory for the Project is shown below in Table 2-1.[20] Incremental emissions were calculated as the difference between the 2050 full Project buildout emissions and a hypothetical 2050 no-Project condition approximated using the 2019 baseline operational activity scaled for 2050 emission factors. This is the appropriate increment to model over a 2050 base year, which accounts for background travel projected to 2050. This increment is notably different than that used for comparison to BAAQMD California Environmental Quality Act (CEQA) thresholds of significance, which subtracts a 2019 Baseline, and thus will not match what is presented in Draft EIR Section 4.2 Air Quality. As such, this analysis is more conservative than that presented in the Air Quality Section as here a larger Project increment is evaluated.

Project emissions modeled in the PGM include oxides of nitrogen (NOx), reactive organic gases (ROG), fine primary particulate matter ($PM_{2.5}$), carbon monoxide (CO), and sulfur dioxide (SO_2). Since some of these pollutants incorporate a wide range of chemical species (e.g., ROG and PM), the Project emissions were further speciated into detailed chemical species or groups of species to be used as inputs for the PGM's robust chemistry solver. NO_X and ROG are precursors to ozone and, along with SO_2, are also precursors to secondarily formed $PM_{2.5}$. CO also plays a smaller role in the formation of ozone and is thus conservatively evaluated here. Mobile source emissions were split into categories based on the EMFAC2017 emission rates. For PM, less than 2.5 microns in diameter ($PM_{2.5}$) emissions are used in the modeling; less than 10 microns in diameter (PM_{10}) emissions are presented for information below.

---

[19] https://www.cmascenter.org/smoke/

[20] Average daily emissions are modeled here as the Project's operations are generally consistent throughout the year.

Table 2-1. Average Daily 2050 Incremental Emissions, Full Project Buildout

Emission Category	NOx	ROG[21]	PM_{10}	$PM_{2.5}$	SO_2	CO
	lbs/day	lbs/day	lbs/day	lbs/day	lbs/day	lbs/day
Mobile	117	38	123	36	1.6	434
Diurnal	--	1.8	--	--	--	--
Hotsoak	--	4.2	--	--	--	--
Idling Exhaust	0.89	0.88	1.9E-04	3.9E-04	0.0039	13
Brakewear	--	--	0.79	0.78	--	--
Tirewear	--	--	0.17	0.10	--	--
Resting Loss	--	1.9	--	--	--	--
Road Dust	--	--	122	35	--	--
Running Exhaust	57	2.6	0.019	0.040	1.5	252
Running Loss	--	18	--	--	--	--
Starting Exhaust	59	8.2	0.0024	0.0051	0.047	170
Architectural Coatings	--	6.0	--	--	--	--
Consumer Products	--	31	--	--	--	--
Landscaping	8.2E-04	0.0087	3.3E-04	3.3E-04	--	0.10
Energy	2.1	0.23	0.16	0.16	0.012	1.7
Emergency Generators	1.0	0.0059	0.020	0.020	0.0020	0.34
Central Utility Plant	4.9	3.2	8.8	8.2	0.80	11
Total	125	79	132	44	2.4	447

All emissions listed in Table 2-1 represent the average daily incremental operational emissions estimated for the proposed Project's 2050 buildout scenario. Emissions were derived following methodologies as outlined in Draft EIR Section 4.2 Air Quality.

Mobile emissions include light, medium, and heavy-duty vehicles. Table 2-2 below provides a summary of the spatial distribution of mobile emissions broken down by primary routes taken to and from the campus. Values in this table were calculated based on estimated trip counts split by faculty/staff/students, patients/visitors, and residents, along with average trip distances on primary routes.[22]

[21] ROG means total organic gases minus ARB's "exempt" compounds (e.g., methane, ethane, CFCs, etc.). ROG is similar, but not identical, to USEPA's term "VOC", which is based on USEPA's exempt list, which is slightly different from ARB's list. ROG emissions are modeled as VOC emissions in this assessment.

[22] Trip route distribution percentages were calculated from data in EIR Chapter 4.15 (Tables 4.15-10 and 4.15-11) in combination with detailed trip length and route endpoint data provided by the Adavant Consulting (email communication, April 9, 2020).

Table 2-2. Mobile Emission Distribution

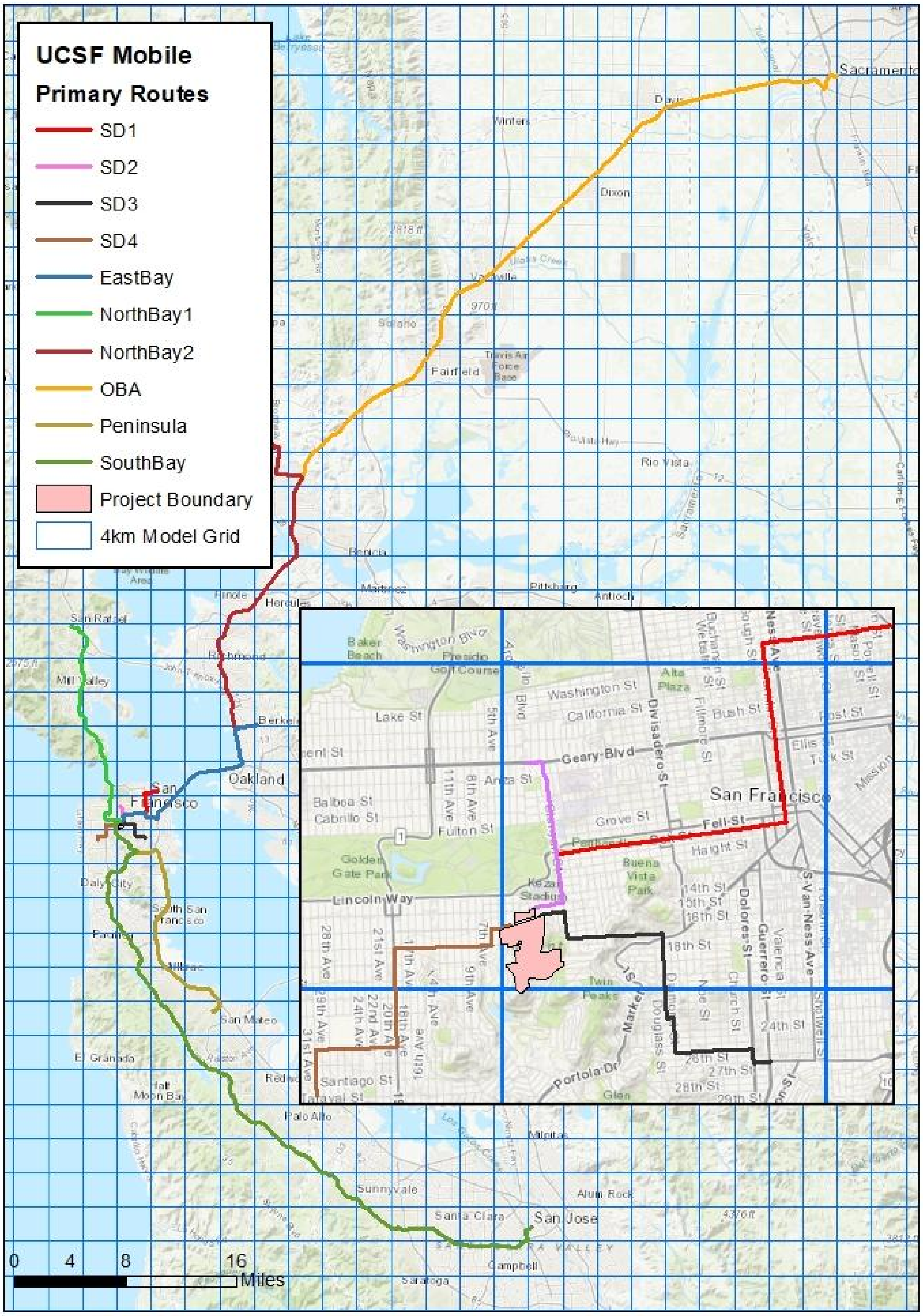
Primary Routes	Distribution (%)[1]
Northeast San Francisco Super District (SD1)	1.3
Northwest San Francisco Super District (SD2)	0.75
Southeast San Francisco Super District (SD3)	2.8
Southwest San Francisco Super District (SD4)	1.6
East Bay	21
North Bay 1	8.9
North Bay 2	4.6
Outside Bay Area (OBA)	39
Peninsula	15
South Bay	5.2

Note:
1. Total may not add to 100 percent due to rounding.

Project emissions are allocated across the Project site into 4 km x 4 km grid cells for the PGM. Figure 2-1 below shows the Project boundary overlaid with the 4-km grid. The Project site is shown in peach, and the primary routes are shown in varied colors.[23] For primary routes that cross into multiple cells, emissions were allocated proportionally based on the length of roadway within each cell.

[23] The spatial distribution of the primary routes was determined based on route endpoint data provided by Adavant Consulting (email communication, April 9, 2020). For zones with multiple endpoints (i.e. East Bay) the emissions are mapped up to the point where the main route splits, or they are split into two routes (e.g. NorthBay 1 and NorthBay 2).

Figure 2-1. Overlap of Model Grid Cells on Project Site and Primary Routes



2.2 Converting Project Inventories to SMOKE Input Format

The first step in the emissions processing was to convert the Project emission inventory into the Flat File 2010 (FF10) format for input to SMOKE. We assigned appropriate Source Classification Codes (SCCs) to the Project emissions sources. Table 2-3 provides SCC assigned to each project source.

Table 2-3. Assigned SCC to Project Emission Sources

Emission Source	SCC	SCC Description
Energy	2103006000	Stationary Source Fuel Combustion; Commercial/Institutional; Natural Gas; Total: Boilers and IC Engines
Mobile -LDA	220100111B	Mobile Sources; Highway Vehicles - Gasoline; Light Duty Gasoline Vehicles (LDGV); Rural[24] Interstate: Brake Wear
Mobile -LDA	220100111R	Mobile Sources; Highway Vehicles - Gasoline; Light Duty Gasoline Vehicles (LDGV); Rural Interstate: Resting Loss
Mobile -LDA	220100111S	Mobile Sources; Highway Vehicles - Gasoline; Light Duty Gasoline Vehicles (LDGV); Rural Interstate: Start
Mobile -LDA	220100111T	Mobile Sources; Highway Vehicles - Gasoline; Light Duty Gasoline Vehicles (LDGV); Rural Interstate: Tire Wear
Mobile -LDA	220100111V	Mobile Sources; Highway Vehicles - Gasoline; Light Duty Gasoline Vehicles (LDGV); Rural Interstate: Evap (except Refueling)
Mobile -LDA	220100111X	Mobile Sources; Highway Vehicles - Gasoline; Light Duty Gasoline Vehicles (LDGV); Rural Interstate: Exhaust
Mobile -LDT1	220102011B	Mobile Sources; Highway Vehicles - Gasoline; Light Duty Gasoline Trucks 1 & 2 (M6) = LDGT1 (M5); Rural Interstate: Brake Wear
Mobile -LDT1	220102011R	Mobile Sources; Highway Vehicles - Gasoline; Light Duty Gasoline Trucks 1 & 2 (M6) = LDGT1 (M5); Rural Interstate: Resting Loss
Mobile -LDT1	220102011S	Mobile Sources; Highway Vehicles - Gasoline; Light Duty Gasoline Trucks 1 & 2 (M6) = LDGT1 (M5); Rural Interstate: Start
Mobile -LDT1	220102011T	Mobile Sources; Highway Vehicles - Gasoline; Light Duty Gasoline Trucks 1 & 2 (M6) = LDGT1 (M5); Rural Interstate: Tire Wear
Mobile -LDT1	220102011V	Mobile Sources; Highway Vehicles - Gasoline; Light Duty Gasoline Trucks 1 & 2 (M6) = LDGT1 (M5); Rural Interstate: Evap (except Refueling)
Mobile -LDT1	220102011X	Mobile Sources; Highway Vehicles - Gasoline; Light Duty Gasoline Trucks 1 & 2 (M6) = LDGT1 (M5); Rural Interstate: Exhaust
Mobile -HHDT	2201070110	Mobile Sources; Highway Vehicles - Gasoline; Heavy Duty Gasoline Vehicles 2B thru 8B & Buses (HDGV); Rural Interstate: Total
Mobile -HHDT	220107011B	Mobile Sources; Highway Vehicles - Gasoline; Heavy Duty Gasoline Vehicles 2B thru 8B & Buses (HDGV); Rural Interstate: Brake Wear
Mobile -LHDT1	220107011I	Mobile Sources; Highway Vehicles - Gasoline; Heavy Duty Gasoline Vehicles 2B thru 8B & Buses (HDGV); Rural Interstate: Idling
Mobile -HHDT	220107011R	Mobile Sources; Highway Vehicles - Gasoline; Heavy Duty Gasoline Vehicles 2B thru 8B & Buses (HDGV); Rural Interstate: Resting Loss

[24] Rural and Urban mobile designations provide equivalent chemical speciation and temporal distributions, as the EMFAC mobile emissions model does not distinguish between the two.

Table 2-3. Assigned SCC to Project Emission Sources

Emission Source	SCC	SCC Description
Mobile -HHDT	220107011S	Mobile Sources; Highway Vehicles - Gasoline; Heavy Duty Gasoline Vehicles 2B thru 8B & Buses (HDGV); Rural Interstate: Start
Mobile -HHDT	220107011T	Mobile Sources; Highway Vehicles - Gasoline; Heavy Duty Gasoline Vehicles 2B thru 8B & Buses (HDGV); Rural Interstate: Tire Wear
Mobile -HHDT	220107011V	Mobile Sources; Highway Vehicles - Gasoline; Heavy Duty Gasoline Vehicles 2B thru 8B & Buses (HDGV); Rural Interstate: Evap (except Refueling)
Mobile -HHDT	220107011X	Mobile Sources; Highway Vehicles - Gasoline; Heavy Duty Gasoline Vehicles 2B thru 8B & Buses (HDGV); Rural Interstate: Exhaust
Mobile -OBUS	220107013B	Mobile Sources; Highway Vehicles - Gasoline; Heavy Duty Gasoline Vehicles 2B thru 8B & Buses (HDGV); Rural Other Principal Arterial: Brake Wear
Mobile -OBUS	220107013I	Mobile Sources; Highway Vehicles - Gasoline; Heavy Duty Gasoline Vehicles 2B thru 8B & Buses (HDGV); Rural Other Principal Arterial: Idling
Mobile -OBUS	220107013R	Mobile Sources; Highway Vehicles - Gasoline; Heavy Duty Gasoline Vehicles 2B thru 8B & Buses (HDGV); Rural Other Principal Arterial: Resting Loss
Mobile -OBUS	220107013S	Mobile Sources; Highway Vehicles - Gasoline; Heavy Duty Gasoline Vehicles 2B thru 8B & Buses (HDGV); Rural Other Principal Arterial: Start
Mobile -OBUS	220107013T	Mobile Sources; Highway Vehicles - Gasoline; Heavy Duty Gasoline Vehicles 2B thru 8B & Buses (HDGV); Rural Other Principal Arterial: Tire Wear
Mobile -OBUS	220107013V	Mobile Sources; Highway Vehicles - Gasoline; Heavy Duty Gasoline Vehicles 2B thru 8B & Buses (HDGV); Rural Other Principal Arterial: Evap (except Refueling)
Mobile -OBUS	220107013X	Mobile Sources; Highway Vehicles - Gasoline; Heavy Duty Gasoline Vehicles 2B thru 8B & Buses (HDGV); Rural Other Principal Arterial: Exhaust
Mobile -OBUS	2201070130	Mobile Sources; Highway Vehicles - Gasoline; Heavy Duty Gasoline Vehicles 2B thru 8B & Buses (HDGV); Rural Other Principal Arterial: Total
Mobile -MCY	220108011B	Mobile Sources; Highway Vehicles - Gasoline; Motorcycles (MC); Rural Interstate: Brake Wear
Mobile -MCY	220108011R	Mobile Sources; Highway Vehicles - Gasoline; Motorcycles (MC); Rural Interstate: Resting Loss
Mobile -MCY	220108011S	Mobile Sources; Highway Vehicles - Gasoline; Motorcycles (MC); Rural Interstate: Start
Mobile -MCY	220108011T	Mobile Sources; Highway Vehicles - Gasoline; Motorcycles (MC); Rural Interstate: Tire Wear
Mobile -MCY	220108011V	Mobile Sources; Highway Vehicles - Gasoline; Motorcycles (MC); Rural Interstate: Evap (except Refueling)
Mobile -MCY	220108011X	Mobile Sources; Highway Vehicles - Gasoline; Motorcycles (MC); Rural Interstate: Exhaust

Table 2-3. Assigned SCC to Project Emission Sources

Emission Source	SCC	SCC Description
Mobile -LDA	223000111B	Mobile Sources; Highway Vehicles - Diesel; Light Duty Diesel Vehicles (LDDV); Rural Interstate: Brake Wear
Mobile -LDA	223000111T	Mobile Sources; Highway Vehicles - Diesel; Light Duty Diesel Vehicles (LDDV); Rural Interstate: Tire Wear
Mobile -LDA	223000111X	Mobile Sources; Highway Vehicles - Diesel; Light Duty Diesel Vehicles (LDDV); Rural Interstate: Exhaust
Mobile -LDT1	223006011B	Mobile Sources; Highway Vehicles - Diesel; Light Duty Diesel Trucks 1 thru 4 (M6) (LDDT); Rural Interstate: Brake Wear
Mobile -LDT1	223006011T	Mobile Sources; Highway Vehicles - Diesel; Light Duty Diesel Trucks 1 thru 4 (M6) (LDDT); Rural Interstate: Tire Wear
Mobile -LDT1	223006011X	Mobile Sources; Highway Vehicles - Diesel; Light Duty Diesel Trucks 1 thru 4 (M6) (LDDT); Rural Interstate: Exhaust
Mobile -LHDT1	223007111B	Mobile Sources; Highway Vehicles - Diesel; Heavy Duty Diesel Vehicles (HDDV) Class 2B; Rural Interstate: Brake Wear
Mobile -LHDT1	223007111I	Mobile Sources; Highway Vehicles – Diesel; Heavy Duty Diesel Vehicles (HDDV) Class 2B; Rural Interstate: Idling
Mobile -LHDT1	223007111T	Mobile Sources; Highway Vehicles - Diesel; Heavy Duty Diesel Vehicles (HDDV) Class 2B; Rural Interstate: Tire Wear
Mobile -LHDT1	223007111X	Mobile Sources; Highway Vehicles - Diesel; Heavy Duty Diesel Vehicles (HDDV) Class 2B; Rural Interstate: Exhaust
Mobile -MHDT	2230072110	Mobile Sources; Highway Vehicles - Diesel; Heavy Duty Diesel Vehicles (HDDV) Class 3, 4, & 5; Rural Interstate: Total
Mobile -LHDT2	223007211B	Mobile Sources; Highway Vehicles - Diesel; Heavy Duty Diesel Vehicles (HDDV) Class 3, 4, & 5; Rural Interstate: Brake Wear
Mobile -LHDT2	223007211I	Mobile Sources; Highway Vehicles - Diesel; Heavy Duty Diesel Vehicles (HDDV) Class 3, 4, & 5; Rural Interstate: Idling
Mobile -LHDT2	223007211T	Mobile Sources; Highway Vehicles - Diesel; Heavy Duty Diesel Vehicles (HDDV) Class 3, 4, & 5; Rural Interstate: Tire Wear
Mobile -LHDT2	223007211X	Mobile Sources; Highway Vehicles - Diesel; Heavy Duty Diesel Vehicles (HDDV) Class 3, 4, & 5; Rural Interstate: Exhaust
Mobile -HHDT	223007311B	Mobile Sources; Highway Vehicles - Diesel; Heavy Duty Diesel Vehicles (HDDV) Class 6 & 7; Rural Interstate: Brake Wear
Mobile -HHDT	223007311I	Mobile Sources; Highway Vehicles - Diesel; Heavy Duty Diesel Vehicles (HDDV) Class 6 & 7; Rural Interstate: Idling
Mobile -HHDT	223007311S	Mobile Sources; Highway Vehicles - Diesel; Heavy Duty Diesel Vehicles (HDDV) Class 6 & 7; Rural Interstate: Start
Mobile -HHDT	223007311T	Mobile Sources; Highway Vehicles - Diesel; Heavy Duty Diesel Vehicles (HDDV) Class 6 & 7; Rural Interstate: Tire Wear

Table 2-3. Assigned SCC to Project Emission Sources

Emission Source	SCC	SCC Description
Mobile -HHDT	223007311X	Mobile Sources; Highway Vehicles - Diesel; Heavy Duty Diesel Vehicles (HDDV) Class 6 & 7; Rural Interstate: Exhaust
Mobile -OBUS	223007513B	Mobile Sources; Highway Vehicles - Diesel; Heavy Duty Diesel Buses (School & Transit); Rural Other Principal Arterial: Brake Wear
Mobile -OBUS	223007513I	Mobile Sources; Highway Vehicles - Diesel; Heavy Duty Diesel Buses (School & Transit); Rural Other Principal Arterial: Idling
Mobile -OBUS	223007513S	Mobile Sources; Highway Vehicles - Diesel; Heavy Duty Diesel Buses (School & Transit); Rural Other Principal Arterial: Start
Mobile -OBUS	223007513T	Mobile Sources; Highway Vehicles - Diesel; Heavy Duty Diesel Buses (School & Transit); Rural Other Principal Arterial: Tire Wear
Mobile -OBUS	223007513X	Mobile Sources; Highway Vehicles - Diesel; Heavy Duty Diesel Buses (School & Transit); Rural Other Principal Arterial: Exhaust
Fugitive Dust	2294000000	Mobile Sources; Paved Roads; All Paved Roads; Total: Fugitives
Landscaping Equipment	2265004010	Mobile Sources; Off-highway Vehicle Gasoline, 4-Stroke; Lawn and Garden Equipment; Lawn Mowers (Residential)
Central Utility Plant	20300202	Internal Combustion Engines; Commercial/Institutional; Natural Gas; Turbine
Emergency Generators	20300101	Internal Combustion Engines; Commercial/Institutional; Distillate Oil (Diesel); Reciprocating
Architectural Coating	2401001000	Solvent Utilization; Surface Coating; Architectural Coatings; Total: All Solvent Types
Consumer Products	2460000000	Solvent Utilization; Miscellaneous Non-industrial: Consumer and Commercial; All Processes; Total: All Solvent Types
Consumer Products	2460100000	Solvent Utilization; Miscellaneous Non-industrial: Consumer and Commercial; All Personal Care Products; Total: All Solvent Types
Consumer Products	2460200000	Solvent Utilization; Miscellaneous Non-industrial: Consumer and Commercial; All Household Products; Total: All Solvent Types
Consumer Products	2460400000	Solvent Utilization; Miscellaneous Non-industrial: Consumer and Commercial; All Automotive Aftermarket Products; Total: All Solvent Types
Consumer Products	2460500000	Solvent Utilization; Miscellaneous Non-industrial: Consumer and Commercial; All Coatings and Related Products; Total: All Solvent Types
Consumer Products	2460600000	Solvent Utilization; Miscellaneous Non-industrial: Consumer and Commercial; All Adhesives and Sealants; Total: All Solvent Types
Consumer Products	2460800000	Solvent Utilization; Miscellaneous Non-industrial: Consumer and Commercial; All FIFRA Related Products; Total: All Solvent Types

Table 2-3. Assigned SCC to Project Emission Sources

Emission Source	SCC	SCC Description
Consumer Products	2460900000	Solvent Utilization; Miscellaneous Non-industrial: Consumer and Commercial; Miscellaneous Products (Not Otherwise Covered); Total: All Solvent Types

2.2.1 Generate Spatial Surrogates for 4-km Domains

As part of the analysis, the Project source emissions need to be spatially allocated to appropriate geographic locations. The emissions can be allocated to modeling grid cells using gridding surrogates. To process the Project emissions, a Project area-based spatial surrogate was developed. The surrogate was developed using the US Environmental Protection Agency (USEPA's) Spatial Allocation Tool,[25] which combines geographical information system (GIS)-based data (shapefiles) and modeling domain definitions to generate the appropriate gridded surrogate data set. The Project sources were then assigned specific surrogates for gridding by cross-referencing the SCCs. As mentioned above, all Project emissions were distributed in the modeling grid cells where the Project is located as shown in Figure 2-1. The mobile sources were spatially distributed in the site's grid cells and surrounding grid cells, as outlined in Table 2-2.

2.2.2 SMOKE 4 km Processing of Project Emissions

SMOKE system was used to process emissions for the Northern California 4-km modeling grid shown in Figure 2-1. Although CAMx is run for each day of the year using each day's meteorological data, emissions are processed using a representative week from each month (seven days a month) to represent the entire month's emissions. This method is used for emissions to avoid redundancy in data and save disk space and computational time since emissions, temporally, during one week of a given month are likely very similar to emissions from a different week of the same month. Holidays were modeled separately as if they were a Sunday. SMOKE was applied to perform following tasks:

1. <u>Chemical Speciation</u>: Emission estimates of criteria air pollutants were speciated for the SAPRC07 AERO6 chemical mechanism employed in CMAQ in SMOKE processing. We used speciation profiles compatible with the SAPRC07 AERO6 mechanism for PM2.5 from the BAAQMD's modeling system to be consistent with the regional modeling emissions. We then converted those emissions into CAMx-ready formats using CMAQ2CAMx conversion program and species mapping.
2. <u>Temporal Allocation</u>: Annual emission estimates were resolved on an hourly timescale for CAMx modeling. These allocations were determined from the particular source category, specified by the SCC. Monthly, weekly, and diurnal profiles were cross-referenced to SCC to provide the appropriate temporal resolution. The temporal profiles were also obtained from the BAAQMD's emissions modeling system.
3. <u>Spatial Allocation</u>: The Project emission estimates were spatially resolved to the grid cells for modeling using spatial surrogates as described above.

[25] https://www.cmascenter.org/sa-tools/documentation/4.2/html/srgtool/SurrogateToolUserGuide_4_2.pdf

2.2.3 QA/QC of Emissions Modeling

Standard quality assurance/quality control (QA/QC) was conducted during all aspects of the SMOKE emissions processing. These steps followed the approach recommended in USEPA modeling guidance (USEPA, 2007). SMOKE includes quality assurance (QA) and reporting features to keep track of the adjustments at each processing stage and ensure that data integrity is not compromised. We carefully reviewed the SMOKE log files for error messages and ensured that appropriate source profiles were used. All error records reported during processing were reviewed and resolved. This is important to ensure that source categories are correctly characterized. We also compared SMOKE input and output emissions: Summary tables were generated to compare input inventory totals against model-ready output totals to confirm consistency. Spatial plots were generated to visually verify correct spatial allocation of the emissions.

2.2.4 Merge SMOKE Pre-merged Emissions to Generate CAMx-ready Emission Inputs

The final step in the emissions processing is to merge the Project gridded emissions with other regional components through the gridded merge program (MRGUAM) for CAMx. We merged the daily emissions in the time format required by CAMx.

2.2.5 Emissions Summary

Summaries of the Project gridded CAMx model-ready emissions data are provided in this section. Table 2-4 and Table 2-5 summarize the annual emission inventory data input to SMOKE from the FF10 data files in pounds per day by project source types, by pollutants and by project regions. The consistency in data in Table 2-4 and Table 2-5 as well as Table 2-1 offer confidence in the correct operation of the SMOKE emissions processing for CAMx.

Table 2-4. Project Emission Inventory Data Input to SMOKE by Source Type (2050, Average lbs/day)

Type	NO_X	VOC	PM_{10}	$PM_{2.5}$	SO_2	CO
Mobile	117	38	123	36	1.6	434
Architectural Coatings	--	6.0	--	--	--	--
Consumer Products	--	31	--	--	--	--
Landscaping	8.2E-04	0.0087	3.3E-04	3.3E-04	0.0E+00	0.10
Energy	2	0.2	0.16	0.16	0.01	2
Emergency Generators	1.0	0.01	0.02	0.02	0.002	0.34
Central Utility Plant	5	3.2	9	8	0.8	11
Total	125	79	132	44	2.4	447

Table 2-5. Project Emission Inventory Data Output from SMOKE by Project Region (2050, Average lbs/day)

Type	NO_X	VOC	PM_{10}	$PM_{2.5}$	SO_2	CO
Onsite	42	59	18	11	1.0	124
Offsite	83	20	114	33	1.4	324
Total	125	79	132	44	2.4	447

Spatial displays of the gridded emissions data are presented below. We examined the gridded emissions in 4-km grid to verify accurate spatial allocation by SMOKE. Figures 2-2 through 2-7 displays gridded emissions for the Project inventory in the 4-km modeling grid.[26]

[26] Emissions of each pollutant are spatially allocated across all grid cells where emissions are present, however, some grid cells may show as blank in the Figures below due to the color scale.

Figure 2-2. Spatial Distribution of NO_x Emissions (in lbs/day) for the Project in the Northern California 4-km Domain

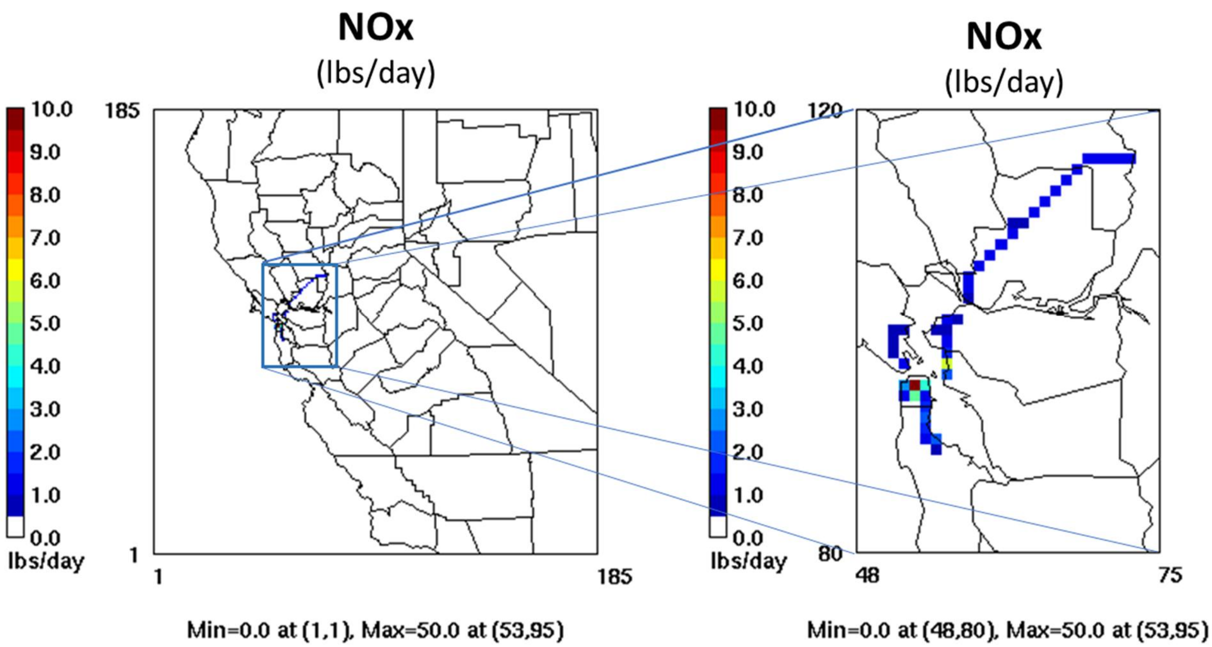


Figure 2-3. Spatial Distribution of VOC Emissions (in lbs/day) for the Project in the Northern California 4-km Domain

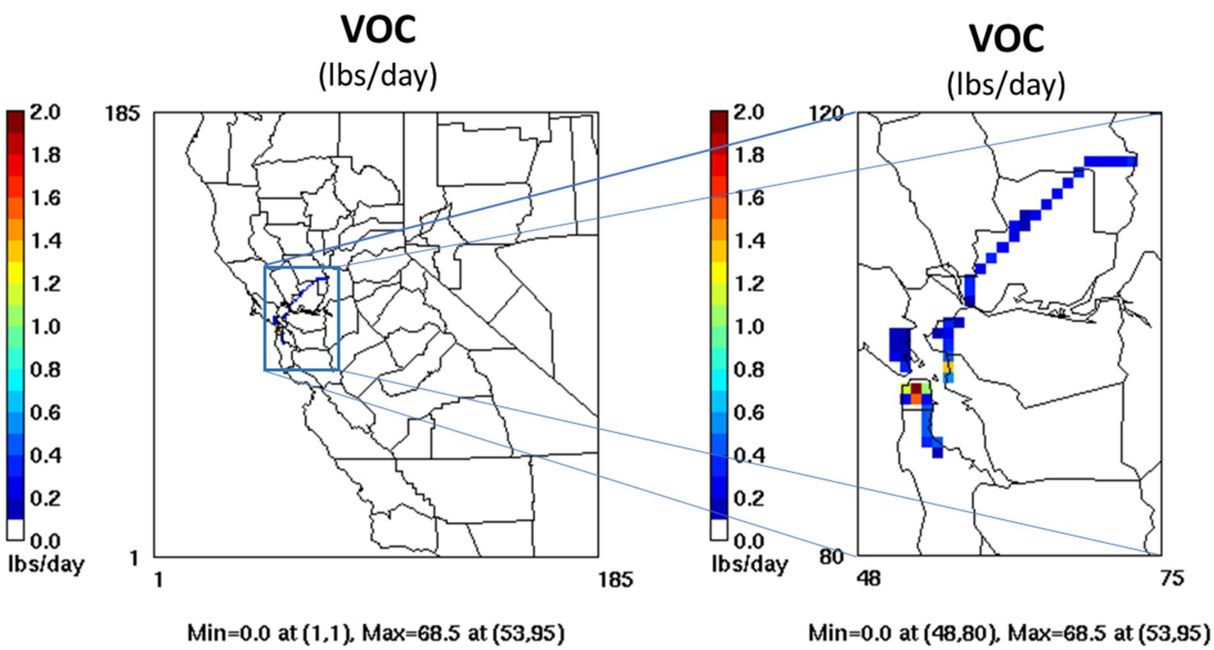


Figure 2-4. Spatial Distribution of PM_{10} Emissions (in lbs/day) for the Project in the Northern California 4-km Domain

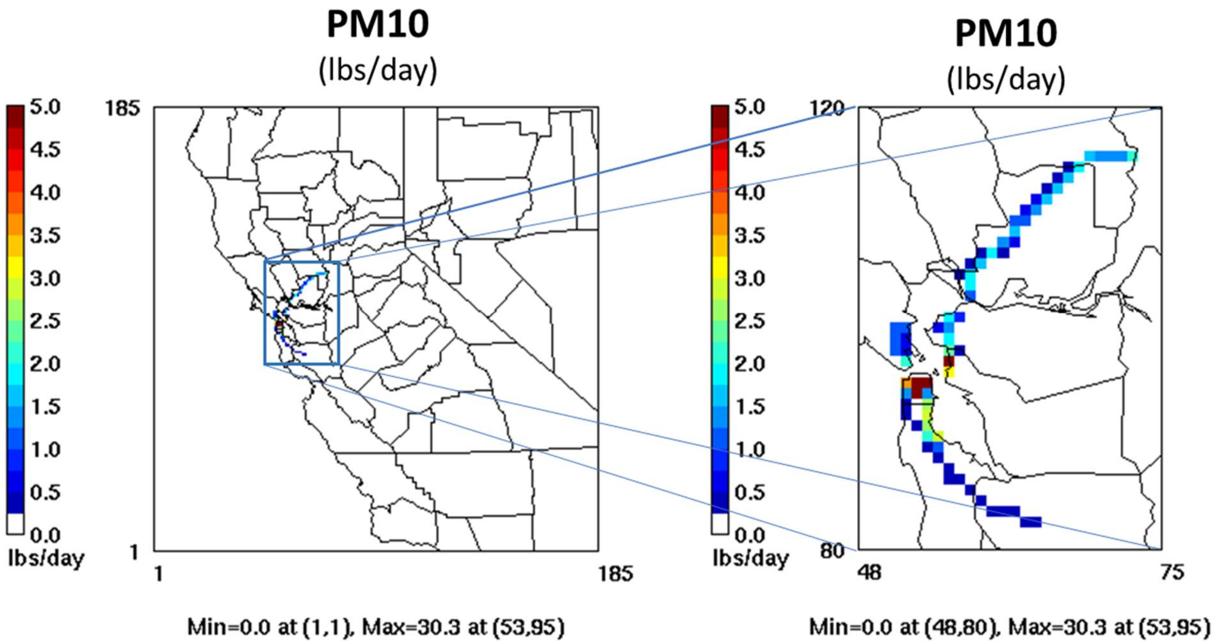


Figure 2-5. Spatial Distribution of $PM_{2.5}$ Emissions (in lbs/day) for the Project in the Northern California 4-km Domain

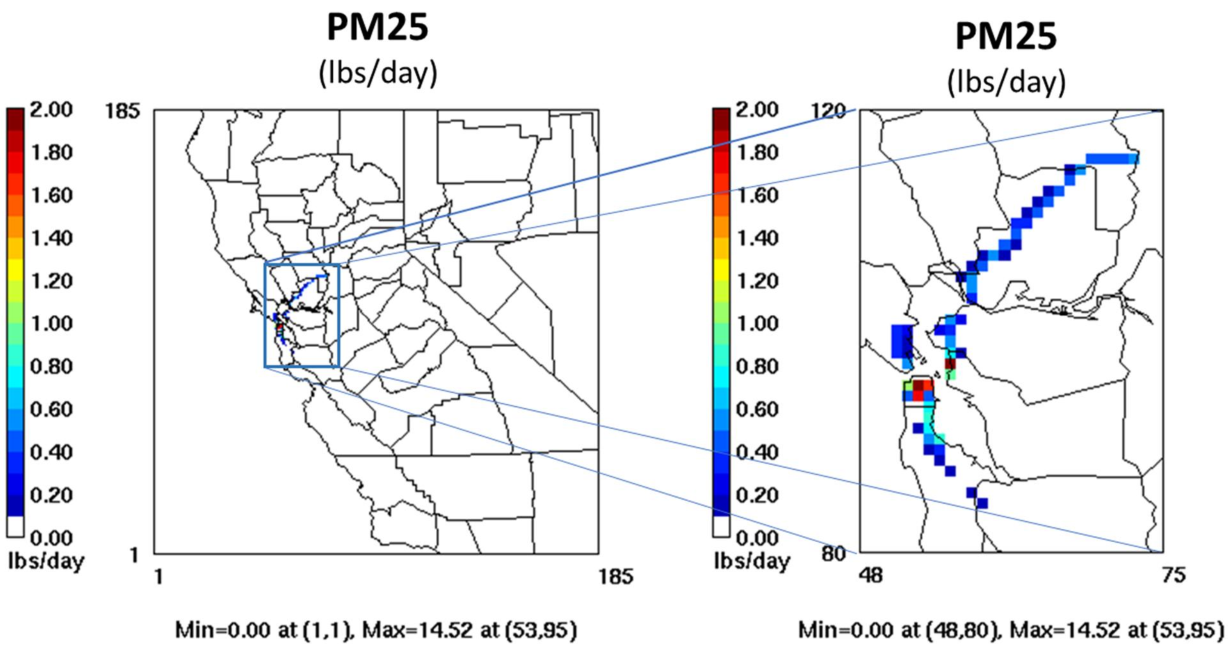


Figure 2-6. Spatial Distribution of SO_2 Emissions (in lbs/day) for the Project in the Northern California 4-km Domain

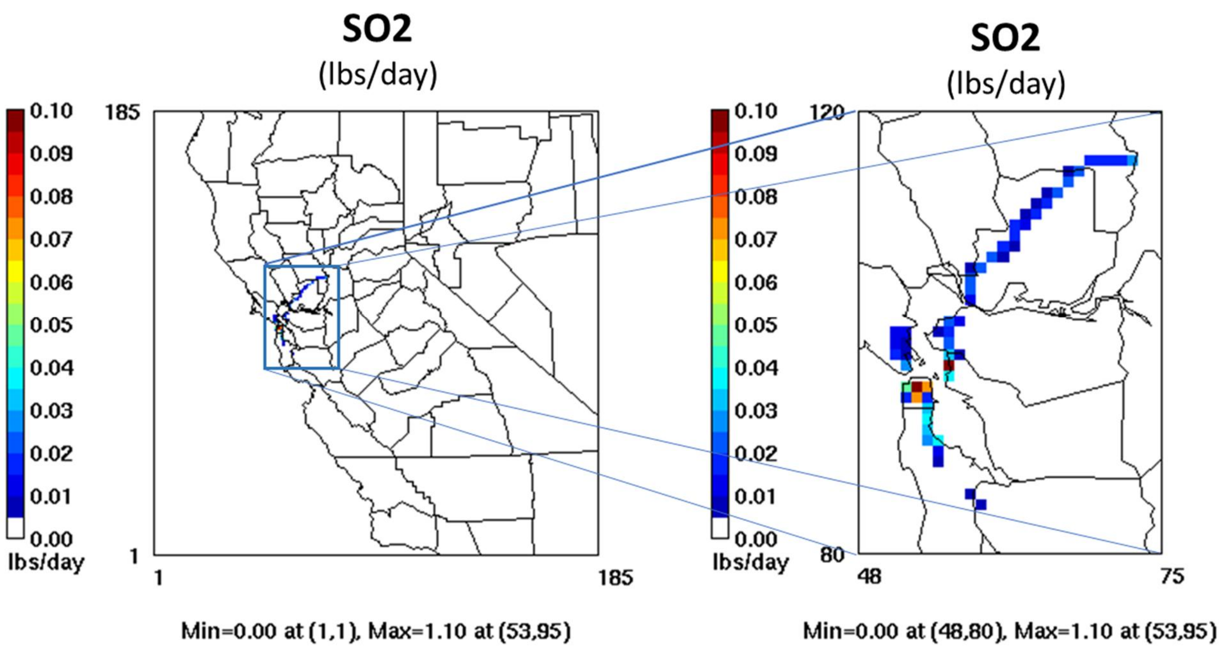
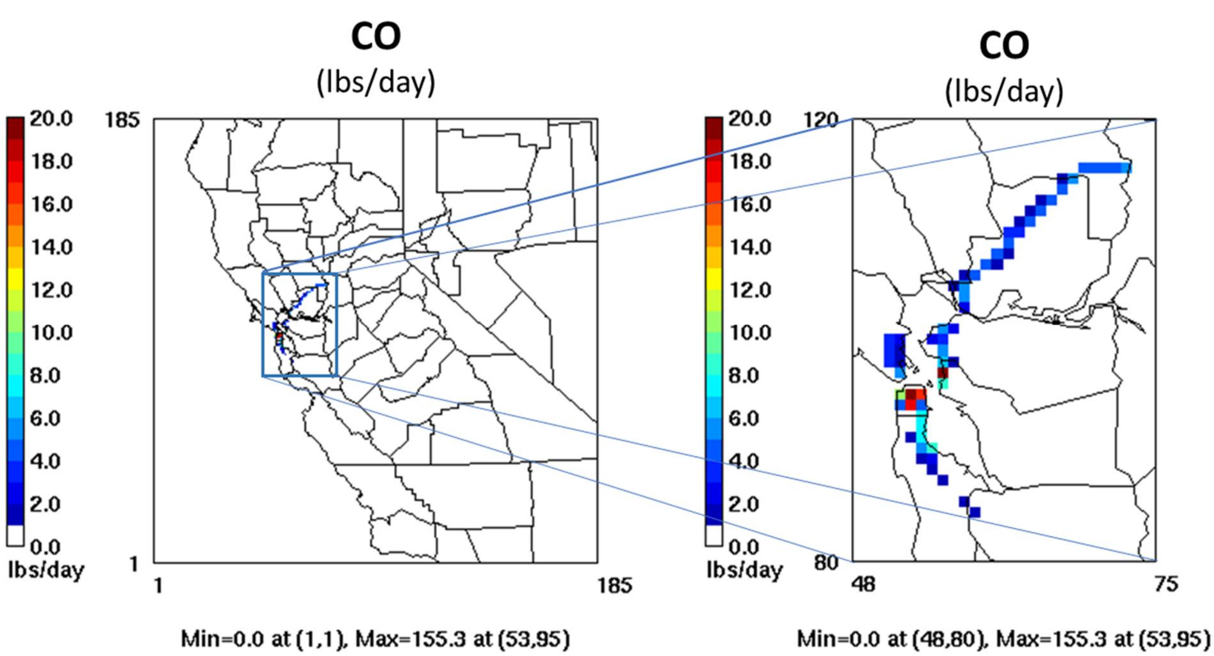


Figure 2-7. Spatial Distribution of CO Emissions (in lbs/day) for the Project in the Northern California 4-km Domain



3. EMISSIONS FROM THE INITIAL PHASE PROJECTS [IRVING STREET ARRIVAL, RESEARCH AND ACADEMIC BUILDING, AND INITIAL ALDEA HOUSING DENSIFICATION]

As the potential health effects from the Initial Phase Projects are generally characterized using the full Project level modeling results and a comparison of total emissions, details of the incremental operational emissions associated with the Initial Phase Projects are discussed below.

Incremental operational emissions associated with the Initial Phase Projects were estimated for the year of buildout (2030). Initial Phase Projects include Irving Street Arrival, Research and Academic Building, and initial Aldea housing densification and do not include the New Hospital. Emissions associated with these projects include emissions from architectural coatings, VOCs in consumer products, landscaping equipment, emergency generators, central utility plant (CUP), and emissions associated with motor vehicle use. Incremental emissions for 2030 are shown in Table 2-6 and were derived following methodologies as outlined in Draft EIR Section 4.2 Air Quality.

Table 2-6. Average Daily Incremental 2030 Emissions, Initial Phase Projects

Emission Category	NOx	ROG	PM_{10}	$PM_{2.5}$	SO_2	CO
	lbs/day	lbs/day	lbs/day	lbs/day	lbs/day	lbs/day
On-Road Mobile	19	5.5	23	6.6	0.32	76
Architectural Coatings	--	1.3	--	--	--	--
Consumer Products	--	8.8	--	--	--	--
Landscaping	0.067	0.17	0.032	0.032	3.3E-04	5.8
Energy[1]	-1.3	-1.0	-0.090	-0.090	--	--
Emergency Generators	1.0	0.0059	0.020	0.020	0.0020	0.34
Central Utility Plant	0.17	0.11	0.32	0.30	0.026	0.35
Total	19	15	23	6.9	0.35	83
Change from 2050 Emissions	-81%	-85%	-83%	-84%	-85%	-81%

Notes:

1. The Initial Phase Projects include removal of existing sources, which leads to a decrease in incremental energy emissions.

4. CONSTRUCTION EMISSIONS

As the potential health effects from construction activity are generally discussed, in comparison to the potential health effects from the full Project level modeling results, details of construction emissions quantified are presented below.

Construction emissions were quantified both for the Initial Phase Projects (Irving Street Arrival, Research and Academic Building, and initial Aldea housing densification) and the New Hospital for years 2022 through 2029. Details of phasing and sequencing in 2030 and beyond are not yet available and thus emissions, including potential overlapping construction and operational emissions, cannot be accurately quantified beyond that year. Construction emissions were quantified following methodologies as outlined in Draft EIR Section 4.2 Air Quality and are shown in Table 2-7 below.

Table 2-7. Maximum Daily Unmitigated Construction Emissions, Initial Phase Projects + New Hospital (2022-2029)

Year	NOx	ROG	PM_{10}	$PM_{2.5}$
	lbs/day	lbs/day	lbs/day	lbs/day
2022	51	3.9	1.7	1.6
2023	24	2.7	0.95	0.89
2024	51	10	1.4	1.3
2025	43	10	1.0	1.0
2026	51	5.0	1.0	1.0
2027	25	2.5	0.50	0.48
2028	26	22	0.55	0.53
2029	26	31	0.56	0.53
Maximum	51	31	1.7	1.6
Change from 2050 Emissions	-59%	-61%	-99%	-96%

5. REFERENCES

Coats Jr., C.J., 1996. High-performance algorithms in the Sparse Matrix Operator Kernel Emissions (SMOKE) modeling system. Proc. Ninth AMS Joint Conference on Applications of Air Pollution Meteorology with AWMA. Amer. Meteor. Soc., Atlanta, GA, 584-588.

Coats Jr., C.J., Houyoux, M.R., 1996. Fast Emissions Modeling with the Sparse Matrix Operator Kernel Emissions (SMOKE) Modeling System. The Emission Inventory: Key to Planning, Permits, Compliance, and Reporting, Air & Waste Management Association. New Orleans, Louisiana.

EPA, 2007. Guidance on the Use of Models and Other Analyses for Demonstrating Attainment of Air Quality Goals for Ozone, PM2.5 and Regional Haze. Office of Air Quality Planning and Standards, U.S. Environmental Protection Agency, Research Triangle Park, NC. EPA-454/B-07-002.

ATTACHMENT B
PGM INPUTS, OUTPUTS, AND ASSUMPTIONS

1. REGIONAL AIR QUALITY MODELING PLATFORM

The latest publicly available Photochemical Grid Model (PGM) database for Northern California was developed by the Bay Area Air Quality Management District (BAAQMD) in support of the 2000 Central California Ozone Study (CCOS), and was adapted for this analysis.[27] The Northern California 2012 4-km CAMx modeling database and a projected 2050 emissions database was used in this assessment. The 2012 base case is based on a PGM modeling databases developed by the BAAQMD. The BAAQMD PGM database is tailored for California using California-specific input tools (e.g., the EMFAC[28] mobile source emissions model) and use a high-resolution 4-km horizontal grid to better simulate meteorology and air quality in the complex terrain and coastal environment of California. This contrasts with the United States Environmental Protection Agency's (USEPA)national modeling platforms[29] used for national rulemakings (e.g., transport rules such as CSAPR[30] or defining new NAAQS) that use a coarser 12-km horizontal grid resolution.

The BAAQMD selected the computational domain shown in Figure 1-1 below to keep consistency with the 2000 CCOS (BAAQMD, 2009). The CCOS was established to understand and investigate the ozone formation in Central California, therefore the computational domain included all Central California and portions of Northern California.

Details of the model inputs, configuration, and results are presented in Section 2 of this Attachment.

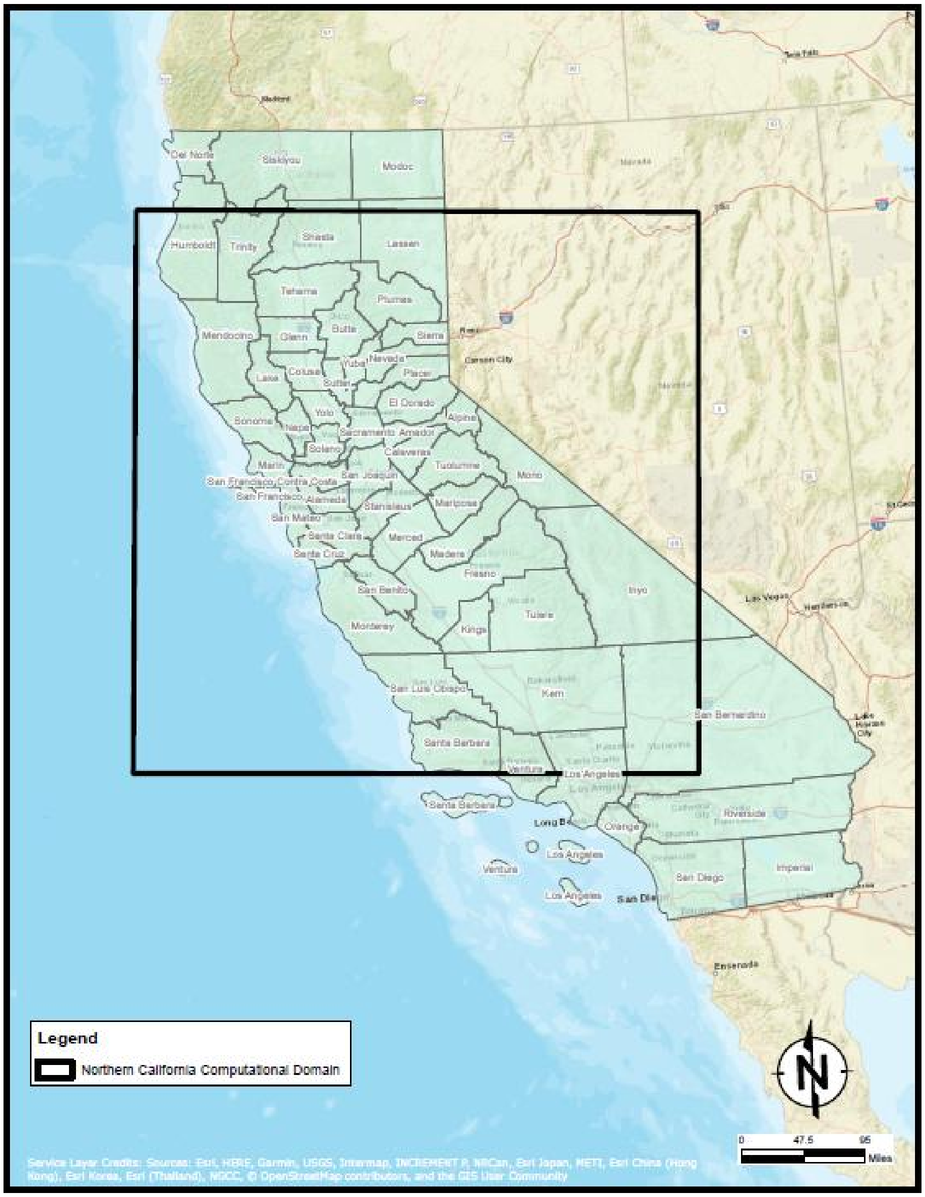
27 http://www.baaqmd.gov/about-air-quality/research-and-data/research-and-modeling.

28 https://www.arb.ca.gov/emfac/

29 https://www.epa.gov/air-emissions-modeling/2014-2016-version-7-air-emissions-modeling-platforms

30 https://www.epa.gov/csapr

Figure 1-1. Air quality modeling domain for Northern California[31]



2. REGIONAL GRID MODELING

In this section we describe the regional PGM modeling setup to assess the outcome of the Project emissions on the ambient PM2.5 levels in the region. The 2012 base case modeling databases were developed by the BAAQMD for the Community Multiscale Air Quality (CMAQ) PGM. The CMAQ annual 2012 4-km modeling database and annual 2012 4-km Weather Research and Forecasting (WRF) meteorological model output files were obtained from the BAAQMD. The BAAQMD CMAQ and WRF 2012 4-km data were then processed to obtain 2012

[31] https://ww3.arb.ca.gov/research/cabots/docs/9a-cabots-baaqmd-20170419.pdf

4-km annual PGM modeling database for the Comprehensive Air Quality Model with extensions (CAMx). The following paragraphs described how Ramboll developed the CAMx 2012 4-km annual database used in this study, starting with the BAAQMD CMAQ and WRF 2012 4-km data. Preparation of the Project emissions inputs for CAMx is discussed in Attachment A.

2.1 Model Inputs and Configuration

Ramboll converted the 2012 CMAQ 2-D and in-line point emissions files from BAAQMD to CAMx area-/point-source emissions files using the CMAQ2CAMx interface program.[32] Seasalt emissions were developed using an emissions processor that integrates published sea spray flux algorithms to estimate sea salt particulate matter (PM) emissions for input to CAMx. The CAMx sea salt emissions were then merged with area emissions files. On-road mobile sources in the BAAQMD database were based on EMFAC2014. Thus, on-road mobile sources were first updated to EMFAC2017 using county and pollutant specific scaling factors. We then projected on-road emissions to 2050 using projection factors derived from EMFAC2017. All other anthropogenic sources were projected to 2035 using county, pollutant and source category-specific growth factors derived from ARB's California Emissions Projection Analysis Model (CEPAM) 2016 state implementation plan (SIP) inventory. The farthest future year available in the CEPAM is 2035 so the other anthropogenic sources were held constant at 2035 levels in the 2050 inventory. CEPAM estimates emissions for a specific year based on growth and control factors. The growth factors account for county-specific economic activity profiles, population forecasts, and other socio/demographic activity. The control factors reflect the effects of adopted emission control rules.

The most commonly used prognostic meteorological models to provide meteorological fields for air quality modeling are the WRF model (Skamarock et al., 2005) and the Fifth-Generation Mesoscale Model (MM5; Grell et al, 1994). MM5, a nonhydrostatic, prognostic meteorological model developed in the 1970s by Pennsylvania State University and the National Center for Atmospheric Research (NCAR), has been widely used for urban- and regional-scale photochemical, fine particulate, and regional haze regulatory modeling studies. However, development of MM5 ceased in 2006 and WRF has become the new standard model for regulatory air quality applications in the US. WRF was jointly developed by NCAR and the National Center for Environmental Prediction in late 1990s. It has been under continuous development, improvement, testing and open peer-review and is used world-wide by hundreds of researchers and practitioners. BAAQMD adopted WRF version 3.8 for the 2012 simulations. For the current application, the meteorology remains unchanged for the future year simulation and BAAQMD WRF 2012 4-km model outputs were processed using the WRFCAMx[33] processor to generate the meteorological fields ready for CAMx. The WRF model employs a terrain-following coordinate system defined by pressure, using multiple layers that extend from the surface to 50 millibars (approximately 19 kilometers above ground level [AGL]). A layer averaging scheme is adopted for CAMx simulations to reduce the computational burden. Table 2-1 presents the mapping from the WRF vertical layer structure to the CAMx vertical layers.

---

[32] http://www.camx.com/download/support-software.aspx.

[33] WRFCAMx is available on the CAMx website (http://www.camx.com/download/support-software.aspx)

Table 2-1 Vertical layer structure for WRF and CAMx modeling.

<table>
<tr><th colspan="2">WRF</th><th colspan="4">CAMx</th></tr>
<tr><th>Layer</th><th>Height (m)</th><th>Layer</th><th>Height (m)</th><th>Thickness (m)</th><th>Sigma[a]</th></tr>
<tr><td>50</td><td>19260</td><td rowspan="3">28</td><td rowspan="3">19260</td><td rowspan="3">2625</td><td rowspan="3">0.0000</td></tr>
<tr><td>49</td><td>16635</td></tr>
<tr><td>48</td><td>14423</td></tr>
<tr><td>47</td><td>12436</td><td rowspan="3">27</td><td rowspan="3">12436</td><td rowspan="3">1849</td><td rowspan="3">0.1339</td></tr>
<tr><td>46</td><td>10587</td></tr>
<tr><td>45</td><td>9234</td></tr>
<tr><td>44</td><td>8100</td><td rowspan="3">26</td><td rowspan="3">8100</td><td rowspan="3">960</td><td rowspan="3">0.3119</td></tr>
<tr><td>43</td><td>7140</td></tr>
<tr><td>42</td><td>6324</td></tr>
<tr><td>41</td><td>5629</td><td rowspan="3">25</td><td rowspan="3">5629</td><td rowspan="3">594</td><td rowspan="3">0.4630</td></tr>
<tr><td>40</td><td>5034</td></tr>
<tr><td>39</td><td>4524</td></tr>
<tr><td>38</td><td>4086</td><td rowspan="3">24</td><td rowspan="3">4086</td><td rowspan="3">376</td><td rowspan="3">0.5806</td></tr>
<tr><td>37</td><td>3710</td></tr>
<tr><td>36</td><td>3387</td></tr>
<tr><td>35</td><td>3097</td><td rowspan="3">23</td><td rowspan="3">3097</td><td rowspan="3">261</td><td rowspan="3">0.6668</td></tr>
<tr><td>34</td><td>2835</td></tr>
<tr><td>33</td><td>2600</td></tr>
<tr><td>32</td><td>2389</td><td rowspan="3">22</td><td rowspan="3">2389</td><td rowspan="3">191</td><td rowspan="3">0.7341</td></tr>
<tr><td>31</td><td>2198</td></tr>
<tr><td>30</td><td>2028</td></tr>
<tr><td>29</td><td>1873</td><td rowspan="3">21</td><td rowspan="3">1873</td><td rowspan="3">139</td><td rowspan="3">0.7863</td></tr>
<tr><td>28</td><td>1735</td></tr>
<tr><td>27</td><td>1609</td></tr>
<tr><td>26</td><td>1497</td><td rowspan="2">20</td><td rowspan="2">1497</td><td rowspan="2">102</td><td rowspan="2">0.8261</td></tr>
<tr><td>25</td><td>1396</td></tr>
<tr><td>24</td><td>1304</td><td rowspan="2">19</td><td rowspan="2">1304</td><td rowspan="2">87</td><td rowspan="2">0.8471</td></tr>
<tr><td>23</td><td>1217</td></tr>
<tr><td>22</td><td>1133</td><td rowspan="2">18</td><td rowspan="2">1133</td><td rowspan="2">81</td><td rowspan="2">0.8661</td></tr>
<tr><td>21</td><td>1052</td></tr>
<tr><td>20</td><td>974</td><td rowspan="3">17</td><td rowspan="3">974</td><td rowspan="3">75</td><td rowspan="3">0.8840</td></tr>
<tr><td>19</td><td>899</td></tr>
<tr><td>18</td><td>827</td></tr>
<tr><td>17</td><td>758</td><td>16</td><td>758</td><td>66</td><td>0.9088</td></tr>
<tr><td>16</td><td>692</td><td rowspan="2">15</td><td rowspan="2">692</td><td rowspan="2">64</td><td rowspan="2">0.9165</td></tr>
<tr><td>15</td><td>628</td></tr>
<tr><td>14</td><td>566</td><td>14</td><td>566</td><td>59</td><td>0.9312</td></tr>
<tr><td>13</td><td>507</td><td>13</td><td>507</td><td>57</td><td>0.9382</td></tr>
<tr><td>12</td><td>450</td><td>12</td><td>450</td><td>53</td><td>0.9450</td></tr>
<tr><td>11</td><td>398</td><td>11</td><td>398</td><td>50</td><td>0.9513</td></tr>
<tr><td>10</td><td>348</td><td>10</td><td>348</td><td>46</td><td>0.9573</td></tr>
<tr><td>9</td><td>302</td><td>9</td><td>302</td><td>44</td><td>0.9629</td></tr>
<tr><td>8</td><td>258</td><td>8</td><td>258</td><td>40</td><td>0.9682</td></tr>
<tr><td>7</td><td>218</td><td>7</td><td>218</td><td>38</td><td>0.9731</td></tr>
<tr><td>6</td><td>180</td><td>6</td><td>180</td><td>36</td><td>0.9777</td></tr>
<tr><td>5</td><td>144</td><td>5</td><td>144</td><td>32</td><td>0.9821</td></tr>
<tr><td>4</td><td>112</td><td>4</td><td>112</td><td>31</td><td>0.9861</td></tr>
<tr><td>3</td><td>81</td><td>3</td><td>81</td><td>29</td><td>0.9899</td></tr>
<tr><td>2</td><td>52</td><td>2</td><td>52</td><td>27</td><td>0.9935</td></tr>
<tr><td>1</td><td>25</td><td>1</td><td>25</td><td>25</td><td>0.9969</td></tr>
<tr><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>1.0000</td></tr>
</table>

[a] The sigma vertical coordinate system is used to simplify the equations solved by atmospheric models and is defined as sigma = $(p-p_T)/(p_S - p_T)$ where p is pressure and the subscripts T and S stand for the top and surface values of the model atmosphere, respectively.

The lateral boundary conditions (BCs) for the 4-km state-wide modeling grid were extracted from a global model simulation for the year 2012. The Model for Ozone and Related Chemical Tracers Version 4 (MOZART-4; Emmons et al., 2010) is a global chemical transport model developed jointly by NCAR, the Geophysical Fluid Dynamics Laboratory, and the Max Planck Institute for Meteorology. It simulates chemistry and transport of tropospheric gases and bulk aerosols. The MOZART-4 simulation with updated meteorological fields derived from the National Aeronautics and Space Administration's Goddard Earth Observing System Model Version 5 (GEOS-5)[34] were downloaded from the UCAR website[35] and the MOZART2CAMx processor was used to derive both the boundary and the initial conditions for the modeling. Five days of spin-up periods were used for the 4-km grids to minimize the influence of the initial conditions.

Additional data used in the air quality modeling include ozone column data from the Ozone Monitoring Instrument (OMI) which continues the Total Ozone Mapping Spectrometer (TOMS) record for total ozone and other atmospheric parameters related to ozone chemistry (OMI officially replaced the TOMS ozone column satellite data on January 1, 2006). OMI data are available every 24-hours and are obtained from the TOMS ftp site.[36] The CAMx O3MAP program reads the OMI ozone column text file data and interpolates to fill gaps and generated gridded daily ozone column input data. The OMI data is used in the CAMx (TUV) radiation models which is a radiative transfer model that develops clear-sky photolysis rate inputs for CAMx. The landuse file was generated with the WRFCAMx processor and modified to remove lakes and set coastal waters with a surf zone width of 50 m, this file was used to update the emissions database and provide more realistic representation of sea salt emissions.

Table 2-2 presents the CAMx configuration used for the modeling in this Project analysis. SAPRC07TC (Carter, 2010) is the chemistry mechanism used for California SIPs was used here. It includes additional model species to explicitly represent selected toxics and reactive organic compounds and uses numerical expressions of rate constants that are compatible with the current chemistry mechanism solver. The partitioning of inorganic aerosol constituents (sulfate, nitrate ammonium and chloride) between gas and aerosol phases is performed using the ISORROPIA module. The SOAP semi-volatile equilibrium scheme performs the organic aerosol-gas partitioning. These processes are described in more detailed in the CAMx user guide.

[34] http://www.acd.ucar.edu/wrf-chem/mozart.shtml

[35] https://www.acom.ucar.edu/wrf-chem/mozart.shtml

[36] ftp://toms.gsfc.nasa.gov/pub/omi/data/

Table 2-2. CAMx modeling configuration.

Science Option	Configuration	Notes
Model Code	CAMx v6.5	Released April 2018
Horizontal Grid	4-km 1-way nesting	
O3 and PM 4-km	185 x 185 grid cells	
Vertical Grid	28 vertical layers extending up to ~19 km AGL	Collapsed from 50 WRF/MM5 layers (see Table 3-1)
Initial Conditions	Extracted from the MOZART global model outputs	5-day spin-up for 4-km domain
Boundary Conditions	Extracted from the MOZART global model outputs	Boundary concentration set for 4-km domain extracted using MOZART2CAMx
Photolysis Rate	Photolysis rates lookup table	Derived from satellite measurements and TUV processor
Gas-phase Chemistry	SAPRC07TC	Solved by the Euler Backward Iterative (EBI) solver
Aerosol-phase Chemistry	ISORROPIA (inorganic aerosol) SOAP v2.1 (organic aerosol)	
Meteorological Input Preprocessor	WRFCAMx v4.7	
Advection	Piecewise Parabolic Method (PPM)	
Diffusion	Eddy diffusion algorithm	

2.2 Model Results

The future modeling scenario was simulated using the CAMx source apportionment technology. Both cumulative concentrations from all the sources and the concentrations from Project-specific emissions are derived from a single simulation following the previous section model configuration. The model results of hourly $PM_{2.5}$ concentrations were processed into aggregated metrics that are relevant to health effects.

The metrics relevant to the $PM_{2.5}$ health effects selected in this study are 24-hour annual average concentrations (see Attachment C).

Figure 2-1 shows spatial plots of annual average and a single day episode maximum 24-hour average $PM_{2.5}$ concentrations from the base case. In the base case, the central valley of California shows annual $PM_{2.5}$ concentrations that range between 8 and 20 $\mu g/m^3$. Isolated regions in San Bernardino and Los Angeles counties could reach up to 36 $\mu g/m^3$. The largest increases in $PM_{2.5}$ concentrations from the Project occur over the grid cell where the Project is located, followed by the immediately adjacent grid cells. Contributions of the Project emissions to annual average $PM_{2.5}$ are 0.039 $\mu g/m^3$ at the most affected areas and represent a 0.4 percent increase over the base case concentrations at that location. Contributions to the maximum 24-hour average are 0.118 $\mu g/m^3$ at the most affected area and represent a

0.4 percent increase over the base case concentrations at that location. Figure 2-2 presents increases in quarterly average and maximum 24-hour average $PM_{2.5}$ due to the Project by $PM_{2.5}$ component at the grid cell of maximum concentration change. It confirms that the $PM_{2.5}$ increases due to the Project are mostly due to primary PM components (the sum of “other”, EC and POA in the chart).

Figure 2-1. Results of the 4 km $PM_{2.5}$ Modeling Domain

$PM_{2.5}$ Concentrations from the Base Case Scenario (left panels);
Increases in $PM_{2.5}$ due to the Project (center panel is modeling domain and right panel is local project area); Annual Averages (top panels);
Maximum 24-hour Averages (bottom panels)

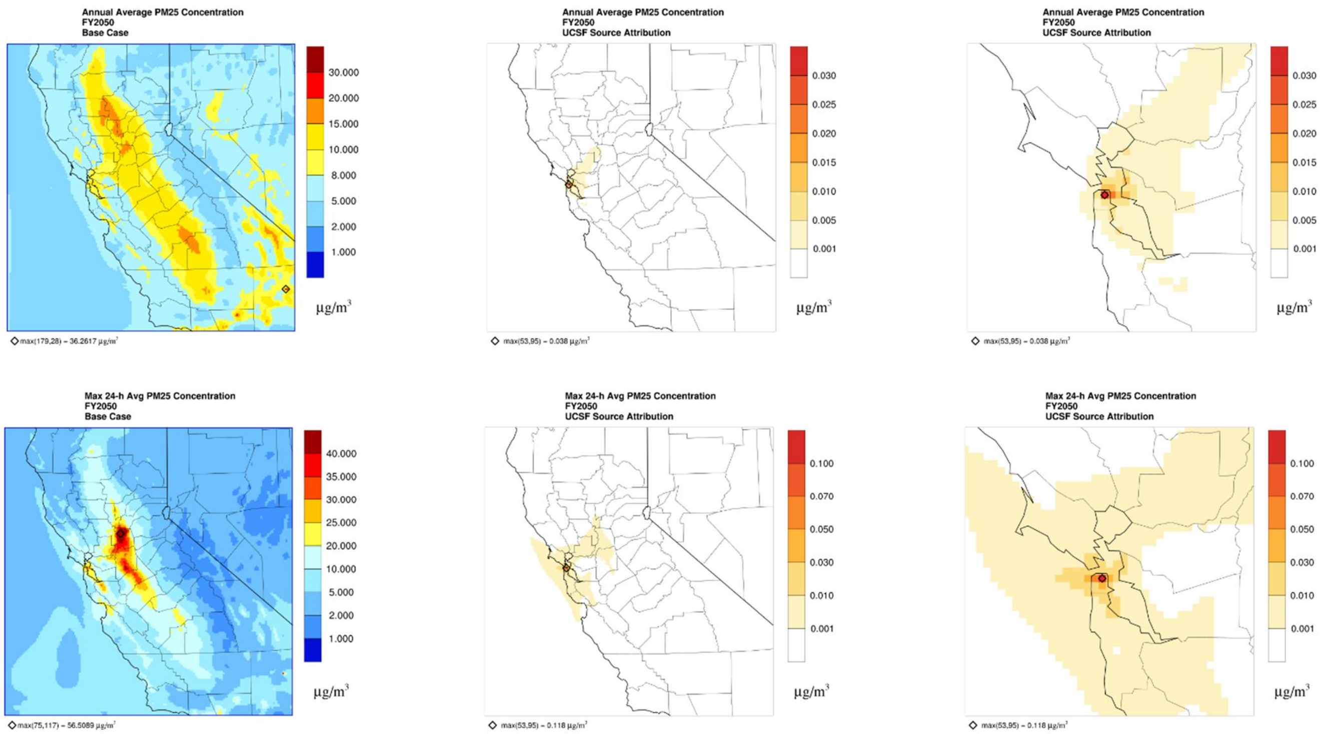
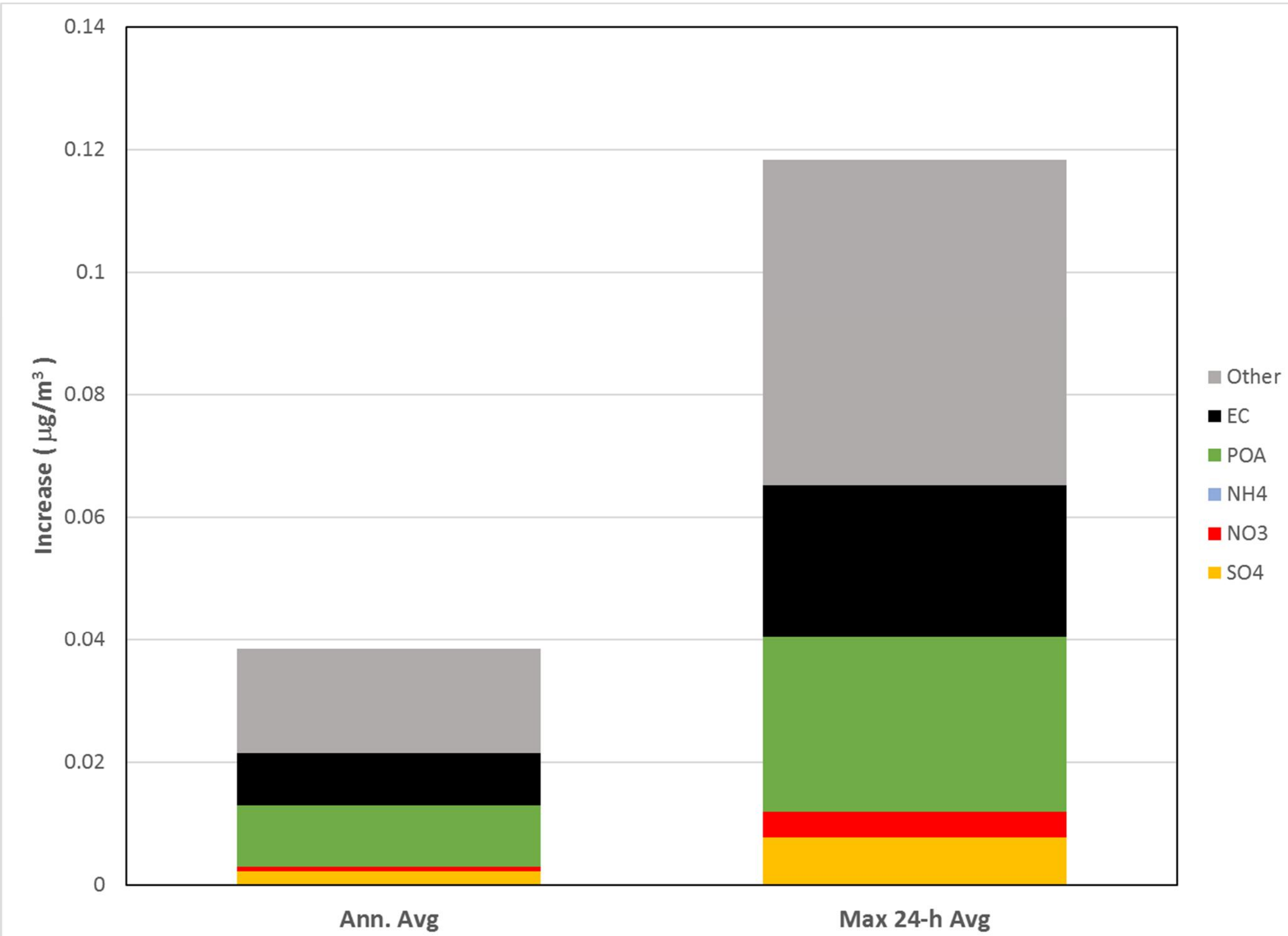


Figure 2-2. Increases in Annual Average and Episode Maximum 24-hour Average $PM_{2.5}$ Concentrations due to the Project by $PM_{2.5}$ Component: fine particulate sulfate (SO_4), nitrate (NO_3), ammonium (NH_4), primary organic aerosol (POA), elemental carbon (EC), and other primary PM (Other); Where the Maximum Change due to Project Emissions Occurred



The metrics relevant to the ozone health effects selected in this study are consistent with the ozone NAAQS (see Attachment C). The model provides hourly concentrations that are further post-processed to produce maximum daily average 8-hour (MDA8) ozone concentrations for each day.

Figure 2-3 displays spatial plots of the annual average MDA8 ozone for the 2050 emissions scenario and the corresponding annual average MDA8 increases to ozone concentrations due to the Project emissions. In the base case, counties located in the south-eastern portion of the domain (San Bernardino, Inyo, Tulare, Kern) show the highest MDA8 annual average ozone concentration between 45 and 50 ppb with isolated regions in Kern county with up to 53 ppb. The maximum increase in the annual average MDA8 ozone concentrations due to the

Project is 0.003 ppb and occurs in Yolo county where it represents a 0.007 percent increase over the base case concentrations.

Figure 2-4 displays MDA8 ozone for the base case and increases in MDA8 ozone due to the project on August 9 of the simulation year, the day that the Project has the highest ozone contribution, which is reasonable given that this occurs in the middle of the summer when higher temperatures and increased solar radiation favour the formation of ozone. The highest MDA8 ozone contribution due to the Project is 0.019 ppb (Figure 2-4, right) that occurs in Contra Costa county where it represents a 0.03 percent increase over the base case concentrations.

Figure 2-3. Annual Average MDA8 Ozone Concentrations from the Base Case Scenario (left) and Increases in Highest MDA8 Ozone Concentrations due to the Project (center for modeling domain and right for local project area) for the Annual Modeling of the 2050 Emissions Scenario

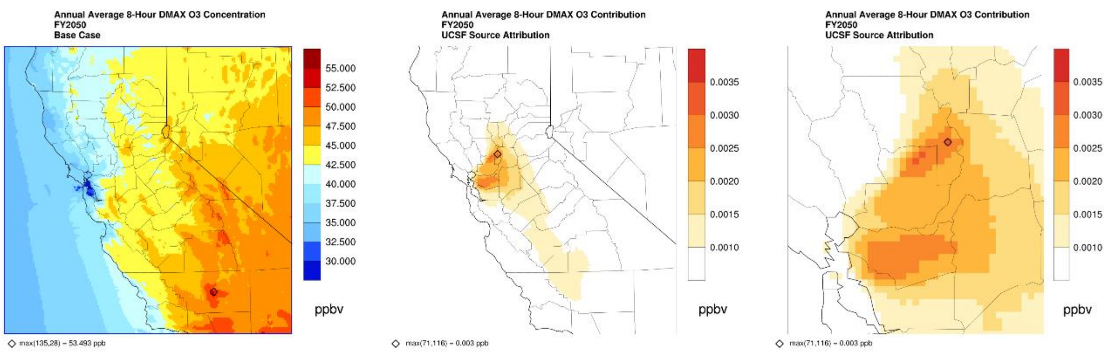
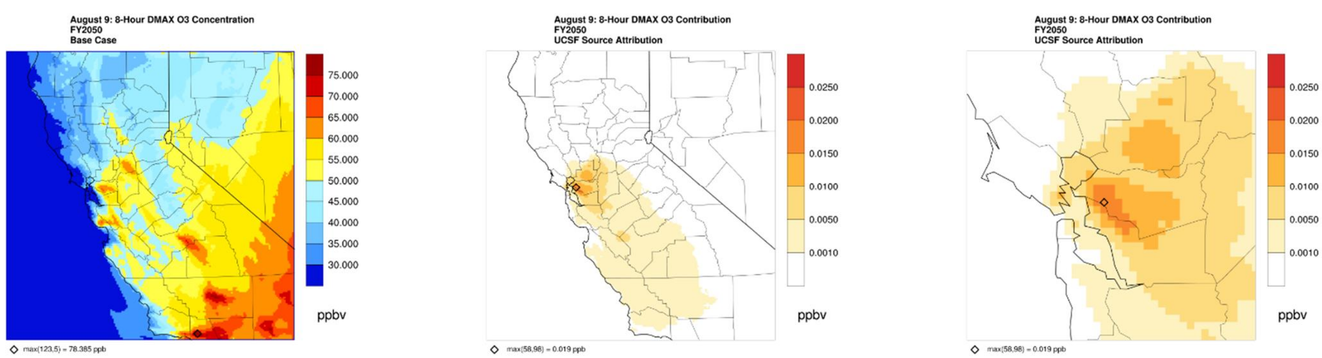


Figure 2-4. MDA8 Ozone Concentrations from the Base Case Scenario (left) and Increases in MDA8 Ozone Concentrations due to the Project (center for modeling domain and right for local project area) on August 9th, the Day with the Highest Project Ozone Contributions for the Annual Modeling of the 2050 Emissions Scenario



2.3 PGM Uncertainty

PGMs generally represent the state-of-the-science when the treatment of photochemically formed air pollution is required over multiple spatial scales (e.g., from single-source to continental). PGMs are part of a modeling system in which there are several other major components that determine model performance, including meteorology, emissions inventories (including background), and chemical mechanisms. It is important to note that both the meteorological models that inform the PGMs and PGM predictions, themselves, in accordance with EPA guidance, are compared with available observations through multiple statistical metrics to characterize any biases and errors.

One of the largest sources of uncertainty for PGM is the processing and accurate accounting of all emission sources into the model. PGMs are Eulerian models that require gridded data that vary in space and time. An accurate prediction of secondary formed pollutants, like ozone and secondary $PM_{2.5}$, requires a comprehensive accounting of all possible sources of pollution and not only those specific to a Project. This typically requires a significant level of effort to construct spatially and temporally varying emission inventories where there may be uncertainties in the characterization of emissions.

A second source of uncertainty is introduced by the meteorological inputs. PGMs require gridded meteorological inputs that are typically provided by mesoscale meteorological model (e.g., WRF) that provide three-dimensional characterization of winds, temperature, humidity and other meteorological variables.

An additional source of uncertainty pertains to the PGM formulations themselves. For example, the models' chemical mechanism represents a simplification of the thousands of chemical reactions involving hundreds of species that take place in the atmosphere in order to reduce the computational burden. PGM being state-of-the-science can only reflect what is understood or established on any given aspect: chemistry, transport, aerosol formation, etc. As the science advances and certain processes are better understood, the models' formulations are modified with the expectation to improve their predictions.

Despite these complexities and associated uncertainties, the USEPA recommends using PGM's for a variety of applications including State Implementation Plans and Regional Haze Planning, and CAMx/CMAQ specifically for single-source modeling of ozone and secondary $PM_{2.5}$. The USEPA believes that the relative change in the PGM-predicted concentrations (e.g., the incremental changes due to the emissions from a single-source) is more accurate and reliable than the total predicted concentrations (USEPA, 2018).

3. REFERENCES

Bay Area Air Quality Management. 2009. Ozone Modeling and Data Analysis During CCOS. Tanrikulu,S. Soong, S-T., Tran C. September 2009. http://www.baaqmd.gov/~/media/Files/Planning%20and%20Research/Research%20and%20Modeling/CCOS%20modeling%20report.ashx

Carter, W.P.L., 2000. Documentation of the SAPRC99 Chemical Mechanism for VOC Reactivity Assessment, Final Report to California Air Resources Board, Contract No. 92-329, and (in part) 95-308, May 8, 2000. http://www.engr.ucr.edu/~carter/reactdat.htm

Emmons, L.K., Walters, S., Hess, P.G., Lamarque, J.F., Pfister, G.G., Fillmore, D., Granier, C., Guenther, A., Kinnison, D., Laepple, T., Orlando, J., Tie, X., Tyndall, G., Wiedinmyer, C., Baughcum, S.L., Kloster, S., 2010. Description and evaluation of the Model for Ozone and Related chemical Tracers, Version 4 (MOZART-4), Geoscientific Model Development, 3, 43-67.

Gery, M.W., Whitten, G.Z., Killus, J.P., Dodge, M.C., 1989. A Photochemical Kinetics Mechanism for Urban and Regional Scale Computer Modeling. J. Geophys. Res., 94, 925-956.

Grell, G.A., Dundhia, J., Stauffer, D.R., 1994. A description of the Fifth-Generation Penn State/NCAR Mesoscale Model (MM5), National Center for Atmospheric Research, Boulder, CO, NCAR/TN-398+STR.

Skamarock, W.C., Klemp, J.B., Dudhia, J., Gill, G.O., Barker, D.M., Wang, W., Powers, J.G., 2005. A description of the Advanced Research WRF Version 2. NCAR Technical Note NCAR/TN-468+STR, June 2005.

Stockwell, W.R., 1999. Review of the updated maximum incremental reactivity scale of Dr. William Carter. Division of Atmospheric Sciences, Desert Research Institute, November 29, 1999. http://www.cert.ucr.edu/~carter/pubs/stockrev.pdf

USEPA. 2018. Modeling Guidance for Demonstrating Air Quality Goals for Ozone, PM2.5, and Regional Haze. U.S. Environmental Protection Agency, Office of Air Quality Planning and Standards, Air Assessment Division. Research Triangle Park, NC. EPA 454/R-18-009. November 29. https://www3.epa.gov/ttn/scram/guidance/guide/O3-PM-RH-Modeling_Guidance-2018.pdf.

ATTACHMENT C
BENMAP AND HEALTH EFFECTS

1. HEALTH EFFECTS ANALYSIS

The potential health effects of ozone and particulate matter less than 2.5 microns in diameter ($PM_{2.5}$) concentrations due to the Project's emissions were estimated using the Environmental Benefits Mapping and Analysis Program (BenMAP), Community Edition v1.4 (July 2018).[37] BenMAP, developed by the United States Environmental Protection Agency (USEPA), is a powerful and flexible tool that helps users estimate human health effects and economic benefits resulted from changes in air quality. BenMAP outputs include PM- and ozone-related health endpoints such as premature mortality, hospital admissions, and emergency room visits. BenMAP uses the following simplified formula to relate changes in ambient air pollution to certain health endpoints (USEPA, 2018)[38]:

Health Effect = Air Quality Change × Health Effect Estimate × Exposed Population × Background Health Incidence Rate

- Air Quality Change - The difference between the starting air pollution level (the base) and the air pollution level after some change, such as a new source.
- Health Effect Estimate - An estimate of the percentage change in an adverse health effect due to a one unit change in ambient air pollution. Effect estimates, also referred to as concentration-response (C-R) functions, are obtained from epidemiological studies.
- Exposed Population - The number of people affected by the air quality change. The government census office is a good source for this information. This analysis uses data from PopGrid, which is an add-on program to BenMAP that allocates the block-level U.S. Census population to a user-defined grid.[39]
- Background Health Incidence Rate - An estimate of the average number of people over a given population that suffer from some adverse health effect over a given period of time. For example, the health incidence for mortality is the number of people over a given population who might die in a given year. Health incidence rates and other health data are typically collected by the government as well as the World Health Organization. BenMAP calculates background health incidence rates based on the available health statistics and population data, with preference given to individual-level data counts (e.g., mortality counts or hospital and emergency department discharges) at the County-level. For California counties, data were available at the individual-level. The background health incidence data are also based on different years depending on data availability. For example, hospital admissions and emergency department visits for California are based on 2011 data. For mortality background incidence rates, USEPA obtained data for 2012-2014 from the Centers for Disease Control WONDER database (http://wonder.cdc.gov) and generated age-, cause-, and county-specific mortality rates as described in the BenMAP manual.36 The projected mortality rates for the years 2015-2050 are then calculated using Census Bureau projected life tables.[40]

---

[37] http://www.epa.gov/air/benmap/

[38] The common function used for calculating health impacts is the following log-linear function: Health Effect = Background Health Incidence Rate x [1 – exponential (Health Effect Estimate * Air Quality Change)] x Exposed Population

[39] https://www.epa.gov/sites/production/files/2015-04/documents/benmap-ce_user_manual_march_2015.pdf

[40] https://www.census.gov/programs-surveys/popproj/data/tables.html

The health endpoints analyzed in this study and the BenMAP results are presented in Section 2 of this attachment.

2. HEALTH EFFECTS ANALYSIS RESULTS

This section presents the health effects of the Project emissions on the population in the northern California domain, estimated by the BenMAP model. The Comprehensive Air Quality Model with extensions (CAMx) modeling results are processed to generate aggregated daily and annual average $PM_{2.5}$ and maximum daily 8-hour ozone concentrations appropriate for various health endpoints. The CAMx simulation results from the full year (January to December) are used to estimate the health effects of $PM_{2.5}$ and ozone. BenMAP translates increases in the pollutant concentration due to the Project emissions to changes in the incidence rate for each health effect using a C-R function derived from previously published epidemiological studies. BenMAP often provides multiple C-R functions based on different epidemiological studies for a given health endpoint. We used the C-R functions used in past USEPA regulatory assessments when evaluating health effects, together with a more refined population data. This analysis uses population data from PopGrid, which allocates the census population to each modeled 4x4 kilometer (km) grid cell.

The population used for both the quantified health effects and the background health incidence presented here is future year 2050. The PopGrid program was used to project 2010 block-level U.S. Census population to 2050. BenMAP reads this file to incorporate population changes into its health effect calculations. The population in the Northern California domain is projected to be 24,961,329 in 2050.

2.1 $PM_{2.5}$ Health Effects

Consistent with USEPA's assessment of health effects of particulate matter, our health effects evaluation focuses on $PM_{2.5}$ and not PM_{10}, as $PM_{2.5}$ has a much larger body of evidence that this size fraction is associated with health effects due to the sources, composition, chemical properties and lifetime in the atmosphere (USEPA 2009). $PM_{2.5}$ is capable of penetrating deeper into the lungs because of their size compared to larger particles and this is believed to contribute to greater health effects. Consistent with USEPA health effects evaluations, the health effect functions in BenMAP for PM use fine particulate ($PM_{2.5}$) as the causal PM agent.

Although there are a large number of potential health endpoints that could be included in the analysis as described above, we selected the key health endpoints that have been the focus of recent United States Environmental Protection Agency (USEPA) risk assessments (e.g., USEPA, 2010; USEPA, 2014). For example, the USEPA notes that health endpoints were selected based on consideration of at-risk populations (e.g. asthmatics), endpoints that have public health significance, and endpoints for which information is sufficient to support a quantitative C-R relationship (USEPA, 2014).

The health endpoints and associated C-R functions examined in this study are presented in Table 2-1. Each C-R function is based on a certain age range for the given health endpoint depending on the underlying epidemiological study on which it is based. Increases in the BenMAP-estimated health effect incidences and percent of background health incidence due to the Project emissions are presented in Table 2-2. Mean incidence rates are presented along with 2.5 and 97.5 percentiles to demonstrate the potential range in estimated health effects. These values reflect the total health effects across the Northern California model domain, though the regions of primary health effect results are shown in Figures 2-1 and 2-2 of Attachment B.

Table 2-1. Summary of $PM_{2.5}$ Health Endpoints Used in this Study

Health Endpoint	Age Range	Daily Metric	Seasonal Metric	Annual Metric	C-R Function Selected
Emergency Room Visits, Asthma	0-99	24-hr mean			Mar et al., 2010[1]
Mortality, All Cause	30-99	24-hr mean	Quarterly mean	Mean	Krewski et al., 2009[1]
Hospital Admissions, Asthma	0-64	24-hr mean	-	-	Sheppard, 2003[1]
Hospital Admissions, All Cardiovascular (less Myocardial Infarctions)	65-99	24-hr mean	-	-	Bell, 2008[1]
Hospital Admissions, All Respiratory	65-99	24-hr mean	-	-	Zanobetti et al., 2009[1]
Acute Myocardial Infarction, Nonfatal	18-24	24-hr mean	-	-	Zanobetti et al., 2009[1]
Acute Myocardial Infarction, Nonfatal	25-44	24-hr mean	-	-	
Acute Myocardial Infarction, Nonfatal	45-54	24-hr mean	-	-	
Acute Myocardial Infarction, Nonfatal	55-64	24-hr mean	-	-	
Acute Myocardial Infarction, Nonfatal	65-99	24-hr mean	-	-	

[1] C-R functions available in BenMAP (USEPA, 2018)

The results show that the highest health effect is for all-cause mortality, with an estimated mean increased incidence of 2.36 deaths per year due to the Project emissions. Smaller mean increased incidences per year were estimated for other relevant $PM_{2.5}$-related health effects: 0.99 increase in incidence of asthma related emergency room visits, 0.42 increase in incidence of respiratory hospital admissions, and 0.20 increase in incidence of cardiovascular hospital admissions.

It should be noted, however, that the estimated increased incidence in those health effects are quite minor compared to the background health incidence values (shown in Table 2-2 as percent of Background Health Incidence). For example, for mortality, the increase of 2.36 deaths per year due to Project emissions represents 0.00072% of the total all-cause mortality for people ages 30 to 99.

Table 2-2. BenMAP-Estimated $PM_{2.5}$ Annual Health Effects of the Project Emissions Across the Northern California Model Domain[1]

Health Endpoint[2]	Project Incidences (Annual)			Background Health Incidence (Annual)	Project Mean as Percent of Background Health Incidence[4] (%)
	2.5 Percentile[3]	Mean	97.5 Percentile[3]		
Emergency Room Visits, Asthma [0-99]	0.26	0.99	1.71	126,657	0.00078%
Mortality, All Cause [30-99]	1.59	2.36	3.12	327,475	0.00072%
Hospital Admissions, Asthma [0-64]	0.03	0.07	0.11	14,603	0.00049%
Hospital Admissions, All Cardiovascular (less Myocardial Infarctions) [65-99]	0.15	0.20	0.25	180,325	0.00011%
Hospital Admissions, All Respiratory [65-99]	0.24	0.42	0.59	155,122	0.00027%
Acute Myocardial Infarction, Nonfatal [18-24]	0.000045	0.000094	0.00014	32	0.00030%
Acute Myocardial Infarction, Nonfatal [25-44]	0.0032	0.0065	0.010	1,657	0.00039%
Acute Myocardial Infarction, Nonfatal [45-54]	0.0075	0.015	0.023	4,260	0.00036%
Acute Myocardial Infarction, Nonfatal [55-64]	0.014	0.029	0.044	8,464	0.00034%
Acute Myocardial Infarction, Nonfatal [65-99]	0.053	0.110	0.17	33,946	0.00032%

[1] Health effects are shown terms of incidences of each health endpoint and how it compares to the base (2050 base year health effect incidences) values.

[2] Affected age ranges are shown in square brackets.

[3] The percentiles are generated in BenMAP using a Monte Carlo analysis and represent the statistical uncertainty in the incidence associated with the CRF, but do not include other potential sources of uncertainty (i.e., in the air modeling, in estimates of projected background incidence or populations). These confidence bounds are typically used by USEPA to represent the 95% confidence intervals around the mean estimate.

[4] The percent of background health incidence uses the mean incidence.

2.2 Ozone Health Effects

As noted above, although a larger number of health endpoints could be evaluated, we selected the health endpoints based on recent USEPA risk assessments (USEPA, 2010; USEPA, 2014). The health endpoints and associated C-R functions examined in this study are presented in Table 2-3. Each C-R function is associated with a certain age range for the given health endpoint depending on the epidemiological study on which it is based. Increases in the BenMAP-estimated health effect incidences and percent of background health incidence due to the Project emissions are presented in Table 2-4. Mean incidence rates are presented along with 2.5 and 97.5 percentiles to demonstrate the potential range in estimated health effects. These values reflect the total health effects across the Northern California model domain, though the regions of primary health effect results are shown in Figures 2-3 and 2-4 of Attachment B.

Table 2-3. Summary of Ozone Health Endpoints Used in this Study.

Health Endpoint	Age Range	Daily Metric	Seasonal Metric	Annual Metric	C-R Function Selected
Hospital Admissions, All Respiratory	65 - 99	MDA8	-	-	Katsouyanni et al., 2009[1]
Mortality, Non-Accidental	0 - 99	MDA8	-	-	Smith et al., 2009[1]
Emergency Room Visits, Asthma	0 - 17	MDA8	-	-	Mar and Koenig, 2009[1]
Emergency Room Visits, Asthma	18 - 99	MDA8	-	-	Mar and Koenig, 2009[1]

[1] C-R functions available in BenMAP (USEPA, 2018)

For this Project, asthma-related emergency room visits are associated with the highest health effects due to the Project emissions in the northern California domain (0.76 incidences per year for adults ages 18 to 99 and 0.47 incidences per year for children ages 0 to 17). Hospital admissions due to respiratory issues for adults age 65-99 and non-accidental mortality have lower incidence increases (0.10 and 0.055 incidences per year, respectively).

The estimated increases in those health effect incidences are quite minor compared to the background health incidence (shown in Table 2-4 as percent of Background Health Incidence). For example, the increase in asthma emergency room visits represents 0.0011% of the total asthma-related emergency room visits for children.

Table 2-4. BenMAP-Estimated Mean Ozone Annual Health Effects of the Project Emissions Across the Northern California Model Domain[1]

Health Endpoint[2]	Project Incidences (Annual)			Background Health Incidence (Annual)	Project Mean as Percent of Background Health Incidence[4] (%)
	2.5 Percentile[3]	Mean	97.5 Percentile[3]		
Hospital Admissions, All Respiratory [65-99]	-0.024	0.10	0.23	155,122	0.000066%

Mortality, Non-Accidental [0-99]	-0.015	0.055	0.13	204,688	0.000027%
Emergency Room Visits, Asthma [0-17]	0.084	0.47	0.85	41,194	0.0011%
Emergency Room Visits, Asthma [18-99]	0.21	0.76	1.31	85,464	0.00089%

[1] Health effects are shown terms of incidences of each health endpoint and how it compares to the base (2050 base year health effect incidences) values.

[2] Affected age ranges are shown in square brackets.

[3]The percentiles are generated in BenMAP using a Monte Carlo analysis and represent the statistical uncertainty in the incidence associated with the CRF, but do not include other potential sources of uncertainty (i.e., in the air modeling, in estimates of projected background incidence or populations). These confidence bounds are typically used by USEPA to represent the 95% confidence intervals around the mean estimate.

[4] The percent of background health incidence uses the mean incidence.

2.3 Initial Phase Projects Health Effects [Irving Street Arrival, Research and Academic Building, and Initial Aldea Housing Densification]

The potential health effects from the emissions associated with the Initial Phase Projects can be generally characterized using the full Project level modeling results and a comparison of total emissions. This is because the types and general spatial allocation of emissions is similar between the Initial Phase Projects and the full Project buildout. Emissions from the Initial Phase Projects would also be subject to similar meteorological and photochemical reaction conditions as the full Project assessment. Additionally, the exposed population at full buildout in 2050 is greater than the exposed population in 2030 with Initial Phase Projects and therefore linearly scaling full Project buildout health effects to estimate Initial Phase Projects health effects is conservative.

Concentrations changes, and thus health effects, from $PM_{2.5}$ are driven by primary $PM_{2.5}$ emissions (see Attachment B), with smaller contributions from NOx, VOC, and SO_2 resulting in secondary $PM_{2.5}$ formation. Based on a ratio of total $PM_{2.5}$ emissions from the full Project to Initial Phase Projects $PM_{2.5}$ emissions, approximate health effect results from $PM_{2.5}$ for the Initial Phase Projects would be approximately 80% lower than those from the full Project buildout.

Concentration changes, and thus health effects, from ozone are driven primarily by emissions of VOC and NOx, with some contribution from CO. Based on a ratio of total VOC and NOx emissions from the full Project to Initial Phase Projects VOC and NOx emissions, approximate health effect results from ozone for the Initial Phase Projects would be approximately 80% lower than those from the full Project buildout.

2.4 Construction Health Effects [Initial Phase Projects and the New Hospital]

As maximum daily emissions associated with construction activity are a fraction of incremental 2050 emissions evaluated under the full Project buildout, any potential health effects resulting from such construction activity would be less than what has been modeled for the full Project buildout.

2.5 Conclusion

The $PM_{2.5}$ and ozone concentration changes modeled by CAMx were converted to potential health effects on various health endpoints including premature mortality, hospitalizations, and emergency room visits, using the BenMAP health effects assessment model and health endpoints typically used in past USEPA regulatory assessments. Estimated changes in the annual health effect incidences are presented across the California grids in the northern California domain. Across the board, the estimated increases in those health effect incidences are quite minor compared to the background health incidence values with the largest $PM_{2.5}$ health effect (all-cause mortality) from the Project (2050 build out) representing 0.00072% of the total of all deaths, and the largest health effect for ozone (asthma related emergency room visits by adults) representing 0.00089% of all emergency room visits. The estimated increase in health effect incidences for the Initial Phase Projects (2030) would be approximately 80% lower the those from the full Project. Similarly, any potential health effects from construction activity would be lower than what has been modeled for the full Project buildout.

Project-related health incidences occur both in closer proximity to Project emissions, particularly for $PM_{2.5}$ health effects (see Attachment B for maps of modeled concentration changes), or over a large area due to the regional nature of emission dispersion and photochemical reactions that occur, particularly for ozone health effects (concentration changes also shown in Attachment B). When taken into context, the small increase in incidences and the small percent of the number of background incidences indicate that these health effects are minimal in a developed environment.

2.5.1 Uncertainty

The approach and methodology of this analysis ensures that the uncertainty is of a conservative nature. In addition to the conservative assumptions built into the emissions noted above, there are a number of assumptions built into the application of C-R functions in BenMAP that may lead to an overestimation of health effects. For example, for all-cause mortality health effects from $PM_{2.5}$, these estimates are based on a single epidemiological study that found an association between $PM_{2.5}$ concentrations and mortality. While similar studies suggest that such an association exists, there remains uncertainty regarding a clear causal link. This uncertainty stems from the limitations of epidemiological studies, such as inadequate exposure estimates and the inability to control for many factors that could explain the association between $PM_{2.5}$ and mortality such as lifestyle factors like smoking or exposures to other air pollutants. Several reviews have evaluated the scientific evidence of health effects from specific particulate components (e.g., Rohr and Wyzga 2012; Lippmann and Chen, 2009; Kelly and Fussell, 2007). These reviews indicate that the evidence is strongest for combustion-derived components of PM including elemental carbon (EC), organic carbon (OC) and various metals (e.g., nickel and vanadium), however, there is still no definitive data that points to any particular component of PM as being more toxic than other components. The USEPA has also stated that results from various studies have shown the importance of considering particle size, composition, and particle source in determining the health effects of PM (USEPA, 2009). Further, USEPA (2009) found that studies have reported that particles from industrial sources and from coal combustion appear to be the most significant contributors to PM-related mortality, consistent with the findings by Rohr and Wyzga (2012) and others. This is particularly important to note here, as the majority of PM emissions generated from the Project are from brakewear, tirewear, and entrained roadway dust (see Attachment A), and not from combustion. Therefore, by not considering the relative toxicity of PM components, the results presented here are conservative.

Another uncertainty highlighted by the USEPA (2012) which applies to potential health effects from both $PM_{2.5}$ and ozone, is the assumption of a log-linear response between exposure and health effects, without consideration for a threshold concentration below which effects may not be measurable. The issue of a threshold for $PM_{2.5}$ and ozone is highly debated and can have significant implications for health effects analyses as it requires consideration of current air pollution levels and calculating effects only for areas that exceed threshold levels. Without consideration of a threshold concentration, any changes in air pollution are assumed to adversely affect health. Although the USEPA traditionally does not consider thresholds in its cost-benefit analyses, the NAAQS itself is a health-based threshold level that the USEPA has developed based on evaluating the most current evidence of health effects.

For both the $PM_{2.5}$ and ozone health effects calculated, each of the pollutants may be a confounder of the other. Thus, while the C-R functions are from studies that evaluated the effects for each pollutant individually, both air pollutants could contribute to the health effect outcomes evaluated, and thus the overall health effects may be overstated.

As noted above, the health effects estimation using this method presumes that effects seen at large concentration differences can be linearly scaled down to small increases in concentration, with no consideration of potential thresholds below which health effects may not occur. This methodology of linearly scaling health effects is broadly accepted for use in regulatory evaluations and is considered as being health protective (USEPA, 2010). In summary, health effects presented in this report are conservatively estimated, and the actual effects may be zero.

3. REFERENCES

Kelly, F.J., J.C. Fussell, 2007. Particulate Toxicity Ranking Report. Report Number 2/07. Environmental Research Group, Kings College, London.

Lippmann, M., L.C. Chen, 2009. Health effects of concentrated ambient air particulate matter (CAPs) and its components. *Crit. Rev. Toxicol*., 39, 865e913.

Rohr A.C., R.E. Wyzga, 2012. Attributing Health Effects to Individual Particulate Matter Constituents. *Atmos Environ*., 62, 130-152. doi:10.1016/j.atmosenv.07.036.

USEPA, 2009. Integrated Science Assessment (ISA) For Particulate Matter (Final Report, Dec 2009). U.S. Environmental Protection Agency, Washington, DC, EPA/600/R-08/139F, 2009. https://cfpub.epa.gov/ncea/isa/recordisplay.cfm?deid=216546

USEPA, 2010. Quantitative Health Risk Assessment for Particulate Matter. Office of Air Quality Planning and Standards, U.S. Environmental Protection Agency. EPA-452/R-10-005. June 2010. Available: https://www3.epa.gov/ttn/naaqs/standards/pm/data/PM_RA_FINAL_June_2010.pdf.

USEPA, 2012. Regulatory Impact Analysis for the Final Revisions to the National Ambient Air Quality Standards for Particulate Matter. U.S. Environmental Protection Agency, Washington, DC, EPA-452/R-12-005. https://www3.epa.gov/ttn/ecas/docs/ria/naaqs-pm_ria_final_2012-12.pdf

USEPA, 2014. Health Risk and Exposure Assessment for Ozone Final Report. Risk and Benefits Group, Health and Environmental Impacts Division, Office of Air Quality Planning and Standards, U.S. Environmental Protection Agency.EPA-452/R-14-004a.

USEPA, 2018. BenMAP Environmental Benefits Mapping and Analysis Program – Community Edition User’s Manual. United States Environmental Protection Agency. Available at: https://www.epa.gov/benmap/benmap-ce-manual-and-appendices.

Appendix NOI
Noise and Vibration Appendix

RCNM Outputs for Construction Noise

Traffic Noise Model

HUD DNL Noise Model

Noise Level Monitoring Data

RCNM Outputs for Construction Noise

Aldea Construction
Roadway Construction Noise Model (RCNM),Version 1.1

Report date: 10/24/2019
Case Description: Aldea Construction

**** Receptor #1 ****

		Baselines (dBA)		
Description	Land Use	Daytime	Evening	Night
90 Behr Avenue	Residential	69.0	69.0	60.0

Equipment

Description	Impact Device	Usage (%)	Spec Lmax (dBA)	Actual Lmax (dBA)	Receptor Distance (feet)	Estimated Shielding (dBA)
Crane	No	16		80.6	70.0	0.0
Gradall	No	40		83.4	70.0	0.0

Results

	Calculated (dBA)		Noise Limits (dBA)						Noise Limit Exceedance (dBA)					
			Day		Evening		Night		Day		Evening		Night	
Equipment	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq
Crane	77.6	69.7	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Gradall	80.5	76.5	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Total	80.5	77.3	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

Aldea Demo
Roadway Construction Noise Model (RCNM),Version 1.1

Report date: 10/24/2019
Case Description: Aldea demolition

**** Receptor #1 ****

Description	Land Use	Baselines (dBA) Daytime	Evening	Night
90 Behr Avenue	Residential	69.0	69.0	60.0

Equipment

Description	Impact Device	Usage (%)	Spec Lmax (dBA)	Actual Lmax (dBA)	Receptor Distance (feet)	Estimated Shielding (dBA)
Backhoe	No	40		77.6	70.0	0.0
Mounted Impact Hammer (hoe ram)	Yes	20		90.3	70.0	0.0

Results

	Calculated (dBA)		Noise Limits (dBA) Day		Evening		Night		Noise Limit Exceedance (dBA) Day		Evening		Night	
Equipment	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq
Backhoe	74.6	70.7	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Mounted Impact Hammer (hoe ram)	87.4	80.4	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Total	87.4	80.8	N/A	N/A	N/A	N/A								

Aldea Demo

N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

Irving Street Construction
Roadway Construction Noise Model (RCNM),Version 1.1

Report date: 10/24/2019
Case Description: Irving Street Construction

**** Receptor #1 ****

Description	Land Use	Baselines (dBA) Daytime	Evening	Night
30 Irving Street	Residential	69.0	69.0	60.0

Equipment

Description	Impact Device	Usage (%)	Spec Lmax (dBA)	Actual Lmax (dBA)	Receptor Distance (feet)	Estimated Shielding (dBA)
Crane	No	16		80.6	70.0	0.0
Gradall	No	40		83.4	70.0	0.0

Results

	Calculated (dBA)		Noise Limits (dBA)						Noise Limit Exceedance (dBA)					
			Day		Evening		Night		Day		Evening		Night	
Equipment	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq
Crane	77.6	69.7	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Gradall	80.5	76.5	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Total	80.5	77.3	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

Irving Street Demo
Roadway Construction Noise Model (RCNM),Version 1.1

Report date: 10/24/2019
Case Description: Irving Street demolition

**** Receptor #1 ****

Description	Land Use	Baselines (dBA) Daytime	Evening	Night
30 Irving Street	Residential	69.0	69.0	60.0

Equipment

Description	Impact Device	Usage (%)	Spec Lmax (dBA)	Actual Lmax (dBA)	Receptor Distance (feet)	Estimated Shielding (dBA)
Backhoe	No	40		77.6	70.0	0.0
Mounted Impact Hammer (hoe ram)	Yes	20		90.3	70.0	0.0

Results

Equipment	Calculated (dBA) Lmax	Leq	Noise Limits (dBA) Day Lmax	Leq	Evening Lmax	Leq	Night Lmax	Leq	Noise Limit Exceedance (dBA) Day Lmax	Leq	Evening Lmax	Leq	Night Lmax	Leq
Backhoe	74.6	70.7	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Mounted Impact Hammer (hoe ram)	87.4	80.4	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Total	87.4	80.8	N/A	N/A	N/A	N/A								

Irving Street Demo

N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

RAB Construction
Roadway Construction Noise Model (RCNM),Version 1.1

Report date: 10/24/2019
Case Description: RAB Construction

**** Receptor #1 ****

		Baselines (dBA)		
Description	Land Use	Daytime	Evening	Night
650 Parnassus	Residential	64.0	64.0	55.0

Equipment

Description	Impact Device	Usage (%)	Spec Lmax (dBA)	Actual Lmax (dBA)	Receptor Distance (feet)	Estimated Shielding (dBA)
Crane	No	16		80.6	75.0	0.0
Gradall	No	40		83.4	75.0	0.0

Results

	Calculated (dBA)		Noise Limits (dBA)						Noise Limit Exceedance (dBA)					
			Day		Evening		Night		Day		Evening		Night	
Equipment	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq
Crane	77.0	69.1	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Gradall	79.9	75.9	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Total	79.9	76.7	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

RAB Demo

Roadway Construction Noise Model (RCNM),Version 1.1

Report date: 10/24/2019
Case Description: RAB demolition

**** Receptor #1 ****

Description	Land Use	Baselines (dBA) Daytime	Evening	Night
650 Parnassus	Residential	63.0	63.0	55.0

Equipment

Description	Impact Device	Usage (%)	Spec Lmax (dBA)	Actual Lmax (dBA)	Receptor Distance (feet)	Estimated Shielding (dBA)
Backhoe	No	40		77.6	75.0	0.0
Mounted Impact Hammer (hoe ram)	Yes	20		90.3	75.0	0.0

Results

	Calculated (dBA)		Noise Limits (dBA) Day		Evening		Night		Noise Limit Exceedance (dBA) Day		Evening		Night	
Equipment	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq
Backhoe	74.0	70.1	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Mounted Impact Hammer (hoe ram)	86.8	79.8	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Total	86.8	80.2	N/A	N/A	N/A	N/A								

N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

Traffic Noise Model

Existing

ROAD SEGMENT Calveno Peak	from:	to:	TOTAL # VEHICLES	VEHICLE TYPE % Auto %	Auto	MT %	MT	HT %	HT	VEHICLE SPEED Auto	k/h	MT	k/h	HT	k/h	NOISE LEVEL (dBA) Auto	MT	HT	CALCULATED NOISE LEVEL (15 meters from roadway center)	Receptor Dist. from Roadway Center (m.)	Adjusted Noise Level (dBA)	Distance from Roadway to 65 dBA (m.)	Distance from Roadway to 65 dBA (ft)
Kirkham	7th	5th	354	97	343.38	2	7.08	1	3.54	25	40	25	40	25	40	55.5	50.3	54.9	58.8	40	54.6	3.6	11.9
5th	Kirkham	Judah	297	97	288.09	2	5.94	1	2.97	25	40	25	40	25	40	54.7	49.5	54.1	58.1	40	53.8	3.0	10.0
7th	Kirkham	Judah	1043	97	1011.7	2	20.86	1	10.4	25	40	25	40	25	40	60.2	54.9	59.6	63.5	40	59.3	10.7	35.1
Judah	7th	5th	681	95	646.95	3	20.43	2	13.6	25	40	25	40	25	40	58.2	54.9	60.7	63.3	40	59.1	10.2	33.5
Parnassus	5th	3rd	904	95	858.8	3	27.12	2	18.1	25	40	25	40	25	40	59.4	56.1	62.0	64.6	40	60.3	13.6	44.5
Parnassus	3rd	Hillway	878	95	834.1	3	26.34	2	17.6	25	40	25	40	25	40	59.3	56.0	61.8	64.4	40	60.2	13.2	43.2
Parnassus	Hillway	Stanyan	643	95	610.85	3	19.29	2	12.9	25	40	25	40	25	40	58.0	54.6	60.5	63.1	40	58.8	9.6	31.7
Stanyan	Parnassus	Fredrick	713	95	677.35	3	21.39	2	14.3	25	40	25	40	25	40	58.4	55.1	60.9	63.5	40	59.3	10.7	35.1
Irving	Stanyan	Arguello	321	95	304.95	3	9.63	2	6.42	25	40	25	40	25	40	54.9	51.6	57.5	60.1	40	55.8	4.8	15.8
Irving	Arguello	4th	391	95	371.45	3	11.73	2	7.82	25	40	25	40	25	40	55.8	52.4	58.3	60.9	40	56.7	5.9	19.2
Lincoln	Arguello	4th	3776	95	3587.2	3	113.3	2	75.5	35	56	35	56	35	56	69.9	64.6	69.5	73.3	40	69.1	102.0	334.7
Clarendon	Johnstone	Laguna Hnda	683	97	662.51	2	13.66	1	6.83	35	56	35	56	35	56	62.5	55.4	59.1	64.7	40	60.4	14.0	45.8

Assumptions: PM peak hour traffic data from Fehr & Peers

Existing + Project

ROAD SEGMENT Calveno Peak	from:	to:	TOTAL # VEHICLES	VEHICLE TYPE % Auto %	Auto	MT %	MT	HT %	HT	VEHICLE SPEED Auto	k/h	MT	k/h	HT	k/h	NOISE LEVEL (dBA) Auto	MT	HT	CALCULATED NOISE LEVEL (15 meters from roadway center)	Receptor Dist. from Roadway Center (m.)	Adjusted Noise Level (dBA)	Distance from Roadway to 65 dBA (m.)	Distance from Roadway to 65 dBA (ft)
Kirkham	7th	5th	517	97	501.49	2	10.34	1	5.17	25	40	25	40	25	40	57.1	51.9	56.5	60.5	40	56.2	5.3	17.4
5th	Kirkham	Judah	342	97	331.74	2	6.84	1	3.42	25	40	25	40	25	40	55.3	50.1	54.7	58.7	40	54.4	3.5	11.5
7th	Kirkham	Judah	1424	97	1381.3	2	28.48	1	14.2	25	40	25	40	25	40	61.5	56.3	60.9	64.9	40	60.6	14.6	47.9
Judah	7th	5th	1055	95	1002.3	3	31.65	2	21.1	25	40	25	40	25	40	60.1	56.8	62.6	65.2	40	61.0	15.8	51.9
Parnassus	5th	3rd	1355	95	1287.3	3	40.65	2	27.1	25	40	25	40	25	40	61.2	57.8	63.7	66.3	40	62.1	20.3	66.7
Parnassus	3rd	Hillway	1437	95	1365.2	3	43.11	2	28.7	25	40	25	40	25	40	61.5	58.1	64.0	66.6	40	62.3	21.6	70.7
Parnassus	Hillway	Stanyan	957	95	909.15	3	28.71	2	19.1	25	40	25	40	25	40	59.7	56.3	62.2	64.8	40	60.6	14.4	47.1
Stanyan	Parnassus	Fredrick	966	95	917.7	3	28.98	2	19.3	25	40	25	40	25	40	59.7	56.4	62.3	64.9	40	60.6	14.5	47.6
Irving	Stanyan	Arguello	403	95	382.85	3	12.09	2	8.06	25	40	25	40	25	40	55.9	52.6	58.5	61.1	40	56.8	6.0	19.8
Irving	Arguello	4th	589	95	559.55	3	17.67	2	11.8	25	40	25	40	25	40	57.6	54.2	60.1	62.7	40	58.4	8.8	29.0
Lincoln	Arguello	4th	4131	95	3924.5	3	123.9	2	82.6	35	56	35	56	35	56	70.2	65.0	69.9	73.7	40	69.5	111.6	366.2
Clarendon	Johnstone	Laguna Hnda	748	97	725.56	2	14.96	1	7.48	35	56	35	56	35	56	62.9	55.8	59.5	65.1	40	60.8	15.3	50.2

Assumptions: PM peak hour traffic data from Fehr & Peers

Cumulative + Project

ROAD SEGMENT Calveno Peak	from:		TOTAL # VEHICLES	VEHICLE TYPE % Auto %	Auto	MT %	MT	HT %	HT	VEHICLE SPEED Auto	k/h	MT	k/h	HT	k/h	NOISE LEVEL (dBA) Auto	MT	HT	CALCULATED NOISE LEVEL (15 meters from roadway center)	Receptor Dist. from Roadway Center (m.)	Adjusted Noise Level (dBA)	Distance from Roadway to 65 dBA (m.)	Distance from Roadway to 65 dBA (ft)
Kirkham	7th	5th	650	97	630.5	2	13	1	6.5	25	40	25	40	25	40	58.1	52.9	57.5	61.5	40	57.2	6.7	21.9
5th	Kirkham	Judah	392	97	380.24	2	7.84	1	3.92	25	40	25	40	25	40	55.9	50.7	55.3	59.3	40	55.0	4.0	13.2
7th	Kirkham	Judah	1,494	97	1449.2	2	29.88	1	14.9	25	40	25	40	25	40	61.7	56.5	61.1	65.1	40	60.8	15.3	50.3
Judah	7th	5th	1,121	95	1065	3	33.63	2	22.4	25	40	25	40	25	40	60.4	57.0	62.9	65.5	40	61.2	16.8	55.2
Parnassus	5th	3rd	1,436	95	1364.2	3	43.08	2	28.7	25	40	25	40	25	40	61.4	58.1	64.0	66.6	40	62.3	21.5	70.7
Parnassus	3rd	Hillway	1,528	95	1451.6	3	45.84	2	30.6	25	40	25	40	25	40	61.7	58.4	64.3	66.8	40	62.6	22.9	75.2
Parnassus	Hillway	Stanyan	1,037	95	985.15	3	31.11	2	20.7	25	40	25	40	25	40	60.0	56.7	62.6	65.2	40	60.9	15.6	51.1
Stanyan	Parnassus	Fredrick	1,000	95	950	3	30	2	20	25	40	25	40	25	40	59.9	56.5	62.4	65.0	40	60.7	15.0	49.2
Irving	Stanyan	Arguello	466	95	442.7	3	13.98	2	9.32	25	40	25	40	25	40	56.6	53.2	59.1	61.7	40	57.4	7.0	22.9
Irving	Arguello	4th	681	95	646.95	3	20.43	2	13.6	25	40	25	40	25	40	58.2	54.9	60.7	63.3	40	59.1	10.2	33.5
Lincoln	Arguello	4th	4,287	95	4072.7	3	128.6	2	85.7	35	56	35	56	35	56	70.4	65.1	70.1	73.9	40	69.6	115.8	380.0
Clarendon	Johnstone	Laguna Hnda	789	97	765.33	2	15.78	1	7.89	35	56	35	56	35	56	63.1	56.0	59.7	65.3	40	61.1	16.1	52.9

Assumptions: PM peak hour traffic data from Fehr & Peers

HUD DNL Noise Model

Site ID	UCSF Parnassus Campus Existing
Record Date	6/4/2020
User's Name	C. Sanchez

Road # 1 Name:	**Medical Center Way Existing**

Road #1

Vehicle Type	**Cars** ☑	**Medium Trucks** ☑	**Heavy Trucks** ☑
Effective Distance	180	180	180
Distance to Stop Sign	150	150	150
Average Speed	15	15	15
Average Daily Trips (ADT)	742	201	57
Night Fraction of ADT	15	15	15
Road Gradient (%)			9
Vehicle DNL	32	46	58
Calculate Road #1 DNL	58	Reset	

Add Road Source Add Rail Source

Airport Noise Level	
Loud Impulse Sounds?	○**Yes** ○**No**

Site ID	UCSF Parnassus Campus with CPHP
Record Date	6/4/2020
User's Name	C. Sanchez

Road # 1 Name: **Medical Center Way with Project**

Road #1

Vehicle Type	**Cars** ☑	**Medium Trucks** ☑	**Heavy Trucks** ☑
Effective Distance	180	180	180
Distance to Stop Sign	150	150	150
Average Speed	15	15	15
Average Daily Trips (ADT)	890	242	68
Night Fraction of ADT	15	15	15
Road Gradient (%)			9
Vehicle DNL	33	47	58
Calculate Road #1 DNL	59	Reset	

Add Road Source Add Rail Source

Airport Noise Level	
Loud Impulse Sounds?	○**Yes** ○**No**

Noise Level Monitoring Data

Summary

File Name on Meter	LxT_Data.058
File Name on PC	SLM_0004437_LxT_Data_058.00.ldbin
Serial Number	0004437
Model	SoundTrack LxT®
Firmware Version	2.302
User	C. Sanchez
Location	Aldea Housing
Job Description	UCSF CPHP
Note	

Measurement

Description	
Start	2019-10-17 10:10:19
Stop	2019-10-23 10:28:45
Duration	144:18:26.813
Run Time	144:18:26.813
Pause	00:00:00.0
Pre Calibration	2019-10-17 09:34:07
Post Calibration	None
Calibration Deviation	---

Overall Settings

RMS Weight	A Weighting			
Peak Weight	Z Weighting			
Detector	Slow			
Preamp	PRMLxT2B			
Microphone Correction	Off			
Integration Method	Exponential			
Overload	142.2 dB			
	A	**C**	**Z**	
Under Range Peak	98.5	95.5	**100.5**	dB
Under Range Limit	**47.5**	45.5	53.5	dB
Noise Floor	34.4	35.0	42.6	dB

Results

LASeq	49.3 dB	
LASE	106.5 dB	
EAS	4.947 mPa²h	
EAS8	274.237 µPa²h	
EAS40	1.371 mPa²h	
LZSpeak (max)	2019-10-23 10:28:40	110.1 dB
LASmax	2019-10-23 10:08:57	89.5 dB
LASmin	2019-10-18 04:12:59	40.4 dB
SEA	-99.9 dB	
LAS > 85.0 dB (Exceedance Counts / Duration)	3	17.7 s
LAS > 115.0 dB (Exceedance Counts / Duration)	0	0.0 s
LZSpeak > 135.0 dB (Exceedance Counts / Duration)	0	0.0 s
LZSpeak > 137.0 dB (Exceedance Counts / Duration)	0	0.0 s
LZSpeak > 140.0 dB (Exceedance Counts / Duration)	0	0.0 s
LCSeq	60.0 dB	
LASeq	49.3 dB	
LCSeq - LASeq	10.7 dB	
LAIeq	52.0 dB	
LAeq	49.3 dB	
LAIeq - LAeq	2.7 dB	

Record #	Record Type	Date	Time	LASeq	LZpeak	LASmax	LASmin	OVLD	OBA OVLD	Marker
1	Run	2019-10-17	10:10:18							
2		2019-10-17	10:10:19	53.2	106.7	77.2	43.1	No	No	
3		2019-10-17	11:10:19	47.2	92.0	62.6	42.7	No	No	
4		2019-10-17	12:10:19	49.4	96.8	66.2	43.6	No	No	
5		2019-10-17	13:10:19	49.2	91.1	65.0	44.2	No	No	
6		2019-10-17	14:10:19	50.1	108.2	68.2	45.8	No	No	
7		2019-10-17	15:10:19	49.6	92.9	69.3	46.0	No	No	
8		2019-10-17	16:10:19	49.0	93.3	59.8	45.7	No	No	
9		2019-10-17	17:10:19	49.9	96.2	64.8	45.9	No	No	
10		2019-10-17	18:10:19	49.7	91.1	67.5	44.9	No	No	
11		2019-10-17	19:10:19	48.0	89.9	64.0	43.6	No	No	
12		2019-10-17	20:10:19	47.9	86.7	63.4	43.8	No	No	
13		2019-10-17	21:10:19	46.4	86.6	61.8	42.9	No	No	
14		2019-10-17	22:10:19	44.5	86.7	49.1	42.5	No	No	
15		2019-10-17	23:10:19	44.2	83.7	51.0	42.2	No	No	
16		2019-10-18	0:10:19	43.8	79.9	55.0	41.4	No	No	
17		2019-10-18	1:10:19	42.9	82.1	52.0	40.7	No	No	
18		2019-10-18	2:10:19	42.2	79.9	48.8	40.6	No	No	
19		2019-10-18	3:10:19	42.0	86.3	49.0	40.6	No	No	
20		2019-10-18	4:10:19	42.3	78.5	49.3	40.4	No	No	
21		2019-10-18	5:10:19	46.0	92.9	70.4	41.6	No	No	
22		2019-10-18	6:10:19	46.8	94.6	68.8	40.9	No	No	
23		2019-10-18	7:10:19	49.6	89.5	66.9	42.9	No	No	
24		2019-10-18	8:10:19	48.8	92.1	69.8	43.2	No	No	
25		2019-10-18	9:10:19	48.5	90.6	64.6	41.6	No	No	
26		2019-10-18	10:10:19	46.2	91.3	60.6	41.2	No	No	
27		2019-10-18	11:10:19	45.0	85.8	63.2	40.8	No	No	
28		2019-10-18	12:10:19	48.3	92.8	69.4	40.9	No	No	
29		2019-10-18	13:10:19	52.6	89.5	74.7	41.8	No	No	
30		2019-10-18	14:10:19	47.8	91.5	66.2	42.2	No	No	
31		2019-10-18	15:10:19	49.1	90.0	63.5	44.7	No	No	
32		2019-10-18	16:10:19	49.3	94.0	63.7	45.2	No	No	
33		2019-10-18	17:10:19	49.9	89.5	66.0	46.3	No	No	
34		2019-10-18	18:10:19	47.5	91.6	54.6	43.9	No	No	
35		2019-10-18	19:10:19	46.5	94.9	60.4	43.6	No	No	
36		2019-10-18	20:10:19	47.6	90.8	66.2	43.4	No	No	
37		2019-10-18	21:10:19	45.8	87.1	57.6	43.4	No	No	
38		2019-10-18	22:10:19	44.6	83.4	53.1	42.6	No	No	
39		2019-10-18	23:10:19	44.7	85.2	53.2	42.7	No	No	
40		2019-10-19	0:10:19	43.6	84.4	53.0	41.9	No	No	
41		2019-10-19	1:10:19	43.1	80.0	50.5	41.2	No	No	
42		2019-10-19	2:10:19	43.2	82.2	52.7	41.6	No	No	
43		2019-10-19	3:10:19	44.1	85.0	59.2	41.5	No	No	
44		2019-10-19	4:10:19	42.5	74.8	45.3	41.0	No	No	
45		2019-10-19	5:10:19	43.5	79.6	50.5	41.6	No	No	
46		2019-10-19	6:10:19	45.1	80.9	58.8	42.1	No	No	
47		2019-10-19	7:10:19	48.3	84.5	64.3	42.2	No	No	
48		2019-10-19	8:10:19	46.9	88.6	61.8	41.5	No	No	
49		2019-10-19	9:10:19	47.5	89.1	64.6	41.2	No	No	
50		2019-10-19	10:10:19	48.4	89.1	67.2	40.8	No	No	
51		2019-10-19	11:10:19	49.0	91.7	72.1	41.1	No	No	
52		2019-10-19	12:10:19	47.4	91.5	66.0	40.9	No	No	
53		2019-10-19	13:10:19	47.9	95.5	71.0	41.8	No	No	
54		2019-10-19	14:10:19	48.1	92.4	63.1	43.4	No	No	
55		2019-10-19	15:10:19	46.4	88.5	59.3	41.9	No	No	
56		2019-10-19	16:10:19	45.1	90.3	56.0	41.7	No	No	
57		2019-10-19	17:10:19	47.1	90.1	65.8	41.2	No	No	
58		2019-10-19	18:10:19	45.1	82.8	52.1	42.5	No	No	
59		2019-10-19	19:10:19	45.2	86.7	51.2	43.0	No	No	
60		2019-10-19	20:10:19	45.6	86.5	54.4	43.4	No	No	
61		2019-10-19	21:10:19	44.3	80.7	50.4	42.3	No	No	
62		2019-10-19	22:10:19	44.9	85.5	52.8	42.6	No	No	
63		2019-10-19	23:10:19	44.4	82.3	54.5	42.5	No	No	
64		2019-10-20	0:10:19	44.6	94.3	63.1	42.2	No	No	
65		2019-10-20	1:10:19	43.1	74.9	49.0	41.5	No	No	
66		2019-10-20	2:10:19	43.0	97.1	58.1	41.3	No	No	
67		2019-10-20	3:10:19	42.8	76.9	50.0	41.4	No	No	
68		2019-10-20	4:10:19	43.2	78.2	51.5	42.0	No	No	
69		2019-10-20	5:10:19	43.6	90.9	54.6	42.0	No	No	
70		2019-10-20	6:10:19	45.4	86.7	59.8	42.8	No	No	
71		2019-10-20	7:10:19	47.0	92.0	61.4	42.9	No	No	
72		2019-10-20	8:10:19	48.7	86.4	65.2	43.2	No	No	
73		2019-10-20	9:10:19	49.0	90.3	72.9	42.9	No	No	

74		2019-10-20	10:10:19	47.8	87.7	65.9	42.0	No	No
75		2019-10-20	11:10:19	46.4	86.4	61.5	41.2	No	No
76		2019-10-20	12:10:19	46.1	95.1	60.2	41.1	No	No
77		2019-10-20	13:10:19	49.3	88.7	65.8	42.3	No	No
78		2019-10-20	14:10:19	47.0	92.9	59.8	42.6	No	No
79		2019-10-20	15:10:19	49.9	89.5	67.5	42.5	No	No
80		2019-10-20	16:10:19	46.2	87.9	58.9	43.6	No	No
81		2019-10-20	17:10:19	49.4	90.4	67.0	43.8	No	No
82		2019-10-20	18:10:19	47.7	90.4	59.1	44.3	No	No
83		2019-10-20	19:10:19	47.9	84.5	61.6	44.1	No	No
84		2019-10-20	20:10:19	47.1	89.2	59.9	43.4	No	No
85		2019-10-20	21:10:19	45.9	87.0	57.2	43.0	No	No
86		2019-10-20	22:10:19	45.2	81.1	52.6	41.5	No	No
87		2019-10-20	23:10:19	44.2	80.5	58.8	41.5	No	No
88		2019-10-21	0:10:19	43.1	81.1	51.8	41.7	No	No
89		2019-10-21	1:10:19	42.3	78.0	48.0	40.9	No	No
90		2019-10-21	2:10:19	41.9	74.0	44.4	40.8	No	No
91		2019-10-21	3:10:19	42.2	75.4	47.4	41.2	No	No
92		2019-10-21	4:10:19	44.0	77.9	51.1	41.9	No	No
93		2019-10-21	5:10:19	46.6	88.6	59.0	43.2	No	No
94		2019-10-21	6:10:19	47.4	84.4	59.5	45.2	No	No
95		2019-10-21	7:10:19	48.9	86.7	57.2	45.2	No	No
96		2019-10-21	8:10:19	50.5	91.9	65.5	46.1	No	No
97		2019-10-21	9:10:19	49.6	88.0	62.5	46.3	No	No
98		2019-10-21	10:10:19	47.8	86.9	56.4	43.7	No	No
99		2019-10-21	11:10:19	47.5	90.7	61.3	43.1	No	No
100		2019-10-21	12:10:19	46.2	90.6	57.2	43.4	No	No
101		2019-10-21	13:10:19	48.1	90.7	65.8	44.2	No	No
102		2019-10-21	14:10:19	46.4	91.3	58.0	43.3	No	No
103		2019-10-21	15:10:19	46.9	90.6	57.5	44.1	No	No
104		2019-10-21	16:10:19	47.2	87.3	67.9	44.3	No	No
105		2019-10-21	17:10:19	47.2	92.6	63.6	44.1	No	No
106		2019-10-21	18:10:19	49.3	93.2	65.3	43.2	No	No
107		2019-10-21	19:10:19	45.6	89.7	58.4	42.7	No	No
108		2019-10-21	20:10:19	45.9	88.1	56.6	43.4	No	No
109		2019-10-21	21:10:19	45.2	90.0	55.1	42.5	No	No
110		2019-10-21	22:10:19	43.9	87.9	51.7	42.5	No	No
111		2019-10-21	23:10:19	44.7	82.0	56.9	42.1	No	No
112		2019-10-22	0:10:19	42.7	76.4	48.7	41.2	No	No
113		2019-10-22	1:10:19	41.7	84.0	45.8	40.7	No	No
114		2019-10-22	2:10:19	42.7	81.2	52.3	40.8	No	No
115		2019-10-22	3:10:19	44.1	87.0	57.5	41.9	No	No
116		2019-10-22	4:10:19	44.0	76.5	51.9	42.4	No	No
117		2019-10-22	5:10:19	46.0	87.2	66.2	42.2	No	No
118		2019-10-22	6:10:19	49.7	93.6	71.9	42.8	No	No
119		2019-10-22	7:10:19	49.3	87.1	60.6	44.3	No	No
120		2019-10-22	8:10:19	50.3	91.6	68.9	46.1	No	No
121		2019-10-22	9:10:19	48.3	88.7	60.4	45.0	No	No
122		2019-10-22	10:10:19	47.0	88.7	58.1	44.1	No	No
123		2019-10-22	11:10:19	46.8	87.9	65.6	42.1	No	No
124		2019-10-22	12:10:19	45.8	88.2	60.6	42.7	No	No
125		2019-10-22	13:10:19	46.4	90.6	60.1	43.0	No	No
126		2019-10-22	14:10:19	48.0	92.5	64.9	43.0	No	No
127		2019-10-22	15:10:19	47.4	90.0	61.4	43.5	No	No
128		2019-10-22	16:10:19	48.6	93.6	69.0	44.0	No	No
129		2019-10-22	17:10:19	46.8	90.0	58.8	43.6	No	No
130		2019-10-22	18:10:19	48.6	93.8	67.0	43.3	No	No
131		2019-10-22	19:10:19	53.8	95.2	75.1	43.4	No	No
132		2019-10-22	20:10:19	45.4	88.6	61.4	41.7	No	No
133		2019-10-22	21:10:19	44.3	86.7	58.3	41.3	No	No
134		2019-10-22	22:10:19	42.6	81.8	48.7	40.9	No	No
135		2019-10-22	23:10:19	43.0	85.8	50.5	41.5	No	No
136		2019-10-23	0:10:19	44.2	85.9	63.6	41.1	No	No
137		2019-10-23	1:10:19	42.4	78.0	49.1	41.2	No	No
138		2019-10-23	2:10:19	43.1	81.0	51.0	41.5	No	No
139		2019-10-23	3:10:19	42.7	78.8	53.8	41.3	No	No
140		2019-10-23	4:10:19	43.0	77.7	51.0	41.2	No	No
141		2019-10-23	5:10:19	45.4	80.2	53.3	43.1	No	No
142		2019-10-23	6:10:19	46.8	87.5	63.5	43.5	No	No
143		2019-10-23	7:10:19	48.7	90.2	68.5	45.1	No	No
144		2019-10-23	8:10:19	48.8	95.1	59.8	45.2	No	No
145		2019-10-23	9:10:19	66.9	105.9	89.5	45.6	No	No
146		2019-10-23	10:10:19	56.1	110.1	81.2	45.0	No	No
147	Stop	2019-10-23	10:28:45						

Summary

File Name on Meter	LxT_Data.036
File Name on PC	SLM_0004435_LxT_Data_036.00.ldbin
Serial Number	0004435
Model	SoundTrack LxT®
Firmware Version	2.302
User	C. Sanchez
Location	ST-1 Judah and 5th
Job Description	UCSF CPHP
Note	

Measurement

Description	
Start	2019-10-17 11:00:32
Stop	2019-10-17 11:16:36
Duration	00:16:04.4
Run Time	00:15:17.5
Pause	00:00:46.9
Pre Calibration	2019-10-17 10:25:17
Post Calibration	None
Calibration Deviation	---

Overall Settings

RMS Weight	A Weighting			
Peak Weight	Z Weighting			
Detector	Slow			
Preamp	PRMLxT2B			
Microphone Correction	Off			
Integration Method	Linear			
Overload	141.4 dB			
	A	**C**	**Z**	
Under Range Peak	97.7	94.7	**99.7**	dB
Under Range Limit	**46.7**	44.7	52.7	dB
Noise Floor	33.6	34.2	41.8	dB

Results

LAeq	63.1 dB	
LAE	92.7 dB	
EA	206.663 µPa²h	
EA8	6.487 mPa²h	
EA40	32.435 mPa²h	
LZpeak (max)	2019-10-17 11:04:30	101.7 dB
LASmax	2019-10-17 11:10:07	79.6 dB
LASmin	2019-10-17 11:13:51	49.7 dB
SEA	-99.9 dB	
LAS > 85.0 dB (Exceedance Counts / Duration)	0	0.0 s
LAS > 115.0 dB (Exceedance Counts / Duration)	0	0.0 s
LZpeak > 135.0 dB (Exceedance Counts / Duration)	0	0.0 s
LZpeak > 137.0 dB (Exceedance Counts / Duration)	0	0.0 s
LZpeak > 140.0 dB (Exceedance Counts / Duration)	0	0.0 s
LCeq	72.1 dB	
LAeq	63.1 dB	
LCeq - LAeq	9.0 dB	
LAIeq	65.1 dB	
LAeq	63.1 dB	
LAIeq - LAeq	2.0 dB	

Record #	Record Type	Date	Time	LAeq	LZpeak	LASmax	LASmin	OVLD	OBA OVLD	Marker
1	Run	2019-10-17	11:00:32							
2		2019-10-17	11:00:32	62.2	98.1	69.8	55.6	No	No	
3		2019-10-17	11:01:32	63.1	95.3	70.5	55.8	No	No	
4		2019-10-17	11:02:32	63.6	101.3	71.4	53.3	No	No	
5		2019-10-17	11:03:32	61.6	101.7	67.8	55.3	No	No	
6		2019-10-17	11:04:32	58.3	89.6	64.3	54.5	No	No	
7		2019-10-17	11:05:32	62.1	96.2	69.0	54.4	No	No	
8		2019-10-17	11:06:32	59.2	94.2	65.3	50.1	No	No	
9		2019-10-17	11:07:32	60.3	99.0	64.2	56.3	No	No	
10		2019-10-17	11:08:32	62.8	96.8	72.0	54.7	No	No	
11		2019-10-17	11:09:32	70.7	98.1	79.6	58.7	No	No	
12	Pause	2019-10-17	11:10:11							
13	Resume	2019-10-17	11:10:58							
14		2019-10-17	11:10:58	64.9	93.8	72.4	57.1	No	No	
15		2019-10-17	11:11:58	65.1	93.1	71.7	57.4	No	No	
16		2019-10-17	11:12:58	61.5	100.5	67.1	49.7	No	No	
17		2019-10-17	11:13:58	57.6	94.8	65.7	50.4	No	No	
18		2019-10-17	11:14:58	59.8	89.9	66.3	50.9	No	No	
19		2019-10-17	11:15:58	58.8	92.9	64.6	53.0	No	No	
20	Stop	2019-10-17	11:16:36							

Summary	
File Name on Meter	LxT_Data.037
File Name on PC	SLM_0004435_LxT_Data_037.00.ldbin
Serial Number	0004435
Model	SoundTrack LxT®
Firmware Version	2.302
User	C. Sanchez
Location	ST-2 Kirkham and 5th Ave.
Job Description	UCSF CPHP
Note	

Measurement	
Description	
Start	2019-10-17 11:33:19
Stop	2019-10-17 11:48:23
Duration	00:15:03.8
Run Time	00:15:03.8
Pause	00:00:00.0
Pre Calibration	2019-10-17 10:25:17
Post Calibration	None
Calibration Deviation	---

Overall Settings				
RMS Weight	A Weighting			
Peak Weight	Z Weighting			
Detector	Slow			
Preamp	PRMLxT2B			
Microphone Correction	Off			
Integration Method	Linear			
Overload	141.4 dB			
	A	**C**	**Z**	
Under Range Peak	97.7	94.7	**99.7**	dB
Under Range Limit	**46.7**	44.7	52.7	dB
Noise Floor	33.6	34.2	41.8	dB

Results		
LAeq	57.6 dB	
LAE	87.1 dB	
EA	57.269 µPa²h	
EA8	1.825 mPa²h	
EA40	9.125 mPa²h	
LZpeak (max)	2019-10-17 11:43:58	97.3 dB
LASmax	2019-10-17 11:46:43	72.4 dB
LASmin	2019-10-17 11:46:11	46.4 dB
SEA	-99.9 dB	
LAS > 85.0 dB (Exceedance Counts / Duration)	0	0.0 s
LAS > 115.0 dB (Exceedance Counts / Duration)	0	0.0 s
LZpeak > 135.0 dB (Exceedance Counts / Duration)	0	0.0 s
LZpeak > 137.0 dB (Exceedance Counts / Duration)	0	0.0 s
LZpeak > 140.0 dB (Exceedance Counts / Duration)	0	0.0 s
LCeq	68.5 dB	
LAeq	57.6 dB	
LCeq - LAeq	10.9 dB	
LAIeq	61.0 dB	
LAeq	57.6 dB	
LAIeq - LAeq	3.5 dB	

Record #	Record Type	Date	Time	LAeq	LZpeak	LASmax	LASmin	OVLD	OBA OVLD	Marker
1	Run	2019-10-17	11:33:19							
2		2019-10-17	11:33:19	58.8	88.7	67.9	54.5	No	No	
3		2019-10-17	11:34:19	57.9	93.5	67.3	51.5	No	No	
4		2019-10-17	11:35:19	55.6	92.2	58.6	52.3	No	No	
5		2019-10-17	11:36:19	55.8	92.3	60.1	50.5	No	No	
6		2019-10-17	11:37:19	55.8	93.2	58.8	53.8	No	No	
7		2019-10-17	11:38:19	56.9	93.3	60.5	53.9	No	No	
8		2019-10-17	11:39:19	60.8	94.3	67.5	54.8	No	No	
9		2019-10-17	11:40:19	56.9	86.9	62.5	54.1	No	No	
10		2019-10-17	11:41:19	55.6	88.5	59.4	53.6	No	No	
11		2019-10-17	11:42:19	54.9	95.8	58.5	51.3	No	No	
12		2019-10-17	11:43:19	59.2	97.3	68.4	52.7	No	No	
13		2019-10-17	11:44:19	55.6	90.8	68.6	47.9	No	No	
14		2019-10-17	11:45:19	51.4	89.2	56.2	46.4	No	No	
15		2019-10-17	11:46:19	62.1	96.9	72.4	49.2	No	No	
16		2019-10-17	11:47:19	53.8	86.9	60.4	46.5	No	No	
17		2019-10-17	11:48:19	55.8	85.1	56.6	52.0	No	No	
18	Stop	2019-10-17	11:48:23							

Summary

File Name on Meter	LxT_Data.035
File Name on PC	SLM_0004435_LxT_Data_035.00.ldbin
Serial Number	0004435
Model	SoundTrack LxT®
Firmware Version	2.302
User	C. Sanchez
Location	ST-3 Irving and Arguello
Job Description	UCSF CPHP
Note	

Measurement

Description	
Start	2019-10-17 10:34:44
Stop	2019-10-17 10:50:01
Duration	00:15:17.7
Run Time	00:15:17.7
Pause	00:00:00.0
Pre Calibration	2019-10-17 10:25:36
Post Calibration	None
Calibration Deviation	---

Overall Settings

RMS Weight	A Weighting			
Peak Weight	Z Weighting			
Detector	Slow			
Preamp	PRMLxT2B			
Microphone Correction	Off			
Integration Method	Linear			
Overload	141.4 dB			
	A	**C**	**Z**	
Under Range Peak	97.7	94.7	**99.7**	dB
Under Range Limit	**46.7**	44.7	52.7	dB
Noise Floor	33.6	34.2	41.8	dB

Results

LAeq	68.9 dB	
LAE	98.5 dB	
EA	788.319 µPa²h	
EA8	24.740 mPa²h	
EA40	123.698 mPa²h	
LZpeak (max)	2019-10-17 10:48:01	105.4 dB
LASmax	2019-10-17 10:48:01	82.8 dB
LASmin	2019-10-17 10:46:06	52.1 dB
SEA	-99.9 dB	
LAS > 85.0 dB (Exceedance Counts / Duration)	0	0.0 s
LAS > 115.0 dB (Exceedance Counts / Duration)	0	0.0 s
LZpeak > 135.0 dB (Exceedance Counts / Duration)	0	0.0 s
LZpeak > 137.0 dB (Exceedance Counts / Duration)	0	0.0 s
LZpeak > 140.0 dB (Exceedance Counts / Duration)	0	0.0 s
LCeq	75.8 dB	
LAeq	68.9 dB	
LCeq - LAeq	6.9 dB	
LAIeq	71.2 dB	
LAeq	68.9 dB	
LAIeq - LAeq	2.3 dB	

Record #	Record Type	Date	Time	LAeq	LZpeak	LASmax	LASmin	OVLD	OBA OVLD	Marker
1	alibration Chang	2019-10-17	10:25:36							
2	Run	2019-10-17	10:34:44							
3		2019-10-17	10:34:44	66.8	91.9	72.7	57.9	No	No	
4		2019-10-17	10:35:44	71.6	96.3	75.1	63.0	No	No	
5		2019-10-17	10:36:44	60.6	91.0	65.5	54.8	No	No	
6		2019-10-17	10:37:44	66.3	95.2	79.0	56.2	No	No	
7		2019-10-17	10:38:44	70.0	98.1	77.8	55.0	No	No	
8		2019-10-17	10:39:44	68.7	95.7	77.6	59.5	No	No	
9		2019-10-17	10:40:44	69.3	97.0	75.9	63.2	No	No	
10		2019-10-17	10:41:44	70.6	95.3	75.5	62.2	No	No	
11		2019-10-17	10:42:44	73.9	95.9	78.1	62.2	No	No	
12		2019-10-17	10:43:44	68.8	97.2	79.2	57.3	No	No	
13		2019-10-17	10:44:44	57.1	93.0	62.4	53.4	No	No	
14		2019-10-17	10:45:44	56.1	87.7	63.0	52.1	No	No	
15		2019-10-17	10:46:44	60.5	90.2	65.3	54.0	No	No	
16		2019-10-17	10:47:44	73.1	105.4	82.8	62.4	No	No	
17		2019-10-17	10:48:44	61.0	90.3	66.2	56.9	No	No	
18		2019-10-17	10:49:44	61.9	89.3	63.0	60.7	No	No	
19	Stop	2019-10-17	10:50:01							

Appendix SHDW
Shadow Study Appendix

PREVISION DESIGN

FAN 1

UCSF HEIGHTS PLAN PROJECT

Net New Shadow Fan Diagram, factoring in existing shadow

ALL AREAS RECEIVING NET NEW SHADOW CAST BY THE PROPOSED PROJECT

FULL YEAR

Proposed Project

Project Open Space

Refined Shadow Fan of Proposed Project

occasional shadow — frequent shadow

SFUSD Schools

1. Independence High School
2. Grattan Elementary School

Publicly Accessible Open Spaces (Ownership)

1. Golden Gate Park (RPD)
2. Richard Gamble Memorial Park (RPD)
3. Grattan Playground (RPD)
4. Interior Greenbelt (RPD)
5. Mount Sutro Open Space Preserve (UCSF)

PREVISION DESIGN

B1.1

CPHP PROJECT

Shading diagrams on the Summer Solstice

6:46 AM

SUMMER SOLSTICE
JUNE 21

Publicly Accessible Open Spaces (Ownership)
1. Golden Gate Park (RPD)
2. Richard Gamble Memorial Park (RPD)
3. Grattan Playground (RPD)
4. Interior Greenbelt (RPD)
5. Mount Sutro Open Space Preserve (UCSF)

SFUSD SCHOOLS
1. Independence High School
2. Grattan Elementary School

Proposed Project
Project Open Spaces
Existing (current) Shadows
New Shading by Project

PREVISION DESIGN

B1.2

CPHP PROJECT

Shading diagrams on the Summer Solstice

7:00 AM

SUMMER SOLSTICE
JUNE 21

Publicly Accessible Open Spaces (Ownership)
1 Golden Gate Park (RPD)
2 Richard Gamble Memorial Park (RPD)
3 Grattan Playground (RPD)
4 Interior Greenbelt (RPD)
5 Mount Sutro Open Space Preserve (UCSF)

SFUSD SCHOOLS
1 Independence High School
2 Grattan Elementary School

Proposed Project
Project Open Spaces
Existing (current) Shadows
New Shading by Project

PREVISION DESIGN

B1.3

CPHP PROJECT

Shading diagrams on the Summer Solstice

8:00 AM

SUMMER SOLSTICE
JUNE 21

Publicly Accessible Open Spaces (Ownership)

1. Golden Gate Park (RPD)
2. Richard Gamble Memorial Park (RPD)
3. Grattan Playground (RPD)
4. Interior Greenbelt (RPD)
5. Mount Sutro Open Space Preserve (UCSF)

SFUSD SCHOOLS

1. Independence High School
2. Grattan Elementary School

Proposed Project

Project Open Spaces

Existing (current) Shadows

New Shading by Project

PREVISION DESIGN

B1.4

CPHP PROJECT

Shading diagrams on the Summer Solstice

9:00 AM

SUMMER SOLSTICE
JUNE 21

Publicly Accessible Open Spaces (Ownership)
1 Golden Gate Park (RPD)
2 Richard Gamble Memorial Park (RPD)
3 Grattan Playground (RPD)
4 Interior Greenbelt (RPD)
5 Mount Sutro Open Space Preserve (UCSF)

SFUSD SCHOOLS
1 Independence High School
2 Grattan Elementary School

Proposed Project
Project Open Spaces
Existing (current) Shadows
New Shading by Project

PREVISION DESIGN

B1.5

CPHP PROJECT

Shading diagrams on the Summer Solstice

10:00 AM

SUMMER SOLSTICE
JUNE 21

Publicly Accessible Open Spaces (Ownership)
1 Golden Gate Park (RPD)
2 Richard Gamble Memorial Park (RPD)
3 Grattan Playground (RPD)
4 Interior Greenbelt (RPD)
5 Mount Sutro Open Space Preserve (UCSF)

SFUSD SCHOOLS
1 Independence High School
2 Grattan Elementary School

Proposed Project
Project Open Spaces
Existing (current) Shadows
New Shading by Project

PREVISION DESIGN

B1.6

CPHP PROJECT

Shading diagrams on the Summer Solstice

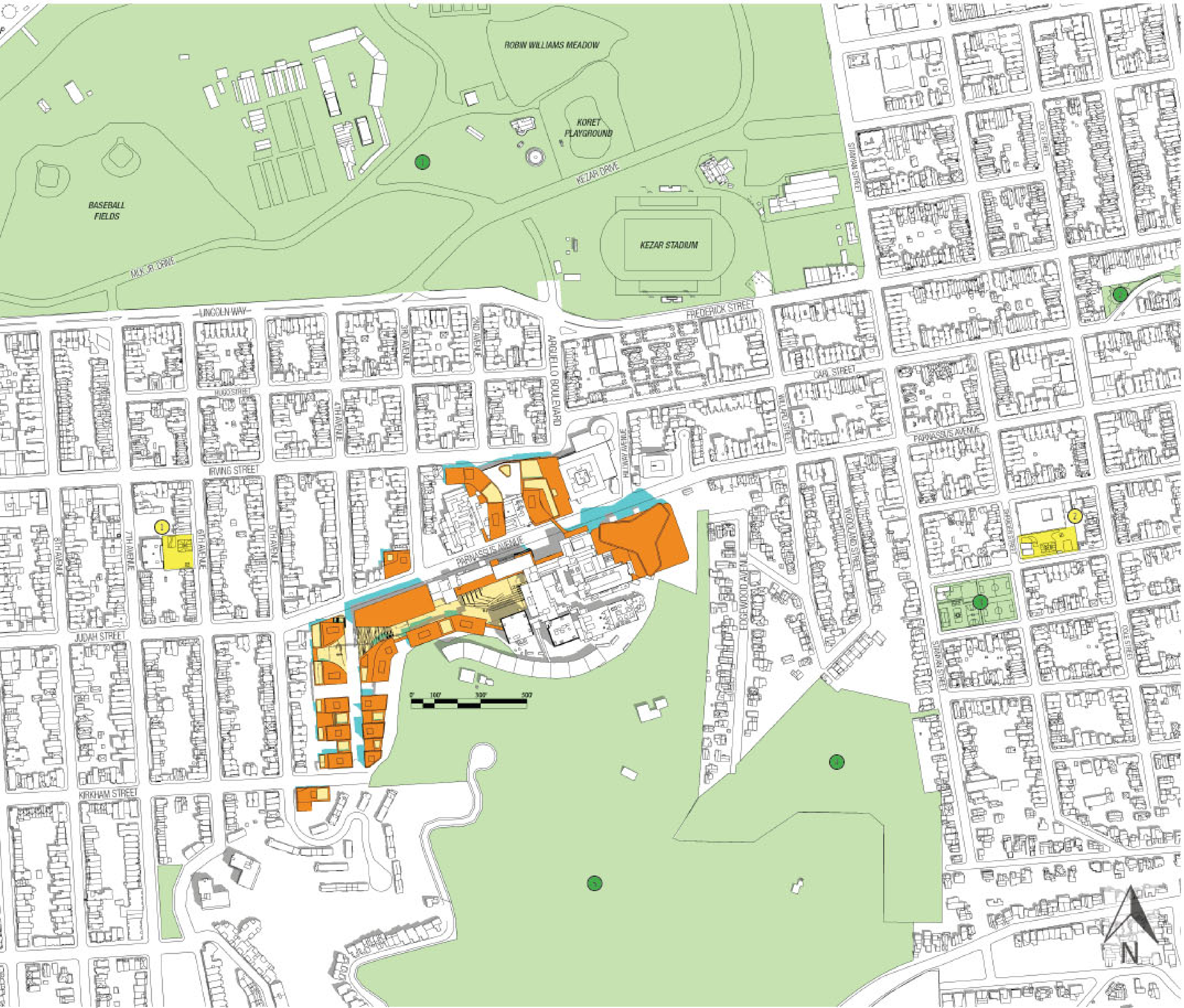
11:00 AM

SUMMER SOLSTICE
JUNE 21

Publicly Accessible Open Spaces (Ownership)
- 1 Golden Gate Park (RPD)
- 2 Richard Gamble Memorial Park (RPD)
- 3 Grattan Playground (RPD)
- 4 Interior Greenbelt (RPD)
- 5 Mount Sutro Open Space Preserve (UCSF)

SFUSD SCHOOLS
- 1 Independence High School
- 2 Grattan Elementary School

- Proposed Project
- Project Open Spaces
- Existing (current) Shadows
- New Shading by Project



B1.7

CPHP PROJECT

Shading diagrams on the Summer Solstice

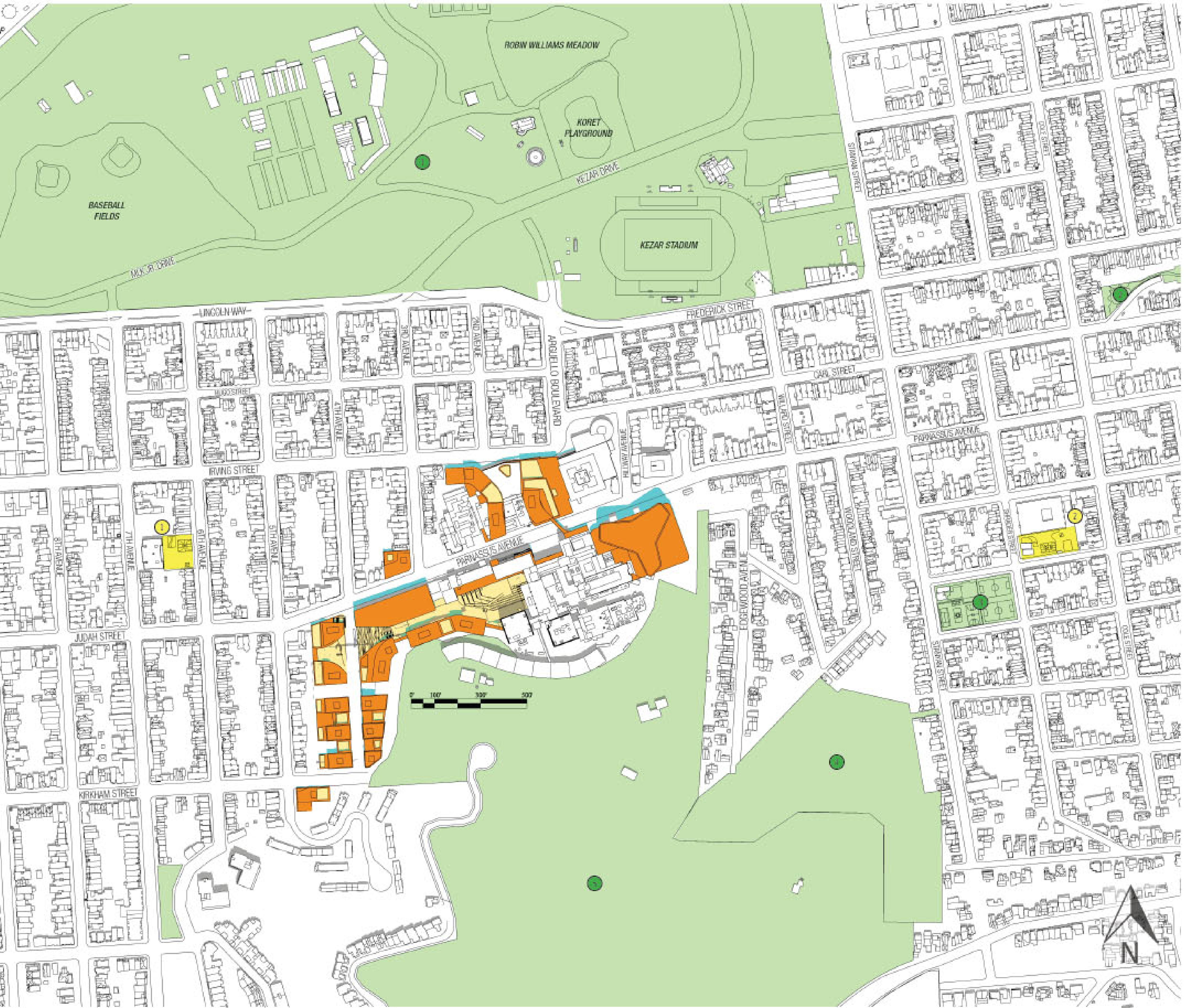
12:00 PM

SUMMER SOLSTICE
JUNE 21

Publicly Accessible Open Spaces (Ownership)
1 Golden Gate Park (RPD)
2 Richard Gamble Memorial Park (RPD)
3 Grattan Playground (RPD)
4 Interior Greenbelt (RPD)
5 Mount Sutro Open Space Preserve (UCSF)

SFUSD SCHOOLS
1 Independence High School
2 Grattan Elementary School

Proposed Project
Project Open Spaces
Existing (current) Shadows
New Shading by Project



PREVISION DESIGN

B1.8

CPHP PROJECT

Shading diagrams on the Summer Solstice

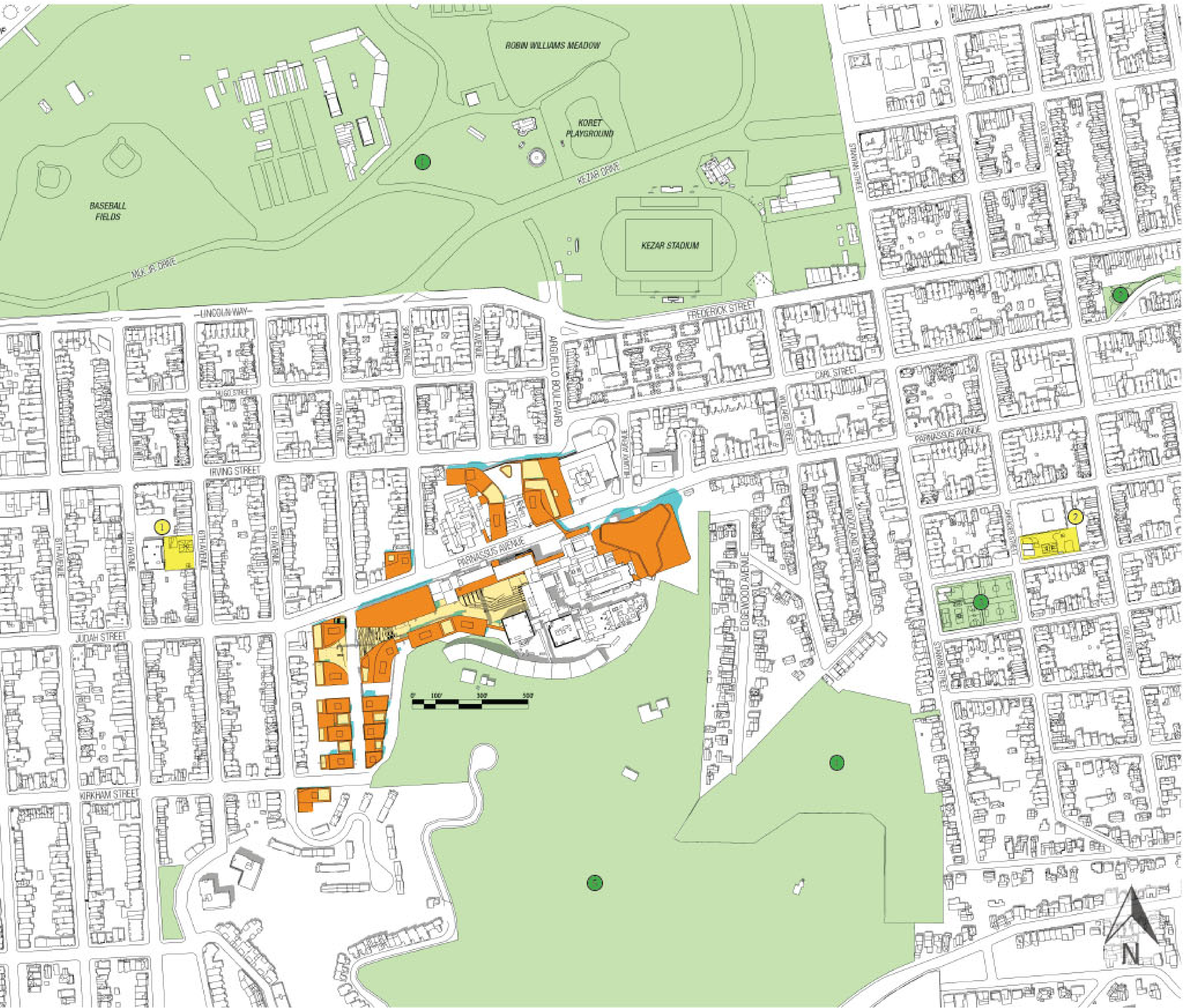
1:00 PM

SUMMER SOLSTICE
JUNE 21

Publicly Accessible Open Spaces (Ownership)
1. Golden Gate Park (RPD)
2. Richard Gamble Memorial Park (RPD)
3. Grattan Playground (RPD)
4. Interior Greenbelt (RPD)
5. Mount Sutro Open Space Preserve (UCSF)

SFUSD SCHOOLS
1. Independence High School
2. Grattan Elementary School

Proposed Project
Project Open Spaces
Existing (current) Shadows
New Shading by Project



PREVISION DESIGN

B1.9

CPHP PROJECT

Shading diagrams on the Summer Solstice

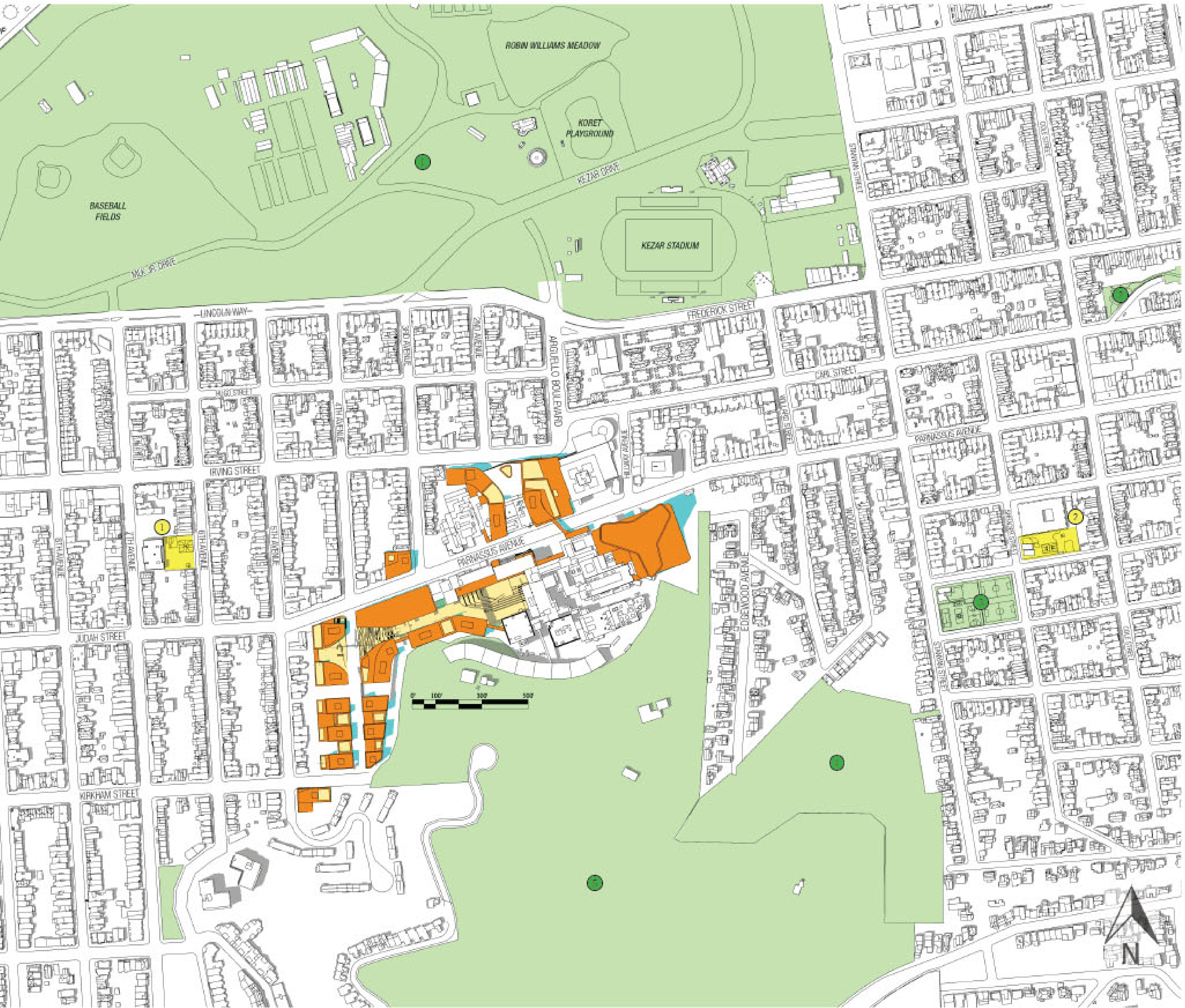
2:00 PM

SUMMER SOLSTICE
JUNE 21

Publicly Accessible Open Spaces (Ownership)
- Golden Gate Park (RPD)
- Richard Gamble Memorial Park (RPD)
- Grattan Playground (RPD)
- Interior Greenbelt (RPD)
- Mount Sutro Open Space Preserve (UCSF)

SFUSD SCHOOLS
- 1 Independence High School
- 2 Grattan Elementary School

- Proposed Project
- Project Open Spaces
- Existing (current) Shadows
- New Shading by Project



PREVISION DESIGN

B1.10

CPHP PROJECT

Shading diagrams on the Summer Solstice

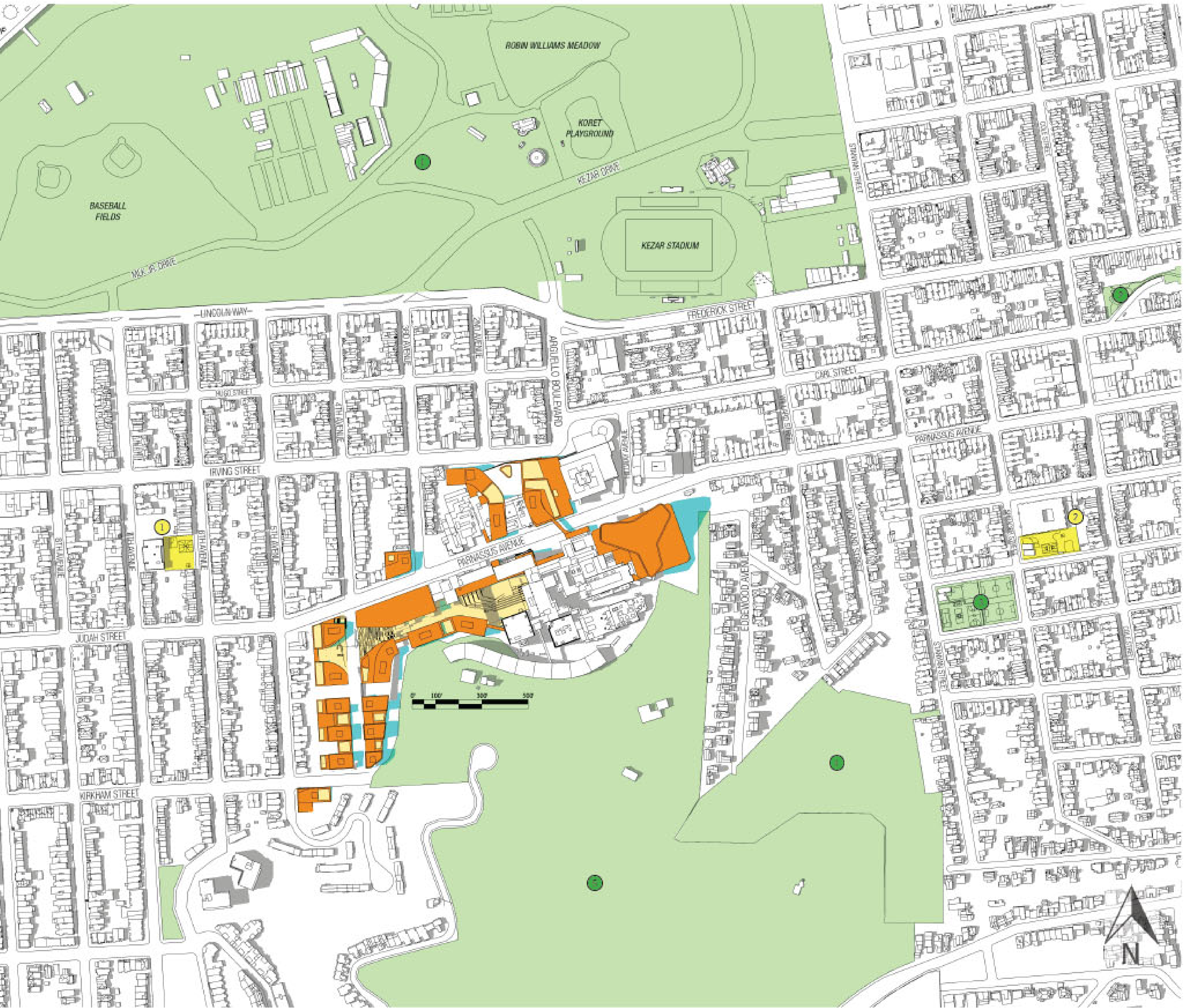
3:00 PM

SUMMER SOLSTICE
JUNE 21

Publicly Accessible Open Spaces (Ownership)
- Golden Gate Park (RPD)
- Richard Gamble Memorial Park (RPD)
- Grattan Playground (RPD)
- Interior Greenbelt (RPD)
- Mount Sutro Open Space Preserve (UCSF)

SFUSD SCHOOLS
- 1 Independence High School
- 2 Grattan Elementary School

- Proposed Project
- Project Open Spaces
- Existing (current) Shadows
- New Shading by Project



PREVISION DESIGN

B1.11

CPHP PROJECT

Shading diagrams on the Summer Solstice

4:00 PM

SUMMER SOLSTICE
JUNE 21

Publicly Accessible Open Spaces (Ownership)
- Golden Gate Park (RPD)
- Richard Gamble Memorial Park (RPD)
- Grattan Playground (RPD)
- Interior Greenbelt (RPD)
- Mount Sutro Open Space Preserve (UCSF)

SFUSD SCHOOLS
1. Independence High School
2. Grattan Elementary School

- Proposed Project
- Project Open Spaces
- Existing (current) Shadows
- New Shading by Project

PREVISION DESIGN

B1.12

CPHP PROJECT

Shading diagrams on the Summer Solstice

5:00 PM

SUMMER SOLSTICE
JUNE 21

Publicly Accessible Open Spaces (Ownership)
1. Golden Gate Park (RPD)
2. Richard Gamble Memorial Park (RPD)
3. Grattan Playground (RPD)
4. Interior Greenbelt (RPD)
5. Mount Sutro Open Space Preserve (UCSF)

SFUSD SCHOOLS
1. Independence High School
2. Grattan Elementary School

- Proposed Project
- Project Open Spaces
- Existing (current) Shadows
- New Shading by Project

PREVISION DESIGN

B1.13

CPHP PROJECT

Shading diagrams on the Summer Solstice

6:00 PM

SUMMER SOLSTICE
JUNE 21

Publicly Accessible Open Spaces (Ownership)
- 1 Golden Gate Park (RPD)
- 2 Richard Gamble Memorial Park (RPD)
- 3 Grattan Playground (RPD)
- 4 Interior Greenbelt (RPD)
- 5 Mount Sutro Open Space Preserve (UCSF)

SFUSD SCHOOLS
- 1 Independence High School
- 2 Grattan Elementary School

- Proposed Project
- Project Open Spaces
- Existing (current) Shadows
- New Shading by Project

PREVISION DESIGN

B1.14

CPHP PROJECT

Shading diagrams on the Summer Solstice

7:00 PM

SUMMER SOLSTICE
JUNE 21

Publicly Accessible Open Spaces (Ownership)
1. Golden Gate Park (RPD)
2. Richard Gamble Memorial Park (RPD)
3. Grattan Playground (RPD)
4. Interior Greenbelt (RPD)
5. Mount Sutro Open Space Preserve (UCSF)

SFUSD SCHOOLS
1. Independence High School
2. Grattan Elementary School

Proposed Project
Project Open Spaces
Existing (current) Shadows
New Shading by Project

PREVISION DESIGN

B1.15

CPHP PROJECT

Shading diagrams on the Summer Solstice

7:36 PM

SUMMER SOLSTICE
JUNE 21

Publicly Accessible Open Spaces (Ownership)
1. Golden Gate Park (RPD)
2. Richard Gamble Memorial Park (RPD)
3. Grattan Playground (RPD)
4. Interior Greenbelt (RPD)
5. Mount Sutro Open Space Preserve (UCSF)

SFUSD SCHOOLS
1. Independence High School
2. Grattan Elementary School

Proposed Project
Project Open Spaces
Existing (current) Shadows
New Shading by Project

PREVISION DESIGN

C1.1

CPHP PROJECT

Shading diagrams near the Fall/Spring Equinoxes

7:57 AM

APPROX. FALL EQUINOX (SPRING SIMILAR) SEPTEMBER 20

Publicly Accessible Open Spaces (Ownership)
1 Golden Gate Park (RPD)
2 Richard Gamble Memorial Park (RPD)
3 Grattan Playground (RPD)
4 Interior Greenbelt (RPD)
5 Mount Sutro Open Space Preserve (UCSF)

SFUSD SCHOOLS
1 Independence High School
2 Grattan Elementary School

Proposed Project
Project Open Spaces
Existing (current) Shadows
New Shading by Project

PREVISION DESIGN

C1.2

CPHP PROJECT

Shading diagrams near the Fall/Spring Equinoxes

8:00 AM

APPROX. FALL EQUINOX (SPRING SIMILAR)
SEPTEMBER 20

Publicly Accessible Open Spaces (Ownership)
- Golden Gate Park (RPD)
- Richard Gamble Memorial Park (RPD)
- Grattan Playground (RPD)
- Interior Greenbelt (RPD)
- Mount Sutro Open Space Preserve (UCSF)

SFUSD SCHOOLS
1. Independence High School
2. Grattan Elementary School

- Proposed Project
- Project Open Spaces
- Existing (current) Shadows
- New Shading by Project

PREVISION DESIGN

C1.3

CPHP PROJECT

Shading diagrams near the Fall/Spring Equinoxes

9:00 AM

APPROX. FALL EQUINOX (SPRING SIMILAR)
SEPTEMBER 20

Publicly Accessible Open Spaces (Ownership)
1. Golden Gate Park (RPD)
2. Richard Gamble Memorial Park (RPD)
3. Grattan Playground (RPD)
4. Interior Greenbelt (RPD)
5. Mount Sutro Open Space Preserve (UCSF)

SFUSD SCHOOLS
1. Independence High School
2. Grattan Elementary School

Proposed Project
Project Open Spaces
Existing (current) Shadows
New Shading by Project

PREVISION DESIGN

C1.4

CPHP PROJECT

Shading diagrams near the Fall/Spring Equinoxes

10:00 AM

APPROX. FALL EQUINOX (SPRING SIMILAR)
SEPTEMBER 20

Publicly Accessible Open Spaces (Ownership)
- Golden Gate Park (RPD)
- Richard Gamble Memorial Park (RPD)
- Grattan Playground (RPD)
- Interior Greenbelt (RPD)
- Mount Sutro Open Space Preserve (UCSF)

SFUSD SCHOOLS
1. Independence High School
2. Grattan Elementary School

Proposed Project
Project Open Spaces
Existing (current) Shadows
New Shading by Project

PREVISION DESIGN

C1.5

CPHP PROJECT

Shading diagrams near the Fall/Spring Equinoxes

11:00 AM

APPROX. FALL EQUINOX (SPRING SIMILAR)
SEPTEMBER 20

Publicly Accessible Open Spaces (Ownership)
- 1 Golden Gate Park (RPD)
- 2 Richard Gamble Memorial Park (RPD)
- 3 Grattan Playground (RPD)
- 4 Interior Greenbelt (RPD)
- 5 Mount Sutro Open Space Preserve (UCSF)

SFUSD SCHOOLS
- 1 Independence High School
- 2 Grattan Elementary School

- Proposed Project
- Project Open Spaces
- Existing (current) Shadows
- New Shading by Project

PREVISION DESIGN

C1.6

CPHP PROJECT

Shading diagrams near the Fall/Spring Equinoxes

12:00 PM

APPROX. FALL EQUINOX (SPRING SIMILAR) SEPTEMBER 20

Publicly Accessible Open Spaces (Ownership)
- 1 Golden Gate Park (RPD)
- 2 Richard Gamble Memorial Park (RPD)
- 3 Grattan Playground (RPD)
- 4 Interior Greenbelt (RPD)
- 5 Mount Sutro Open Space Preserve (UCSF)

SFUSD SCHOOLS
- 1 Independence High School
- 2 Grattan Elementary School

- Proposed Project
- Project Open Spaces
- Existing (current) Shadows
- New Shading by Project

PREVISION DESIGN

C1.7

CPHP PROJECT

Shading diagrams near the Fall/Spring Equinoxes

1:00 PM

APPROX. FALL EQUINOX (SPRING SIMILAR)
SEPTEMBER 20

Publicly Accessible Open Spaces (Ownership)
1 Golden Gate Park (RPD)
2 Richard Gamble Memorial Park (RPD)
3 Grattan Playground (RPD)
4 Interior Greenbelt (RPD)
5 Mount Sutro Open Space Preserve (UCSF)

SFUSD SCHOOLS
1 Independence High School
2 Grattan Elementary School

Proposed Project
Project Open Spaces
Existing (current) Shadows
New Shading by Project

PREVISION DESIGN

C1.8

CPHP PROJECT

Shading diagrams near the Fall/Spring Equinoxes

2:00 PM

APPROX. FALL EQUINOX (SPRING SIMILAR)
SEPTEMBER 20

Publicly Accessible Open Spaces (Ownership)
- Golden Gate Park (RPD)
- Richard Gamble Memorial Park (RPD)
- Grattan Playground (RPD)
- Interior Greenbelt (RPD)
- Mount Sutro Open Space Preserve (UCSF)

SFUSD SCHOOLS
1. Independence High School
2. Grattan Elementary School

- Proposed Project
- Project Open Spaces
- Existing (current) Shadows
- New Shading by Project

PREVISION DESIGN

C1.9

CPHP PROJECT

Shading diagrams near the Fall/Spring Equinoxes

3:00 PM

APPROX. FALL EQUINOX (SPRING SIMILAR)
SEPTEMBER 20

Publicly Accessible Open Spaces (Ownership)
1 Golden Gate Park (RPD)
2 Richard Gamble Memorial Park (RPD)
3 Grattan Playground (RPD)
4 Interior Greenbelt (RPD)
5 Mount Sutro Open Space Preserve (UCSF)

SFUSD SCHOOLS
1 Independence High School
2 Grattan Elementary School

Proposed Project
Project Open Spaces
Existing (current) Shadows
New Shading by Project

PREVISION DESIGN

C1.10

CPHP PROJECT

Shading diagrams near the Fall/Spring Equinoxes

4:00 PM

APPROX. FALL EQUINOX (SPRING SIMILAR)
SEPTEMBER 20

Publicly Accessible Open Spaces (Ownership)
1 Golden Gate Park (RPD)
2 Richard Gamble Memorial Park (RPD)
3 Grattan Playground (RPD)
4 Interior Greenbelt (RPD)
5 Mount Sutro Open Space Preserve (UCSF)

SFUSD SCHOOLS
1 Independence High School
2 Grattan Elementary School

Proposed Project
Project Open Spaces
Existing (current) Shadows
New Shading by Project

PREVISION DESIGN

C1.11

CPHP PROJECT

Shading diagrams near the Fall/Spring Equinoxes

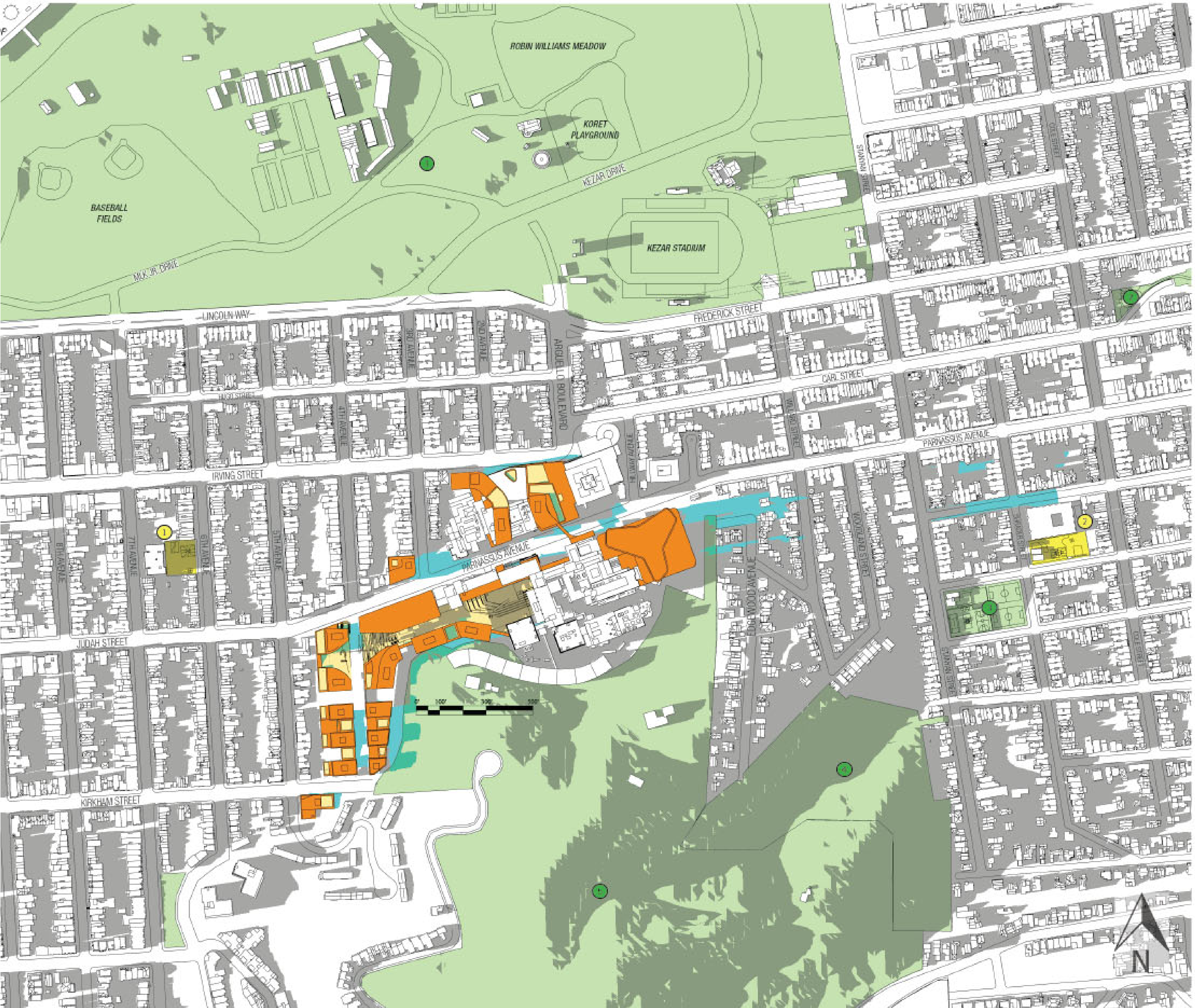
5:00 PM

APPROX. FALL EQUINOX (SPRING SIMILAR)
SEPTEMBER 20

Publicly Accessible Open Spaces (Ownership)
- Golden Gate Park (RPD)
- Richard Gamble Memorial Park (RPD)
- Grattan Playground (RPD)
- Interior Greenbelt (RPD)
- Mount Sutro Open Space Preserve (UCSF)

SFUSD SCHOOLS
1. Independence High School
2. Grattan Elementary School

- Proposed Project
- Project Open Spaces
- Existing (current) Shadows
- New Shading by Project



PREVISION DESIGN

C1.12

CPHP PROJECT

Shading diagrams near the Fall/Spring Equinoxes

6:00 PM

APPROX. FALL EQUINOX (SPRING SIMILAR) SEPTEMBER 20

Publicly Accessible Open Spaces (Ownership)
- 1 Golden Gate Park (RPD)
- 2 Richard Gamble Memorial Park (RPD)
- 3 Grattan Playground (RPD)
- 4 Interior Greenbelt (RPD)
- 5 Mount Sutro Open Space Preserve (UCSF)

SFUSD SCHOOLS
- 1 Independence High School
- 2 Grattan Elementary School

- Proposed Project
- Project Open Spaces
- Existing (current) Shadows
- New Shading by Project

PREVISION DESIGN

C1.13

CPHP PROJECT

Shading diagrams near the Fall/Spring Equinoxes

6:09 PM

APPROX. FALL EQUINOX (SPRING SIMILAR)
SEPTEMBER 20

Publicly Accessible Open Spaces (Ownership)
1 Golden Gate Park (RPD)
2 Richard Gamble Memorial Park (RPD)
3 Grattan Playground (RPD)
4 Interior Greenbelt (RPD)
5 Mount Sutro Open Space Preserve (UCSF)

SFUSD SCHOOLS
1 Independence High School
2 Grattan Elementary School

Proposed Project
Project Open Spaces
Existing (current) Shadows
New Shading by Project

PREVISION DESIGN

D1.1

CPHP PROJECT

Shading diagrams on the Winter Solstice

8:19 AM

WINTER SOLSTICE DECEMBER 20

Publicly Accessible Open Spaces (Ownership)
1 Golden Gate Park (RPD)
2 Richard Gamble Memorial Park (RPD)
3 Grattan Playground (RPD)
4 Interior Greenbelt (RPD)
5 Mount Sutro Open Space Preserve (UCSF)

SFUSD SCHOOLS
1 Independence High School
2 Grattan Elementary School

Proposed Project
Project Open Spaces
Existing (current) Shadows
New Shading by Project

PREVISION DESIGN

D1.2

CPHP PROJECT

Shading diagrams on the Winter Solstice

9:00 AM

WINTER SOLSTICE DECEMBER 20

Publicly Accessible Open Spaces (Ownership)
- 1 Golden Gate Park (RPD)
- 2 Richard Gamble Memorial Park (RPD)
- 3 Grattan Playground (RPD)
- 4 Interior Greenbelt (RPD)
- 5 Mount Sutro Open Space Preserve (UCSF)

SFUSD SCHOOLS
- 1 Independence High School
- 2 Grattan Elementary School

Proposed Project
Project Open Spaces
Existing (current) Shadows
New Shading by Project

PREVISION DESIGN

D1.3

CPHP PROJECT

Shading diagrams on the Winter Solstice

10:00 AM

WINTER SOLSTICE DECEMBER 20

Publicly Accessible Open Spaces (Ownership)
1. Golden Gate Park (RPD)
2. Richard Gamble Memorial Park (RPD)
3. Grattan Playground (RPD)
4. Interior Greenbelt (RPD)
5. Mount Sutro Open Space Preserve (UCSF)

SFUSD SCHOOLS
1. Independence High School
2. Grattan Elementary School

- Proposed Project
- Project Open Spaces
- Existing (current) Shadows
- New Shading by Project

PREVISION DESIGN

D1.4

CPHP PROJECT

Shading diagrams on the Winter Solstice

11:00 AM

WINTER SOLSTICE DECEMBER 20

Publicly Accessible Open Spaces (Ownership)
- Golden Gate Park (RPD)
- Richard Gamble Memorial Park (RPD)
- Grattan Playground (RPD)
- Interior Greenbelt (RPD)
- Mount Sutro Open Space Preserve (UCSF)

SFUSD SCHOOLS
1. Independence High School
2. Grattan Elementary School

- Proposed Project
- Project Open Spaces
- Existing (current) Shadows
- New Shading by Project

PREVISION DESIGN

D1.5

CPHP PROJECT

Shading diagrams on the Winter Solstice

12:00 PM

WINTER SOLSTICE DECEMBER 20

Publicly Accessible Open Spaces (Ownership)
- Golden Gate Park (RPD)
- Richard Gamble Memorial Park (RPD)
- Grattan Playground (RPD)
- Interior Greenbelt (RPD)
- Mount Sutro Open Space Preserve (UCSF)

SFUSD SCHOOLS
1. Independence High School
2. Grattan Elementary School

- Proposed Project
- Project Open Spaces
- Existing (current) Shadows
- New Shading by Project

PREVISION DESIGN

D1.6

CPHP PROJECT

Shading diagrams on the Winter Solstice

1:00 PM

WINTER SOLSTICE
DECEMBER 20

Publicly Accessible Open Spaces (Ownership)
- 1 Golden Gate Park (RPD)
- 2 Richard Gamble Memorial Park (RPD)
- 3 Grattan Playground (RPD)
- 4 Interior Greenbelt (RPD)
- 5 Mount Sutro Open Space Preserve (UCSF)

SFUSD SCHOOLS
- 1 Independence High School
- 2 Grattan Elementary School

- Proposed Project
- Project Open Spaces
- Existing (current) Shadows
- New Shading by Project

PREVISION DESIGN

D1.7

CPHP PROJECT

Shading diagrams on the Winter Solstice

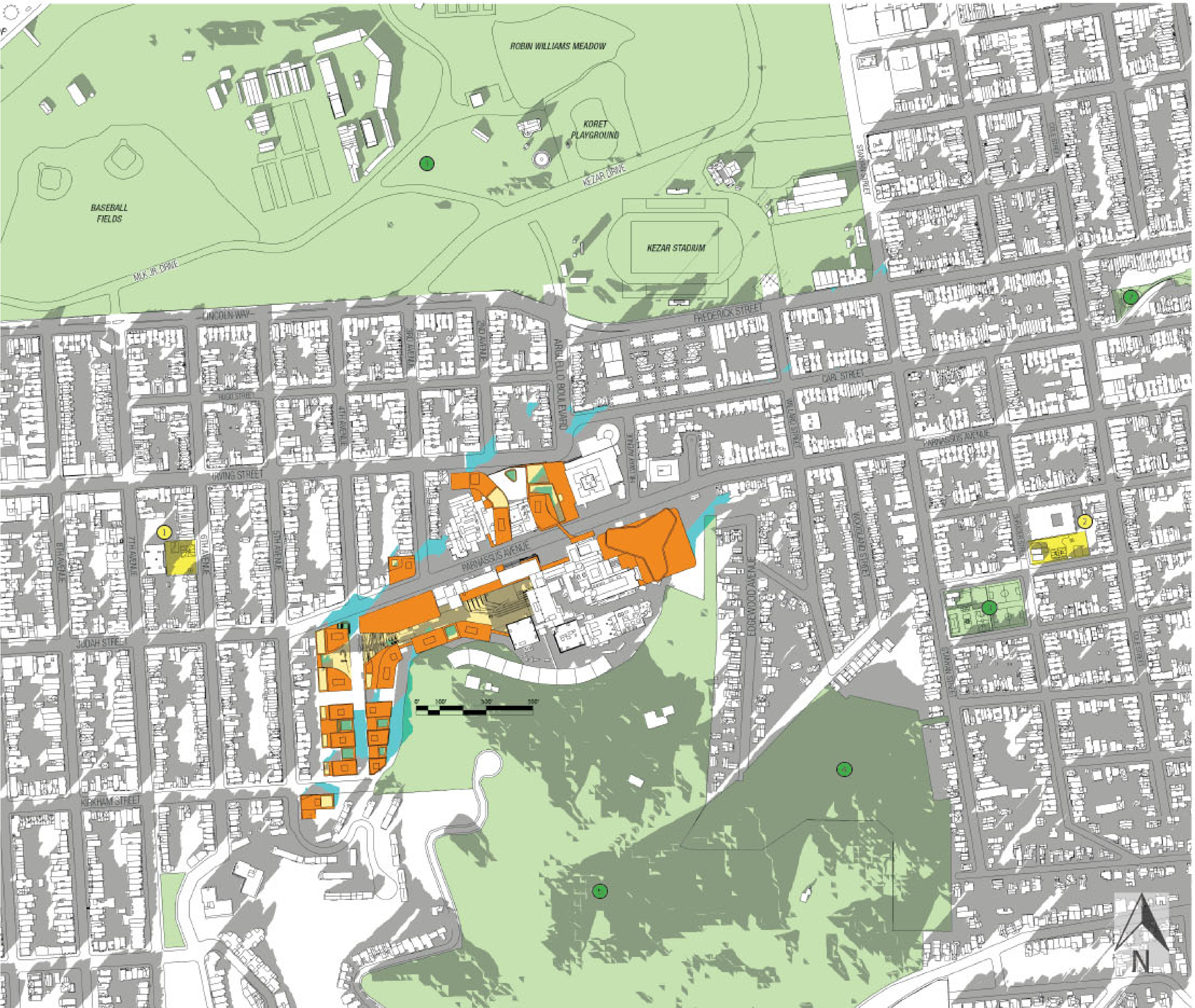
2:00 PM

WINTER SOLSTICE
DECEMBER 20

Publicly Accessible Open Spaces (Ownership)
1 Golden Gate Park (RPD)
2 Richard Gamble Memorial Park (RPD)
3 Grattan Playground (RPD)
4 Interior Greenbelt (RPD)
5 Mount Sutro Open Space Preserve (UCSF)

SFUSD SCHOOLS
1 Independence High School
2 Grattan Elementary School

Proposed Project
Project Open Spaces
Existing (current) Shadows
New Shading by Project



PREVISION DESIGN

D1.8

CPHP PROJECT

Shading diagrams on the Winter Solstice

3:00 PM

WINTER SOLSTICE
DECEMBER 20

Publicly Accessible Open Spaces (Ownership)
1. Golden Gate Park (RPD)
2. Richard Gamble Memorial Park (RPD)
3. Grattan Playground (RPD)
4. Interior Greenbelt (RPD)
5. Mount Sutro Open Space Preserve (UCSF)

SFUSD SCHOOLS
1. Independence High School
2. Grattan Elementary School

Proposed Project
Project Open Spaces
Existing (current) Shadows
New Shading by Project

PREVISION DESIGN

D1.9

CPHP PROJECT

Shading diagrams on the Winter Solstice

3:54 PM

WINTER SOLSTICE
DECEMBER 20

Publicly Accessible Open Spaces (Ownership)
- 1 Golden Gate Park (RPD)
- 2 Richard Gamble Memorial Park (RPD)
- 3 Grattan Playground (RPD)
- 4 Interior Greenbelt (RPD)
- 5 Mount Sutro Open Space Preserve (UCSF)

SFUSD SCHOOLS
- 1 Independence High School
- 2 Grattan Elementary School

- Proposed Project
- Project Open Spaces
- Existing (current) Shadows
- New Shading by Project

GGP1

CPHP PROJECT

Shading diagrams on the date of maximum shading

- Golden Gate Park
- Existing (current) Shadows
- New Shading by Project
- Project

PARK FEATURES

1. Wooded areas with walking paths
2. Golden Gate Park Nursery
3. Structural Maintenance Division
4. San Francisco Lawn Bowling Club
5. Robin Williams Meadow Picnic Area
6. Robin Williams Meadow
7. Carousel
8. Kezar Triangle
9. Little Rec Field Grass Area 1
10. Kezar Pavilion

PREVISION DESIGN

8:19 AM

DATE OF MAXIMUM SHADOW
DECEMBER 20

GGP2

CPHP PROJECT

Shading diagrams on the date of maximum shading

- Golden Gate Park
- Existing (current) Shadows
- New Shading by Project
- Project

PARK FEATURES

- Wooded areas with walking paths
- Golden Gate Park Nursery
- Structural Maintenance Division
- San Francisco Lawn Bowling Club
- Robin Williams Meadow Picnic Area
- Robin Williams Meadow
- Carousel
- Kezar Triangle
- Little Rec Field Grass Area 1
- Kezar Pavilion

PREVISION DESIGN

8:30 AM

DATE OF MAXIMUM SHADOW
DECEMBER 20

GGP3

CPHP PROJECT

Shading diagrams on the date of maximum shading

8:45 AM

DATE OF MAXIMUM SHADOW
DECEMBER 20

GGP4

PREVISION DESIGN

CPHP PROJECT

Shading diagrams on the date of maximum shading

- Golden Gate Park
- Existing (current) Shadows
- New Shading by Project
- Project

PARK FEATURES

- Wooded areas with walking paths
- Golden Gate Park Nursery
- Structural Maintenance Division
- San Francisco Lawn Bowling Club
- Robin Williams Meadow Picnic Area
- Robin Williams Meadow
- Carousel
- Kezar Triangle
- Little Rec Field Grass Area 1
- Kezar Pavilion

9:00 AM

DATE OF MAXIMUM SHADOW
DECEMBER 20

GGP5

CPHP PROJECT

Shading diagrams on the date of maximum shading

Golden Gate Park
Existing (current) Shadows
New Shading by Project
Project

PARK FEATURES
Wooded areas with walking paths
Golden Gate Park Nursery
Structural Maintenance Division
San Francisco Lawn Bowling Club
Robin Williams Meadow Picnic Area
Robin Williams Meadow
Carousel
Kezar Triangle
Little Rec Field Grass Area 1
Kezar Pavilion

PREVISION DESIGN

9:15 AM

DATE OF MAXIMUM SHADOW
DECEMBER 20

GGP6

CPHP PROJECT

Shading diagrams on the date of maximum shading

Golden Gate Park	
Existing (current) Shadows	
New Shading by Project	
Project	

PARK FEATURES

- Wooded areas with walking paths
- Golden Gate Park Nursery
- Structural Maintenance Division
- San Francisco Lawn Bowling Club
- Robin Williams Meadow Picnic Area
- Robin Williams Meadow
- Carousel
- Kezar Triangle
- Little Rec Field Grass Area 1
- Kezar Pavilion

PREVISION DESIGN

9:30 AM

DATE OF MAXIMUM SHADOW
DECEMBER 20

GGP7

CPHP PROJECT

Shading diagrams on the date of maximum shading

- Golden Gate Park
- Existing (current) Shadows
- New Shading by Project
- Project

PARK FEATURES

- Wooded areas with walking paths
- Golden Gate Park Nursery
- Structural Maintenance Division
- San Francisco Lawn Bowling Club
- Robin Williams Meadow Picnic Area
- Robin Williams Meadow
- Carousel
- Kezar Triangle
- Little Rec Field Grass Area 1
- Kezar Pavilion

PREVISION DESIGN

9:45 AM

DATE OF MAXIMUM SHADOW
DECEMBER 20

GGP8

CPHP PROJECT

Shading diagrams on the date of maximum shading

PREVISION DESIGN

10:00 AM

DATE OF MAXIMUM SHADOW
DECEMBER 20

- Golden Gate Park
- Existing (current) Shadows
- New Shading by Project
- Project

PARK FEATURES

- Wooded areas with walking paths
- Golden Gate Park Nursery
- Structural Maintenance Division
- San Francisco Lawn Bowling Club
- Robin Williams Meadow Picnic Area
- Robin Williams Meadow
- Carousel
- Kezar Triangle
- Little Rec Field Grass Area 1
- Kezar Pavilion

GGP9

CPHP PROJECT

Shading diagrams on the date of maximum shading

- Golden Gate Park
- Existing (current) Shadows
- New Shading by Project
- Project

PARK FEATURES

- Wooded areas with walking paths
- Golden Gate Park Nursery
- Structural Maintenance Division
- San Francisco Lawn Bowling Club
- Robin Williams Meadow Picnic Area
- Robin Williams Meadow
- Carousel
- Kezar Triangle
- Little Rec Field Grass Area 1
- Kezar Pavilion

PREVISION DESIGN

10:15 AM

DATE OF MAXIMUM SHADOW
DECEMBER 20

GGP10

PREVISION DESIGN

CPHP PROJECT

Shading diagrams on the date of maximum shading

10:30 AM

DATE OF MAXIMUM SHADOW
DECEMBER 20

Golden Gate Park
Existing (current) Shadows
New Shading by Project
Project

PARK FEATURES

- Wooded areas with walking paths
- Golden Gate Park Nursery
- Structural Maintenance Division
- San Francisco Lawn Bowling Club
- Robin Williams Meadow Picnic Area
- Robin Williams Meadow
- Carousel
- Kezar Triangle
- Little Rec Field Grass Area 1
- Kezar Pavilion

GGP11

CPHP PROJECT

Shading diagrams on the date of maximum shading

- Golden Gate Park
- Existing (current) Shadows
- New Shading by Project
- Project

PARK FEATURES

- Wooded areas with walking paths
- Golden Gate Park Nursery
- Structural Maintenance Division
- San Francisco Lawn Bowling Club
- Robin Williams Meadow Picnic Area
- Robin Williams Meadow
- Carousel
- Kezar Triangle
- Little Rec Field Grass Area 1
- Kezar Pavilion

PREVISION DESIGN

10:45 AM

DATE OF MAXIMUM SHADOW
DECEMBER 20

GGP12

CPHP PROJECT

Shading diagrams on the date of maximum shading

- Golden Gate Park
- Existing (current) Shadows
- New Shading by Project
- Project

PARK FEATURES

- Wooded areas with walking paths
- Golden Gate Park Nursery
- Structural Maintenance Division
- San Francisco Lawn Bowling Club
- Robin Williams Meadow Picnic Area
- Robin Williams Meadow
- Carousel
- Kezar Triangle
- Little Rec Field Grass Area 1
- Kezar Pavilion

PREVISION DESIGN

11:00 AM

DATE OF MAXIMUM SHADOW
DECEMBER 20

GGP13

CPHP PROJECT

Shading diagrams on the date of maximum shading

PREVISION DESIGN

11:15 AM

DATE OF MAXIMUM SHADOW
DECEMBER 20

- Golden Gate Park
- Existing (current) Shadows
- New Shading by Project
- Project

PARK FEATURES

- Wooded areas with walking paths
- Golden Gate Park Nursery
- Structural Maintenance Division
- San Francisco Lawn Bowling Club
- Robin Williams Meadow Picnic Area
- Robin Williams Meadow
- Carousel
- Kezar Triangle
- Little Rec Field Grass Area 1
- Kezar Pavilion

GGP14

CPHP PROJECT

Shading diagrams on the date of maximum shading

- Golden Gate Park
- Existing (current) Shadows
- New Shading by Project
- Project

PARK FEATURES

- Wooded areas with walking paths
- Golden Gate Park Nursery
- Structural Maintenance Division
- San Francisco Lawn Bowling Club
- Robin Williams Meadow Picnic Area
- Robin Williams Meadow
- Carousel
- Kezar Triangle
- Little Rec Field Grass Area 1
- Kezar Pavilion

PREVISION DESIGN

11:30 AM

DATE OF MAXIMUM SHADOW
DECEMBER 20

GGP15

CPHP PROJECT

Shading diagrams on the date of maximum shading

Golden Gate Park
Existing (current) Shadows
New Shading by Project
Project

PARK FEATURES

- Wooded areas with walking paths
- Golden Gate Park Nursery
- Structural Maintenance Division
- San Francisco Lawn Bowling Club
- Robin Williams Meadow Picnic Area
- Robin Williams Meadow
- Carousel
- Kezar Triangle
- Little Rec Field Grass Area 1
- Kezar Pavilion

PREVISION DESIGN

11:45 AM

DATE OF MAXIMUM SHADOW
DECEMBER 20

GGP16

CPHP PROJECT

Shading diagrams on the date of maximum shading

- Golden Gate Park
- Existing (current) Shadows
- New Shading by Project
- Project

PARK FEATURES

- Wooded areas with walking paths
- Golden Gate Park Nursery
- Structural Maintenance Division
- San Francisco Lawn Bowling Club
- Robin Williams Meadow Picnic Area
- Robin Williams Meadow
- Carousel
- Kezar Triangle
- Little Rec Field Grass Area 1
- Kezar Pavilion

PREVISION DESIGN

12:00 PM

DATE OF MAXIMUM SHADOW
DECEMBER 20

GGP17

PREVISION DESIGN

CPHP PROJECT

Shading diagrams on the date of maximum shading

- Golden Gate Park
- Existing (current) Shadows
- New Shading by Project
- Project

PARK FEATURES

- Wooded areas with walking paths
- Golden Gate Park Nursery
- Structural Maintenance Division
- San Francisco Lawn Bowling Club
- Robin Williams Meadow Picnic Area
- Robin Williams Meadow
- Carousel
- Kezar Triangle
- Little Rec Field Grass Area 1
- Kezar Pavilion

1:00 PM

DATE OF MAXIMUM SHADOW

DECEMBER 20

GGP18

CPHP PROJECT

Shading diagrams on the date of maximum shading

- Golden Gate Park
- Existing (current) Shadows
- New Shading by Project
- Project

PARK FEATURES

- Wooded areas with walking paths
- Golden Gate Park Nursery
- Structural Maintenance Division
- San Francisco Lawn Bowling Club
- Robin Williams Meadow Picnic Area
- Robin Williams Meadow
- Carousel
- Kezar Triangle
- Little Rec Field Grass Area 1
- Kezar Pavilion

PREVISION DESIGN

1:45 PM

DATE OF MAXIMUM SHADOW

DECEMBER 20

GGP19

CPHP PROJECT

Shading diagrams on the date of maximum shading

- Golden Gate Park
- Existing (current) Shadows
- New Shading by Project
- Project

PARK FEATURES

- Wooded areas with walking paths
- Golden Gate Park Nursery
- Structural Maintenance Division
- San Francisco Lawn Bowling Club
- Robin Williams Meadow Picnic Area
- Robin Williams Meadow
- Carousel
- Kezar Triangle
- Little Rec Field Grass Area 1
- Kezar Pavilion

PREVISION DESIGN

2:00 PM

DATE OF MAXIMUM SHADOW
DECEMBER 20

GGP20

PREVISION DESIGN

CPHP PROJECT

Shading diagrams on the date of maximum shading

Golden Gate Park
Existing (current) Shadows
New Shading by Project
Project

PARK FEATURES
Wooded areas with walking paths
Golden Gate Park Nursery
Structural Maintenance Division
San Francisco Lawn Bowling Club
Robin Williams Meadow Picnic Area
Robin Williams Meadow
Carousel
Kezar Triangle
Little Rec Field Grass Area 1
Kezar Pavilion

2:15 PM

DATE OF MAXIMUM SHADOW
DECEMBER 20

GGP21

CPHP PROJECT

Shading diagrams on the date of maximum shading

- Golden Gate Park
- Existing (current) Shadows
- New Shading by Project
- Project

PARK FEATURES

- Wooded areas with walking paths
- Golden Gate Park Nursery
- Structural Maintenance Division
- San Francisco Lawn Bowling Club
- Robin Williams Meadow Picnic Area
- Robin Williams Meadow
- Carousel
- Kezar Triangle
- Little Rec Field Grass Area 1
- Kezar Pavilion

PREVISION DESIGN

2:30 PM

DATE OF MAXIMUM SHADOW
DECEMBER 20

GGP22

CPHP PROJECT

Shading diagrams on the date of maximum shading

PREVISION DESIGN

2:45 PM

DATE OF MAXIMUM SHADOW
DECEMBER 20

- Golden Gate Park
- Existing (current) Shadows
- New Shading by Project
- Project

PARK FEATURES

- Wooded areas with walking paths
- Golden Gate Park Nursery
- Structural Maintenance Division
- San Francisco Lawn Bowling Club
- Robin Williams Meadow Picnic Area
- Robin Williams Meadow
- Carousel
- Kezar Triangle
- Little Rec Field Grass Area 1
- Kezar Pavilion

GGP23

CPHP PROJECT

Shading diagrams on the date of maximum shading

- Golden Gate Park
- Existing (current) Shadows
- New Shading by Project
- Project

PARK FEATURES

- Wooded areas with walking paths
- Golden Gate Park Nursery
- Structural Maintenance Division
- San Francisco Lawn Bowling Club
- Robin Williams Meadow Picnic Area
- Robin Williams Meadow
- Carousel
- Kezar Triangle
- Little Rec Field Grass Area 1
- Kezar Pavilion

PREVISION DESIGN

3:00 PM

DATE OF MAXIMUM SHADOW
DECEMBER 20

GGP24

CPHP PROJECT

Shading diagrams on the date of maximum shading

- Golden Gate Park
- Existing (current) Shadows
- New Shading by Project
- Project

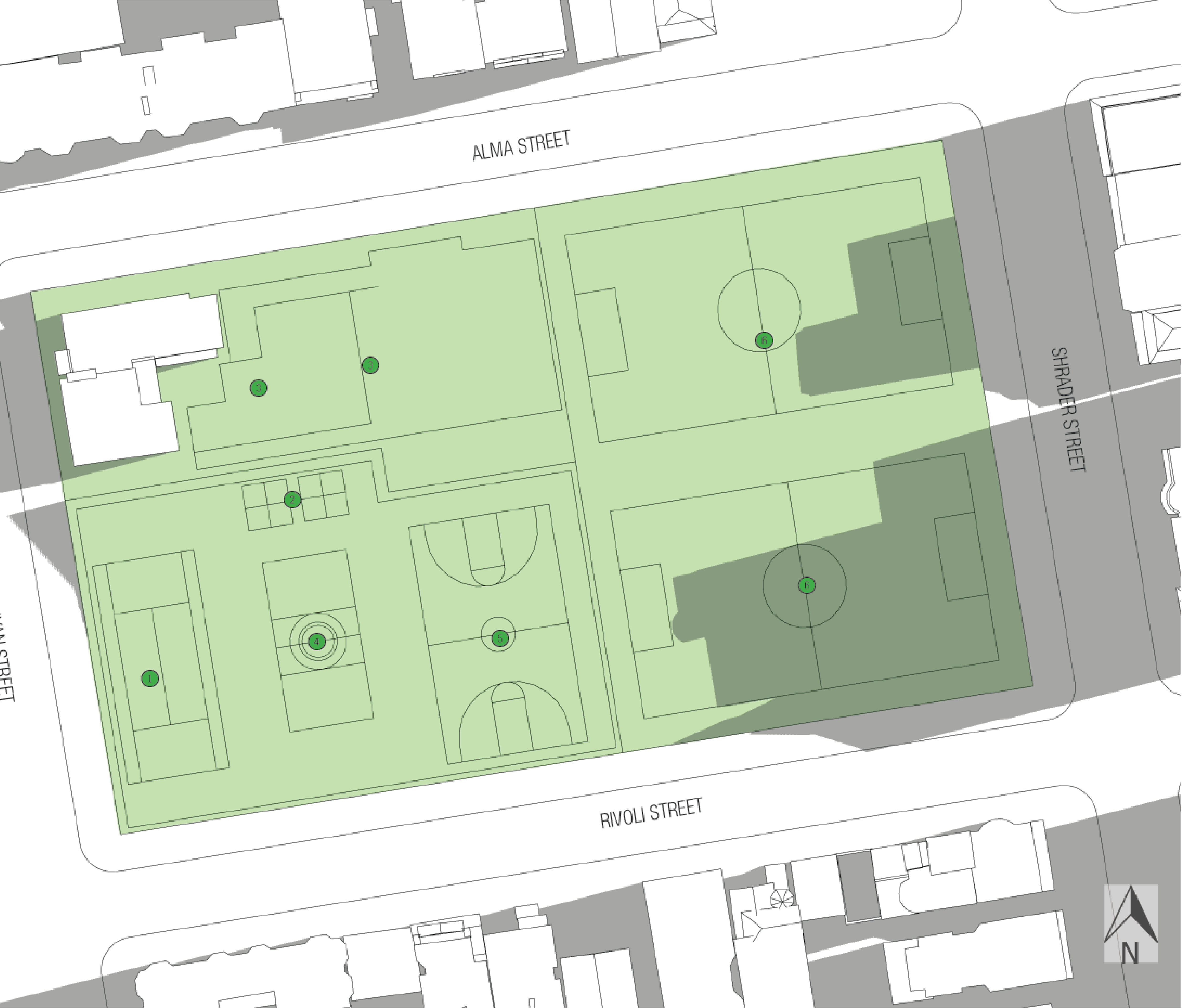
PARK FEATURES

- Wooded areas with walking paths
- Golden Gate Park Nursery
- Structural Maintenance Division
- San Francisco Lawn Bowling Club
- Robin Williams Meadow Picnic Area
- Robin Williams Meadow
- Carousel
- Kezar Triangle
- Little Rec Field Grass Area 1
- Kezar Pavilion

PREVISION DESIGN

3:54 PM

DATE OF MAXIMUM SHADOW
DECEMBER 20



PREVISION DESIGN

GRATTAN PLAYGROUND 1

CPHP PROJECT

Shading diagrams on the date of maximum shading

7:12 AM

DATE OF MAXIMUM SHADOW AUGUST 2

PREVISION DESIGN

GRATTAN PLAYGROUND 2

CPHP PROJECT

Shading diagrams on the date of maximum shading

8:00 AM

DATE OF MAXIMUM SHADOW
AUGUST 2

PREVISION DESIGN

GRATTAN PLAYGROUND 3

CPHP PROJECT

Shading diagrams on the date of maximum shading

9:00 AM

DATE OF MAXIMUM SHADOW AUGUST 2

PARK FEATURES
1 Tennis court
2 Foursquare courts
3 Play structure
4 Blacktop area
5 Basketball court
6 Soccer Field

Grattan Playground (RPD)
Existing (current) Shadows
New Shading by Project

PREVISION DESIGN

GRATTAN PLAYGROUND 4

CPHP PROJECT

Shading diagrams on the date of maximum shading

10:00 AM

DATE OF MAXIMUM SHADOW AUGUST 2

PARK FEATURES

1. Tennis court
2. Foursquare courts
3. Play structure
4. Blacktop area
5. Basketball court
6. Soccer Field

Grattan Playground (RPD)

Existing (current) Shadows

New Shading by Project

PREVISION DESIGN

GRATTAN PLAYGROUND 5

CPHP PROJECT

Shading diagrams on the date of maximum shading

11:00 AM

DATE OF MAXIMUM SHADOW AUGUST 2

PARK FEATURES
- 1 Tennis court
- 2 Foursquare courts
- 3 Play structure
- 4 Blacktop area
- 5 Basketball court
- 6 Soccer Field

Grattan Playground (RPD)
Existing (current) Shadows
New Shading by Project

PREVISION DESIGN

GRATTAN PLAYGROUND 6

CPHP PROJECT

Shading diagrams on the date of maximum shading

12:00 PM

DATE OF MAXIMUM SHADOW
AUGUST 2

PARK FEATURES
1. Tennis court
2. Foursquare courts
3. Play structure
4. Blacktop area
5. Basketball court
6. Soccer Field

Grattan Playground (RPD)
Existing (current) Shadows
New Shading by Project

PREVISION DESIGN

GRATTAN PLAYGROUND 7

CPHP PROJECT

Shading diagrams on the date of maximum shading

1:00 PM

DATE OF MAXIMUM SHADOW
AUGUST 2

PREVISION DESIGN

GRATTAN PLAYGROUND 8

CPHP PROJECT

Shading diagrams on the date of maximum shading

2:00 PM

DATE OF MAXIMUM SHADOW
AUGUST 2

PARK FEATURES
1 Tennis court
2 Foursquare courts
3 Play structure
4 Blacktop area
5 Basketball court
6 Soccer Field

Grattan Playground (RPD)
Existing (current) Shadows
New Shading by Project

PREVISION DESIGN

GRATTAN PLAYGROUND 9

CPHP PROJECT

Shading diagrams on the date of maximum shading

3:00 PM

DATE OF MAXIMUM SHADOW
AUGUST 2

PARK FEATURES
1 Tennis court
2 Foursquare courts
3 Play structure
4 Blacktop area
5 Basketball court
6 Soccer Field

Grattan Playground (RPD)
Existing (current) Shadows
New Shading by Project

GRATTAN PLAYGROUND 10

CPHP PROJECT

Shading diagrams on the date of maximum shading

4:00 PM

DATE OF MAXIMUM SHADOW
AUGUST 2

PARK FEATURES
1. Tennis court
2. Foursquare courts
3. Play structure
4. Blacktop area
5. Basketball court
6. Soccer Field

Grattan Playground (RPD)
Existing (current) Shadows
New Shading by Project

PREVISION DESIGN

GRATTAN PLAYGROUND 11

CPHP PROJECT

Shading diagrams on the date of maximum shading

5:00 PM

DATE OF MAXIMUM SHADOW
AUGUST 2

PARK FEATURES
1. Tennis court
2. Foursquare courts
3. Play structure
4. Blacktop area
5. Basketball court
6. Soccer Field

Grattan Playground (RPD)
Existing (current) Shadows
New Shading by Project

PREVISION DESIGN

GRATTAN PLAYGROUND 12

CPHP PROJECT

Shading diagrams on the date of maximum shading

6:00 PM

DATE OF MAXIMUM SHADOW
AUGUST 2

PARK FEATURES
- Tennis court
- Foursquare courts
- Play structure
- Blacktop area
- Basketball court
- Soccer Field

- Grattan Playground (RPD)
- Existing (current) Shadows
- New Shading by Project

PREVISION DESIGN

GRATTAN PLAYGROUND 13

CPHP PROJECT

Shading diagrams on the date of maximum shading

6:30 PM

DATE OF MAXIMUM SHADOW AUGUST 2

PARK FEATURES
1. Tennis court
2. Foursquare courts
3. Play structure
4. Blacktop area
5. Basketball court
6. Soccer Field

- Grattan Playground (RPD)
- Existing (current) Shadows
- New Shading by Project

PREVISION DESIGN

GRATTAN PLAYGROUND 14

CPHP PROJECT

Shading diagrams on the date of maximum shading

6:45 PM

DATE OF MAXIMUM SHADOW
AUGUST 2

PARK FEATURES
1 Tennis court
2 Foursquare courts
3 Play structure
4 Blacktop area
5 Basketball court
6 Soccer Field

Grattan Playground (RPD)
Existing (current) Shadows
New Shading by Project

PREVISION DESIGN

GRATTAN PLAYGROUND 15

CPHP PROJECT

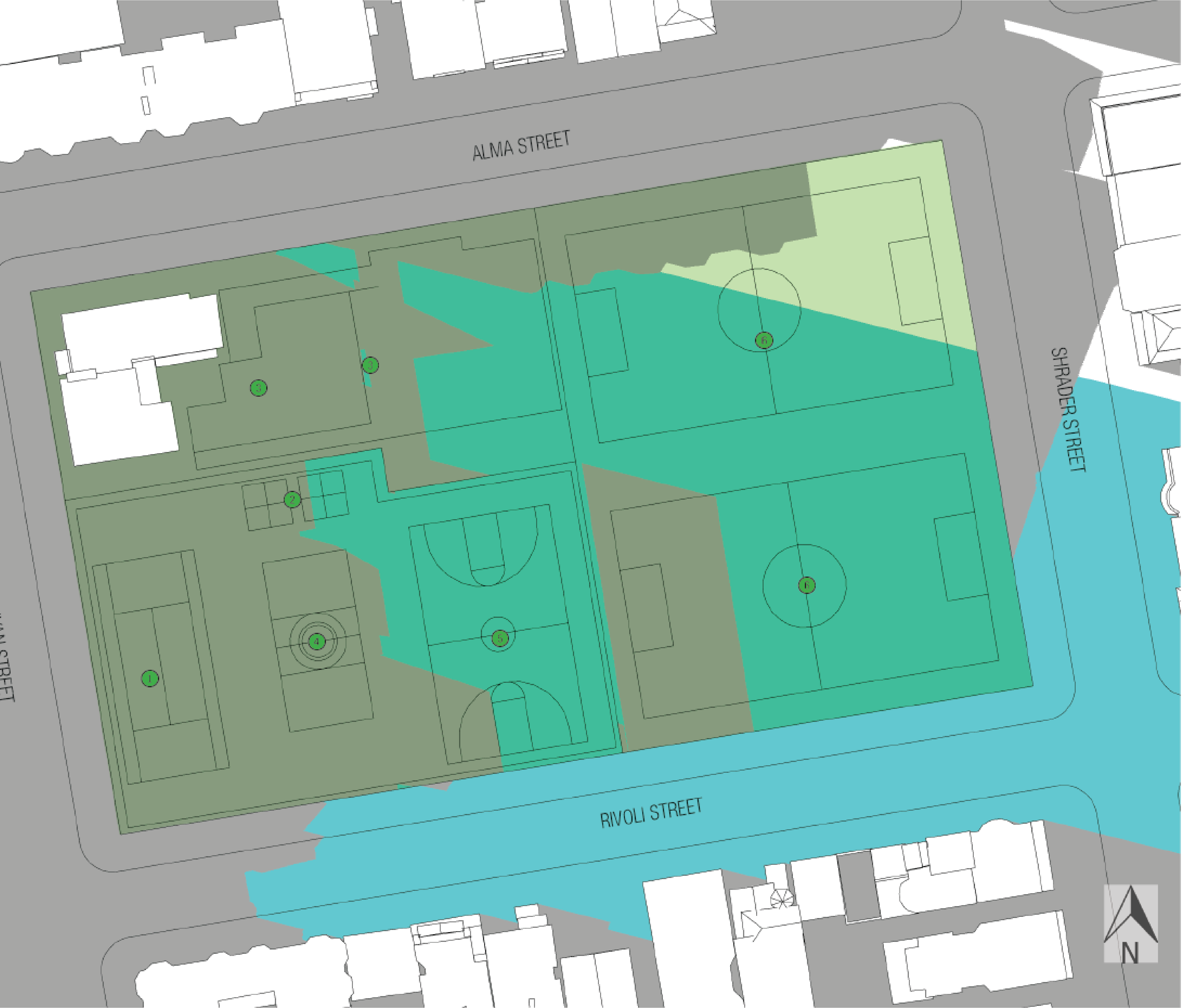
Shading diagrams on the date of maximum shading

7:00 PM

DATE OF MAXIMUM SHADOW AUGUST 2

PARK FEATURES
- 1 Tennis court
- 2 Foursquare courts
- 3 Play structure
- 4 Blacktop area
- 5 Basketball court
- 6 Soccer Field

- Grattan Playground (RPD)
- Existing (current) Shadows
- New Shading by Project



PREVISION DESIGN

GRATTAN PLAYGROUND 16

CPHP PROJECT

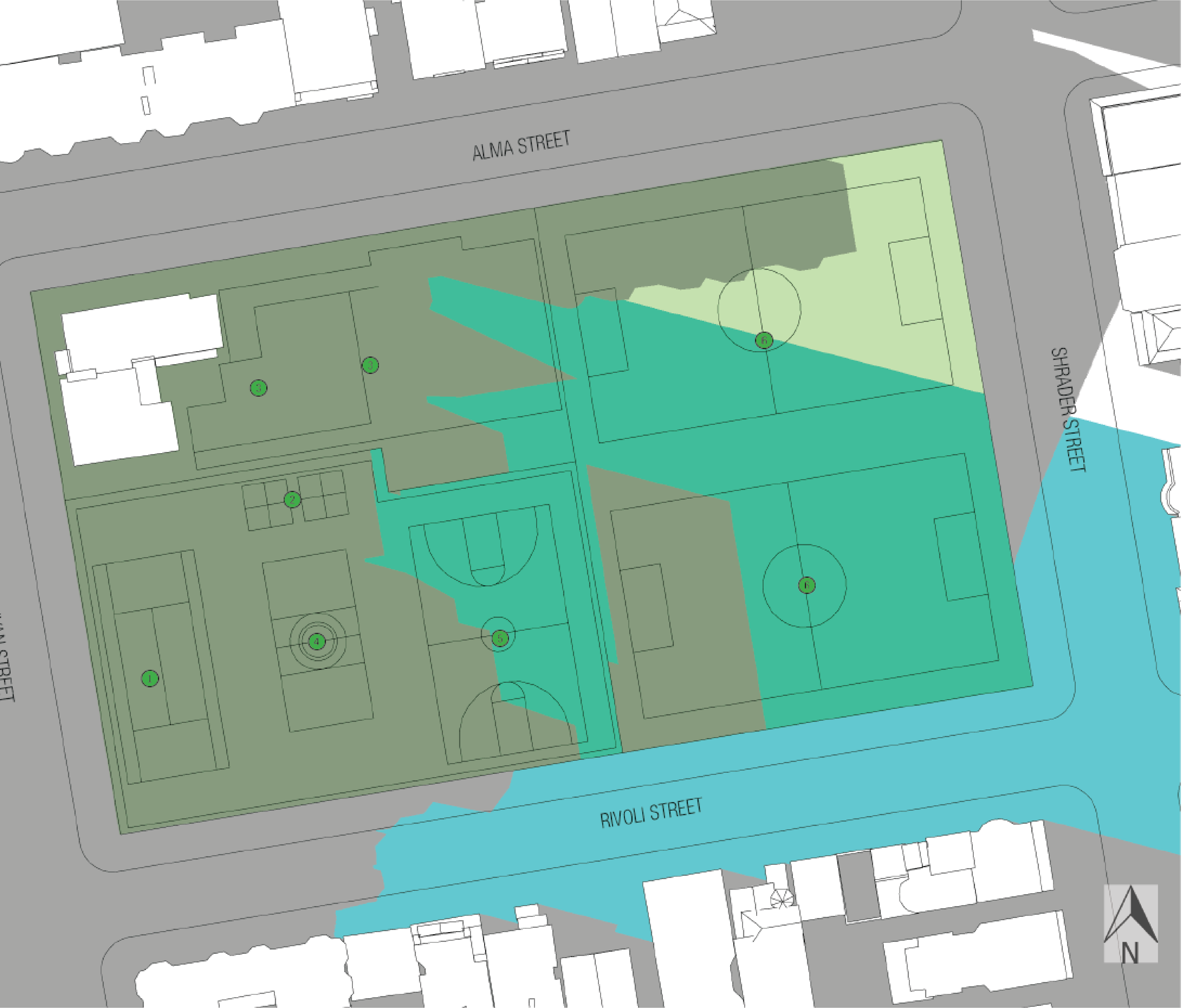
Shading diagrams on the date of maximum shading

7:15 PM

DATE OF MAXIMUM SHADOW AUGUST 2

PARK FEATURES
1 Tennis court
2 Foursquare courts
3 Play structure
4 Blacktop area
5 Basketball court
6 Soccer Field

Grattan Playground (RPD)
Existing (current) Shadows
New Shading by Project



PREVISION DESIGN

GRATTAN PLAYGROUND 17

CPHP PROJECT

Shading diagrams on the date of maximum shading

7:18 PM

DATE OF MAXIMUM SHADOW AUGUST 2

PREVISION DESIGN

GAMBLE 1

CPHP PROJECT

Shading diagrams on the date of maximum shading

7:36 AM

DATE OF MAXIMUM SHADOW
NOVEMBER 1

PREVISION DESIGN

GAMBLE 2

CPHP PROJECT

Shading diagrams on the date of maximum shading

8:00 AM

DATE OF MAXIMUM SHADOW
NOVEMBER 1

PARK FEATURES
- Walking trail
- Grassy area
- Landscaped area

- Richard Gamble Memorial Park
- Existing (current) Shadows
- New Shading by Project

PREVISION DESIGN

GAMBLE 3

CPHP PROJECT

Shading diagrams on the date of maximum shading

9:00 AM

DATE OF MAXIMUM SHADOW
NOVEMBER 1

PREVISION DESIGN

GAMBLE 4

CPHP PROJECT

Shading diagrams on the date of maximum shading

10:00 AM

DATE OF MAXIMUM SHADOW
NOVEMBER 1

PARK FEATURES
- Walking trail
- Grassy area
- Landscaped area

Richard Gamble Memorial Park
Existing (current) Shadows
New Shading by Project

PREVISION DESIGN

GAMBLE 5

CPHP PROJECT

Shading diagrams on the date of maximum shading

11:00 AM

DATE OF MAXIMUM SHADOW
NOVEMBER 1

PARK FEATURES
- Walking trail
- Grassy area
- Landscaped area

- Richard Gamble Memorial Park
- Existing (current) Shadows
- New Shading by Project

PREVISION DESIGN

GAMBLE 6

CPHP PROJECT

Shading diagrams on the date of maximum shading

12:00 PM

DATE OF MAXIMUM SHADOW
NOVEMBER 1

PARK FEATURES
- Walking trail
- Grassy area
- Landscaped area

- Richard Gamble Memorial Park
- Existing (current) Shadows
- New Shading by Project

PREVISION DESIGN

GAMBLE 7

CPHP PROJECT

Shading diagrams on the date of maximum shading

1:00 PM

DATE OF MAXIMUM SHADOW
NOVEMBER 1

PARK FEATURES
Walking trail
Grassy area
Landscaped area

Richard Gamble Memorial Park
Existing (current) Shadows
New Shading by Project

PREVISION DESIGN

GAMBLE 8

CPHP PROJECT

Shading diagrams on the date of maximum shading

2:00 PM

DATE OF MAXIMUM SHADOW
NOVEMBER 1

PARK FEATURES
- Walking trail
- Grassy area
- Landscaped area

- Richard Gamble Memorial Park
- Existing (current) Shadows
- New Shading by Project

PREVISION DESIGN

GAMBLE 9

CPHP PROJECT

Shading diagrams on the date of maximum shading

3:00 PM

DATE OF MAXIMUM SHADOW
NOVEMBER 1

PARK FEATURES
- Walking trail
- Grassy area
- Landscaped area

Richard Gamble Memorial Park
Existing (current) Shadows
New Shading by Project

PREVISION DESIGN

GAMBLE 10

CPHP PROJECT

Shading diagrams on the date of maximum shading

4:00 PM

DATE OF MAXIMUM SHADOW NOVEMBER 1

PARK FEATURES
Walking trail
Grassy area
Landscaped area

Richard Gamble Memorial Park
Existing (current) Shadows
New Shading by Project

PREVISION DESIGN

GAMBLE 11

CPHP PROJECT

Shading diagrams on the date of maximum shading

4:10 PM

DATE OF MAXIMUM SHADOW NOVEMBER 1

PREVISION DESIGN

GRATTAN 1

CPHP PROJECT

Shading diagrams on the date of maximum shading

7:44 AM

DATE OF MAXIMUM SHADOW SEPTEMBER 6

PREVISION DESIGN

GRATTAN 2

CPHP PROJECT

Shading diagrams on the date of maximum shading

8:00 AM

DATE OF MAXIMUM SHADOW SEPTEMBER 6

PLAYGROUND FEATURES
- Outdoor planter boxes and picnic tables
- Blacktop area
- Basketball court
- Foursquare court
- Play structure

- Grattan Elementary Playground
- Existing (current) Shadows
- New Shading by Project

PREVISION DESIGN

GRATTAN 3

CPHP PROJECT

Shading diagrams on the date of maximum shading

9:00 AM

DATE OF MAXIMUM SHADOW SEPTEMBER 6

PLAYGROUND FEATURES
- Outdoor planter boxes and picnic tables
- Blacktop area
- Basketball court
- Foursquare court
- Play structure

- Grattan Elementary Playground
- Existing (current) Shadows
- New Shading by Project

PREVISION DESIGN

GRATTAN 4

CPHP PROJECT

Shading diagrams on the date of maximum shading

10:00 AM

DATE OF MAXIMUM SHADOW SEPTEMBER 6

PLAYGROUND FEATURES
- Outdoor planter boxes and picnic tables
- Blacktop area
- Basketball court
- Foursquare court
- Play structure

- Grattan Elementary Playground
- Existing (current) Shadows
- New Shading by Project

PREVISION DESIGN

GRATTAN 5

CPHP PROJECT

Shading diagrams on the date of maximum shading

11:00 AM

DATE OF MAXIMUM SHADOW
SEPTEMBER 6

PLAYGROUND FEATURES
- Outdoor planter boxes and picnic tables
- Blacktop area
- Basketball court
- Foursquare court
- Play structure

Grattan Elementary Playground
Existing (current) Shadows
New Shading by Project

PREVISION DESIGN

GRATTAN 6

CPHP PROJECT

Shading diagrams on the date of maximum shading

12:00 PM

DATE OF MAXIMUM SHADOW
SEPTEMBER 6

PREVISION DESIGN

GRATTAN 7

CPHP PROJECT

Shading diagrams on the date of maximum shading

1:00 PM

DATE OF MAXIMUM SHADOW SEPTEMBER 6

PLAYGROUND FEATURES
- Outdoor planter boxes and picnic tables
- Blacktop area
- Basketball court
- Foursquare court
- Play structure

Grattan Elementary Playground
Existing (current) Shadows
New Shading by Project

PREVISION DESIGN

GRATTAN 8

CPHP PROJECT

Shading diagrams on the date of maximum shading

2:00 PM

DATE OF MAXIMUM SHADOW
SEPTEMBER 6

PLAYGROUND FEATURES
- Outdoor planter boxes and picnic tables
- Blacktop area
- Basketball court
- Foursquare court
- Play structure

- Grattan Elementary Playground
- Existing (current) Shadows
- New Shading by Project

PREVISION DESIGN

GRATTAN 9

CPHP PROJECT

Shading diagrams on the date of maximum shading

3:00 PM

DATE OF MAXIMUM SHADOW
SEPTEMBER 6

PLAYGROUND FEATURES
- Outdoor planter boxes and picnic tables
- Blacktop area
- Basketball court
- Foursquare court
- Play structure

Grattan Elementary Playground
Existing (current) Shadows
New Shading by Project

PREVISION DESIGN

GRATTAN 10

CPHP PROJECT

Shading diagrams on the date of maximum shading

4:00 PM

DATE OF MAXIMUM SHADOW
SEPTEMBER 6

PLAYGROUND FEATURES
- Outdoor planter boxes and picnic tables
- Blacktop area
- Basketball court
- Foursquare court
- Play structure

Grattan Elementary Playground
Existing (current) Shadows
New Shading by Project

PREVISION DESIGN

GRATTAN 11

CPHP PROJECT

Shading diagrams on the date of maximum shading

5:00 PM

DATE OF MAXIMUM SHADOW SEPTEMBER 6

PLAYGROUND FEATURES
- Outdoor planter boxes and picnic tables
- Blacktop area
- Basketball court
- Foursquare court
- Play structure

- Grattan Elementary Playground
- Existing (current) Shadows
- New Shading by Project

PREVISION DESIGN

GRATTAN 12

CPHP PROJECT

Shading diagrams on the date of maximum shading

6:00 PM

DATE OF MAXIMUM SHADOW SEPTEMBER 6

PREVISION DESIGN

GRATTAN 13

CPHP PROJECT

Shading diagrams on the date of maximum shading

6:31 PM

DATE OF MAXIMUM SHADOW SEPTEMBER 6

PLAYGROUND FEATURES
- Outdoor planter boxes and picnic tables
- Blacktop area
- Basketball court
- Foursquare court
- Play structure

- Grattan Elementary Playground
- Existing (current) Shadows
- New Shading by Project

PREVISION DESIGN

IHS 1

CPHP PROJECT

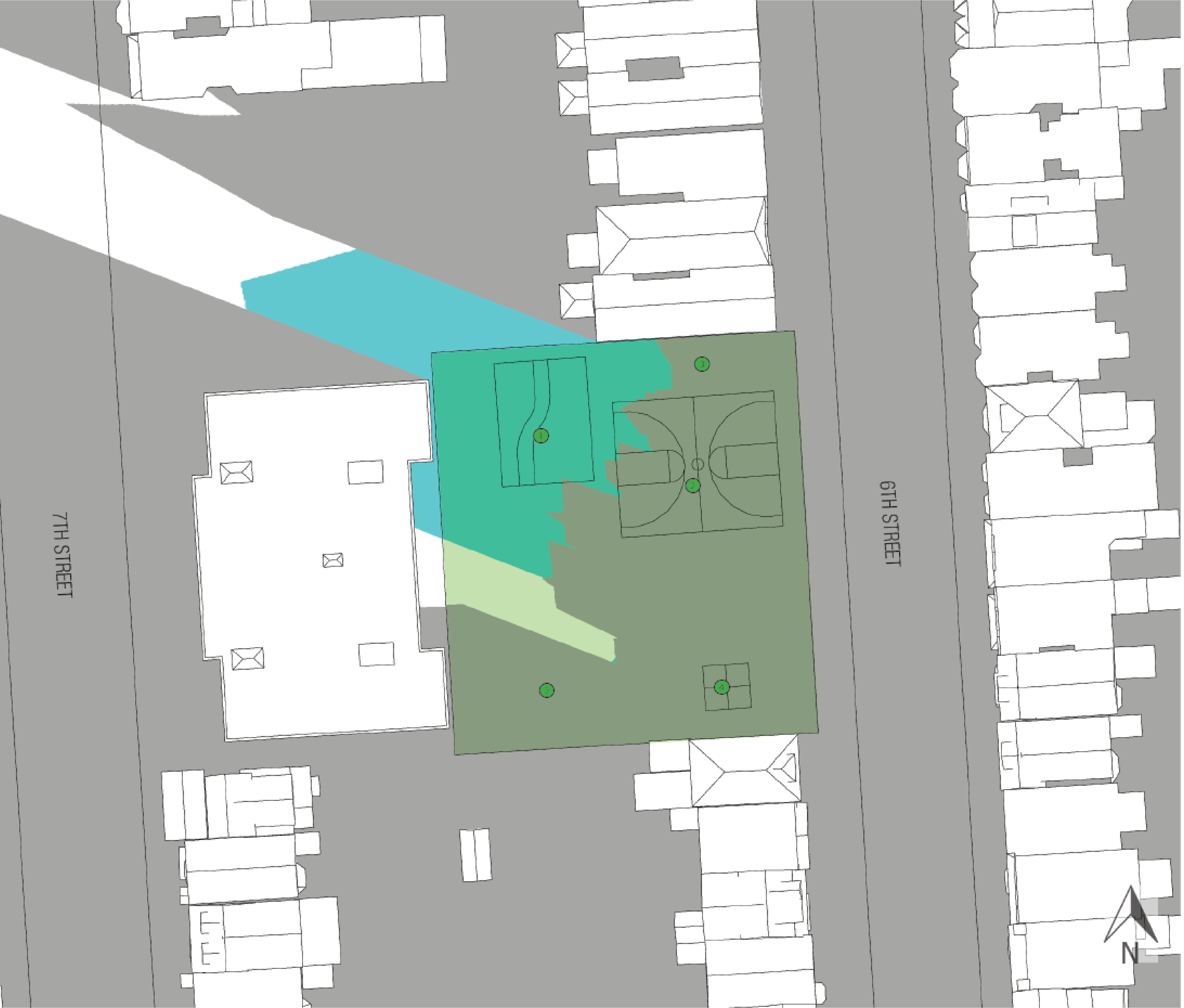
Shading diagrams on the date of maximum shading

8:16 AM

DATE OF MAXIMUM SHADOW
OCTOBER 11

Independence High School Outdoor Space
Existing (current) Shadows
New Shading by Project

Independence High School Features
1 Landscape area with walking path
2 Basketball court
3 Blacktop area
4 Four square court



PREVISION DESIGN

IHS 2

CPHP PROJECT

Shading diagrams on the date of maximum shading

8:30 AM

DATE OF MAXIMUM SHADOW OCTOBER 11

Independence High School Outdoor Space
Existing (current) Shadows
New Shading by Project

Independence High School Features
1 Landscape area with walking path
2 Basketball court
3 Blacktop area
4 Four square court

PREVISION DESIGN

IHS 3

CPHP PROJECT

Shading diagrams on the date of maximum shading

8:45 AM

DATE OF MAXIMUM SHADOW OCTOBER 11

Independence High School Outdoor Space
Existing (current) Shadows
New Shading by Project

Independence High School Features
1 Landscape area with walking path
2 Basketball court
3 Blacktop area
4 Four square court

PREVISION DESIGN

IHS 4

CPHP PROJECT

Shading diagrams on the date of maximum shading

9:00 AM

DATE OF MAXIMUM SHADOW
OCTOBER 11

- Independence High School Outdoor Space
- Existing (current) Shadows
- New Shading by Project

Independence High School Features

1. Landscape area with walking path
2. Basketball court
3. Blacktop area
4. Four square court

PREVISION DESIGN

IHS 5

CPHP PROJECT

Shading diagrams on the date of maximum shading

10:00 AM

DATE OF MAXIMUM SHADOW
OCTOBER 11

Independence High School Outdoor Space
Existing (current) Shadows
New Shading by Project

Independence High School Features

1. Landscape area with walking path
2. Basketball court
3. Blacktop area
4. Four square court

PREVISION DESIGN

IHS 6

CPHP PROJECT

Shading diagrams on the date of maximum shading

11:00 AM

DATE OF MAXIMUM SHADOW
OCTOBER 11

Independence High School Outdoor Space
Existing (current) Shadows
New Shading by Project

Independence High School Features
1 Landscape area with walking path
2 Basketball court
3 Blacktop area
4 Four square court

PREVISION DESIGN

IHS 7

CPHP PROJECT

Shading diagrams on the date of maximum shading

12:00 PM

DATE OF MAXIMUM SHADOW
OCTOBER 11

- Independence High School Outdoor Space
- Existing (current) Shadows
- New Shading by Project

Independence High School Features

1. Landscape area with walking path
2. Basketball court
3. Blacktop area
4. Four square court

PREVISION DESIGN

IHS 8

CPHP PROJECT

Shading diagrams on the date of maximum shading

1:00 PM

DATE OF MAXIMUM SHADOW
OCTOBER 11

Independence High School Outdoor Space
Existing (current) Shadows
New Shading by Project

Independence High School Features
1. Landscape area with walking path
2. Basketball court
3. Blacktop area
4. Four square court

PREVISION DESIGN

IHS 9

CPHP PROJECT

Shading diagrams on the date of maximum shading

2:00 PM

DATE OF MAXIMUM SHADOW
OCTOBER 11

Independence High School Outdoor Space

Existing (current) Shadows

New Shading by Project

Independence High School Features

1. Landscape area with walking path
2. Basketball court
3. Blacktop area
4. Four square court

PREVISION
DESIGN

IHS 10

CPHP PROJECT

Shading diagrams on the date of maximum shading

3:00 PM

DATE OF MAXIMUM SHADOW
OCTOBER 11

- Independence High School Outdoor Space
- Existing (current) Shadows
- New Shading by Project

Independence High School Features

- Landscape area with walking path
- Basketball court
- Blacktop area
- Four square court

PREVISION DESIGN

IHS 11

CPHP PROJECT

Shading diagrams on the date of maximum shading

4:00 PM

DATE OF MAXIMUM SHADOW
OCTOBER 11

- Independence High School Outdoor Space
- Existing (current) Shadows
- New Shading by Project

Independence High School Features

1. Landscape area with walking path
2. Basketball court
3. Blacktop area
4. Four square court

PREVISION DESIGN

IHS 12

CPHP PROJECT

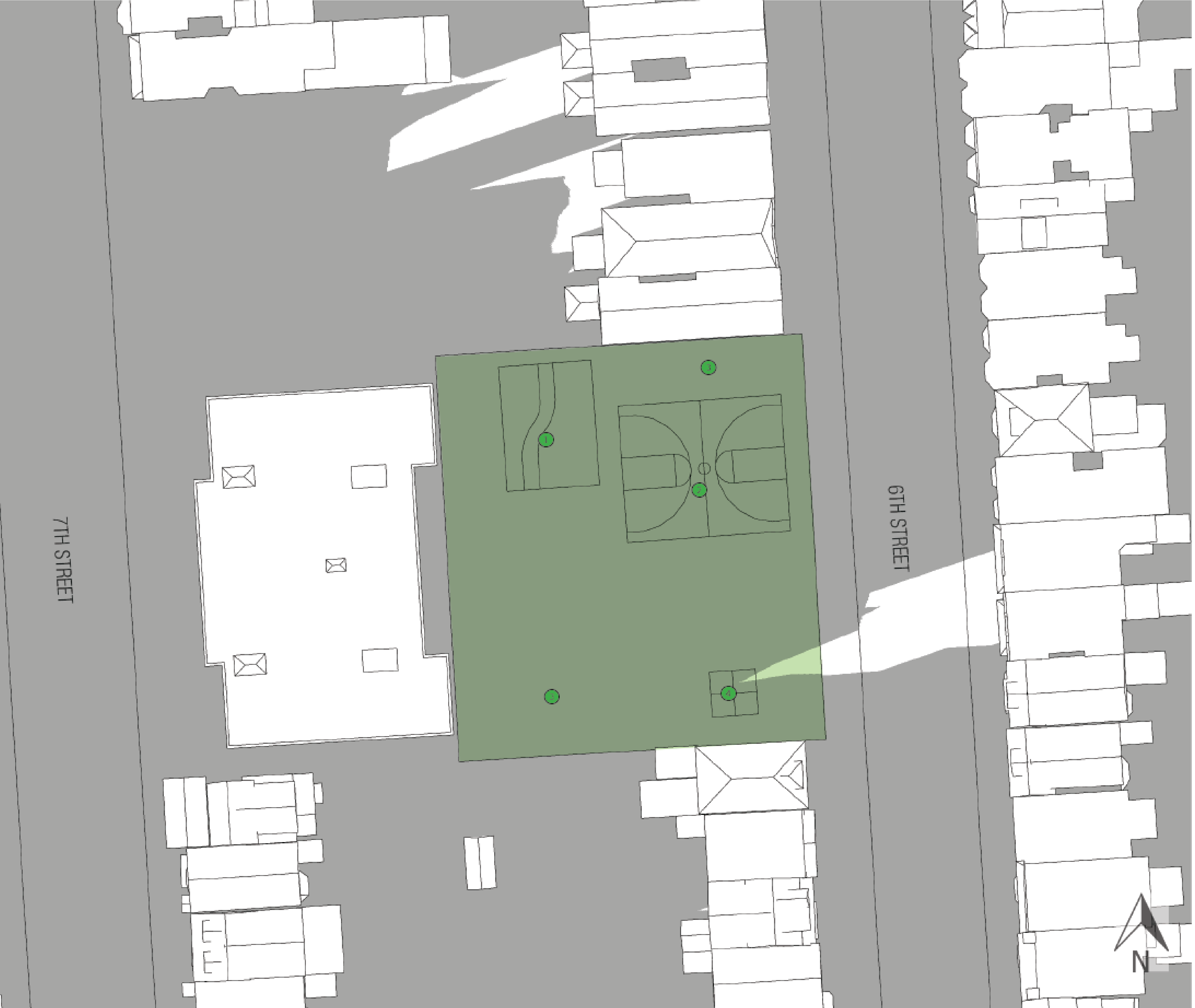
Shading diagrams on the date of maximum shading

5:00 PM

DATE OF MAXIMUM SHADOW
OCTOBER 11

Independence High School Outdoor Space
Existing (current) Shadows
New Shading by Project

Independence High School Features
1. Landscape area with walking path
2. Basketball court
3. Blacktop area
4. Four square court



PREVISION DESIGN

IHS 13

CPHP PROJECT

Shading diagrams on the date of maximum shading

5:37 PM

DATE OF MAXIMUM SHADOW
OCTOBER 11

- Independence High School Outdoor Space
- Existing (current) Shadows
- New Shading by Project

Independence High School Features

1. Landscape area with walking path
2. Basketball court
3. Blacktop area
4. Four square court

GOLDEN GATE PARK

JUNE 21

Analysis Hours: 6:46 AM-7:36 PM (PDT)

SUMMER SOLSTICE

Analysis Time	CURRENT SHADOW (PARTIAL AREA)			NEW SHADOW FROM CPHP			NOT USED		
	Area (sf)	Area/Time (sfh)	Coverage	Area (sf)	Area/Time (sfh)	Coverage	Area (sf)	Area/Time (sfh)	Coverage
6:46 AM	636,069.71	69967.67	1.4%	0.00	0.00	0.0%	0.00	0.00	0.0%
7:00 AM	463,186.46	106532.89	1.0%	0.00	0.00	0.0%	0.00	0.00	0.0%
7:15 AM	349,942.75	87485.69	0.8%	0.00	0.00	0.0%	0.00	0.00	0.0%
7:30 AM	273,859.13	68464.78	0.6%	0.00	0.00	0.0%	0.00	0.00	0.0%
7:45 AM	222,423.99	55606.00	0.5%	0.00	0.00	0.0%	0.00	0.00	0.0%
8:00 AM	184,677.55	46169.39	0.4%	0.00	0.00	0.0%	0.00	0.00	0.0%
8:15 AM	156,951.87	39237.97	0.4%	0.00	0.00	0.0%	0.00	0.00	0.0%
8:30 AM	137,210.16	34302.54	0.3%	0.00	0.00	0.0%	0.00	0.00	0.0%
8:45 AM	121,546.40	30386.60	0.3%	0.00	0.00	0.0%	0.00	0.00	0.0%
9:00 AM	109,550.60	27387.65	0.2%	0.00	0.00	0.0%	0.00	0.00	0.0%
9:15 AM	100,336.62	25084.16	0.2%	0.00	0.00	0.0%	0.00	0.00	0.0%
9:30 AM	92,048.46	23012.11	0.2%	0.00	0.00	0.0%	0.00	0.00	0.0%
9:45 AM	85,007.92	21251.98	0.2%	0.00	0.00	0.0%	0.00	0.00	0.0%
10:00 AM	78,139.32	19534.83	0.2%	0.00	0.00	0.0%	0.00	0.00	0.0%
10:15 AM	71,751.26	17937.82	0.2%	0.00	0.00	0.0%	0.00	0.00	0.0%
10:30 AM	65,773.20	16443.30	0.1%	0.00	0.00	0.0%	0.00	0.00	0.0%
10:45 AM	60,319.76	15079.94	0.1%	0.00	0.00	0.0%	0.00	0.00	0.0%
11:00 AM	55,060.30	13765.08	0.1%	0.00	0.00	0.0%	0.00	0.00	0.0%
11:15 AM	50,448.91	12612.23	0.1%	0.00	0.00	0.0%	0.00	0.00	0.0%
11:30 AM	45,806.65	11451.66	0.1%	0.00	0.00	0.0%	0.00	0.00	0.0%
11:45 AM	41,680.20	10420.05	0.1%	0.00	0.00	0.0%	0.00	0.00	0.0%
12:00 PM	37,439.13	9359.78	0.1%	0.00	0.00	0.0%	0.00	0.00	0.0%
12:15 PM	33,290.63	8322.66	0.1%	0.00	0.00	0.0%	0.00	0.00	0.0%
12:30 PM	29,887.20	7471.80	0.1%	0.00	0.00	0.0%	0.00	0.00	0.0%
12:45 PM	27,577.09	6894.27	0.1%	0.00	0.00	0.0%	0.00	0.00	0.0%
1:00 PM	25,932.68	6483.17	0.1%	0.00	0.00	0.0%	0.00	0.00	0.0%
1:15 PM	27,616.77	6904.19	0.1%	0.00	0.00	0.0%	0.00	0.00	0.0%
1:30 PM	28,956.98	7239.25	0.1%	0.00	0.00	0.0%	0.00	0.00	0.0%
1:45 PM	31,677.09	7919.27	0.1%	0.00	0.00	0.0%	0.00	0.00	0.0%
2:00 PM	33,806.44	8451.61	0.1%	0.00	0.00	0.0%	0.00	0.00	0.0%
2:15 PM	36,645.58	9161.39	0.1%	0.00	0.00	0.0%	0.00	0.00	0.0%
2:30 PM	40,181.28	10045.32	0.1%	0.00	0.00	0.0%	0.00	0.00	0.0%
2:45 PM	44,625.15	11156.29	0.1%	0.00	0.00	0.0%	0.00	0.00	0.0%
3:00 PM	48,985.25	12246.31	0.1%	0.00	0.00	0.0%	0.00	0.00	0.0%
3:15 PM	53,645.14	13411.29	0.1%	0.00	0.00	0.0%	0.00	0.00	0.0%
3:30 PM	58,490.19	14622.55	0.1%	0.00	0.00	0.0%	0.00	0.00	0.0%
3:45 PM	64,362.45	16090.61	0.1%	0.00	0.00	0.0%	0.00	0.00	0.0%
4:00 PM	70,781.37	17695.34	0.2%	0.00	0.00	0.0%	0.00	0.00	0.0%
4:15 PM	78,148.14	19537.04	0.2%	0.00	0.00	0.0%	0.00	0.00	0.0%
4:30 PM	85,642.76	21410.69	0.2%	0.00	0.00	0.0%	0.00	0.00	0.0%
4:45 PM	94,023.51	23505.88	0.2%	0.00	0.00	0.0%	0.00	0.00	0.0%
5:00 PM	104,269.10	26067.27	0.2%	0.00	0.00	0.0%	0.00	0.00	0.0%
5:15 PM	115,577.16	28894.29	0.3%	0.00	0.00	0.0%	0.00	0.00	0.0%
5:30 PM	128,234.25	32058.56	0.3%	0.00	0.00	0.0%	0.00	0.00	0.0%
5:45 PM	142,297.68	35574.42	0.3%	0.00	0.00	0.0%	0.00	0.00	0.0%
6:00 PM	158,825.52	39706.38	0.4%	0.00	0.00	0.0%	0.00	0.00	0.0%
6:15 PM	178,571.64	44642.91	0.4%	0.00	0.00	0.0%	0.00	0.00	0.0%
6:30 PM	207,139.37	51784.84	0.5%	0.00	0.00	0.0%	0.00	0.00	0.0%
6:45 PM	244,890.21	61222.55	0.5%	0.00	0.00	0.0%	0.00	0.00	0.0%
7:00 PM	301,434.92	75358.73	0.7%	0.00	0.00	0.0%	0.00	0.00	0.0%
7:15 PM	407,364.76	122209.43	0.9%	0.00	0.00	0.0%	0.00	0.00	0.0%
7:36 PM	672,731.63	121091.69	1.5%	0.00	0.00	0.0%	0.00	0.00	0.0%

JUNE 28

Analysis Hours: 6:48 AM-7:36 PM (PDT)

JUNE 14 SIMILAR

Analysis Time	CURRENT SHADOW (PARTIAL AREA)			NEW SHADOW FROM CPHP			NOT USED		
	Area (sf)	Area/Time (sfh)	Coverage	Area (sf)	Area/Time (sfh)	Coverage	Area (sf)	Area/Time (sfh)	Coverage
6:48 AM	633,107.13	63310.71	1.4%	0.00	0.00	0.0%	0.00	0.00	0.0%
7:00 AM	485,317.63	106769.88	1.1%	0.00	0.00	0.0%	0.00	0.00	0.0%
7:15 AM	360,973.06	90243.27	0.8%	0.00	0.00	0.0%	0.00	0.00	0.0%
7:30 AM	281,940.09	70485.02	0.6%	0.00	0.00	0.0%	0.00	0.00	0.0%
7:45 AM	228,071.40	57017.85	0.5%	0.00	0.00	0.0%	0.00	0.00	0.0%
8:00 AM	188,473.36	47118.34	0.4%	0.00	0.00	0.0%	0.00	0.00	0.0%
8:15 AM	159,786.60	39946.65	0.4%	0.00	0.00	0.0%	0.00	0.00	0.0%
8:30 AM	139,445.32	34861.33	0.3%	0.00	0.00	0.0%	0.00	0.00	0.0%
8:45 AM	123,239.30	30809.83	0.3%	0.00	0.00	0.0%	0.00	0.00	0.0%
9:00 AM	111,036.30	27759.07	0.2%	0.00	0.00	0.0%	0.00	0.00	0.0%
9:15 AM	101,350.60	25337.65	0.2%	0.00	0.00	0.0%	0.00	0.00	0.0%
9:30 AM	93,018.35	23254.59	0.2%	0.00	0.00	0.0%	0.00	0.00	0.0%
9:45 AM	85,849.96	21462.49	0.2%	0.00	0.00	0.0%	0.00	0.00	0.0%
10:00 AM	79,012.23	19753.06	0.2%	0.00	0.00	0.0%	0.00	0.00	0.0%
10:15 AM	72,566.85	18141.71	0.2%	0.00	0.00	0.0%	0.00	0.00	0.0%
10:30 AM	66,456.53	16614.13	0.1%	0.00	0.00	0.0%	0.00	0.00	0.0%
10:45 AM	61,033.95	15258.49	0.1%	0.00	0.00	0.0%	0.00	0.00	0.0%
11:00 AM	55,677.51	13919.38	0.1%	0.00	0.00	0.0%	0.00	0.00	0.0%
11:15 AM	50,977.94	12744.48	0.1%	0.00	0.00	0.0%	0.00	0.00	0.0%
11:30 AM	46,397.40	11599.35	0.1%	0.00	0.00	0.0%	0.00	0.00	0.0%
11:45 AM	42,231.28	10557.82	0.1%	0.00	0.00	0.0%	0.00	0.00	0.0%
12:00 PM	37,946.12	9486.53	0.1%	0.00	0.00	0.0%	0.00	0.00	0.0%
12:15 PM	33,837.30	8459.33	0.1%	0.00	0.00	0.0%	0.00	0.00	0.0%
12:30 PM	30,363.32	7590.83	0.1%	0.00	0.00	0.0%	0.00	0.00	0.0%
12:45 PM	27,973.86	6993.47	0.1%	0.00	0.00	0.0%	0.00	0.00	0.0%
1:00 PM	26,064.94	6516.23	0.1%	0.00	0.00	0.0%	0.00	0.00	0.0%
1:15 PM	27,616.77	6904.19	0.1%	0.00	0.00	0.0%	0.00	0.00	0.0%
1:30 PM	29,036.34	7259.08	0.1%	0.00	0.00	0.0%	0.00	0.00	0.0%
1:45 PM	31,606.55	7901.64	0.1%	0.00	0.00	0.0%	0.00	0.00	0.0%
2:00 PM	33,810.85	8452.71	0.1%	0.00	0.00	0.0%	0.00	0.00	0.0%
2:15 PM	36,517.73	9129.43	0.1%	0.00	0.00	0.0%	0.00	0.00	0.0%
2:30 PM	40,035.79	10008.95	0.1%	0.00	0.00	0.0%	0.00	0.00	0.0%
2:45 PM	44,268.05	11067.01	0.1%	0.00	0.00	0.0%	0.00	0.00	0.0%
3:00 PM	48,729.55	12182.39	0.1%	0.00	0.00	0.0%	0.00	0.00	0.0%
3:15 PM	53,340.95	13335.24	0.1%	0.00	0.00	0.0%	0.00	0.00	0.0%
3:30 PM	58,168.36	14542.09	0.1%	0.00	0.00	0.0%	0.00	0.00	0.0%
3:45 PM	63,824.60	15956.15	0.1%	0.00	0.00	0.0%	0.00	0.00	0.0%
4:00 PM	70,287.61	17571.90	0.2%	0.00	0.00	0.0%	0.00	0.00	0.0%
4:15 PM	77,438.36	19359.59	0.2%	0.00	0.00	0.0%	0.00	0.00	0.0%
4:30 PM	85,074.05	21268.51	0.2%	0.00	0.00	0.0%	0.00	0.00	0.0%
4:45 PM	93,401.90	23350.47	0.2%	0.00	0.00	0.0%	0.00	0.00	0.0%
5:00 PM	103,418.24	25854.56	0.2%	0.00	0.00	0.0%	0.00	0.00	0.0%
5:15 PM	114,545.54	28636.39	0.3%	0.00	0.00	0.0%	0.00	0.00	0.0%
5:30 PM	127,083.60	31770.90	0.3%	0.00	0.00	0.0%	0.00	0.00	0.0%
5:45 PM	141,107.36	35276.84	0.3%	0.00	0.00	0.0%	0.00	0.00	0.0%
6:00 PM	157,569.07	39392.27	0.4%	0.00	0.00	0.0%	0.00	0.00	0.0%
6:15 PM	176,808.20	44202.05	0.4%	0.00	0.00	0.0%	0.00	0.00	0.0%
6:30 PM	204,926.25	51231.56	0.5%	0.00	0.00	0.0%	0.00	0.00	0.0%
6:45 PM	240,124.52	60031.13	0.5%	0.00	0.00	0.0%	0.00	0.00	0.0%
7:00 PM	295,386.32	73846.58	0.7%	0.00	0.00	0.0%	0.00	0.00	0.0%
7:15 PM	398,300.68	119490.20	0.9%	0.00	0.00	0.0%	0.00	0.00	0.0%
7:36 PM	668,331.85	120299.73	1.5%	0.00	0.00	0.0%	0.00	0.00	0.0%

JULY 5

Analysis Hours: 6:52 AM-7:36 PM (PDT)

JUNE 7 SIMILAR

Analysis Time	CURRENT SHADOW (PARTIAL AREA)			NEW SHADOW FROM CPHP			NOT USED		
	Area (sf)	Area/Time (sfh)	Coverage	Area (sf)	Area/Time (sfh)	Coverage	Area (sf)	Area/Time (sfh)	Coverage
6:52 AM	625,079.07	37504.74	1.4%	0.00	0.00	0.0%	0.00	0.00	0.0%
7:00 AM	519,563.64	98717.09	1.2%	0.00	0.00	0.0%	0.00	0.00	0.0%
7:15 AM	377,791.87	94447.97	0.8%	0.00	0.00	0.0%	0.00	0.00	0.0%
7:30 AM	293,821.27	73455.32	0.7%	0.00	0.00	0.0%	0.00	0.00	0.0%
7:45 AM	237,585.16	59396.29	0.5%	0.00	0.00	0.0%	0.00	0.00	0.0%
8:00 AM	195,042.17	48760.54	0.4%	0.00	0.00	0.0%	0.00	0.00	0.0%
8:15 AM	163,846.92	40961.73	0.4%	0.00	0.00	0.0%	0.00	0.00	0.0%
8:30 AM	142,742.95	35685.74	0.3%	0.00	0.00	0.0%	0.00	0.00	0.0%
8:45 AM	125,796.29	31449.07	0.3%	0.00	0.00	0.0%	0.00	0.00	0.0%
9:00 AM	113,108.34	28277.08	0.3%	0.00	0.00	0.0%	0.00	0.00	0.0%
9:15 AM	103,224.26	25806.06	0.2%	0.00	0.00	0.0%	0.00	0.00	0.0%
9:30 AM	94,706.84	23676.71	0.2%	0.00	0.00	0.0%	0.00	0.00	0.0%
9:45 AM	87,203.41	21800.85	0.2%	0.00	0.00	0.0%	0.00	0.00	0.0%
10:00 AM	80,330.40	20082.60	0.2%	0.00	0.00	0.0%	0.00	0.00	0.0%
10:15 AM	73,677.82	18419.46	0.2%	0.00	0.00	0.0%	0.00	0.00	0.0%
10:30 AM	67,532.23	16883.06	0.2%	0.00	0.00	0.0%	0.00	0.00	0.0%
10:45 AM	62,122.88	15530.72	0.1%	0.00	0.00	0.0%	0.00	0.00	0.0%
11:00 AM	56,647.40	14161.85	0.1%	0.00	0.00	0.0%	0.00	0.00	0.0%
11:15 AM	51,855.25	12963.81	0.1%	0.00	0.00	0.0%	0.00	0.00	0.0%
11:30 AM	47,332.03	11833.01	0.1%	0.00	0.00	0.0%	0.00	0.00	0.0%
11:45 AM	42,870.52	10717.63	0.1%	0.00	0.00	0.0%	0.00	0.00	0.0%
12:00 PM	38,770.52	9692.63	0.1%	0.00	0.00	0.0%	0.00	0.00	0.0%
12:15 PM	34,503.00	8625.75	0.1%	0.00	0.00	0.0%	0.00	0.00	0.0%
12:30 PM	31,099.56	7774.89	0.1%	0.00	0.00	0.0%	0.00	0.00	0.0%
12:45 PM	28,692.46	7173.12	0.1%	0.00	0.00	0.0%	0.00	0.00	0.0%
1:00 PM	26,607.20	6651.80	0.1%	0.00	0.00	0.0%	0.00	0.00	0.0%
1:15 PM	27,938.59	6984.65	0.1%	0.00	0.00	0.0%	0.00	0.00	0.0%
1:30 PM	29,406.66	7351.66	0.1%	0.00	0.00	0.0%	0.00	0.00	0.0%
1:45 PM	31,928.38	7982.09	0.1%	0.00	0.00	0.0%	0.00	0.00	0.0%
2:00 PM	34,110.63	8527.66	0.1%	0.00	0.00	0.0%	0.00	0.00	0.0%
2:15 PM	36,971.82	9242.95	0.1%	0.00	0.00	0.0%	0.00	0.00	0.0%
2:30 PM	40,194.50	10048.63	0.1%	0.00	0.00	0.0%	0.00	0.00	0.0%
2:45 PM	44,413.53	11103.38	0.1%	0.00	0.00	0.0%	0.00	0.00	0.0%
3:00 PM	48,879.44	12219.86	0.1%	0.00	0.00	0.0%	0.00	0.00	0.0%
3:15 PM	53,490.84	13372.71	0.1%	0.00	0.00	0.0%	0.00	0.00	0.0%
3:30 PM	58,309.44	14577.36	0.1%	0.00	0.00	0.0%	0.00	0.00	0.0%
3:45 PM	63,758.47	15939.62	0.1%	0.00	0.00	0.0%	0.00	0.00	0.0%
4:00 PM	70,062.77	17515.69	0.2%	0.00	0.00	0.0%	0.00	0.00	0.0%
4:15 PM	77,341.37	19335.34	0.2%	0.00	0.00	0.0%	0.00	0.00	0.0%
4:30 PM	84,963.84	21240.96	0.2%	0.00	0.00	0.0%	0.00	0.00	0.0%
4:45 PM	93,278.46	23319.61	0.2%	0.00	0.00	0.0%	0.00	0.00	0.0%
5:00 PM	102,972.97	25743.24	0.2%	0.00	0.00	0.0%	0.00	0.00	0.0%
5:15 PM	114,034.15	28508.54	0.3%	0.00	0.00	0.0%	0.00	0.00	0.0%
5:30 PM	126,894.03	31723.51	0.3%	0.00	0.00	0.0%	0.00	0.00	0.0%
5:45 PM	140,900.15	35225.04	0.3%	0.00	0.00	0.0%	0.00	0.00	0.0%
6:00 PM	157,207.57	39301.89	0.4%	0.00	0.00	0.0%	0.00	0.00	0.0%
6:15 PM	176,697.99	44174.50	0.4%	0.00	0.00	0.0%	0.00	0.00	0.0%
6:30 PM	204,414.86	51103.71	0.5%	0.00	0.00	0.0%	0.00	0.00	0.0%
6:45 PM	240,900.43	60225.11	0.5%	0.00	0.00	0.0%	0.00	0.00	0.0%
7:00 PM	295,783.09	73945.77	0.7%	0.00	0.00	0.0%	0.00	0.00	0.0%
7:15 PM	399,244.12	119773.24	0.9%	0.00	0.00	0.0%	0.00	0.00	0.0%
7:36 PM	659,320.67	118677.72	1.5%	0.00	0.00	0.0%	0.00	0.00	0.0%

GOLDEN GATE PARK

JULY 12

Analysis Hours: 6:56 AM-7:33 PM (PDT)

MAY 31 SIMILAR

Analysis Time	CURRENT SHADOW (PARTIAL AREA)			NEW SHADOW FROM CPHP			NOT USED		
	Area (sf)	Area/Time (sfh)	Coverage	Area (sf)	Area/Time (sfh)	Coverage	Area (sf)	Area/Time (sfh)	Coverage
6:56 AM	614,278.00	18428.34	1.4%	0.00	0.00	0.0%	0.00	0.00	0.0%
7:00 AM	563,561.46	84534.22	1.3%	0.00	0.00	0.0%	0.00	0.00	0.0%
7:15 AM	403,251.54	100812.88	0.9%	0.00	0.00	0.0%	0.00	0.00	0.0%
7:30 AM	311,825.99	77956.50	0.7%	0.00	0.00	0.0%	0.00	0.00	0.0%
7:45 AM	248,324.51	62081.13	0.6%	0.00	0.00	0.0%	0.00	0.00	0.0%
8:00 AM	202,585.29	50646.32	0.5%	0.00	0.00	0.0%	0.00	0.00	0.0%
8:15 AM	169,882.29	42470.57	0.4%	0.00	0.00	0.0%	0.00	0.00	0.0%
8:30 AM	147,054.56	36763.64	0.3%	0.00	0.00	0.0%	0.00	0.00	0.0%
8:45 AM	129,071.88	32267.97	0.3%	0.00	0.00	0.0%	0.00	0.00	0.0%
9:00 AM	115,722.64	28930.66	0.3%	0.00	0.00	0.0%	0.00	0.00	0.0%
9:15 AM	105,190.49	26297.62	0.2%	0.00	0.00	0.0%	0.00	0.00	0.0%
9:30 AM	96,712.76	24178.19	0.2%	0.00	0.00	0.0%	0.00	0.00	0.0%
9:45 AM	89,116.74	22279.18	0.2%	0.00	0.00	0.0%	0.00	0.00	0.0%
10:00 AM	81,807.28	20451.82	0.2%	0.00	0.00	0.0%	0.00	0.00	0.0%
10:15 AM	75,198.79	18799.70	0.2%	0.00	0.00	0.0%	0.00	0.00	0.0%
10:30 AM	68,903.31	17225.83	0.2%	0.00	0.00	0.0%	0.00	0.00	0.0%
10:45 AM	63,313.20	15828.30	0.1%	0.00	0.00	0.0%	0.00	0.00	0.0%
11:00 AM	57,776.00	14444.00	0.1%	0.00	0.00	0.0%	0.00	0.00	0.0%
11:15 AM	53,058.80	13264.70	0.1%	0.00	0.00	0.0%	0.00	0.00	0.0%
11:30 AM	48,478.26	12119.57	0.1%	0.00	0.00	0.0%	0.00	0.00	0.0%
11:45 AM	43,994.72	10998.68	0.1%	0.00	0.00	0.0%	0.00	0.00	0.0%
12:00 PM	39,639.02	9909.75	0.1%	0.00	0.00	0.0%	0.00	0.00	0.0%
12:15 PM	35,486.12	8871.53	0.1%	0.00	0.00	0.0%	0.00	0.00	0.0%
12:30 PM	32,104.72	8026.18	0.1%	0.00	0.00	0.0%	0.00	0.00	0.0%
12:45 PM	29,627.09	7406.77	0.1%	0.00	0.00	0.0%	0.00	0.00	0.0%
1:00 PM	27,607.95	6901.99	0.1%	0.00	0.00	0.0%	0.00	0.00	0.0%
1:15 PM	28,811.50	7202.87	0.1%	0.00	0.00	0.0%	0.00	0.00	0.0%
1:30 PM	30,217.84	7554.46	0.1%	0.00	0.00	0.0%	0.00	0.00	0.0%
1:45 PM	32,726.33	8181.58	0.1%	0.00	0.00	0.0%	0.00	0.00	0.0%
2:00 PM	34,921.82	8730.45	0.1%	0.00	0.00	0.0%	0.00	0.00	0.0%
2:15 PM	37,641.92	9410.48	0.1%	0.00	0.00	0.0%	0.00	0.00	0.0%
2:30 PM	40,785.25	10196.31	0.1%	0.00	0.00	0.0%	0.00	0.00	0.0%
2:45 PM	44,960.20	11240.05	0.1%	0.00	0.00	0.0%	0.00	0.00	0.0%
3:00 PM	49,382.02	12345.51	0.1%	0.00	0.00	0.0%	0.00	0.00	0.0%
3:15 PM	53,966.97	13491.74	0.1%	0.00	0.00	0.0%	0.00	0.00	0.0%
3:30 PM	58,798.79	14699.70	0.1%	0.00	0.00	0.0%	0.00	0.00	0.0%
3:45 PM	64,208.15	16052.04	0.1%	0.00	0.00	0.0%	0.00	0.00	0.0%
4:00 PM	70,265.56	17566.39	0.2%	0.00	0.00	0.0%	0.00	0.00	0.0%
4:15 PM	77,447.17	19361.79	0.2%	0.00	0.00	0.0%	0.00	0.00	0.0%
4:30 PM	85,303.30	21325.82	0.2%	0.00	0.00	0.0%	0.00	0.00	0.0%
4:45 PM	93,578.24	23394.56	0.2%	0.00	0.00	0.0%	0.00	0.00	0.0%
5:00 PM	103,418.24	25854.56	0.2%	0.00	0.00	0.0%	0.00	0.00	0.0%
5:15 PM	114,417.69	28604.42	0.3%	0.00	0.00	0.0%	0.00	0.00	0.0%
5:30 PM	127,264.35	31816.09	0.3%	0.00	0.00	0.0%	0.00	0.00	0.0%
5:45 PM	141,574.67	35393.67	0.3%	0.00	0.00	0.0%	0.00	0.00	0.0%
6:00 PM	158,080.47	39520.12	0.4%	0.00	0.00	0.0%	0.00	0.00	0.0%
6:15 PM	177,972.07	44493.02	0.4%	0.00	0.00	0.0%	0.00	0.00	0.0%
6:30 PM	206,627.97	51656.99	0.5%	0.00	0.00	0.0%	0.00	0.00	0.0%
6:45 PM	244,264.19	61066.05	0.5%	0.00	0.00	0.0%	0.00	0.00	0.0%
7:00 PM	301,681.80	75420.45	0.7%	0.00	0.00	0.0%	0.00	0.00	0.0%
7:15 PM	410,715.30	115000.28	0.9%	0.00	0.00	0.0%	0.00	0.00	0.0%
7:33 PM	644,401.96	96660.29	1.4%	0.00	0.00	0.0%	0.00	0.00	0.0%

GOLDEN GATE PARK

Quantitative Shading Calculations for CPHP

JULY 19

Analysis Hours: 7:01 AM-7:30 PM (PDT)

MAY 24 SIMILAR

Analysis Time	CURRENT SHADOW (PARTIAL AREA)			NEW SHADOW FROM CPHP			NOT USED		
	Area (sf)	Area/Time (sfh)	Coverage	Area (sf)	Area/Time (sfh)	Coverage	Area (sf)	Area/Time (sfh)	Coverage
7:01 AM	603,490.16	78453.72	1.3%	0.00	0.00	0.0%	0.00	0.00	0.0%
7:16 AM	425,038.84	102009.32	1.0%	0.00	0.00	0.0%	0.00	0.00	0.0%
7:30 AM	334,860.92	80366.62	0.7%	0.00	0.00	0.0%	0.00	0.00	0.0%
7:45 AM	262,193.97	65548.49	0.6%	0.00	0.00	0.0%	0.00	0.00	0.0%
8:00 AM	213,289.37	53322.34	0.5%	0.00	0.00	0.0%	0.00	0.00	0.0%
8:15 AM	177,169.71	44292.43	0.4%	0.00	0.00	0.0%	0.00	0.00	0.0%
8:30 AM	152,309.61	38077.40	0.3%	0.00	0.00	0.0%	0.00	0.00	0.0%
8:45 AM	133,431.99	33358.00	0.3%	0.00	0.00	0.0%	0.00	0.00	0.0%
9:00 AM	119,046.72	29761.68	0.3%	0.00	0.00	0.0%	0.00	0.00	0.0%
9:15 AM	108,285.33	27071.33	0.2%	0.00	0.00	0.0%	0.00	0.00	0.0%
9:30 AM	99,371.14	24842.79	0.2%	0.00	0.00	0.0%	0.00	0.00	0.0%
9:45 AM	91,232.87	22808.22	0.2%	0.00	0.00	0.0%	0.00	0.00	0.0%
10:00 AM	83,645.66	20911.42	0.2%	0.00	0.00	0.0%	0.00	0.00	0.0%
10:15 AM	76,918.14	19229.54	0.2%	0.00	0.00	0.0%	0.00	0.00	0.0%
10:30 AM	70,534.49	17633.62	0.2%	0.00	0.00	0.0%	0.00	0.00	0.0%
10:45 AM	64,847.39	16211.85	0.1%	0.00	0.00	0.0%	0.00	0.00	0.0%
11:00 AM	59,305.78	14826.45	0.1%	0.00	0.00	0.0%	0.00	0.00	0.0%
11:15 AM	54,623.85	13655.96	0.1%	0.00	0.00	0.0%	0.00	0.00	0.0%
11:30 AM	49,756.76	12439.19	0.1%	0.00	0.00	0.0%	0.00	0.00	0.0%
11:45 AM	45,224.71	11306.18	0.1%	0.00	0.00	0.0%	0.00	0.00	0.0%
12:00 PM	40,727.94	10181.99	0.1%	0.00	0.00	0.0%	0.00	0.00	0.0%
12:15 PM	36,535.36	9133.84	0.1%	0.00	0.00	0.0%	0.00	0.00	0.0%
12:30 PM	33,330.31	8332.58	0.1%	0.00	0.00	0.0%	0.00	0.00	0.0%
12:45 PM	30,790.96	7697.74	0.1%	0.00	0.00	0.0%	0.00	0.00	0.0%
1:00 PM	28,710.10	7177.52	0.1%	0.00	0.00	0.0%	0.00	0.00	0.0%
1:15 PM	30,006.23	7501.56	0.1%	0.00	0.00	0.0%	0.00	0.00	0.0%
1:30 PM	31,452.25	7863.06	0.1%	0.00	0.00	0.0%	0.00	0.00	0.0%
1:45 PM	33,863.75	8465.94	0.1%	0.00	0.00	0.0%	0.00	0.00	0.0%
2:00 PM	36,160.63	9040.16	0.1%	0.00	0.00	0.0%	0.00	0.00	0.0%
2:15 PM	39,065.90	9766.48	0.1%	0.00	0.00	0.0%	0.00	0.00	0.0%
2:30 PM	41,662.57	10415.64	0.1%	0.00	0.00	0.0%	0.00	0.00	0.0%
2:45 PM	46,000.63	11500.16	0.1%	0.00	0.00	0.0%	0.00	0.00	0.0%
3:00 PM	50,382.78	12595.69	0.1%	0.00	0.00	0.0%	0.00	0.00	0.0%
3:15 PM	55,192.56	13798.14	0.1%	0.00	0.00	0.0%	0.00	0.00	0.0%
3:30 PM	59,918.58	14979.64	0.1%	0.00	0.00	0.0%	0.00	0.00	0.0%
3:45 PM	65,226.53	16306.63	0.1%	0.00	0.00	0.0%	0.00	0.00	0.0%
4:00 PM	71,134.06	17783.51	0.2%	0.00	0.00	0.0%	0.00	0.00	0.0%
4:15 PM	78,258.36	19564.59	0.2%	0.00	0.00	0.0%	0.00	0.00	0.0%
4:30 PM	86,101.26	21525.31	0.2%	0.00	0.00	0.0%	0.00	0.00	0.0%
4:45 PM	94,905.23	23726.31	0.2%	0.00	0.00	0.0%	0.00	0.00	0.0%
5:00 PM	104,286.73	26071.68	0.2%	0.00	0.00	0.0%	0.00	0.00	0.0%
5:15 PM	115,744.68	28936.17	0.3%	0.00	0.00	0.0%	0.00	0.00	0.0%
5:30 PM	128,485.54	32121.38	0.3%	0.00	0.00	0.0%	0.00	0.00	0.0%
5:45 PM	143,333.70	35833.43	0.3%	0.00	0.00	0.0%	0.00	0.00	0.0%
6:00 PM	160,284.77	40071.19	0.4%	0.00	0.00	0.0%	0.00	0.00	0.0%
6:15 PM	181,062.50	45265.63	0.4%	0.00	0.00	0.0%	0.00	0.00	0.0%
6:30 PM	211,358.40	52839.60	0.5%	0.00	0.00	0.0%	0.00	0.00	0.0%
6:45 PM	252,177.63	63044.41	0.6%	0.00	0.00	0.0%	0.00	0.00	0.0%
7:00 PM	314,250.72	78562.68	0.7%	0.00	0.00	0.0%	0.00	0.00	0.0%
7:15 PM	433,327.01	108331.75	1.0%	0.00	0.00	0.0%	0.00	0.00	0.0%
7:30 PM	626,132.73	81397.25	1.4%	0.00	0.00	0.0%	0.00	0.00	0.0%

JULY 26

Analysis Hours: 7:07 AM-7:25 PM (PDT)

MAY 17 SIMILAR

Analysis Time	CURRENT SHADOW (PARTIAL AREA)			NEW SHADOW FROM CPHP			NOT USED		
	Area (sf)	Area/Time (sfh)	Coverage	Area (sf)	Area/Time (sfh)	Coverage	Area (sf)	Area/Time (sfh)	Coverage
7:07 AM	590,207.04	35412.42	1.3%	0.00	0.00	0.0%	0.00	0.00	0.0%
7:15 AM	484,211.07	92000.10	1.1%	0.00	0.00	0.0%	0.00	0.00	0.0%
7:30 AM	362,361.77	90590.44	0.8%	0.00	0.00	0.0%	0.00	0.00	0.0%
7:45 AM	281,992.99	70498.25	0.6%	0.00	0.00	0.0%	0.00	0.00	0.0%
8:00 AM	227,004.52	56751.13	0.5%	0.00	0.00	0.0%	0.00	0.00	0.0%
8:15 AM	186,449.81	46612.45	0.4%	0.00	0.00	0.0%	0.00	0.00	0.0%
8:30 AM	159,442.73	39860.68	0.4%	0.00	0.00	0.0%	0.00	0.00	0.0%
8:45 AM	138,400.48	34600.12	0.3%	0.00	0.00	0.0%	0.00	0.00	0.0%
9:00 AM	122,961.56	30740.39	0.3%	0.00	0.00	0.0%	0.00	0.00	0.0%
9:15 AM	111,838.66	27959.67	0.3%	0.00	0.00	0.0%	0.00	0.00	0.0%
9:30 AM	102,333.72	25583.43	0.2%	0.00	0.00	0.0%	0.00	0.00	0.0%
9:45 AM	93,604.69	23401.17	0.2%	0.00	0.00	0.0%	0.00	0.00	0.0%
10:00 AM	86,026.31	21506.58	0.2%	0.00	0.00	0.0%	0.00	0.00	0.0%
10:15 AM	78,818.25	19704.56	0.2%	0.00	0.00	0.0%	0.00	0.00	0.0%
10:30 AM	72,518.36	18129.59	0.2%	0.00	0.00	0.0%	0.00	0.00	0.0%
10:45 AM	66,566.75	16641.69	0.1%	0.00	0.00	0.0%	0.00	0.00	0.0%
11:00 AM	61,100.08	15275.02	0.1%	0.00	0.00	0.0%	0.00	0.00	0.0%
11:15 AM	56,074.28	14018.57	0.1%	0.00	0.00	0.0%	0.00	0.00	0.0%
11:30 AM	51,198.37	12799.59	0.1%	0.00	0.00	0.0%	0.00	0.00	0.0%
11:45 AM	46,556.11	11639.03	0.1%	0.00	0.00	0.0%	0.00	0.00	0.0%
12:00 PM	42,046.11	10511.53	0.1%	0.00	0.00	0.0%	0.00	0.00	0.0%
12:15 PM	38,060.74	9515.18	0.1%	0.00	0.00	0.0%	0.00	0.00	0.0%
12:30 PM	34,767.52	8691.88	0.1%	0.00	0.00	0.0%	0.00	0.00	0.0%
12:45 PM	32,364.83	8091.21	0.1%	0.00	0.00	0.0%	0.00	0.00	0.0%
1:00 PM	30,425.04	7606.26	0.1%	0.00	0.00	0.0%	0.00	0.00	0.0%
1:15 PM	31,721.17	7930.29	0.1%	0.00	0.00	0.0%	0.00	0.00	0.0%
1:30 PM	33,180.42	8295.10	0.1%	0.00	0.00	0.0%	0.00	0.00	0.0%
1:45 PM	35,543.43	8885.86	0.1%	0.00	0.00	0.0%	0.00	0.00	0.0%
2:00 PM	37,902.03	9475.51	0.1%	0.00	0.00	0.0%	0.00	0.00	0.0%
2:15 PM	40,851.38	10212.85	0.1%	0.00	0.00	0.0%	0.00	0.00	0.0%
2:30 PM	43,284.93	10821.23	0.1%	0.00	0.00	0.0%	0.00	0.00	0.0%
2:45 PM	47,503.96	11875.99	0.1%	0.00	0.00	0.0%	0.00	0.00	0.0%
3:00 PM	51,925.79	12981.45	0.1%	0.00	0.00	0.0%	0.00	0.00	0.0%
3:15 PM	56,735.57	14183.89	0.1%	0.00	0.00	0.0%	0.00	0.00	0.0%
3:30 PM	61,633.52	15408.38	0.1%	0.00	0.00	0.0%	0.00	0.00	0.0%
3:45 PM	67,086.96	16771.74	0.1%	0.00	0.00	0.0%	0.00	0.00	0.0%
4:00 PM	72,540.40	18135.10	0.2%	0.00	0.00	0.0%	0.00	0.00	0.0%
4:15 PM	79,677.92	19919.48	0.2%	0.00	0.00	0.0%	0.00	0.00	0.0%
4:30 PM	87,388.57	21847.14	0.2%	0.00	0.00	0.0%	0.00	0.00	0.0%
4:45 PM	96,562.86	24140.72	0.2%	0.00	0.00	0.0%	0.00	0.00	0.0%
5:00 PM	106,372.00	26593.00	0.2%	0.00	0.00	0.0%	0.00	0.00	0.0%
5:15 PM	117,658.01	29414.50	0.3%	0.00	0.00	0.0%	0.00	0.00	0.0%
5:30 PM	130,751.56	32687.89	0.3%	0.00	0.00	0.0%	0.00	0.00	0.0%
5:45 PM	146,128.75	36532.19	0.3%	0.00	0.00	0.0%	0.00	0.00	0.0%
6:00 PM	164,155.52	41038.88	0.4%	0.00	0.00	0.0%	0.00	0.00	0.0%
6:15 PM	185,969.27	46492.32	0.4%	0.00	0.00	0.0%	0.00	0.00	0.0%
6:30 PM	218,756.03	54689.01	0.5%	0.00	0.00	0.0%	0.00	0.00	0.0%
6:45 PM	262,837.62	65709.41	0.6%	0.00	0.00	0.0%	0.00	0.00	0.0%
7:00 PM	335,341.46	83835.37	0.7%	0.00	0.00	0.0%	0.00	0.00	0.0%
7:15 PM	470,672.26	98841.17	1.1%	0.00	0.00	0.0%	0.00	0.00	0.0%
7:25 PM	608,269.08	54744.22	1.4%	0.00	0.00	0.0%	0.00	0.00	0.0%

AUGUST 2

Analysis Hours: 7:12 AM-7:18 PM (PDT)

MAY 10 SIMILAR

Analysis Time	CURRENT SHADOW (PARTIAL AREA)			NEW SHADOW FROM CPHP			NOT USED		
	Area (sf)	Area/Time (sfh)	Coverage	Area (sf)	Area/Time (sfh)	Coverage	Area (sf)	Area/Time (sfh)	Coverage
7:12 AM	574,380.17	11487.60	1.3%	0.00	0.00	0.0%	0.00	0.00	0.0%
7:15 AM	539,829.97	80974.50	1.2%	0.00	0.00	0.0%	0.00	0.00	0.0%
7:30 AM	394,094.88	98523.72	0.9%	0.00	0.00	0.0%	0.00	0.00	0.0%
7:45 AM	304,331.37	76082.84	0.7%	0.00	0.00	0.0%	0.00	0.00	0.0%
8:00 AM	242,372.90	60593.23	0.5%	0.00	0.00	0.0%	0.00	0.00	0.0%
8:15 AM	196,717.44	49179.36	0.4%	0.00	0.00	0.0%	0.00	0.00	0.0%
8:30 AM	166,483.26	41620.82	0.4%	0.00	0.00	0.0%	0.00	0.00	0.0%
8:45 AM	144,034.67	36008.67	0.3%	0.00	0.00	0.0%	0.00	0.00	0.0%
9:00 AM	128,265.11	32066.28	0.3%	0.00	0.00	0.0%	0.00	0.00	0.0%
9:15 AM	115,700.60	28925.15	0.3%	0.00	0.00	0.0%	0.00	0.00	0.0%
9:30 AM	105,410.92	26352.73	0.2%	0.00	0.00	0.0%	0.00	0.00	0.0%
9:45 AM	96,509.96	24127.49	0.2%	0.00	0.00	0.0%	0.00	0.00	0.0%
10:00 AM	88,477.49	22119.37	0.2%	0.00	0.00	0.0%	0.00	0.00	0.0%
10:15 AM	81,278.25	20319.56	0.2%	0.00	0.00	0.0%	0.00	0.00	0.0%
10:30 AM	74,625.67	18656.42	0.2%	0.00	0.00	0.0%	0.00	0.00	0.0%
10:45 AM	68,638.79	17159.70	0.2%	0.00	0.00	0.0%	0.00	0.00	0.0%
11:00 AM	63,132.45	15783.11	0.1%	0.00	0.00	0.0%	0.00	0.00	0.0%
11:15 AM	57,815.68	14453.92	0.1%	0.00	0.00	0.0%	0.00	0.00	0.0%
11:30 AM	52,750.20	13187.55	0.1%	0.00	0.00	0.0%	0.00	0.00	0.0%
11:45 AM	48,024.18	12006.04	0.1%	0.00	0.00	0.0%	0.00	0.00	0.0%
12:00 PM	43,346.65	10836.66	0.1%	0.00	0.00	0.0%	0.00	0.00	0.0%
12:15 PM	39,727.19	9931.80	0.1%	0.00	0.00	0.0%	0.00	0.00	0.0%
12:30 PM	36,438.37	9109.59	0.1%	0.00	0.00	0.0%	0.00	0.00	0.0%
12:45 PM	34,088.59	8522.15	0.1%	0.00	0.00	0.0%	0.00	0.00	0.0%
1:00 PM	32,430.96	8107.74	0.1%	0.00	0.00	0.0%	0.00	0.00	0.0%
1:15 PM	33,872.57	8468.14	0.1%	0.00	0.00	0.0%	0.00	0.00	0.0%
1:30 PM	35,428.81	8857.20	0.1%	0.00	0.00	0.0%	0.00	0.00	0.0%
1:45 PM	37,637.51	9409.38	0.1%	0.00	0.00	0.0%	0.00	0.00	0.0%
2:00 PM	40,057.84	10014.46	0.1%	0.00	0.00	0.0%	0.00	0.00	0.0%
2:15 PM	43,011.60	10752.90	0.1%	0.00	0.00	0.0%	0.00	0.00	0.0%
2:30 PM	45,581.81	11395.45	0.1%	0.00	0.00	0.0%	0.00	0.00	0.0%
2:45 PM	49,501.06	12375.26	0.1%	0.00	0.00	0.0%	0.00	0.00	0.0%
3:00 PM	53,768.58	13442.15	0.1%	0.00	0.00	0.0%	0.00	0.00	0.0%
3:15 PM	58,763.53	14690.88	0.1%	0.00	0.00	0.0%	0.00	0.00	0.0%
3:30 PM	63,943.63	15985.91	0.1%	0.00	0.00	0.0%	0.00	0.00	0.0%
3:45 PM	69,582.23	17395.56	0.2%	0.00	0.00	0.0%	0.00	0.00	0.0%
4:00 PM	75,137.07	18784.27	0.2%	0.00	0.00	0.0%	0.00	0.00	0.0%
4:15 PM	81,926.31	20481.58	0.2%	0.00	0.00	0.0%	0.00	0.00	0.0%
4:30 PM	89,795.66	22448.92	0.2%	0.00	0.00	0.0%	0.00	0.00	0.0%
4:45 PM	99,027.27	24756.82	0.2%	0.00	0.00	0.0%	0.00	0.00	0.0%
5:00 PM	109,409.52	27352.38	0.2%	0.00	0.00	0.0%	0.00	0.00	0.0%
5:15 PM	121,052.64	30263.16	0.3%	0.00	0.00	0.0%	0.00	0.00	0.0%
5:30 PM	134,251.99	33563.00	0.3%	0.00	0.00	0.0%	0.00	0.00	0.0%
5:45 PM	150,052.41	37513.10	0.3%	0.00	0.00	0.0%	0.00	0.00	0.0%
6:00 PM	169,428.21	42357.05	0.4%	0.00	0.00	0.0%	0.00	0.00	0.0%
6:15 PM	195,778.41	48944.60	0.4%	0.00	0.00	0.0%	0.00	0.00	0.0%
6:30 PM	230,258.07	57564.52	0.5%	0.00	0.00	0.0%	0.00	0.00	0.0%
6:45 PM	282,901.16	70725.29	0.6%	0.00	0.00	0.0%	0.00	0.00	0.0%
7:00 PM	368,877.68	92219.42	0.8%	0.00	0.00	0.0%	0.00	0.00	0.0%
7:15 PM	533,997.39	80099.61	1.2%	0.00	0.00	0.0%	0.00	0.00	0.0%
7:18 PM	586,336.29	17590.09	1.3%	0.00	0.00	0.0%	0.00	0.00	0.0%

AUGUST 9

Analysis Hours: 7:19 AM-7:10 PM (PDT)

MAY 3 SIMILAR

Analysis Time	CURRENT SHADOW (PARTIAL AREA)			NEW SHADOW FROM CPHP			NOT USED		
	Area (sf)	Area/Time (sfh)	Coverage	Area (sf)	Area/Time (sfh)	Coverage	Area (sf)	Area/Time (sfh)	Coverage
7:19 AM	559,862.65	50387.64	1.3%	0.00	0.00	0.0%	0.00	0.00	0.0%
7:30 AM	435,372.60	91428.25	1.0%	0.00	0.00	0.0%	0.00	0.00	0.0%
7:45 AM	333,256.19	83314.05	0.7%	0.00	0.00	0.0%	0.00	0.00	0.0%
8:00 AM	262,811.17	65702.79	0.6%	0.00	0.00	0.0%	0.00	0.00	0.0%
8:15 AM	209,013.03	52253.26	0.5%	0.00	0.00	0.0%	0.00	0.00	0.0%
8:30 AM	175,485.62	43871.41	0.4%	0.00	0.00	0.0%	0.00	0.00	0.0%
8:45 AM	151,701.22	37925.31	0.3%	0.00	0.00	0.0%	0.00	0.00	0.0%
9:00 AM	133,947.79	33486.95	0.3%	0.00	0.00	0.0%	0.00	0.00	0.0%
9:15 AM	120,021.02	30005.26	0.3%	0.00	0.00	0.0%	0.00	0.00	0.0%
9:30 AM	109,052.43	27263.11	0.2%	0.00	0.00	0.0%	0.00	0.00	0.0%
9:45 AM	99,812.00	24953.00	0.2%	0.00	0.00	0.0%	0.00	0.00	0.0%
10:00 AM	91,431.25	22857.81	0.2%	0.00	0.00	0.0%	0.00	0.00	0.0%
10:15 AM	83,839.64	20959.91	0.2%	0.00	0.00	0.0%	0.00	0.00	0.0%
10:30 AM	76,997.50	19249.37	0.2%	0.00	0.00	0.0%	0.00	0.00	0.0%
10:45 AM	70,821.05	17705.26	0.2%	0.00	0.00	0.0%	0.00	0.00	0.0%
11:00 AM	65,010.51	16252.63	0.1%	0.00	0.00	0.0%	0.00	0.00	0.0%
11:15 AM	59,583.53	14895.88	0.1%	0.00	0.00	0.0%	0.00	0.00	0.0%
11:30 AM	54,337.29	13584.32	0.1%	0.00	0.00	0.0%	0.00	0.00	0.0%
11:45 AM	49,620.09	12405.02	0.1%	0.00	0.00	0.0%	0.00	0.00	0.0%
12:00 PM	44,924.93	11231.23	0.1%	0.00	0.00	0.0%	0.00	0.00	0.0%
12:15 PM	41,477.40	10369.35	0.1%	0.00	0.00	0.0%	0.00	0.00	0.0%
12:30 PM	38,272.35	9568.09	0.1%	0.00	0.00	0.0%	0.00	0.00	0.0%
12:45 PM	35,940.20	8985.05	0.1%	0.00	0.00	0.0%	0.00	0.00	0.0%
1:00 PM	34,745.47	8686.37	0.1%	0.00	0.00	0.0%	0.00	0.00	0.0%
1:15 PM	36,381.06	9095.27	0.1%	0.00	0.00	0.0%	0.00	0.00	0.0%
1:30 PM	37,919.66	9479.92	0.1%	0.00	0.00	0.0%	0.00	0.00	0.0%
1:45 PM	40,278.27	10069.57	0.1%	0.00	0.00	0.0%	0.00	0.00	0.0%
2:00 PM	42,729.45	10682.36	0.1%	0.00	0.00	0.0%	0.00	0.00	0.0%
2:15 PM	45,775.79	11443.95	0.1%	0.00	0.00	0.0%	0.00	0.00	0.0%
2:30 PM	48,469.44	12117.36	0.1%	0.00	0.00	0.0%	0.00	0.00	0.0%
2:45 PM	51,983.10	12995.77	0.1%	0.00	0.00	0.0%	0.00	0.00	0.0%
3:00 PM	56,268.26	14067.06	0.1%	0.00	0.00	0.0%	0.00	0.00	0.0%
3:15 PM	61,540.94	15385.24	0.1%	0.00	0.00	0.0%	0.00	0.00	0.0%
3:30 PM	66,870.94	16717.74	0.1%	0.00	0.00	0.0%	0.00	0.00	0.0%
3:45 PM	72,553.63	18138.41	0.2%	0.00	0.00	0.0%	0.00	0.00	0.0%
4:00 PM	78,685.99	19671.50	0.2%	0.00	0.00	0.0%	0.00	0.00	0.0%
4:15 PM	85,484.05	21371.01	0.2%	0.00	0.00	0.0%	0.00	0.00	0.0%
4:30 PM	93,031.57	23257.89	0.2%	0.00	0.00	0.0%	0.00	0.00	0.0%
4:45 PM	102,377.81	25594.45	0.2%	0.00	0.00	0.0%	0.00	0.00	0.0%
5:00 PM	113,359.63	28339.91	0.3%	0.00	0.00	0.0%	0.00	0.00	0.0%
5:15 PM	125,716.94	31429.23	0.3%	0.00	0.00	0.0%	0.00	0.00	0.0%
5:30 PM	139,273.38	34818.35	0.3%	0.00	0.00	0.0%	0.00	0.00	0.0%
5:45 PM	155,959.93	38989.98	0.3%	0.00	0.00	0.0%	0.00	0.00	0.0%
6:00 PM	177,416.59	44354.15	0.4%	0.00	0.00	0.0%	0.00	0.00	0.0%
6:15 PM	207,875.61	51968.90	0.5%	0.00	0.00	0.0%	0.00	0.00	0.0%
6:30 PM	246,314.19	61578.55	0.6%	0.00	0.00	0.0%	0.00	0.00	0.0%
6:45 PM	310,252.12	105485.72	0.7%	0.00	0.00	0.0%	0.00	0.00	0.0%
7:10 PM	562,432.86	118110.90	1.3%	0.00	0.00	0.0%	0.00	0.00	0.0%

GOLDEN GATE PARK

AUGUST 16

Analysis Hours: 7:25 AM-7:02 PM (PDT)

APRIL 26 SIMILAR

Analysis Time	CURRENT SHADOW (PARTIAL AREA)			NEW SHADOW FROM CPHP			NOT USED		
	Area (sf)	Area/Time (sfh)	Coverage	Area (sf)	Area/Time (sfh)	Coverage	Area (sf)	Area/Time (sfh)	Coverage
7:25 AM	551,384.91	22055.40	1.2%	0.00	0.00	0.0%	0.00	0.00	0.0%
7:30 AM	491,621.93	83575.73	1.1%	0.00	0.00	0.0%	0.00	0.00	0.0%
7:45 AM	367,965.10	91991.28	0.8%	0.00	0.00	0.0%	0.00	0.00	0.0%
8:00 AM	286,454.50	71613.62	0.6%	0.00	0.00	0.0%	0.00	0.00	0.0%
8:15 AM	229,667.32	57416.83	0.5%	0.00	0.00	0.0%	0.00	0.00	0.0%
8:30 AM	187,961.96	46990.49	0.4%	0.00	0.00	0.0%	0.00	0.00	0.0%
8:45 AM	160,474.34	40118.58	0.4%	0.00	0.00	0.0%	0.00	0.00	0.0%
9:00 AM	140,432.84	35108.21	0.3%	0.00	0.00	0.0%	0.00	0.00	0.0%
9:15 AM	125,192.31	31298.08	0.3%	0.00	0.00	0.0%	0.00	0.00	0.0%
9:30 AM	113,381.67	28345.42	0.3%	0.00	0.00	0.0%	0.00	0.00	0.0%
9:45 AM	103,391.78	25847.95	0.2%	0.00	0.00	0.0%	0.00	0.00	0.0%
10:00 AM	94,574.58	23643.65	0.2%	0.00	0.00	0.0%	0.00	0.00	0.0%
10:15 AM	86,718.46	21679.61	0.2%	0.00	0.00	0.0%	0.00	0.00	0.0%
10:30 AM	79,576.53	19894.13	0.2%	0.00	0.00	0.0%	0.00	0.00	0.0%
10:45 AM	73,091.48	18272.87	0.2%	0.00	0.00	0.0%	0.00	0.00	0.0%
11:00 AM	67,029.65	16757.41	0.1%	0.00	0.00	0.0%	0.00	0.00	0.0%
11:15 AM	61,620.30	15405.07	0.1%	0.00	0.00	0.0%	0.00	0.00	0.0%
11:30 AM	56,250.62	14062.66	0.1%	0.00	0.00	0.0%	0.00	0.00	0.0%
11:45 AM	51,290.95	12822.74	0.1%	0.00	0.00	0.0%	0.00	0.00	0.0%
12:00 PM	47,076.33	11769.08	0.1%	0.00	0.00	0.0%	0.00	0.00	0.0%
12:15 PM	43,686.11	10921.53	0.1%	0.00	0.00	0.0%	0.00	0.00	0.0%
12:30 PM	40,648.59	10162.15	0.1%	0.00	0.00	0.0%	0.00	0.00	0.0%
12:45 PM	38,232.68	9558.17	0.1%	0.00	0.00	0.0%	0.00	0.00	0.0%
1:00 PM	37,633.11	9408.28	0.1%	0.00	0.00	0.0%	0.00	0.00	0.0%
1:15 PM	39,396.55	9849.14	0.1%	0.00	0.00	0.0%	0.00	0.00	0.0%
1:30 PM	41,063.00	10265.75	0.1%	0.00	0.00	0.0%	0.00	0.00	0.0%
1:45 PM	43,271.71	10817.93	0.1%	0.00	0.00	0.0%	0.00	0.00	0.0%
2:00 PM	45,727.30	11431.82	0.1%	0.00	0.00	0.0%	0.00	0.00	0.0%
2:15 PM	48,892.67	12223.17	0.1%	0.00	0.00	0.0%	0.00	0.00	0.0%
2:30 PM	51,916.97	12979.24	0.1%	0.00	0.00	0.0%	0.00	0.00	0.0%
2:45 PM	55,232.24	13808.06	0.1%	0.00	0.00	0.0%	0.00	0.00	0.0%
3:00 PM	59,371.91	14842.98	0.1%	0.00	0.00	0.0%	0.00	0.00	0.0%
3:15 PM	64,807.72	16201.93	0.1%	0.00	0.00	0.0%	0.00	0.00	0.0%
3:30 PM	70,186.21	17546.55	0.2%	0.00	0.00	0.0%	0.00	0.00	0.0%
3:45 PM	76,327.39	19081.85	0.2%	0.00	0.00	0.0%	0.00	0.00	0.0%
4:00 PM	82,702.22	20675.56	0.2%	0.00	0.00	0.0%	0.00	0.00	0.0%
4:15 PM	90,038.14	22509.53	0.2%	0.00	0.00	0.0%	0.00	0.00	0.0%
4:30 PM	97,757.59	24439.40	0.2%	0.00	0.00	0.0%	0.00	0.00	0.0%
4:45 PM	107,020.06	26755.02	0.2%	0.00	0.00	0.0%	0.00	0.00	0.0%
5:00 PM	118,050.38	29512.60	0.3%	0.00	0.00	0.0%	0.00	0.00	0.0%
5:15 PM	130,936.72	32734.18	0.3%	0.00	0.00	0.0%	0.00	0.00	0.0%
5:30 PM	146,080.26	36520.06	0.3%	0.00	0.00	0.0%	0.00	0.00	0.0%
5:45 PM	164,023.26	41005.82	0.4%	0.00	0.00	0.0%	0.00	0.00	0.0%
6:00 PM	188,142.71	47035.68	0.4%	0.00	0.00	0.0%	0.00	0.00	0.0%
6:15 PM	222,745.82	55686.45	0.5%	0.00	0.00	0.0%	0.00	0.00	0.0%
6:30 PM	272,285.26	68071.31	0.6%	0.00	0.00	0.0%	0.00	0.00	0.0%
6:45 PM	350,335.11	94590.48	0.8%	0.00	0.00	0.0%	0.00	0.00	0.0%
7:02 PM	539,578.68	75541.02	1.2%	0.00	0.00	0.0%	0.00	0.00	0.0%

AUGUST 23

Analysis Hours: 7:31 AM-6:52 PM (PDT)

APRIL 19 SIMILAR

Analysis Time	CURRENT SHADOW (PARTIAL AREA)			NEW SHADOW FROM CPHP			NOT USED		
	Area (sf)	Area/Time (sfh)	Coverage	Area (sf)	Area/Time (sfh)	Coverage	Area (sf)	Area/Time (sfh)	Coverage
7:31 AM	548,179.86	60299.78	1.2%	0.00	0.00	0.0%	0.00	0.00	0.0%
7:45 AM	410,270.03	94362.11	0.9%	0.00	0.00	0.0%	0.00	0.00	0.0%
8:00 AM	313,730.50	78432.63	0.7%	0.00	0.00	0.0%	0.00	0.00	0.0%
8:15 AM	249,206.23	62301.56	0.6%	0.00	0.00	0.0%	0.00	0.00	0.0%
8:30 AM	200,098.84	50024.71	0.4%	0.00	0.00	0.0%	0.00	0.00	0.0%
8:45 AM	169,741.22	42435.30	0.4%	0.00	0.00	0.0%	0.00	0.00	0.0%
9:00 AM	147,473.38	36868.34	0.3%	0.00	0.00	0.0%	0.00	0.00	0.0%
9:15 AM	130,544.35	32636.09	0.3%	0.00	0.00	0.0%	0.00	0.00	0.0%
9:30 AM	118,054.79	29513.70	0.3%	0.00	0.00	0.0%	0.00	0.00	0.0%
9:45 AM	107,288.99	26822.25	0.2%	0.00	0.00	0.0%	0.00	0.00	0.0%
10:00 AM	97,881.03	24470.26	0.2%	0.00	0.00	0.0%	0.00	0.00	0.0%
10:15 AM	89,786.84	22446.71	0.2%	0.00	0.00	0.0%	0.00	0.00	0.0%
10:30 AM	82,411.26	20602.81	0.2%	0.00	0.00	0.0%	0.00	0.00	0.0%
10:45 AM	75,851.26	18962.81	0.2%	0.00	0.00	0.0%	0.00	0.00	0.0%
11:00 AM	69,529.33	17382.33	0.2%	0.00	0.00	0.0%	0.00	0.00	0.0%
11:15 AM	63,709.98	15927.49	0.1%	0.00	0.00	0.0%	0.00	0.00	0.0%
11:30 AM	58,256.54	14564.13	0.1%	0.00	0.00	0.0%	0.00	0.00	0.0%
11:45 AM	53,261.59	13315.40	0.1%	0.00	0.00	0.0%	0.00	0.00	0.0%
12:00 PM	49,434.93	12358.73	0.1%	0.00	0.00	0.0%	0.00	0.00	0.0%
12:15 PM	46,097.62	11524.40	0.1%	0.00	0.00	0.0%	0.00	0.00	0.0%
12:30 PM	42,971.92	10742.98	0.1%	0.00	0.00	0.0%	0.00	0.00	0.0%
12:45 PM	40,913.10	10228.28	0.1%	0.00	0.00	0.0%	0.00	0.00	0.0%
1:00 PM	40,952.78	10238.20	0.1%	0.00	0.00	0.0%	0.00	0.00	0.0%
1:15 PM	42,905.79	10726.45	0.1%	0.00	0.00	0.0%	0.00	0.00	0.0%
1:30 PM	44,479.66	11119.92	0.1%	0.00	0.00	0.0%	0.00	0.00	0.0%
1:45 PM	47,063.10	11765.78	0.1%	0.00	0.00	0.0%	0.00	0.00	0.0%
2:00 PM	49,421.70	12355.43	0.1%	0.00	0.00	0.0%	0.00	0.00	0.0%
2:15 PM	52,829.55	13207.39	0.1%	0.00	0.00	0.0%	0.00	0.00	0.0%
2:30 PM	55,708.37	13927.09	0.1%	0.00	0.00	0.0%	0.00	0.00	0.0%
2:45 PM	59,512.99	14878.25	0.1%	0.00	0.00	0.0%	0.00	0.00	0.0%
3:00 PM	63,445.46	15861.36	0.1%	0.00	0.00	0.0%	0.00	0.00	0.0%
3:15 PM	68,854.81	17213.70	0.2%	0.00	0.00	0.0%	0.00	0.00	0.0%
3:30 PM	74,290.62	18572.65	0.2%	0.00	0.00	0.0%	0.00	0.00	0.0%
3:45 PM	80,559.64	20139.91	0.2%	0.00	0.00	0.0%	0.00	0.00	0.0%
4:00 PM	87,494.37	21873.59	0.2%	0.00	0.00	0.0%	0.00	0.00	0.0%
4:15 PM	95,438.67	23859.67	0.2%	0.00	0.00	0.0%	0.00	0.00	0.0%
4:30 PM	103,546.09	25886.52	0.2%	0.00	0.00	0.0%	0.00	0.00	0.0%
4:45 PM	113,302.32	28325.58	0.3%	0.00	0.00	0.0%	0.00	0.00	0.0%
5:00 PM	124,619.19	31154.80	0.3%	0.00	0.00	0.0%	0.00	0.00	0.0%
5:15 PM	137,964.03	34491.01	0.3%	0.00	0.00	0.0%	0.00	0.00	0.0%
5:30 PM	154,751.98	38687.99	0.3%	0.00	0.00	0.0%	0.00	0.00	0.0%
5:45 PM	175,829.49	43957.37	0.4%	0.00	0.00	0.0%	0.00	0.00	0.0%
6:00 PM	203,956.36	50989.09	0.5%	0.00	0.00	0.0%	0.00	0.00	0.0%
6:15 PM	244,934.30	61233.57	0.5%	0.00	0.00	0.0%	0.00	0.00	0.0%
6:30 PM	309,052.98	77263.24	0.7%	0.00	0.00	0.0%	0.00	0.00	0.0%
6:45 PM	419,832.28	79768.13	0.9%	0.00	0.00	0.0%	0.00	0.00	0.0%
6:52 PM	520,052.99	31203.18	1.2%	0.00	0.00	0.0%	0.00	0.00	0.0%

AUGUST 30

Analysis Hours: 7:37 AM-6:42 PM (PDT)

APRIL 12 SIMILAR

Analysis Time	CURRENT SHADOW (PARTIAL AREA)			NEW SHADOW FROM CPHP			NOT USED		
	Area (sf)	Area/Time (sfh)	Coverage	Area (sf)	Area/Time (sfh)	Coverage	Area (sf)	Area/Time (sfh)	Coverage
7:37 AM	550,375.34	33022.52	1.2%	0.00	0.00	0.0%	0.00	0.00	0.0%
7:45 AM	464,019.68	88163.74	1.0%	0.00	0.00	0.0%	0.00	0.00	0.0%
8:00 AM	347,363.71	86840.93	0.8%	0.00	0.00	0.0%	0.00	0.00	0.0%
8:15 AM	273,277.19	68319.30	0.6%	0.00	0.00	0.0%	0.00	0.00	0.0%
8:30 AM	219,959.58	54989.90	0.5%	0.00	0.00	0.0%	0.00	0.00	0.0%
8:45 AM	180,449.71	45112.43	0.4%	0.00	0.00	0.0%	0.00	0.00	0.0%
9:00 AM	155,444.13	38861.03	0.3%	0.00	0.00	0.0%	0.00	0.00	0.0%
9:15 AM	136,958.87	34239.72	0.3%	0.00	0.00	0.0%	0.00	0.00	0.0%
9:30 AM	122,767.58	30691.90	0.3%	0.00	0.00	0.0%	0.00	0.00	0.0%
9:45 AM	111,675.54	27918.89	0.2%	0.00	0.00	0.0%	0.00	0.00	0.0%
10:00 AM	101,923.72	25480.93	0.2%	0.00	0.00	0.0%	0.00	0.00	0.0%
10:15 AM	93,560.61	23390.15	0.2%	0.00	0.00	0.0%	0.00	0.00	0.0%
10:30 AM	85,572.22	21393.06	0.2%	0.00	0.00	0.0%	0.00	0.00	0.0%
10:45 AM	78,641.90	19660.48	0.2%	0.00	0.00	0.0%	0.00	0.00	0.0%
11:00 AM	72,156.85	18039.21	0.2%	0.00	0.00	0.0%	0.00	0.00	0.0%
11:15 AM	66,174.38	16543.60	0.1%	0.00	0.00	0.0%	0.00	0.00	0.0%
11:30 AM	60,385.89	15096.47	0.1%	0.00	0.00	0.0%	0.00	0.00	0.0%
11:45 AM	55,928.80	13982.20	0.1%	0.00	0.00	0.0%	0.00	0.00	0.0%
12:00 PM	51,987.51	12996.88	0.1%	0.00	0.00	0.0%	0.00	0.00	0.0%
12:15 PM	48,826.54	12206.64	0.1%	0.00	0.00	0.0%	0.00	0.00	0.0%
12:30 PM	45,612.67	11403.17	0.1%	0.00	0.00	0.0%	0.00	0.00	0.0%
12:45 PM	44,241.60	11060.40	0.1%	0.00	0.00	0.0%	0.00	0.00	0.0%
1:00 PM	44,598.69	11149.67	0.1%	0.00	0.00	0.0%	0.00	0.00	0.0%
1:15 PM	46,719.23	11679.81	0.1%	0.00	0.00	0.0%	0.00	0.00	0.0%
1:30 PM	48,266.65	12066.66	0.1%	0.00	0.00	0.0%	0.00	0.00	0.0%
1:45 PM	50,938.26	12734.57	0.1%	0.00	0.00	0.0%	0.00	0.00	0.0%
2:00 PM	53,746.54	13436.63	0.1%	0.00	0.00	0.0%	0.00	0.00	0.0%
2:15 PM	57,070.62	14267.66	0.1%	0.00	0.00	0.0%	0.00	0.00	0.0%
2:30 PM	60,306.54	15076.63	0.1%	0.00	0.00	0.0%	0.00	0.00	0.0%
2:45 PM	64,203.74	16050.93	0.1%	0.00	0.00	0.0%	0.00	0.00	0.0%
3:00 PM	67,801.16	16950.29	0.2%	0.00	0.00	0.0%	0.00	0.00	0.0%
3:15 PM	73,532.34	18383.08	0.2%	0.00	0.00	0.0%	0.00	0.00	0.0%
3:30 PM	79,206.20	19801.55	0.2%	0.00	0.00	0.0%	0.00	0.00	0.0%
3:45 PM	86,105.66	21526.42	0.2%	0.00	0.00	0.0%	0.00	0.00	0.0%
4:00 PM	93,507.70	23376.93	0.2%	0.00	0.00	0.0%	0.00	0.00	0.0%
4:15 PM	101,751.79	25437.95	0.2%	0.00	0.00	0.0%	0.00	0.00	0.0%
4:30 PM	110,546.94	27636.74	0.2%	0.00	0.00	0.0%	0.00	0.00	0.0%
4:45 PM	120,686.72	30171.68	0.3%	0.00	0.00	0.0%	0.00	0.00	0.0%
5:00 PM	132,523.81	33130.95	0.3%	0.00	0.00	0.0%	0.00	0.00	0.0%
5:15 PM	147,671.76	36917.94	0.3%	0.00	0.00	0.0%	0.00	0.00	0.0%
5:30 PM	166,161.43	41540.36	0.4%	0.00	0.00	0.0%	0.00	0.00	0.0%
5:45 PM	191,841.53	47960.38	0.4%	0.00	0.00	0.0%	0.00	0.00	0.0%
6:00 PM	228,340.33	57085.08	0.5%	0.00	0.00	0.0%	0.00	0.00	0.0%
6:15 PM	276,759.98	69190.00	0.6%	0.00	0.00	0.0%	0.00	0.00	0.0%
6:30 PM	363,693.17	83649.43	0.8%	0.00	0.00	0.0%	0.00	0.00	0.0%
6:42 PM	498,203.97	54802.44	1.1%	0.00	0.00	0.0%	0.00	0.00	0.0%

GOLDEN GATE PARK

SEPTEMBER 6

Analysis Hours: 7:44 AM-6:31 PM (PDT)

APRIL 5 SIMILAR

Analysis Time	CURRENT SHADOW (PARTIAL AREA)			NEW SHADOW FROM CPHP			NOT USED		
	Area (sf)	Area/Time (sfh)	Coverage	Area (sf)	Area/Time (sfh)	Coverage	Area (sf)	Area/Time (sfh)	Coverage
7:44 AM	558,645.88	72623.96	1.2%	0.00	0.00	0.0%	0.00	0.00	0.0%
8:00 AM	395,950.90	98987.72	0.9%	0.00	0.00	0.0%	0.00	0.00	0.0%
8:15 AM	304,384.27	76096.07	0.7%	0.00	0.00	0.0%	0.00	0.00	0.0%
8:30 AM	239,926.13	59981.53	0.5%	0.00	0.00	0.0%	0.00	0.00	0.0%
8:45 AM	195,377.23	48844.31	0.4%	0.00	0.00	0.0%	0.00	0.00	0.0%
9:00 AM	164,719.82	41179.96	0.4%	0.00	0.00	0.0%	0.00	0.00	0.0%
9:15 AM	144,211.01	36052.75	0.3%	0.00	0.00	0.0%	0.00	0.00	0.0%
9:30 AM	128,344.46	32086.12	0.3%	0.00	0.00	0.0%	0.00	0.00	0.0%
9:45 AM	116,383.93	29095.98	0.3%	0.00	0.00	0.0%	0.00	0.00	0.0%
10:00 AM	106,213.29	26553.32	0.2%	0.00	0.00	0.0%	0.00	0.00	0.0%
10:15 AM	97,061.03	24265.26	0.2%	0.00	0.00	0.0%	0.00	0.00	0.0%
10:30 AM	88,742.01	22185.50	0.2%	0.00	0.00	0.0%	0.00	0.00	0.0%
10:45 AM	81,578.03	20394.51	0.2%	0.00	0.00	0.0%	0.00	0.00	0.0%
11:00 AM	74,757.93	18689.48	0.2%	0.00	0.00	0.0%	0.00	0.00	0.0%
11:15 AM	68,449.22	17112.31	0.2%	0.00	0.00	0.0%	0.00	0.00	0.0%
11:30 AM	63,000.19	15750.05	0.1%	0.00	0.00	0.0%	0.00	0.00	0.0%
11:45 AM	58,834.06	14708.52	0.1%	0.00	0.00	0.0%	0.00	0.00	0.0%
12:00 PM	54,870.73	13717.68	0.1%	0.00	0.00	0.0%	0.00	0.00	0.0%
12:15 PM	51,670.09	12917.52	0.1%	0.00	0.00	0.0%	0.00	0.00	0.0%
12:30 PM	48,619.34	12154.83	0.1%	0.00	0.00	0.0%	0.00	0.00	0.0%
12:45 PM	48,019.77	12004.94	0.1%	0.00	0.00	0.0%	0.00	0.00	0.0%
1:00 PM	48,835.36	12208.84	0.1%	0.00	0.00	0.0%	0.00	0.00	0.0%
1:15 PM	50,867.72	12716.93	0.1%	0.00	0.00	0.0%	0.00	0.00	0.0%
1:30 PM	52,657.61	13164.40	0.1%	0.00	0.00	0.0%	0.00	0.00	0.0%
1:45 PM	55,408.58	13852.15	0.1%	0.00	0.00	0.0%	0.00	0.00	0.0%
2:00 PM	58,172.77	14543.19	0.1%	0.00	0.00	0.0%	0.00	0.00	0.0%
2:15 PM	61,942.13	15485.53	0.1%	0.00	0.00	0.0%	0.00	0.00	0.0%
2:30 PM	65,332.34	16333.08	0.1%	0.00	0.00	0.0%	0.00	0.00	0.0%
2:45 PM	69,233.95	17308.49	0.2%	0.00	0.00	0.0%	0.00	0.00	0.0%
3:00 PM	73,135.56	18283.89	0.2%	0.00	0.00	0.0%	0.00	0.00	0.0%
3:15 PM	78,549.32	19637.33	0.2%	0.00	0.00	0.0%	0.00	0.00	0.0%
3:30 PM	84,765.45	21191.36	0.2%	0.00	0.00	0.0%	0.00	0.00	0.0%
3:45 PM	92,074.91	23018.73	0.2%	0.00	0.00	0.0%	0.00	0.00	0.0%
4:00 PM	99,944.26	24986.06	0.2%	0.00	0.00	0.0%	0.00	0.00	0.0%
4:15 PM	109,242.00	27310.50	0.2%	0.00	0.00	0.0%	0.00	0.00	0.0%
4:30 PM	118,852.75	29713.19	0.3%	0.00	0.00	0.0%	0.00	0.00	0.0%
4:45 PM	129,918.33	32479.58	0.3%	0.00	0.00	0.0%	0.00	0.00	0.0%
5:00 PM	142,522.52	35630.63	0.3%	0.00	0.00	0.0%	0.00	0.00	0.0%
5:15 PM	159,191.44	39797.86	0.4%	0.00	0.00	0.0%	0.00	0.00	0.0%
5:30 PM	181,847.23	45461.81	0.4%	0.00	0.00	0.0%	0.00	0.00	0.0%
5:45 PM	212,438.51	53109.63	0.5%	0.00	0.00	0.0%	0.00	0.00	0.0%
6:00 PM	256,339.35	64084.84	0.6%	0.00	0.00	0.0%	0.00	0.00	0.0%
6:15 PM	325,034.16	87759.22	0.7%	0.00	0.00	0.0%	0.00	0.00	0.0%
6:31 PM	483,139.78	67639.57	1.1%	0.00	0.00	0.0%	0.00	0.00	0.0%

GOLDEN GATE PARK

SEPTEMBER 13

Analysis Hours: 7:50 AM-6:21 PM (PDT)

MARCH 29 SIMILAR

Analysis Time	CURRENT SHADOW (PARTIAL AREA)			NEW SHADOW FROM CPHP			NOT USED		
	Area (sf)	Area/Time (sfh)	Coverage	Area (sf)	Area/Time (sfh)	Coverage	Area (sf)	Area/Time (sfh)	Coverage
7:50 AM	581,768.98	46541.52	1.3%	0.00	0.00	0.0%	0.00	0.00	0.0%
8:00 AM	464,138.71	97469.13	1.0%	0.00	0.00	0.0%	0.00	0.00	0.0%
8:15 AM	344,215.97	86053.99	0.8%	0.00	0.00	0.0%	0.00	0.00	0.0%
8:30 AM	264,477.62	66119.41	0.6%	0.00	0.00	0.0%	0.00	0.00	0.0%
8:45 AM	214,069.69	53517.42	0.5%	0.00	0.00	0.0%	0.00	0.00	0.0%
9:00 AM	176,230.68	44057.67	0.4%	0.00	0.00	0.0%	0.00	0.00	0.0%
9:15 AM	152,181.76	38045.44	0.3%	0.00	0.00	0.0%	0.00	0.00	0.0%
9:30 AM	134,829.51	33707.38	0.3%	0.00	0.00	0.0%	0.00	0.00	0.0%
9:45 AM	122,101.88	30525.47	0.3%	0.00	0.00	0.0%	0.00	0.00	0.0%
10:00 AM	110,965.76	27741.44	0.2%	0.00	0.00	0.0%	0.00	0.00	0.0%
10:15 AM	101,341.79	25335.45	0.2%	0.00	0.00	0.0%	0.00	0.00	0.0%
10:30 AM	92,462.87	23115.72	0.2%	0.00	0.00	0.0%	0.00	0.00	0.0%
10:45 AM	84,902.12	21225.53	0.2%	0.00	0.00	0.0%	0.00	0.00	0.0%
11:00 AM	77,676.42	19419.11	0.2%	0.00	0.00	0.0%	0.00	0.00	0.0%
11:15 AM	71,358.90	17839.72	0.2%	0.00	0.00	0.0%	0.00	0.00	0.0%
11:30 AM	66,209.65	16552.41	0.1%	0.00	0.00	0.0%	0.00	0.00	0.0%
11:45 AM	61,924.49	15481.12	0.1%	0.00	0.00	0.0%	0.00	0.00	0.0%
12:00 PM	58,093.42	14523.35	0.1%	0.00	0.00	0.0%	0.00	0.00	0.0%
12:15 PM	54,800.19	13700.05	0.1%	0.00	0.00	0.0%	0.00	0.00	0.0%
12:30 PM	51,934.60	12983.65	0.1%	0.00	0.00	0.0%	0.00	0.00	0.0%
12:45 PM	52,190.30	13047.58	0.1%	0.00	0.00	0.0%	0.00	0.00	0.0%
1:00 PM	53,279.23	13319.81	0.1%	0.00	0.00	0.0%	0.00	0.00	0.0%
1:15 PM	55,532.02	13883.01	0.1%	0.00	0.00	0.0%	0.00	0.00	0.0%
1:30 PM	57,432.13	14358.03	0.1%	0.00	0.00	0.0%	0.00	0.00	0.0%
1:45 PM	60,346.21	15086.55	0.1%	0.00	0.00	0.0%	0.00	0.00	0.0%
2:00 PM	63,132.45	15783.11	0.1%	0.00	0.00	0.0%	0.00	0.00	0.0%
2:15 PM	67,175.13	16793.78	0.2%	0.00	0.00	0.0%	0.00	0.00	0.0%
2:30 PM	70,807.82	17701.96	0.2%	0.00	0.00	0.0%	0.00	0.00	0.0%
2:45 PM	75,092.98	18773.25	0.2%	0.00	0.00	0.0%	0.00	0.00	0.0%
3:00 PM	79,281.15	19820.29	0.2%	0.00	0.00	0.0%	0.00	0.00	0.0%
3:15 PM	84,377.49	21094.37	0.2%	0.00	0.00	0.0%	0.00	0.00	0.0%
3:30 PM	91,356.31	22839.08	0.2%	0.00	0.00	0.0%	0.00	0.00	0.0%
3:45 PM	99,252.11	24813.03	0.2%	0.00	0.00	0.0%	0.00	0.00	0.0%
4:00 PM	107,844.47	26961.12	0.2%	0.00	0.00	0.0%	0.00	0.00	0.0%
4:15 PM	117,759.41	29439.85	0.3%	0.00	0.00	0.0%	0.00	0.00	0.0%
4:30 PM	128,282.74	32070.69	0.3%	0.00	0.00	0.0%	0.00	0.00	0.0%
4:45 PM	140,710.58	35177.65	0.3%	0.00	0.00	0.0%	0.00	0.00	0.0%
5:00 PM	155,179.61	38794.90	0.3%	0.00	0.00	0.0%	0.00	0.00	0.0%
5:15 PM	174,864.01	43716.00	0.4%	0.00	0.00	0.0%	0.00	0.00	0.0%
5:30 PM	201,364.11	50341.03	0.5%	0.00	0.00	0.0%	0.00	0.00	0.0%
5:45 PM	242,033.44	60508.36	0.5%	0.00	0.00	0.0%	0.00	0.00	0.0%
6:00 PM	300,495.89	75123.97	0.7%	0.00	0.00	0.0%	0.00	0.00	0.0%
6:15 PM	406,875.41	73237.57	0.9%	0.00	0.00	0.0%	0.00	0.00	0.0%
6:21 PM	470,398.93	23519.95	1.1%	0.00	0.00	0.0%	0.00	0.00	0.0%

GOLDEN GATE PARK

Quantitative Shading Calculations for CPHP

SEPTEMBER 20

Analysis Hours: 7:57 AM-6:09 PM (PDT)

APPROXIMATE EQUINOXES
MARCH 22 SIMILAR

Analysis Time	CURRENT SHADOW (PARTIAL AREA)			NEW SHADOW FROM CPHP			NOT USED		
	Area (sf)	Area/Time (sfh)	Coverage	Area (sf)	Area/Time (sfh)	Coverage	Area (sf)	Area/Time (sfh)	Coverage
7:57 AM	610,402.84	12208.06	1.4%	0.00	0.00	0.0%	0.00	0.00	0.0%
8:00 AM	560,188.89	84028.33	1.3%	0.00	0.00	0.0%	0.00	0.00	0.0%
8:15 AM	400,491.75	100122.94	0.9%	0.00	0.00	0.0%	0.00	0.00	0.0%
8:30 AM	300,178.47	75044.62	0.7%	0.00	0.00	0.0%	0.00	0.00	0.0%
8:45 AM	234,931.19	58732.80	0.5%	0.00	0.00	0.0%	0.00	0.00	0.0%
9:00 AM	193,759.27	48439.82	0.4%	0.00	0.00	0.0%	0.00	0.00	0.0%
9:15 AM	163,009.28	40752.32	0.4%	0.00	0.00	0.0%	0.00	0.00	0.0%
9:30 AM	142,526.93	35631.73	0.3%	0.00	0.00	0.0%	0.00	0.00	0.0%
9:45 AM	128,326.83	32081.71	0.3%	0.00	0.00	0.0%	0.00	0.00	0.0%
10:00 AM	116,388.34	29097.08	0.3%	0.00	0.00	0.0%	0.00	0.00	0.0%
10:15 AM	106,050.17	26512.54	0.2%	0.00	0.00	0.0%	0.00	0.00	0.0%
10:30 AM	96,712.76	24178.19	0.2%	0.00	0.00	0.0%	0.00	0.00	0.0%
10:45 AM	88,724.37	22181.09	0.2%	0.00	0.00	0.0%	0.00	0.00	0.0%
11:00 AM	81,123.95	20280.99	0.2%	0.00	0.00	0.0%	0.00	0.00	0.0%
11:15 AM	75,278.14	18819.54	0.2%	0.00	0.00	0.0%	0.00	0.00	0.0%
11:30 AM	70,075.99	17519.00	0.2%	0.00	0.00	0.0%	0.00	0.00	0.0%
11:45 AM	65,764.38	16441.10	0.1%	0.00	0.00	0.0%	0.00	0.00	0.0%
12:00 PM	61,906.86	15476.71	0.1%	0.00	0.00	0.0%	0.00	0.00	0.0%
12:15 PM	58,591.59	14647.90	0.1%	0.00	0.00	0.0%	0.00	0.00	0.0%
12:30 PM	56,277.08	14069.27	0.1%	0.00	0.00	0.0%	0.00	0.00	0.0%
12:45 PM	57,163.20	14290.80	0.1%	0.00	0.00	0.0%	0.00	0.00	0.0%
1:00 PM	58,322.67	14580.67	0.1%	0.00	0.00	0.0%	0.00	0.00	0.0%
1:15 PM	60,769.44	15192.36	0.1%	0.00	0.00	0.0%	0.00	0.00	0.0%
1:30 PM	62,898.79	15724.70	0.1%	0.00	0.00	0.0%	0.00	0.00	0.0%
1:45 PM	65,923.09	16480.77	0.1%	0.00	0.00	0.0%	0.00	0.00	0.0%
2:00 PM	68,973.84	17243.46	0.2%	0.00	0.00	0.0%	0.00	0.00	0.0%
2:15 PM	73,267.82	18316.96	0.2%	0.00	0.00	0.0%	0.00	0.00	0.0%
2:30 PM	77,023.95	19255.99	0.2%	0.00	0.00	0.0%	0.00	0.00	0.0%
2:45 PM	81,758.78	20439.70	0.2%	0.00	0.00	0.0%	0.00	0.00	0.0%
3:00 PM	86,189.43	21547.36	0.2%	0.00	0.00	0.0%	0.00	0.00	0.0%
3:15 PM	91,448.89	22862.22	0.2%	0.00	0.00	0.0%	0.00	0.00	0.0%
3:30 PM	98,670.17	24667.54	0.2%	0.00	0.00	0.0%	0.00	0.00	0.0%
3:45 PM	107,174.36	26793.59	0.2%	0.00	0.00	0.0%	0.00	0.00	0.0%
4:00 PM	116,445.65	29111.41	0.3%	0.00	0.00	0.0%	0.00	0.00	0.0%
4:15 PM	127,361.34	31840.34	0.3%	0.00	0.00	0.0%	0.00	0.00	0.0%
4:30 PM	139,414.46	34853.61	0.3%	0.00	0.00	0.0%	0.00	0.00	0.0%
4:45 PM	154,059.83	38514.96	0.3%	0.00	0.00	0.0%	0.00	0.00	0.0%
5:00 PM	171,482.61	42870.65	0.4%	0.00	0.00	0.0%	0.00	0.00	0.0%
5:15 PM	195,690.24	48922.56	0.4%	0.00	0.00	0.0%	0.00	0.00	0.0%
5:30 PM	229,975.92	57493.98	0.5%	0.00	0.00	0.0%	0.00	0.00	0.0%
5:45 PM	282,676.33	70669.08	0.6%	0.00	0.00	0.0%	0.00	0.00	0.0%
6:00 PM	373,409.72	78416.04	0.8%	0.00	0.00	0.0%	0.00	0.00	0.0%
6:09 PM	466,440.00	37315.20	1.0%	0.00	0.00	0.0%	0.00	0.00	0.0%

SEPTEMBER 27

Analysis Hours: 8:03 AM-5:58 PM (PDT)

MARCH 15 SIMILAR

Analysis Time	CURRENT SHADOW (PARTIAL AREA)			NEW SHADOW FROM CPHP			NOT USED		
	Area (sf)	Area/Time (sfh)	Coverage	Area (sf)	Area/Time (sfh)	Coverage	Area (sf)	Area/Time (sfh)	Coverage
8:03 AM	661,807.12	66180.71	1.5%	0.00	0.00	0.0%	0.00	0.00	0.0%
8:15 AM	481,438.06	105916.37	1.1%	0.00	0.00	0.0%	0.00	0.00	0.0%
8:30 AM	351,172.75	87793.19	0.8%	0.00	0.00	0.0%	0.00	0.00	0.0%
8:45 AM	268,255.79	67063.95	0.6%	0.00	0.00	0.0%	0.00	0.00	0.0%
9:00 AM	213,465.71	53366.43	0.5%	0.00	0.00	0.0%	0.00	0.00	0.0%
9:15 AM	177,297.56	44324.39	0.4%	0.00	0.00	0.0%	0.00	0.00	0.0%
9:30 AM	151,374.99	37843.75	0.3%	0.00	0.00	0.0%	0.00	0.00	0.0%
9:45 AM	135,385.00	33846.25	0.3%	0.00	0.00	0.0%	0.00	0.00	0.0%
10:00 AM	122,132.74	30533.19	0.3%	0.00	0.00	0.0%	0.00	0.00	0.0%
10:15 AM	111,040.71	27760.18	0.2%	0.00	0.00	0.0%	0.00	0.00	0.0%
10:30 AM	100,989.10	25247.27	0.2%	0.00	0.00	0.0%	0.00	0.00	0.0%
10:45 AM	92,409.96	23102.49	0.2%	0.00	0.00	0.0%	0.00	0.00	0.0%
11:00 AM	84,822.76	21205.69	0.2%	0.00	0.00	0.0%	0.00	0.00	0.0%
11:15 AM	79,272.33	19818.08	0.2%	0.00	0.00	0.0%	0.00	0.00	0.0%
11:30 AM	73,876.21	18469.05	0.2%	0.00	0.00	0.0%	0.00	0.00	0.0%
11:45 AM	69,648.36	17412.09	0.2%	0.00	0.00	0.0%	0.00	0.00	0.0%
12:00 PM	65,618.90	16404.72	0.1%	0.00	0.00	0.0%	0.00	0.00	0.0%
12:15 PM	62,479.98	15619.99	0.1%	0.00	0.00	0.0%	0.00	0.00	0.0%
12:30 PM	60,959.01	15239.75	0.1%	0.00	0.00	0.0%	0.00	0.00	0.0%
12:45 PM	62,237.50	15559.38	0.1%	0.00	0.00	0.0%	0.00	0.00	0.0%
1:00 PM	63,895.14	15973.78	0.1%	0.00	0.00	0.0%	0.00	0.00	0.0%
1:15 PM	66,081.80	16520.45	0.1%	0.00	0.00	0.0%	0.00	0.00	0.0%
1:30 PM	68,585.89	17146.47	0.2%	0.00	0.00	0.0%	0.00	0.00	0.0%
1:45 PM	71,808.57	17952.14	0.2%	0.00	0.00	0.0%	0.00	0.00	0.0%
2:00 PM	75,185.56	18796.39	0.2%	0.00	0.00	0.0%	0.00	0.00	0.0%
2:15 PM	79,704.38	19926.09	0.2%	0.00	0.00	0.0%	0.00	0.00	0.0%
2:30 PM	83,874.91	20968.73	0.2%	0.00	0.00	0.0%	0.00	0.00	0.0%
2:45 PM	88,693.51	22173.38	0.2%	0.00	0.00	0.0%	0.00	0.00	0.0%
3:00 PM	93,745.77	23436.44	0.2%	0.00	0.00	0.0%	0.00	0.00	0.0%
3:15 PM	99,737.06	24934.26	0.2%	0.00	0.00	0.0%	0.00	0.00	0.0%
3:30 PM	106,931.89	26732.97	0.2%	0.00	0.00	0.0%	0.00	0.00	0.0%
3:45 PM	116,441.24	29110.31	0.3%	0.00	0.00	0.0%	0.00	0.00	0.0%
4:00 PM	126,492.85	31623.21	0.3%	0.00	0.00	0.0%	0.00	0.00	0.0%
4:15 PM	138,471.02	34617.75	0.3%	0.00	0.00	0.0%	0.00	0.00	0.0%
4:30 PM	152,688.75	38172.19	0.3%	0.00	0.00	0.0%	0.00	0.00	0.0%
4:45 PM	170,067.45	42516.86	0.4%	0.00	0.00	0.0%	0.00	0.00	0.0%
5:00 PM	192,846.69	48211.67	0.4%	0.00	0.00	0.0%	0.00	0.00	0.0%
5:15 PM	224,888.40	56222.10	0.5%	0.00	0.00	0.0%	0.00	0.00	0.0%
5:30 PM	270,517.41	67629.35	0.6%	0.00	0.00	0.0%	0.00	0.00	0.0%
5:45 PM	347,443.07	79911.91	0.8%	0.00	0.00	0.0%	0.00	0.00	0.0%
5:58 PM	470,037.42	51704.12	1.1%	0.00	0.00	0.0%	0.00	0.00	0.0%

OCTOBER 4

Analysis Hours: 8:09 AM-5:47 PM (PDT)

MARCH 8 SIMILAR

Analysis Time	CURRENT SHADOW (PARTIAL AREA)			NEW SHADOW FROM CPHP			NOT USED		
	Area (sf)	Area/Time (sfh)	Coverage	Area (sf)	Area/Time (sfh)	Coverage	Area (sf)	Area/Time (sfh)	Coverage
8:09 AM	733,341.06	29333.64	1.6%	0.00	0.00	0.0%	0.00	0.00	0.0%
8:15 AM	626,652.94	106531.00	1.4%	0.00	0.00	0.0%	0.00	0.00	0.0%
8:30 AM	429,905.93	107476.48	1.0%	0.00	0.00	0.0%	0.00	0.00	0.0%
8:45 AM	317,270.61	79317.65	0.7%	0.00	0.00	0.0%	0.00	0.00	0.0%
9:00 AM	243,642.58	60910.65	0.5%	0.00	0.00	0.0%	0.00	0.00	0.0%
9:15 AM	197,555.07	49388.77	0.4%	0.00	0.00	0.0%	0.00	0.00	0.0%
9:30 AM	165,350.25	41337.56	0.4%	0.00	0.00	0.0%	0.00	0.00	0.0%
9:45 AM	143,946.50	35986.62	0.3%	0.00	0.00	0.0%	0.00	0.00	0.0%
10:00 AM	129,270.27	32317.57	0.3%	0.00	0.00	0.0%	0.00	0.00	0.0%
10:15 AM	117,402.32	29350.58	0.3%	0.00	0.00	0.0%	0.00	0.00	0.0%
10:30 AM	106,508.67	26627.17	0.2%	0.00	0.00	0.0%	0.00	0.00	0.0%
10:45 AM	97,545.98	24386.50	0.2%	0.00	0.00	0.0%	0.00	0.00	0.0%
11:00 AM	90,060.18	22515.04	0.2%	0.00	0.00	0.0%	0.00	0.00	0.0%
11:15 AM	84,183.51	21045.88	0.2%	0.00	0.00	0.0%	0.00	0.00	0.0%
11:30 AM	78,536.10	19634.02	0.2%	0.00	0.00	0.0%	0.00	0.00	0.0%
11:45 AM	74,308.25	18577.06	0.2%	0.00	0.00	0.0%	0.00	0.00	0.0%
12:00 PM	70,146.53	17536.63	0.2%	0.00	0.00	0.0%	0.00	0.00	0.0%
12:15 PM	66,976.75	16744.19	0.1%	0.00	0.00	0.0%	0.00	0.00	0.0%
12:30 PM	66,306.64	16576.66	0.1%	0.00	0.00	0.0%	0.00	0.00	0.0%
12:45 PM	67,695.35	16923.84	0.2%	0.00	0.00	0.0%	0.00	0.00	0.0%
1:00 PM	69,375.03	17343.76	0.2%	0.00	0.00	0.0%	0.00	0.00	0.0%
1:15 PM	71,909.97	17977.49	0.2%	0.00	0.00	0.0%	0.00	0.00	0.0%
1:30 PM	74,612.44	18653.11	0.2%	0.00	0.00	0.0%	0.00	0.00	0.0%
1:45 PM	78,148.14	19537.04	0.2%	0.00	0.00	0.0%	0.00	0.00	0.0%
2:00 PM	81,683.84	20420.96	0.2%	0.00	0.00	0.0%	0.00	0.00	0.0%
2:15 PM	86,502.44	21625.61	0.2%	0.00	0.00	0.0%	0.00	0.00	0.0%
2:30 PM	91,052.11	22763.03	0.2%	0.00	0.00	0.0%	0.00	0.00	0.0%
2:45 PM	96,532.00	24133.00	0.2%	0.00	0.00	0.0%	0.00	0.00	0.0%
3:00 PM	102,011.89	25502.97	0.2%	0.00	0.00	0.0%	0.00	0.00	0.0%
3:15 PM	108,840.81	27210.20	0.2%	0.00	0.00	0.0%	0.00	0.00	0.0%
3:30 PM	116,000.38	29000.10	0.3%	0.00	0.00	0.0%	0.00	0.00	0.0%
3:45 PM	126,528.12	31632.03	0.3%	0.00	0.00	0.0%	0.00	0.00	0.0%
4:00 PM	137,858.22	34464.56	0.3%	0.00	0.00	0.0%	0.00	0.00	0.0%
4:15 PM	151,621.87	37905.47	0.3%	0.00	0.00	0.0%	0.00	0.00	0.0%
4:30 PM	168,286.38	42071.59	0.4%	0.00	0.00	0.0%	0.00	0.00	0.0%
4:45 PM	190,752.60	47688.15	0.4%	0.00	0.00	0.0%	0.00	0.00	0.0%
5:00 PM	221,013.24	55253.31	0.5%	0.00	0.00	0.0%	0.00	0.00	0.0%
5:15 PM	265,478.38	66369.59	0.6%	0.00	0.00	0.0%	0.00	0.00	0.0%
5:30 PM	330,024.69	89106.67	0.7%	0.00	0.00	0.0%	0.00	0.00	0.0%
5:47 PM	477,117.63	66796.47	1.1%	0.00	0.00	0.0%	0.00	0.00	0.0%

OCTOBER 11

Analysis Hours: 8:16 AM-5:37 PM (PDT)

MARCH 1 SIMILAR

Analysis Time	CURRENT SHADOW (PARTIAL AREA)			NEW SHADOW FROM CPHP			NOT USED		
	Area (sf)	Area/Time (sfh)	Coverage	Area (sf)	Area/Time (sfh)	Coverage	Area (sf)	Area/Time (sfh)	Coverage
8:16 AM	817,316.08	98077.93	1.8%	0.00	0.00	0.0%	0.00	0.00	0.0%
8:30 AM	553,170.39	132760.89	1.2%	0.00	0.00	0.0%	0.00	0.00	0.0%
8:45 AM	390,329.93	97582.48	0.9%	0.00	0.00	0.0%	0.00	0.00	0.0%
9:00 AM	292,146.00	73036.50	0.7%	0.00	0.00	0.0%	0.00	0.00	0.0%
9:15 AM	227,392.48	56848.12	0.5%	0.00	0.00	0.0%	0.00	0.00	0.0%
9:30 AM	183,341.75	45835.44	0.4%	0.00	0.00	0.0%	0.00	0.00	0.0%
9:45 AM	156,396.38	39099.10	0.3%	0.00	0.00	0.0%	0.00	0.00	0.0%
10:00 AM	137,946.39	34486.60	0.3%	0.00	0.00	0.0%	0.00	0.00	0.0%
10:15 AM	124,764.68	31191.17	0.3%	0.00	0.00	0.0%	0.00	0.00	0.0%
10:30 AM	112,909.95	28227.49	0.3%	0.00	0.00	0.0%	0.00	0.00	0.0%
10:45 AM	103,700.39	25925.10	0.2%	0.00	0.00	0.0%	0.00	0.00	0.0%
11:00 AM	96,029.42	24007.36	0.2%	0.00	0.00	0.0%	0.00	0.00	0.0%
11:15 AM	89,879.43	22469.86	0.2%	0.00	0.00	0.0%	0.00	0.00	0.0%
11:30 AM	84,187.92	21046.98	0.2%	0.00	0.00	0.0%	0.00	0.00	0.0%
11:45 AM	79,563.30	19890.83	0.2%	0.00	0.00	0.0%	0.00	0.00	0.0%
12:00 PM	75,150.29	18787.57	0.2%	0.00	0.00	0.0%	0.00	0.00	0.0%
12:15 PM	72,509.54	18127.39	0.2%	0.00	0.00	0.0%	0.00	0.00	0.0%
12:30 PM	72,222.98	18055.75	0.2%	0.00	0.00	0.0%	0.00	0.00	0.0%
12:45 PM	73,849.76	18462.44	0.2%	0.00	0.00	0.0%	0.00	0.00	0.0%
1:00 PM	75,943.84	18985.96	0.2%	0.00	0.00	0.0%	0.00	0.00	0.0%
1:15 PM	78,456.74	19614.19	0.2%	0.00	0.00	0.0%	0.00	0.00	0.0%
1:30 PM	81,335.56	20333.89	0.2%	0.00	0.00	0.0%	0.00	0.00	0.0%
1:45 PM	85,038.78	21259.70	0.2%	0.00	0.00	0.0%	0.00	0.00	0.0%
2:00 PM	88,830.18	22207.54	0.2%	0.00	0.00	0.0%	0.00	0.00	0.0%
2:15 PM	93,926.52	23481.63	0.2%	0.00	0.00	0.0%	0.00	0.00	0.0%
2:30 PM	98,917.06	24729.26	0.2%	0.00	0.00	0.0%	0.00	0.00	0.0%
2:45 PM	104,952.43	26238.11	0.2%	0.00	0.00	0.0%	0.00	0.00	0.0%
3:00 PM	111,208.23	27802.06	0.2%	0.00	0.00	0.0%	0.00	0.00	0.0%
3:15 PM	118,799.84	29699.96	0.3%	0.00	0.00	0.0%	0.00	0.00	0.0%
3:30 PM	126,682.42	31670.60	0.3%	0.00	0.00	0.0%	0.00	0.00	0.0%
3:45 PM	137,831.77	34457.94	0.3%	0.00	0.00	0.0%	0.00	0.00	0.0%
4:00 PM	150,528.54	37632.13	0.3%	0.00	0.00	0.0%	0.00	0.00	0.0%
4:15 PM	167,056.38	41764.09	0.4%	0.00	0.00	0.0%	0.00	0.00	0.0%
4:30 PM	188,517.44	47129.36	0.4%	0.00	0.00	0.0%	0.00	0.00	0.0%
4:45 PM	217,261.52	54315.38	0.5%	0.00	0.00	0.0%	0.00	0.00	0.0%
5:00 PM	257,944.08	64486.02	0.6%	0.00	0.00	0.0%	0.00	0.00	0.0%
5:15 PM	318,209.64	79552.41	0.7%	0.00	0.00	0.0%	0.00	0.00	0.0%
5:30 PM	420,114.43	79821.74	0.9%	0.00	0.00	0.0%	0.00	0.00	0.0%
5:37 PM	495,188.49	29711.31	1.1%	0.00	0.00	0.0%	0.00	0.00	0.0%

GOLDEN GATE PARK

Quantitative Shading Calculations for CPHP

OCTOBER 18

Analysis Hours: 8:22 AM-5:27 PM (PDT)

FEBRUARY 22 SIMILAR

Analysis Time	CURRENT SHADOW (PARTIAL AREA)			NEW SHADOW FROM CPHP			NOT USED		
	Area (sf)	Area/Time (sfh)	Coverage	Area (sf)	Area/Time (sfh)	Coverage	Area (sf)	Area/Time (sfh)	Coverage
8:22 AM	902,454.96	54147.30	2.0%	4,192.58	251.55	0.0%	0.00	0.00	0.0%
8:30 AM	738,344.82	132902.07	1.7%	0.00	0.00	0.0%	0.00	0.00	0.0%
8:45 AM	508,863.96	127215.99	1.1%	0.00	0.00	0.0%	0.00	0.00	0.0%
9:00 AM	358,129.52	89532.38	0.8%	0.00	0.00	0.0%	0.00	0.00	0.0%
9:15 AM	277,381.60	69345.40	0.6%	0.00	0.00	0.0%	0.00	0.00	0.0%
9:30 AM	214,748.61	53687.15	0.5%	0.00	0.00	0.0%	0.00	0.00	0.0%
9:45 AM	174,996.27	43749.07	0.4%	0.00	0.00	0.0%	0.00	0.00	0.0%
10:00 AM	149,801.12	37450.28	0.3%	0.00	0.00	0.0%	0.00	0.00	0.0%
10:15 AM	133,850.80	33462.70	0.3%	0.00	0.00	0.0%	0.00	0.00	0.0%
10:30 AM	120,695.54	30173.89	0.3%	0.00	0.00	0.0%	0.00	0.00	0.0%
10:45 AM	111,371.35	27842.84	0.2%	0.00	0.00	0.0%	0.00	0.00	0.0%
11:00 AM	103,127.27	25781.82	0.2%	0.00	0.00	0.0%	0.00	0.00	0.0%
11:15 AM	96,435.01	24108.75	0.2%	0.00	0.00	0.0%	0.00	0.00	0.0%
11:30 AM	90,514.26	22628.57	0.2%	0.00	0.00	0.0%	0.00	0.00	0.0%
11:45 AM	85,559.00	21389.75	0.2%	0.00	0.00	0.0%	0.00	0.00	0.0%
12:00 PM	80,687.49	20171.87	0.2%	0.00	0.00	0.0%	0.00	0.00	0.0%
12:15 PM	78,760.94	19690.23	0.2%	0.00	0.00	0.0%	0.00	0.00	0.0%
12:30 PM	78,805.02	19701.26	0.2%	0.00	0.00	0.0%	0.00	0.00	0.0%
12:45 PM	80,471.47	20117.87	0.2%	0.00	0.00	0.0%	0.00	0.00	0.0%
1:00 PM	82,711.04	20677.76	0.2%	0.00	0.00	0.0%	0.00	0.00	0.0%
1:15 PM	85,259.21	21314.80	0.2%	0.00	0.00	0.0%	0.00	0.00	0.0%
1:30 PM	88,358.46	22089.61	0.2%	0.00	0.00	0.0%	0.00	0.00	0.0%
1:45 PM	92,343.83	23085.96	0.2%	0.00	0.00	0.0%	0.00	0.00	0.0%
2:00 PM	96,435.01	24108.75	0.2%	0.00	0.00	0.0%	0.00	0.00	0.0%
2:15 PM	102,166.19	25541.55	0.2%	0.00	0.00	0.0%	0.00	0.00	0.0%
2:30 PM	107,421.25	26855.31	0.2%	0.00	0.00	0.0%	0.00	0.00	0.0%
2:45 PM	113,884.25	28471.06	0.3%	0.00	0.00	0.0%	0.00	0.00	0.0%
3:00 PM	120,832.21	30208.05	0.3%	0.00	0.00	0.0%	0.00	0.00	0.0%
3:15 PM	129,495.11	32373.78	0.3%	0.00	0.00	0.0%	0.00	0.00	0.0%
3:30 PM	138,422.52	34605.63	0.3%	0.00	0.00	0.0%	0.00	0.00	0.0%
3:45 PM	150,634.34	37658.59	0.3%	0.00	0.00	0.0%	0.00	0.00	0.0%
4:00 PM	166,240.79	41560.20	0.4%	0.00	0.00	0.0%	0.00	0.00	0.0%
4:15 PM	187,141.96	46785.49	0.4%	0.00	0.00	0.0%	0.00	0.00	0.0%
4:30 PM	213,523.02	53380.76	0.5%	0.00	0.00	0.0%	0.00	0.00	0.0%
4:45 PM	256,048.38	64012.10	0.6%	0.00	0.00	0.0%	0.00	0.00	0.0%
5:00 PM	306,491.58	76622.90	0.7%	0.00	0.00	0.0%	0.00	0.00	0.0%
5:15 PM	389,531.97	85697.03	0.9%	0.00	0.00	0.0%	0.00	0.00	0.0%
5:27 PM	519,550.41	51955.04	1.2%	0.00	0.00	0.0%	0.00	0.00	0.0%

GOLDEN GATE PARK

OCTOBER 25

Analysis Hours: 7:30 AM-4:18 PM (PST)

FEBRUARY 15 SIMILAR

Analysis Time	CURRENT SHADOW (PARTIAL AREA)			NEW SHADOW FROM CPHP			NOT USED		
	Area (sf)	Area/Time (sfh)	Coverage	Area (sf)	Area/Time (sfh)	Coverage	Area (sf)	Area/Time (sfh)	Coverage
7:30 AM	997,760.08	129708.81	2.2%	77,322.44	10051.92	0.2%	0.00	0.00	0.0%
7:45 AM	666,211.31	166552.83	1.5%	0.00	0.00	0.0%	0.00	0.00	0.0%
8:00 AM	463,530.33	115882.58	1.0%	0.00	0.00	0.0%	0.00	0.00	0.0%
8:15 AM	345,106.51	86276.63	0.8%	0.00	0.00	0.0%	0.00	0.00	0.0%
8:30 AM	266,875.90	66718.98	0.6%	0.00	0.00	0.0%	0.00	0.00	0.0%
8:45 AM	210,613.35	52653.34	0.5%	0.00	0.00	0.0%	0.00	0.00	0.0%
9:00 AM	170,331.97	42582.99	0.4%	0.00	0.00	0.0%	0.00	0.00	0.0%
9:15 AM	147,627.68	36906.92	0.3%	0.00	0.00	0.0%	0.00	0.00	0.0%
9:30 AM	130,866.18	32716.55	0.3%	0.00	0.00	0.0%	0.00	0.00	0.0%
9:45 AM	120,598.55	30149.64	0.3%	0.00	0.00	0.0%	0.00	0.00	0.0%
10:00 AM	111,071.57	27767.89	0.2%	0.00	0.00	0.0%	0.00	0.00	0.0%
10:15 AM	104,132.43	26033.11	0.2%	0.00	0.00	0.0%	0.00	0.00	0.0%
10:30 AM	97,444.58	24361.15	0.2%	0.00	0.00	0.0%	0.00	0.00	0.0%
10:45 AM	92,414.37	23103.59	0.2%	0.00	0.00	0.0%	0.00	0.00	0.0%
11:00 AM	87,415.02	21853.75	0.2%	0.00	0.00	0.0%	0.00	0.00	0.0%
11:15 AM	85,951.36	21487.84	0.2%	0.00	0.00	0.0%	0.00	0.00	0.0%
11:30 AM	86,180.61	21545.15	0.2%	0.00	0.00	0.0%	0.00	0.00	0.0%
11:45 AM	87,992.54	21998.14	0.2%	0.00	0.00	0.0%	0.00	0.00	0.0%
12:00 PM	90,073.40	22518.35	0.2%	0.00	0.00	0.0%	0.00	0.00	0.0%
12:15 PM	93,000.71	23250.18	0.2%	0.00	0.00	0.0%	0.00	0.00	0.0%
12:30 PM	96,254.26	24063.57	0.2%	0.00	0.00	0.0%	0.00	0.00	0.0%
12:45 PM	100,720.17	25180.04	0.2%	0.00	0.00	0.0%	0.00	0.00	0.0%
1:00 PM	104,996.52	26249.13	0.2%	0.00	0.00	0.0%	0.00	0.00	0.0%
1:15 PM	111,102.43	27775.61	0.2%	0.00	0.00	0.0%	0.00	0.00	0.0%
1:30 PM	116,767.48	29191.87	0.3%	0.00	0.00	0.0%	0.00	0.00	0.0%
1:45 PM	124,195.97	31048.99	0.3%	0.00	0.00	0.0%	0.00	0.00	0.0%
2:00 PM	131,897.79	32974.45	0.3%	0.00	0.00	0.0%	0.00	0.00	0.0%
2:15 PM	142,275.64	35568.91	0.3%	0.00	0.00	0.0%	0.00	0.00	0.0%
2:30 PM	152,494.77	38123.69	0.3%	0.00	0.00	0.0%	0.00	0.00	0.0%
2:45 PM	166,421.54	41605.39	0.4%	0.00	0.00	0.0%	0.00	0.00	0.0%
3:00 PM	185,510.78	46377.69	0.4%	0.00	0.00	0.0%	0.00	0.00	0.0%
3:15 PM	212,667.76	53166.94	0.5%	0.00	0.00	0.0%	0.00	0.00	0.0%
3:30 PM	250,286.34	62571.59	0.6%	0.00	0.00	0.0%	0.00	0.00	0.0%
3:45 PM	302,078.57	75519.64	0.7%	0.00	0.00	0.0%	0.00	0.00	0.0%
4:00 PM	379,718.43	94929.61	0.8%	0.00	0.00	0.0%	0.00	0.00	0.0%
4:15 PM	519,995.68	77999.35	1.2%	0.00	0.00	0.0%	0.00	0.00	0.0%
4:18 PM	557,252.76	16717.58	1.2%	0.00	0.00	0.0%	0.00	0.00	0.0%

NOVEMBER 1

Analysis Hours: 7:36 AM-4:10 PM (PST)

FEBRUARY 8 SIMILAR

Analysis Time	CURRENT SHADOW (PARTIAL AREA)			NEW SHADOW FROM CPHP			NOT USED		
	Area (sf)	Area/Time (sfh)	Coverage	Area (sf)	Area/Time (sfh)	Coverage	Area (sf)	Area/Time (sfh)	Coverage
7:36 AM	1,103,619.39	77253.36	2.5%	147,070.90	10294.96	0.3%	0.00	0.00	0.0%
7:45 AM	872,961.43	165862.67	2.0%	67,279.65	12783.13	0.2%	0.00	0.00	0.0%
8:00 AM	605,985.42	151496.36	1.4%	454.09	113.52	0.0%	0.00	0.00	0.0%
8:15 AM	443,440.34	110860.08	1.0%	0.00	0.00	0.0%	0.00	0.00	0.0%
8:30 AM	331,351.68	82837.92	0.7%	0.00	0.00	0.0%	0.00	0.00	0.0%
8:45 AM	263,754.61	65938.65	0.6%	0.00	0.00	0.0%	0.00	0.00	0.0%
9:00 AM	209,021.84	52255.46	0.5%	0.00	0.00	0.0%	0.00	0.00	0.0%
9:15 AM	168,855.09	42213.77	0.4%	0.00	0.00	0.0%	0.00	0.00	0.0%
9:30 AM	146,640.15	36660.04	0.3%	0.00	0.00	0.0%	0.00	0.00	0.0%
9:45 AM	131,968.33	32992.08	0.3%	0.00	0.00	0.0%	0.00	0.00	0.0%
10:00 AM	120,647.05	30161.76	0.3%	0.00	0.00	0.0%	0.00	0.00	0.0%
10:15 AM	112,442.64	28110.66	0.3%	0.00	0.00	0.0%	0.00	0.00	0.0%
10:30 AM	105,318.34	26329.59	0.2%	0.00	0.00	0.0%	0.00	0.00	0.0%
10:45 AM	99,856.09	24964.02	0.2%	0.00	0.00	0.0%	0.00	0.00	0.0%
11:00 AM	94,764.15	23691.04	0.2%	0.00	0.00	0.0%	0.00	0.00	0.0%
11:15 AM	93,736.95	23434.24	0.2%	0.00	0.00	0.0%	0.00	0.00	0.0%
11:30 AM	93,833.94	23458.48	0.2%	0.00	0.00	0.0%	0.00	0.00	0.0%
11:45 AM	95,720.82	23930.21	0.2%	0.00	0.00	0.0%	0.00	0.00	0.0%
12:00 PM	98,039.74	24509.94	0.2%	0.00	0.00	0.0%	0.00	0.00	0.0%
12:15 PM	101,205.12	25301.28	0.2%	0.00	0.00	0.0%	0.00	0.00	0.0%
12:30 PM	104,683.50	26170.88	0.2%	0.00	0.00	0.0%	0.00	0.00	0.0%
12:45 PM	109,510.92	27377.73	0.2%	0.00	0.00	0.0%	0.00	0.00	0.0%
1:00 PM	114,073.82	28518.46	0.3%	0.00	0.00	0.0%	0.00	0.00	0.0%
1:15 PM	120,448.66	30112.16	0.3%	0.00	0.00	0.0%	0.00	0.00	0.0%
1:30 PM	126,660.38	31665.09	0.3%	0.00	0.00	0.0%	0.00	0.00	0.0%
1:45 PM	135,142.52	33785.63	0.3%	0.00	0.00	0.0%	0.00	0.00	0.0%
2:00 PM	143,774.56	35943.64	0.3%	0.00	0.00	0.0%	0.00	0.00	0.0%
2:15 PM	155,726.28	38931.57	0.3%	0.00	0.00	0.0%	0.00	0.00	0.0%
2:30 PM	169,057.88	42264.47	0.4%	0.00	0.00	0.0%	0.00	0.00	0.0%
2:45 PM	186,440.99	46610.25	0.4%	0.00	0.00	0.0%	0.00	0.00	0.0%
3:00 PM	209,784.53	52446.13	0.5%	0.00	0.00	0.0%	0.00	0.00	0.0%
3:15 PM	247,473.65	61868.41	0.6%	0.00	0.00	0.0%	0.00	0.00	0.0%
3:30 PM	294,328.26	73582.06	0.7%	0.00	0.00	0.0%	0.00	0.00	0.0%
3:45 PM	363,503.60	90875.90	0.8%	0.00	0.00	0.0%	0.00	0.00	0.0%
4:00 PM	481,464.51	101107.55	1.1%	0.00	0.00	0.0%	0.00	0.00	0.0%
4:10 PM	614,410.26	55296.92	1.4%	0.00	0.00	0.0%	0.00	0.00	0.0%

NOVEMBER 8

Analysis Hours: 7:43 AM-4:03 PM (PST)

FEBRUARY 1 SIMILAR

Analysis Time	CURRENT SHADOW (PARTIAL AREA)			NEW SHADOW FROM CPHP			NOT USED		
	Area (sf)	Area/Time (sfh)	Coverage	Area (sf)	Area/Time (sfh)	Coverage	Area (sf)	Area/Time (sfh)	Coverage
7:43 AM	1,198,637.94	11986.38	2.7%	208,046.25	2080.46	0.5%	0.00	0.00	0.0%
7:45 AM	1,160,018.61	150802.42	2.6%	199,048.30	25876.28	0.4%	0.00	0.00	0.0%
8:00 AM	784,176.63	196044.16	1.8%	53,048.69	13262.17	0.1%	0.00	0.00	0.0%
8:15 AM	569,292.64	142323.16	1.3%	1,719.35	429.84	0.0%	0.00	0.00	0.0%
8:30 AM	426,696.47	106674.12	1.0%	0.00	0.00	0.0%	0.00	0.00	0.0%
8:45 AM	328,948.99	82237.25	0.7%	0.00	0.00	0.0%	0.00	0.00	0.0%
9:00 AM	262,599.56	65649.89	0.6%	0.00	0.00	0.0%	0.00	0.00	0.0%
9:15 AM	211,887.43	52971.86	0.5%	0.00	0.00	0.0%	0.00	0.00	0.0%
9:30 AM	173,567.88	43391.97	0.4%	0.00	0.00	0.0%	0.00	0.00	0.0%
9:45 AM	150,140.58	37535.15	0.3%	0.00	0.00	0.0%	0.00	0.00	0.0%
10:00 AM	132,678.12	33169.53	0.3%	0.00	0.00	0.0%	0.00	0.00	0.0%
10:15 AM	123,627.26	30906.81	0.3%	0.00	0.00	0.0%	0.00	0.00	0.0%
10:30 AM	114,594.04	28648.51	0.3%	0.00	0.00	0.0%	0.00	0.00	0.0%
10:45 AM	108,280.92	27070.23	0.2%	0.00	0.00	0.0%	0.00	0.00	0.0%
11:00 AM	102,677.59	25669.40	0.2%	0.00	0.00	0.0%	0.00	0.00	0.0%
11:15 AM	101,531.36	25382.84	0.2%	0.00	0.00	0.0%	0.00	0.00	0.0%
11:30 AM	101,725.33	25431.33	0.2%	0.00	0.00	0.0%	0.00	0.00	0.0%
11:45 AM	103,709.20	25927.30	0.2%	0.00	0.00	0.0%	0.00	0.00	0.0%
12:00 PM	105,781.25	26445.31	0.2%	0.00	0.00	0.0%	0.00	0.00	0.0%
12:15 PM	109,277.27	27319.32	0.2%	0.00	0.00	0.0%	0.00	0.00	0.0%
12:30 PM	112,927.59	28231.90	0.3%	0.00	0.00	0.0%	0.00	0.00	0.0%
12:45 PM	118,306.08	29576.52	0.3%	0.00	0.00	0.0%	0.00	0.00	0.0%
1:00 PM	123,076.18	30769.05	0.3%	0.00	0.00	0.0%	0.00	0.00	0.0%
1:15 PM	129,918.33	32479.58	0.3%	0.00	0.00	0.0%	0.00	0.00	0.0%
1:30 PM	137,148.44	34287.11	0.3%	0.00	0.00	0.0%	0.00	0.00	0.0%
1:45 PM	146,353.59	36588.40	0.3%	0.00	0.00	0.0%	0.00	0.00	0.0%
2:00 PM	156,951.87	39237.97	0.4%	0.00	0.00	0.0%	0.00	0.00	0.0%
2:15 PM	172,699.39	43174.85	0.4%	0.00	0.00	0.0%	0.00	0.00	0.0%
2:30 PM	187,635.72	46908.93	0.4%	0.00	0.00	0.0%	0.00	0.00	0.0%
2:45 PM	210,661.84	52665.46	0.5%	0.00	0.00	0.0%	0.00	0.00	0.0%
3:00 PM	241,623.44	60405.86	0.5%	0.00	0.00	0.0%	0.00	0.00	0.0%
3:15 PM	288,433.96	72108.49	0.6%	0.00	0.00	0.0%	0.00	0.00	0.0%
3:30 PM	348,686.29	87171.57	0.8%	0.00	0.00	0.0%	0.00	0.00	0.0%
3:45 PM	448,832.06	112208.01	1.0%	0.00	0.00	0.0%	0.00	0.00	0.0%
4:00 PM	627,684.55	94152.68	1.4%	0.00	0.00	0.0%	0.00	0.00	0.0%
4:03 PM	676,703.78	20301.11	1.5%	0.00	0.00	0.0%	0.00	0.00	0.0%

GOLDEN GATE PARK

NOVEMBER 15

Analysis Hours: 7:51 AM-3:57 PM (PST)

JANUARY 25 SIMILAR

Analysis Time	CURRENT SHADOW (PARTIAL AREA)			NEW SHADOW FROM CPHP			NOT USED		
	Area (sf)	Area/Time (sfh)	Coverage	Area (sf)	Area/Time (sfh)	Coverage	Area (sf)	Area/Time (sfh)	Coverage
7:51 AM	1,322,740.04	105819.20	3.0%	241,732.36	19338.59	0.5%	0.00	0.00	0.0%
8:00 AM	1,019,547.38	203909.48	2.3%	168,346.80	33669.36	0.4%	0.00	0.00	0.0%
8:15 AM	719,775.80	179943.95	1.6%	26,425.15	6606.29	0.1%	0.00	0.00	0.0%
8:30 AM	532,930.51	133232.63	1.2%	3,566.56	891.64	0.0%	0.00	0.00	0.0%
8:45 AM	414,286.26	103571.57	0.9%	0.00	0.00	0.0%	0.00	0.00	0.0%
9:00 AM	319,814.37	79953.59	0.7%	0.00	0.00	0.0%	0.00	0.00	0.0%
9:15 AM	267,426.98	66856.74	0.6%	0.00	0.00	0.0%	0.00	0.00	0.0%
9:30 AM	215,489.26	53872.31	0.5%	0.00	0.00	0.0%	0.00	0.00	0.0%
9:45 AM	179,281.43	44820.36	0.4%	0.00	0.00	0.0%	0.00	0.00	0.0%
10:00 AM	153,178.11	38294.53	0.3%	0.00	0.00	0.0%	0.00	0.00	0.0%
10:15 AM	137,531.98	34383.00	0.3%	0.00	0.00	0.0%	0.00	0.00	0.0%
10:30 AM	125,809.52	31452.38	0.3%	0.00	0.00	0.0%	0.00	0.00	0.0%
10:45 AM	118,632.32	29658.08	0.3%	0.00	0.00	0.0%	0.00	0.00	0.0%
11:00 AM	111,909.20	27977.30	0.3%	0.00	0.00	0.0%	0.00	0.00	0.0%
11:15 AM	109,947.37	27486.84	0.2%	0.00	0.00	0.0%	0.00	0.00	0.0%
11:30 AM	109,471.24	27367.81	0.2%	0.00	0.00	0.0%	0.00	0.00	0.0%
11:45 AM	111,358.13	27839.53	0.2%	0.00	0.00	0.0%	0.00	0.00	0.0%
12:00 PM	113,747.59	28436.90	0.3%	0.00	0.00	0.0%	0.00	0.00	0.0%
12:15 PM	117,195.11	29298.78	0.3%	0.00	0.00	0.0%	0.00	0.00	0.0%
12:30 PM	120,933.60	30233.40	0.3%	0.00	0.00	0.0%	0.00	0.00	0.0%
12:45 PM	126,585.43	31646.36	0.3%	0.00	0.00	0.0%	0.00	0.00	0.0%
1:00 PM	131,796.40	32949.10	0.3%	0.00	0.00	0.0%	0.00	0.00	0.0%
1:15 PM	139,291.02	34822.75	0.3%	0.00	0.00	0.0%	0.00	0.00	0.0%
1:30 PM	147,905.42	36976.36	0.3%	0.00	0.00	0.0%	0.00	0.00	0.0%
1:45 PM	159,667.57	39916.89	0.4%	0.00	0.00	0.0%	0.00	0.00	0.0%
2:00 PM	172,602.40	43150.60	0.4%	0.00	0.00	0.0%	0.00	0.00	0.0%
2:15 PM	189,218.41	47304.60	0.4%	0.00	0.00	0.0%	0.00	0.00	0.0%
2:30 PM	209,136.47	52284.12	0.5%	0.00	0.00	0.0%	0.00	0.00	0.0%
2:45 PM	239,463.23	59865.81	0.5%	0.00	0.00	0.0%	0.00	0.00	0.0%
3:00 PM	278,757.08	69689.27	0.6%	0.00	0.00	0.0%	0.00	0.00	0.0%
3:15 PM	333,168.02	83292.01	0.7%	0.00	0.00	0.0%	0.00	0.00	0.0%
3:30 PM	417,059.27	104264.82	0.9%	0.00	0.00	0.0%	0.00	0.00	0.0%
3:45 PM	561,683.40	129187.18	1.3%	0.00	0.00	0.0%	0.00	0.00	0.0%
3:57 PM	746,249.44	82087.44	1.7%	0.00	0.00	0.0%	0.00	0.00	0.0%

NOVEMBER 22

Analysis Hours: 7:57 AM-3:54 PM (PST)

JANUARY 18 SIMILAR

Analysis Time	CURRENT SHADOW (PARTIAL AREA)			NEW SHADOW FROM CPHP			NOT USED		
	Area (sf)	Area/Time (sfh)	Coverage	Area (sf)	Area/Time (sfh)	Coverage	Area (sf)	Area/Time (sfh)	Coverage
7:57 AM	1,453,688.69	29073.77	3.2%	249,279.88	4985.60	0.6%	0.00	0.00	0.0%
8:00 AM	1,355,989.70	203398.45	3.0%	238,760.96	35814.14	0.5%	0.00	0.00	0.0%
8:15 AM	909,235.39	227308.85	2.0%	107,353.82	26838.46	0.2%	0.00	0.00	0.0%
8:30 AM	660,017.23	165004.31	1.5%	24,370.74	6092.69	0.1%	0.00	0.00	0.0%
8:45 AM	507,999.88	126999.97	1.1%	7,080.21	1770.05	0.0%	0.00	0.00	0.0%
9:00 AM	392,243.26	98060.82	0.9%	0.00	0.00	0.0%	0.00	0.00	0.0%
9:15 AM	317,909.86	79477.46	0.7%	0.00	0.00	0.0%	0.00	0.00	0.0%
9:30 AM	266,703.97	66675.99	0.6%	0.00	0.00	0.0%	0.00	0.00	0.0%
9:45 AM	219,598.08	54899.52	0.5%	0.00	0.00	0.0%	0.00	0.00	0.0%
10:00 AM	182,133.79	45533.45	0.4%	0.00	0.00	0.0%	0.00	0.00	0.0%
10:15 AM	159,835.09	39958.77	0.4%	0.00	0.00	0.0%	0.00	0.00	0.0%
10:30 AM	141,107.36	35276.84	0.3%	0.00	0.00	0.0%	0.00	0.00	0.0%
10:45 AM	129,733.17	32433.29	0.3%	0.00	0.00	0.0%	0.00	0.00	0.0%
11:00 AM	121,343.60	30335.90	0.3%	0.00	0.00	0.0%	0.00	0.00	0.0%
11:15 AM	119,227.48	29806.87	0.3%	0.00	0.00	0.0%	0.00	0.00	0.0%
11:30 AM	118,213.50	29553.37	0.3%	0.00	0.00	0.0%	0.00	0.00	0.0%
11:45 AM	119,910.81	29977.70	0.3%	0.00	0.00	0.0%	0.00	0.00	0.0%
12:00 PM	122,040.16	30510.04	0.3%	0.00	0.00	0.0%	0.00	0.00	0.0%
12:15 PM	125,716.94	31429.23	0.3%	0.00	0.00	0.0%	0.00	0.00	0.0%
12:30 PM	129,693.49	32423.37	0.3%	0.00	0.00	0.0%	0.00	0.00	0.0%
12:45 PM	135,684.78	33921.20	0.3%	0.00	0.00	0.0%	0.00	0.00	0.0%
1:00 PM	141,080.91	35270.23	0.3%	0.00	0.00	0.0%	0.00	0.00	0.0%
1:15 PM	150,409.50	37602.38	0.3%	0.00	0.00	0.0%	0.00	0.00	0.0%
1:30 PM	159,583.80	39895.95	0.4%	0.00	0.00	0.0%	0.00	0.00	0.0%
1:45 PM	174,621.54	43655.38	0.4%	0.00	0.00	0.0%	0.00	0.00	0.0%
2:00 PM	187,543.14	46885.79	0.4%	0.00	0.00	0.0%	0.00	0.00	0.0%
2:15 PM	208,038.73	52009.68	0.5%	0.00	0.00	0.0%	0.00	0.00	0.0%
2:30 PM	232,369.79	58092.45	0.5%	0.00	0.00	0.0%	0.00	0.00	0.0%
2:45 PM	268,030.96	67007.74	0.6%	0.00	0.00	0.0%	0.00	0.00	0.0%
3:00 PM	312,169.86	78042.47	0.7%	0.00	0.00	0.0%	0.00	0.00	0.0%
3:15 PM	384,365.10	96091.27	0.9%	0.00	0.00	0.0%	0.00	0.00	0.0%
3:30 PM	491,626.34	122906.58	1.1%	0.00	0.00	0.0%	0.00	0.00	0.0%
3:45 PM	666,268.62	133253.72	1.5%	0.00	0.00	0.0%	0.00	0.00	0.0%
3:54 PM	818,850.27	65508.02	1.8%	0.00	0.00	0.0%	0.00	0.00	0.0%

GOLDEN GATE PARK

NOVEMBER 29

Analysis Hours: 8:04 AM-3:51 PM (PST)

JANUARY 11 SIMILAR

Analysis Time	CURRENT SHADOW (PARTIAL AREA)			NEW SHADOW FROM CPHP			NOT USED		
	Area (sf)	Area/Time (sfh)	Coverage	Area (sf)	Area/Time (sfh)	Coverage	Area (sf)	Area/Time (sfh)	Coverage
8:04 AM	1,574,801.75	141732.16	3.5%	244,778.70	22030.08	0.5%	0.00	0.00	0.0%
8:15 AM	1,132,403.14	237804.66	2.5%	181,929.70	38205.24	0.4%	0.00	0.00	0.0%
8:30 AM	801,414.26	200353.56	1.8%	73,372.33	18343.08	0.2%	0.00	0.00	0.0%
8:45 AM	606,726.07	151681.52	1.4%	25,737.41	6434.35	0.1%	0.00	0.00	0.0%
9:00 AM	468,062.37	117015.59	1.0%	5,859.03	1464.76	0.0%	0.00	0.00	0.0%
9:15 AM	375,711.01	93927.75	0.8%	0.00	0.00	0.0%	0.00	0.00	0.0%
9:30 AM	307,999.32	76999.83	0.7%	0.00	0.00	0.0%	0.00	0.00	0.0%
9:45 AM	265,227.09	66306.77	0.6%	0.00	0.00	0.0%	0.00	0.00	0.0%
10:00 AM	216,357.75	54089.44	0.5%	0.00	0.00	0.0%	0.00	0.00	0.0%
10:15 AM	187,560.78	46890.19	0.4%	0.00	0.00	0.0%	0.00	0.00	0.0%
10:30 AM	161,995.31	40498.83	0.4%	0.00	0.00	0.0%	0.00	0.00	0.0%
10:45 AM	147,098.65	36774.66	0.3%	0.00	0.00	0.0%	0.00	0.00	0.0%
11:00 AM	133,802.31	33450.58	0.3%	0.00	0.00	0.0%	0.00	0.00	0.0%
11:15 AM	128,485.54	32121.38	0.3%	0.00	0.00	0.0%	0.00	0.00	0.0%
11:30 AM	126,532.53	31633.13	0.3%	0.00	0.00	0.0%	0.00	0.00	0.0%
11:45 AM	127,440.70	31860.17	0.3%	0.00	0.00	0.0%	0.00	0.00	0.0%
12:00 PM	128,983.71	32245.93	0.3%	0.00	0.00	0.0%	0.00	0.00	0.0%
12:15 PM	133,021.99	33255.50	0.3%	0.00	0.00	0.0%	0.00	0.00	0.0%
12:30 PM	136,685.53	34171.38	0.3%	0.00	0.00	0.0%	0.00	0.00	0.0%
12:45 PM	144,127.25	36031.81	0.3%	0.00	0.00	0.0%	0.00	0.00	0.0%
1:00 PM	150,061.23	37515.31	0.3%	0.00	0.00	0.0%	0.00	0.00	0.0%
1:15 PM	160,597.78	40149.44	0.4%	0.00	0.00	0.0%	0.00	0.00	0.0%
1:30 PM	171,143.15	42785.79	0.4%	0.00	0.00	0.0%	0.00	0.00	0.0%
1:45 PM	187,754.76	46938.69	0.4%	0.00	0.00	0.0%	0.00	0.00	0.0%
2:00 PM	201,368.51	50342.13	0.5%	0.00	0.00	0.0%	0.00	0.00	0.0%
2:15 PM	226,118.39	56529.60	0.5%	0.00	0.00	0.0%	0.00	0.00	0.0%
2:30 PM	253,583.97	63395.99	0.6%	0.00	0.00	0.0%	0.00	0.00	0.0%
2:45 PM	295,390.73	73847.68	0.7%	0.00	0.00	0.0%	0.00	0.00	0.0%
3:00 PM	347,231.46	86807.86	0.8%	0.00	0.00	0.0%	0.00	0.00	0.0%
3:15 PM	434,940.56	108735.14	1.0%	0.00	0.00	0.0%	0.00	0.00	0.0%
3:30 PM	550,948.46	137737.11	1.2%	0.00	0.00	0.0%	0.00	0.00	0.0%
3:45 PM	753,038.69	135546.96	1.7%	0.00	0.00	0.0%	0.00	0.00	0.0%
3:51 PM	881,703.68	44085.18	2.0%	0.00	0.00	0.0%	0.00	0.00	0.0%

DECEMBER 6

Analysis Hours: 8:10 AM-3:51 PM (PST)

JANUARY 4 SIMILAR

Analysis Time	CURRENT SHADOW (PARTIAL AREA)			NEW SHADOW FROM CPHP			NOT USED		
	Area (sf)	Area/Time (sfh)	Coverage	Area (sf)	Area/Time (sfh)	Coverage	Area (sf)	Area/Time (sfh)	Coverage
8:10 AM	1,670,296.44	66811.86	3.7%	252,114.61	10084.58	0.6%	0.00	0.00	0.0%
8:15 AM	1,433,717.73	243732.01	3.2%	230,984.19	39267.31	0.5%	0.00	0.00	0.0%
8:30 AM	953,885.69	238471.42	2.1%	112,794.03	28198.51	0.3%	0.00	0.00	0.0%
8:45 AM	710,601.50	177650.38	1.6%	43,728.90	10932.23	0.1%	0.00	0.00	0.0%
9:00 AM	545,437.71	136359.43	1.2%	25,609.56	6402.39	0.1%	0.00	0.00	0.0%
9:15 AM	433,684.11	108421.03	1.0%	4,095.59	1023.90	0.0%	0.00	0.00	0.0%
9:30 AM	352,120.59	88030.15	0.8%	0.00	0.00	0.0%	0.00	0.00	0.0%
9:45 AM	299,168.90	74792.22	0.7%	0.00	0.00	0.0%	0.00	0.00	0.0%
10:00 AM	251,556.02	62889.00	0.6%	0.00	0.00	0.0%	0.00	0.00	0.0%
10:15 AM	214,805.93	53701.48	0.5%	0.00	0.00	0.0%	0.00	0.00	0.0%
10:30 AM	184,408.63	46102.16	0.4%	0.00	0.00	0.0%	0.00	0.00	0.0%
10:45 AM	164,807.99	41202.00	0.4%	0.00	0.00	0.0%	0.00	0.00	0.0%
11:00 AM	149,148.65	37287.16	0.3%	0.00	0.00	0.0%	0.00	0.00	0.0%
11:15 AM	141,072.09	35268.02	0.3%	0.00	0.00	0.0%	0.00	0.00	0.0%
11:30 AM	135,847.90	33961.97	0.3%	0.00	0.00	0.0%	0.00	0.00	0.0%
11:45 AM	137,130.80	34282.70	0.3%	0.00	0.00	0.0%	0.00	0.00	0.0%
12:00 PM	137,126.39	34281.60	0.3%	0.00	0.00	0.0%	0.00	0.00	0.0%
12:15 PM	140,988.33	35247.08	0.3%	0.00	0.00	0.0%	0.00	0.00	0.0%
12:30 PM	144,114.02	36028.51	0.3%	0.00	0.00	0.0%	0.00	0.00	0.0%
12:45 PM	151,626.28	37906.57	0.3%	0.00	0.00	0.0%	0.00	0.00	0.0%
1:00 PM	158,001.11	39500.28	0.4%	0.00	0.00	0.0%	0.00	0.00	0.0%
1:15 PM	169,353.26	42338.31	0.4%	0.00	0.00	0.0%	0.00	0.00	0.0%
1:30 PM	181,274.11	45318.53	0.4%	0.00	0.00	0.0%	0.00	0.00	0.0%
1:45 PM	196,633.68	49158.42	0.4%	0.00	0.00	0.0%	0.00	0.00	0.0%
2:00 PM	214,219.58	53554.90	0.5%	0.00	0.00	0.0%	0.00	0.00	0.0%
2:15 PM	240,759.36	60189.84	0.5%	0.00	0.00	0.0%	0.00	0.00	0.0%
2:30 PM	269,706.22	67426.56	0.6%	0.00	0.00	0.0%	0.00	0.00	0.0%
2:45 PM	314,942.87	78735.72	0.7%	0.00	0.00	0.0%	0.00	0.00	0.0%
3:00 PM	371,121.66	92780.42	0.8%	0.00	0.00	0.0%	0.00	0.00	0.0%
3:15 PM	466,995.49	116748.87	1.0%	0.00	0.00	0.0%	0.00	0.00	0.0%
3:30 PM	588,840.38	147210.09	1.3%	0.00	0.00	0.0%	0.00	0.00	0.0%
3:45 PM	809,874.36	137678.64	1.8%	0.00	0.00	0.0%	0.00	0.00	0.0%
3:51 PM	929,047.64	46452.38	2.1%	0.00	0.00	0.0%	0.00	0.00	0.0%

GOLDEN GATE PARK

DECEMBER 13

Analysis Hours: 8:15 AM-3:52 PM (PST)

DECEMBER 28 SIMILAR

Analysis Time	CURRENT SHADOW (PARTIAL AREA)			NEW SHADOW FROM CPHP			NOT USED		
	Area (sf)	Area/Time (sfh)	Coverage	Area (sf)	Area/Time (sfh)	Coverage	Area (sf)	Area/Time (sfh)	Coverage
8:15 AM	1,740,159.52	208819.14	3.9%	251,396.01	30167.52	0.6%	0.00	0.00	0.0%
8:30 AM	1,114,208.84	278552.21	2.5%	154,486.17	38621.54	0.3%	0.00	0.00	0.0%
8:45 AM	807,004.36	201751.09	1.8%	81,074.16	20268.54	0.2%	0.00	0.00	0.0%
9:00 AM	615,957.68	153989.42	1.4%	36,877.94	9219.48	0.1%	0.00	0.00	0.0%
9:15 AM	486,199.35	121549.84	1.1%	17,555.05	4388.76	0.0%	0.00	0.00	0.0%
9:30 AM	392,080.15	98020.04	0.9%	837.63	209.41	0.0%	0.00	0.00	0.0%
9:45 AM	329,557.38	82389.34	0.7%	0.00	0.00	0.0%	0.00	0.00	0.0%
10:00 AM	278,902.56	69725.64	0.6%	0.00	0.00	0.0%	0.00	0.00	0.0%
10:15 AM	239,992.26	59998.06	0.5%	0.00	0.00	0.0%	0.00	0.00	0.0%
10:30 AM	201,866.69	50466.67	0.5%	0.00	0.00	0.0%	0.00	0.00	0.0%
10:45 AM	180,767.13	45191.78	0.4%	0.00	0.00	0.0%	0.00	0.00	0.0%
11:00 AM	160,796.17	40199.04	0.4%	0.00	0.00	0.0%	0.00	0.00	0.0%
11:15 AM	152,781.33	38195.33	0.3%	0.00	0.00	0.0%	0.00	0.00	0.0%
11:30 AM	144,233.06	36058.26	0.3%	0.00	0.00	0.0%	0.00	0.00	0.0%
11:45 AM	143,148.54	35787.14	0.3%	0.00	0.00	0.0%	0.00	0.00	0.0%
12:00 PM	142,751.77	35687.94	0.3%	0.00	0.00	0.0%	0.00	0.00	0.0%
12:15 PM	146,851.76	36712.94	0.3%	0.00	0.00	0.0%	0.00	0.00	0.0%
12:30 PM	149,501.33	37375.33	0.3%	0.00	0.00	0.0%	0.00	0.00	0.0%
12:45 PM	156,272.94	39068.24	0.3%	0.00	0.00	0.0%	0.00	0.00	0.0%
1:00 PM	162,797.67	40699.42	0.4%	0.00	0.00	0.0%	0.00	0.00	0.0%
1:15 PM	174,652.40	43663.10	0.4%	0.00	0.00	0.0%	0.00	0.00	0.0%
1:30 PM	185,021.42	46255.36	0.4%	0.00	0.00	0.0%	0.00	0.00	0.0%
1:45 PM	201,275.93	50318.98	0.4%	0.00	0.00	0.0%	0.00	0.00	0.0%
2:00 PM	219,919.90	54979.98	0.5%	0.00	0.00	0.0%	0.00	0.00	0.0%
2:15 PM	248,452.36	62113.09	0.6%	0.00	0.00	0.0%	0.00	0.00	0.0%
2:30 PM	277,227.30	69306.82	0.6%	0.00	0.00	0.0%	0.00	0.00	0.0%
2:45 PM	324,438.99	81109.75	0.7%	0.00	0.00	0.0%	0.00	0.00	0.0%
3:00 PM	382,949.93	95737.48	0.9%	0.00	0.00	0.0%	0.00	0.00	0.0%
3:15 PM	476,994.19	119248.55	1.1%	0.00	0.00	0.0%	0.00	0.00	0.0%
3:30 PM	601,559.19	150389.80	1.3%	0.00	0.00	0.0%	0.00	0.00	0.0%
3:45 PM	820,820.92	147747.76	1.8%	0.00	0.00	0.0%	0.00	0.00	0.0%
3:52 PM	960,070.96	57604.26	2.1%	0.00	0.00	0.0%	0.00	0.00	0.0%

DECEMBER 20

Analysis Hours: 8:19 AM-3:54 PM (PST)

WINTER SOLSTICE
DECEMBER 21 SIMILAR

Analysis Time	CURRENT SHADOW (PARTIAL AREA)			NEW SHADOW FROM CPHP			NOT USED		
	Area (sf)	Area/Time (sfh)	Coverage	Area (sf)	Area/Time (sfh)	Coverage	Area (sf)	Area/Time (sfh)	Coverage
8:19 AM	1,764,508.22	141160.66	3.9%	250,769.99	20061.60	0.6%	0.00	0.00	0.0%
8:30 AM	1,269,378.34	266569.45	2.8%	186,602.82	39186.59	0.4%	0.00	0.00	0.0%
8:45 AM	886,381.21	221595.30	2.0%	99,268.45	24817.11	0.2%	0.00	0.00	0.0%
9:00 AM	664,774.11	166193.53	1.5%	44,297.61	11074.40	0.1%	0.00	0.00	0.0%
9:15 AM	527,406.53	131851.63	1.2%	27,452.35	6863.09	0.1%	0.00	0.00	0.0%
9:30 AM	418,258.41	104564.60	0.9%	3,641.50	910.38	0.0%	0.00	0.00	0.0%
9:45 AM	351,278.55	87819.64	0.8%	57.31	14.33	0.0%	0.00	0.00	0.0%
10:00 AM	294,636.86	73659.21	0.7%	0.00	0.00	0.0%	0.00	0.00	0.0%
10:15 AM	255,633.97	63908.49	0.6%	0.00	0.00	0.0%	0.00	0.00	0.0%
10:30 AM	214,832.38	53708.09	0.5%	0.00	0.00	0.0%	0.00	0.00	0.0%
10:45 AM	189,817.98	47454.50	0.4%	0.00	0.00	0.0%	0.00	0.00	0.0%
11:00 AM	166,950.57	41737.64	0.4%	0.00	0.00	0.0%	0.00	0.00	0.0%
11:15 AM	157,648.43	39412.11	0.4%	0.00	0.00	0.0%	0.00	0.00	0.0%
11:30 AM	148,311.01	37077.75	0.3%	0.00	0.00	0.0%	0.00	0.00	0.0%
11:45 AM	146,750.37	36687.59	0.3%	0.00	0.00	0.0%	0.00	0.00	0.0%
12:00 PM	145,180.91	36295.23	0.3%	0.00	0.00	0.0%	0.00	0.00	0.0%
12:15 PM	148,311.01	37077.75	0.3%	0.00	0.00	0.0%	0.00	0.00	0.0%
12:30 PM	150,643.16	37660.79	0.3%	0.00	0.00	0.0%	0.00	0.00	0.0%
12:45 PM	157,167.89	39291.97	0.4%	0.00	0.00	0.0%	0.00	0.00	0.0%
1:00 PM	163,838.10	40959.53	0.4%	0.00	0.00	0.0%	0.00	0.00	0.0%
1:15 PM	174,802.29	43700.57	0.4%	0.00	0.00	0.0%	0.00	0.00	0.0%
1:30 PM	185,925.19	46481.30	0.4%	0.00	0.00	0.0%	0.00	0.00	0.0%
1:45 PM	201,055.50	50263.88	0.4%	0.00	0.00	0.0%	0.00	0.00	0.0%
2:00 PM	220,519.47	55129.87	0.5%	0.00	0.00	0.0%	0.00	0.00	0.0%
2:15 PM	248,156.99	62039.25	0.6%	0.00	0.00	0.0%	0.00	0.00	0.0%
2:30 PM	274,555.68	68638.92	0.6%	0.00	0.00	0.0%	0.00	0.00	0.0%
2:45 PM	320,250.82	80062.71	0.7%	0.00	0.00	0.0%	0.00	0.00	0.0%
3:00 PM	375,389.19	93847.30	0.8%	0.00	0.00	0.0%	0.00	0.00	0.0%
3:15 PM	467,052.80	116763.20	1.0%	0.00	0.00	0.0%	0.00	0.00	0.0%
3:30 PM	582,518.44	145629.61	1.3%	0.00	0.00	0.0%	0.00	0.00	0.0%
3:45 PM	791,203.94	166152.83	1.8%	0.00	0.00	0.0%	0.00	0.00	0.0%
3:54 PM	973,490.74	77879.26	2.2%	0.00	0.00	0.0%	0.00	0.00	0.0%

THEORETICAL ANNUAL AVAILABLE SUNLIGHT (TAAS)	GOLDEN GATE PARK
Area of Golden Gate Park	1026.83 acres (44,728,912 sf)
Hours of annual available sunlight	3721.4 hrs
TAAS for Golden Gate Park	166,454,173,117 sfh

EXISTING (CURRENT) LEVELS OF SHADOW (ROUGH APPROXIMATE)	GOLDEN GATE PARK
Existing annual total shading on park (sfh)	217,422,029 sfh
Existing shading as percentage of TAAS	0.131%

NEW SHADOW CAST BY THE PROPOSED CPHP PROJECT	GOLDEN GATE PARK
Additional annual shading on Golden Gate Park from Project	8,091,947 sfh
Additional annual shading from Project as percentage of TAAS	0.005%
Combined total annual shading existing + Project (sfh)	225,513,976 sfh
Combined total annual shading from existing + Project as percentage of TAAS	0.136%
Number of days when new shading from Project would occur	128-140 days annually
Dates when new shadow from Project would be cast on Golden Gate Park	Between Oct 12 - Feb 28
Annual range in duration of new Project shadow (duration variance +/- 6 min.)	Zero to approx. 94 min
Range in area of new Project shadow (sf)	Zero to 252,115 sf
Average daily duration of new Project shadow (when present)	Approx. 50 min.
MAXIMUM NEW SHADING BY THE PROPOSED PROJECT	GOLDEN GATE PARK
Dates of maximum new shading from proposed Project (max sfh)	Dec 20 & Dec 21
Total new shading on date(s) of maximum shading (sfh)	102,927.50 sfh
Percentage new shadow on date(s) of maximum shading	0.030%
Date and duration of longest duration of new shading (duration variance +/- 6 min.)	Approx. 94 min on Dec 20 & Dec 21
Date and time of largest area of new Project shadow	252,115 sf on Dec 6/Jan 4 at 8:10 AM
Percentage of Golden Gate Park covered by largest new shadow	0.564%

GRATTAN PLAYGROUND

Quantitative Shading Calculations for CPHP

JUNE 21

Analysis Hours: 6:46 AM-7:36 PM (PDT)

SUMMER SOLSTICE

Analysis Time	CURRENT SHADOW			NEW SHADOW FROM CPHP			NOT USED		
	Area (sf)	Area/Time (sfh)	Coverage	Area (sf)	Area/Time (sfh)	Coverage	Area (sf)	Area/Time (sfh)	Coverage
6:46 AM	12,880.61	1416.87	19.4%	0.00	0.00	0.0%	0.00	0.00	0.0%
7:00 AM	9,755.77	2243.83	14.7%	0.00	0.00	0.0%	0.00	0.00	0.0%
7:15 AM	7,236.84	1809.21	10.9%	0.00	0.00	0.0%	0.00	0.00	0.0%
7:30 AM	5,820.85	1455.21	8.8%	0.00	0.00	0.0%	0.00	0.00	0.0%
7:45 AM	4,726.41	1181.60	7.1%	0.00	0.00	0.0%	0.00	0.00	0.0%
8:00 AM	3,921.99	980.50	5.9%	0.00	0.00	0.0%	0.00	0.00	0.0%
8:15 AM	3,264.75	816.19	4.9%	0.00	0.00	0.0%	0.00	0.00	0.0%
8:30 AM	3,050.05	762.51	4.6%	0.00	0.00	0.0%	0.00	0.00	0.0%
8:45 AM	3,101.99	775.50	4.7%	0.00	0.00	0.0%	0.00	0.00	0.0%
9:00 AM	3,178.36	794.59	4.8%	0.00	0.00	0.0%	0.00	0.00	0.0%
9:15 AM	3,246.38	811.59	4.9%	0.00	0.00	0.0%	0.00	0.00	0.0%
9:30 AM	3,299.99	825.00	5.0%	0.00	0.00	0.0%	0.00	0.00	0.0%
9:45 AM	3,348.48	837.12	5.1%	0.00	0.00	0.0%	0.00	0.00	0.0%
10:00 AM	3,373.75	843.44	5.1%	0.00	0.00	0.0%	0.00	0.00	0.0%
10:15 AM	3,396.04	849.01	5.1%	0.00	0.00	0.0%	0.00	0.00	0.0%
10:30 AM	3,406.95	851.74	5.1%	0.00	0.00	0.0%	0.00	0.00	0.0%
10:45 AM	3,420.41	855.10	5.2%	0.00	0.00	0.0%	0.00	0.00	0.0%
11:00 AM	3,420.48	855.12	5.2%	0.00	0.00	0.0%	0.00	0.00	0.0%
11:15 AM	3,400.69	850.17	5.1%	0.00	0.00	0.0%	0.00	0.00	0.0%
11:30 AM	3,363.40	840.85	5.1%	0.00	0.00	0.0%	0.00	0.00	0.0%
11:45 AM	3,337.49	834.37	5.0%	0.00	0.00	0.0%	0.00	0.00	0.0%
12:00 PM	3,294.68	823.67	5.0%	0.00	0.00	0.0%	0.00	0.00	0.0%
12:15 PM	3,266.73	816.68	4.9%	0.00	0.00	0.0%	0.00	0.00	0.0%
12:30 PM	3,217.11	804.28	4.9%	0.00	0.00	0.0%	0.00	0.00	0.0%
12:45 PM	3,185.52	796.38	4.8%	0.00	0.00	0.0%	0.00	0.00	0.0%
1:00 PM	3,128.34	782.08	4.7%	0.00	0.00	0.0%	0.00	0.00	0.0%
1:15 PM	3,230.51	807.63	4.9%	0.00	0.00	0.0%	0.00	0.00	0.0%
1:30 PM	3,310.87	827.72	5.0%	0.00	0.00	0.0%	0.00	0.00	0.0%
1:45 PM	3,415.11	853.78	5.2%	0.00	0.00	0.0%	0.00	0.00	0.0%
2:00 PM	3,492.74	873.18	5.3%	0.00	0.00	0.0%	0.00	0.00	0.0%
2:15 PM	3,590.49	897.62	5.4%	0.00	0.00	0.0%	0.00	0.00	0.0%
2:30 PM	3,666.22	916.55	5.5%	0.00	0.00	0.0%	0.00	0.00	0.0%
2:45 PM	3,759.06	939.76	5.7%	0.00	0.00	0.0%	0.00	0.00	0.0%
3:00 PM	3,835.44	958.86	5.8%	0.00	0.00	0.0%	0.00	0.00	0.0%
3:15 PM	3,925.80	981.45	5.9%	0.00	0.00	0.0%	0.00	0.00	0.0%
3:30 PM	4,003.95	1000.99	6.0%	0.00	0.00	0.0%	0.00	0.00	0.0%
3:45 PM	4,093.40	1023.35	6.2%	0.00	0.00	0.0%	0.00	0.00	0.0%
4:00 PM	4,175.70	1043.93	6.3%	0.00	0.00	0.0%	0.00	0.00	0.0%
4:15 PM	4,361.93	1090.48	6.6%	0.00	0.00	0.0%	0.00	0.00	0.0%
4:30 PM	4,569.95	1142.49	6.9%	0.00	0.00	0.0%	0.00	0.00	0.0%
4:45 PM	4,796.20	1199.05	7.2%	0.00	0.00	0.0%	0.00	0.00	0.0%
5:00 PM	5,044.23	1261.06	7.6%	0.00	0.00	0.0%	0.00	0.00	0.0%
5:15 PM	5,320.34	1330.08	8.0%	0.00	0.00	0.0%	0.00	0.00	0.0%
5:30 PM	5,632.74	1408.18	8.5%	0.00	0.00	0.0%	0.00	0.00	0.0%
5:45 PM	5,988.55	1497.14	9.0%	0.00	0.00	0.0%	0.00	0.00	0.0%
6:00 PM	6,403.18	1600.79	9.7%	0.00	0.00	0.0%	0.00	0.00	0.0%
6:15 PM	6,889.78	1722.45	10.4%	0.00	0.00	0.0%	0.00	0.00	0.0%
6:30 PM	7,694.64	1923.66	11.6%	0.00	0.00	0.0%	0.00	0.00	0.0%
6:45 PM	8,746.15	2186.54	13.2%	0.00	0.00	0.0%	0.00	0.00	0.0%
7:00 PM	11,322.80	2830.70	17.1%	0.00	0.00	0.0%	3,967.71	991.93	6.0%
7:15 PM	17,527.34	5258.20	26.5%	7,846.92	2354.08	11.8%	6,908.60	2072.58	10.4%
7:36 PM	37,200.01	6696.00	56.2%	0.00	0.00	0.0%	0.00	0.00	0.0%

JUNE 28

Analysis Hours: 6:48 AM-7:36 PM (PDT)

JUNE 14 SIMILAR

Analysis Time	CURRENT SHADOW			NEW SHADOW FROM CPHP			NOT USED		
	Area (sf)	Area/Time (sfh)	Coverage	Area (sf)	Area/Time (sfh)	Coverage	Area (sf)	Area/Time (sfh)	Coverage
6:48 AM	12,909.14	1290.91	19.5%	0.00	0.00	0.0%	0.00	0.00	0.0%
7:00 AM	10,199.81	2243.96	15.4%	0.00	0.00	0.0%	0.00	0.00	0.0%
7:15 AM	7,502.53	1875.63	11.3%	0.00	0.00	0.0%	0.00	0.00	0.0%
7:30 AM	5,990.23	1497.56	9.0%	0.00	0.00	0.0%	0.00	0.00	0.0%
7:45 AM	4,863.96	1215.99	7.3%	0.00	0.00	0.0%	0.00	0.00	0.0%
8:00 AM	4,018.77	1004.69	6.1%	0.00	0.00	0.0%	0.00	0.00	0.0%
8:15 AM	3,335.68	833.92	5.0%	0.00	0.00	0.0%	0.00	0.00	0.0%
8:30 AM	3,058.31	764.58	4.6%	0.00	0.00	0.0%	0.00	0.00	0.0%
8:45 AM	3,104.02	776.01	4.7%	0.00	0.00	0.0%	0.00	0.00	0.0%
9:00 AM	3,179.09	794.77	4.8%	0.00	0.00	0.0%	0.00	0.00	0.0%
9:15 AM	3,248.06	812.01	4.9%	0.00	0.00	0.0%	0.00	0.00	0.0%
9:30 AM	3,302.50	825.63	5.0%	0.00	0.00	0.0%	0.00	0.00	0.0%
9:45 AM	3,351.66	837.91	5.1%	0.00	0.00	0.0%	0.00	0.00	0.0%
10:00 AM	3,378.84	844.71	5.1%	0.00	0.00	0.0%	0.00	0.00	0.0%
10:15 AM	3,401.56	850.39	5.1%	0.00	0.00	0.0%	0.00	0.00	0.0%
10:30 AM	3,412.62	853.16	5.2%	0.00	0.00	0.0%	0.00	0.00	0.0%
10:45 AM	3,426.36	856.59	5.2%	0.00	0.00	0.0%	0.00	0.00	0.0%
11:00 AM	3,426.93	856.73	5.2%	0.00	0.00	0.0%	0.00	0.00	0.0%
11:15 AM	3,410.43	852.61	5.1%	0.00	0.00	0.0%	0.00	0.00	0.0%
11:30 AM	3,373.13	843.28	5.1%	0.00	0.00	0.0%	0.00	0.00	0.0%
11:45 AM	3,346.86	836.72	5.1%	0.00	0.00	0.0%	0.00	0.00	0.0%
12:00 PM	3,304.52	826.13	5.0%	0.00	0.00	0.0%	0.00	0.00	0.0%
12:15 PM	3,276.54	819.13	4.9%	0.00	0.00	0.0%	0.00	0.00	0.0%
12:30 PM	3,227.07	806.77	4.9%	0.00	0.00	0.0%	0.00	0.00	0.0%
12:45 PM	3,195.64	798.91	4.8%	0.00	0.00	0.0%	0.00	0.00	0.0%
1:00 PM	3,138.77	784.69	4.7%	0.00	0.00	0.0%	0.00	0.00	0.0%
1:15 PM	3,227.59	806.90	4.9%	0.00	0.00	0.0%	0.00	0.00	0.0%
1:30 PM	3,308.52	827.13	5.0%	0.00	0.00	0.0%	0.00	0.00	0.0%
1:45 PM	3,413.20	853.30	5.2%	0.00	0.00	0.0%	0.00	0.00	0.0%
2:00 PM	3,491.16	872.79	5.3%	0.00	0.00	0.0%	0.00	0.00	0.0%
2:15 PM	3,589.44	897.36	5.4%	0.00	0.00	0.0%	0.00	0.00	0.0%
2:30 PM	3,665.63	916.41	5.5%	0.00	0.00	0.0%	0.00	0.00	0.0%
2:45 PM	3,759.07	939.77	5.7%	0.00	0.00	0.0%	0.00	0.00	0.0%
3:00 PM	3,835.64	958.91	5.8%	0.00	0.00	0.0%	0.00	0.00	0.0%
3:15 PM	3,926.34	981.59	5.9%	0.00	0.00	0.0%	0.00	0.00	0.0%
3:30 PM	4,004.86	1001.21	6.0%	0.00	0.00	0.0%	0.00	0.00	0.0%
3:45 PM	4,094.83	1023.71	6.2%	0.00	0.00	0.0%	0.00	0.00	0.0%
4:00 PM	4,176.52	1044.13	6.3%	0.00	0.00	0.0%	0.00	0.00	0.0%
4:15 PM	4,345.58	1086.39	6.6%	0.00	0.00	0.0%	0.00	0.00	0.0%
4:30 PM	4,552.77	1138.19	6.9%	0.00	0.00	0.0%	0.00	0.00	0.0%
4:45 PM	4,777.65	1194.41	7.2%	0.00	0.00	0.0%	0.00	0.00	0.0%
5:00 PM	5,024.59	1256.15	7.6%	0.00	0.00	0.0%	0.00	0.00	0.0%
5:15 PM	5,298.83	1324.71	8.0%	0.00	0.00	0.0%	0.00	0.00	0.0%
5:30 PM	5,608.82	1402.21	8.5%	0.00	0.00	0.0%	0.00	0.00	0.0%
5:45 PM	5,961.68	1490.42	9.0%	0.00	0.00	0.0%	0.00	0.00	0.0%
6:00 PM	6,372.33	1593.08	9.6%	0.00	0.00	0.0%	0.00	0.00	0.0%
6:15 PM	6,854.05	1713.51	10.3%	0.00	0.00	0.0%	0.00	0.00	0.0%
6:30 PM	7,623.40	1905.85	11.5%	0.00	0.00	0.0%	0.00	0.00	0.0%
6:45 PM	8,695.25	2173.81	13.1%	0.00	0.00	0.0%	0.00	0.00	0.0%
7:00 PM	11,055.93	2763.98	16.7%	0.00	0.00	0.0%	2,360.22	590.06	3.6%
7:15 PM	17,061.41	5118.42	25.8%	7,657.30	2297.19	11.6%	8,535.75	2560.73	12.9%
7:36 PM	37,107.09	6679.28	56.0%	0.00	0.00	0.0%	0.00	0.00	0.0%

GRATTAN PLAYGROUND

JULY 5

Analysis Hours: 6:52 AM-7:36 PM (PDT)

JUNE 7 SIMILAR

Analysis Time	CURRENT SHADOW			NEW SHADOW FROM CPHP			NOT USED		
	Area (sf)	Area/Time (sfh)	Coverage	Area (sf)	Area/Time (sfh)	Coverage	Area (sf)	Area/Time (sfh)	Coverage
6:52 AM	12,995.97	779.76	19.6%	0.00	0.00	0.0%	0.00	0.00	0.0%
7:00 AM	10,958.11	2082.04	16.5%	0.00	0.00	0.0%	0.00	0.00	0.0%
7:15 AM	7,975.73	1993.93	12.0%	0.00	0.00	0.0%	0.00	0.00	0.0%
7:30 AM	6,274.41	1568.60	9.5%	0.00	0.00	0.0%	0.00	0.00	0.0%
7:45 AM	5,078.32	1269.58	7.7%	0.00	0.00	0.0%	0.00	0.00	0.0%
8:00 AM	4,155.64	1038.91	6.3%	0.00	0.00	0.0%	0.00	0.00	0.0%
8:15 AM	3,431.63	857.91	5.2%	0.00	0.00	0.0%	0.00	0.00	0.0%
8:30 AM	3,095.37	773.84	4.7%	0.00	0.00	0.0%	0.00	0.00	0.0%
8:45 AM	3,127.76	781.94	4.7%	0.00	0.00	0.0%	0.00	0.00	0.0%
9:00 AM	3,198.25	799.56	4.8%	0.00	0.00	0.0%	0.00	0.00	0.0%
9:15 AM	3,268.40	817.10	4.9%	0.00	0.00	0.0%	0.00	0.00	0.0%
9:30 AM	3,321.85	830.46	5.0%	0.00	0.00	0.0%	0.00	0.00	0.0%
9:45 AM	3,371.12	842.78	5.1%	0.00	0.00	0.0%	0.00	0.00	0.0%
10:00 AM	3,400.37	850.09	5.1%	0.00	0.00	0.0%	0.00	0.00	0.0%
10:15 AM	3,422.67	855.67	5.2%	0.00	0.00	0.0%	0.00	0.00	0.0%
10:30 AM	3,433.62	858.41	5.2%	0.00	0.00	0.0%	0.00	0.00	0.0%
10:45 AM	3,447.23	861.81	5.2%	0.00	0.00	0.0%	0.00	0.00	0.0%
11:00 AM	3,447.59	861.90	5.2%	0.00	0.00	0.0%	0.00	0.00	0.0%
11:15 AM	3,434.21	858.55	5.2%	0.00	0.00	0.0%	0.00	0.00	0.0%
11:30 AM	3,396.45	849.11	5.1%	0.00	0.00	0.0%	0.00	0.00	0.0%
11:45 AM	3,369.81	842.45	5.1%	0.00	0.00	0.0%	0.00	0.00	0.0%
12:00 PM	3,327.09	831.77	5.0%	0.00	0.00	0.0%	0.00	0.00	0.0%
12:15 PM	3,298.77	824.69	5.0%	0.00	0.00	0.0%	0.00	0.00	0.0%
12:30 PM	3,249.32	812.33	4.9%	0.00	0.00	0.0%	0.00	0.00	0.0%
12:45 PM	3,217.55	804.39	4.9%	0.00	0.00	0.0%	0.00	0.00	0.0%
1:00 PM	3,161.04	790.26	4.8%	0.00	0.00	0.0%	0.00	0.00	0.0%
1:15 PM	3,240.25	810.06	4.9%	0.00	0.00	0.0%	0.00	0.00	0.0%
1:30 PM	3,322.07	830.52	5.0%	0.00	0.00	0.0%	0.00	0.00	0.0%
1:45 PM	3,427.44	856.86	5.2%	0.00	0.00	0.0%	0.00	0.00	0.0%
2:00 PM	3,506.52	876.63	5.3%	0.00	0.00	0.0%	0.00	0.00	0.0%
2:15 PM	3,605.62	901.41	5.4%	0.00	0.00	0.0%	0.00	0.00	0.0%
2:30 PM	3,682.86	920.71	5.6%	0.00	0.00	0.0%	0.00	0.00	0.0%
2:45 PM	3,777.30	944.33	5.7%	0.00	0.00	0.0%	0.00	0.00	0.0%
3:00 PM	3,855.04	963.76	5.8%	0.00	0.00	0.0%	0.00	0.00	0.0%
3:15 PM	3,947.10	986.78	6.0%	0.00	0.00	0.0%	0.00	0.00	0.0%
3:30 PM	4,026.70	1006.67	6.1%	0.00	0.00	0.0%	0.00	0.00	0.0%
3:45 PM	4,118.39	1029.60	6.2%	0.00	0.00	0.0%	0.00	0.00	0.0%
4:00 PM	4,201.45	1050.36	6.3%	0.00	0.00	0.0%	0.00	0.00	0.0%
4:15 PM	4,339.43	1084.86	6.6%	0.00	0.00	0.0%	0.00	0.00	0.0%
4:30 PM	4,547.43	1136.86	6.9%	0.00	0.00	0.0%	0.00	0.00	0.0%
4:45 PM	4,773.16	1193.29	7.2%	0.00	0.00	0.0%	0.00	0.00	0.0%
5:00 PM	5,021.53	1255.38	7.6%	0.00	0.00	0.0%	0.00	0.00	0.0%
5:15 PM	5,296.36	1324.09	8.0%	0.00	0.00	0.0%	0.00	0.00	0.0%
5:30 PM	5,607.89	1401.97	8.5%	0.00	0.00	0.0%	0.00	0.00	0.0%
5:45 PM	5,962.81	1490.70	9.0%	0.00	0.00	0.0%	0.00	0.00	0.0%
6:00 PM	6,375.95	1593.99	9.6%	0.00	0.00	0.0%	0.00	0.00	0.0%
6:15 PM	6,861.06	1715.26	10.4%	0.00	0.00	0.0%	0.00	0.00	0.0%
6:30 PM	7,652.81	1913.20	11.6%	0.00	0.00	0.0%	0.00	0.00	0.0%
6:45 PM	8,764.20	2191.05	13.2%	0.00	0.00	0.0%	0.00	0.00	0.0%
7:00 PM	11,092.43	2773.11	16.7%	0.00	0.00	0.0%	2,571.67	642.92	3.9%
7:15 PM	17,188.30	5156.49	25.9%	9,206.44	2761.93	13.9%	11,369.24	3410.77	17.2%
7:36 PM	36,822.99	6628.14	55.6%	98.18	17.67	0.1%	0.00	0.00	0.0%

GRATTAN PLAYGROUND

JULY 12

Analysis Hours: 6:56 AM-7:33 PM (PDT)

MAY 31 SIMILAR

Analysis Time	CURRENT SHADOW			NEW SHADOW FROM CPHP			NOT USED		
	Area (sf)	Area/Time (sfh)	Coverage	Area (sf)	Area/Time (sfh)	Coverage	Area (sf)	Area/Time (sfh)	Coverage
6:56 AM	13,137.41	394.12	19.8%	0.00	0.00	0.0%	0.00	0.00	0.0%
7:00 AM	12,104.21	1815.63	18.3%	0.00	0.00	0.0%	0.00	0.00	0.0%
7:15 AM	8,735.17	2183.79	13.2%	0.00	0.00	0.0%	0.00	0.00	0.0%
7:30 AM	6,695.89	1673.97	10.1%	0.00	0.00	0.0%	0.00	0.00	0.0%
7:45 AM	5,381.04	1345.26	8.1%	0.00	0.00	0.0%	0.00	0.00	0.0%
8:00 AM	4,337.53	1084.38	6.5%	0.00	0.00	0.0%	0.00	0.00	0.0%
8:15 AM	3,557.61	889.40	5.4%	0.00	0.00	0.0%	0.00	0.00	0.0%
8:30 AM	3,170.79	792.70	4.8%	0.00	0.00	0.0%	0.00	0.00	0.0%
8:45 AM	3,174.82	793.70	4.8%	0.00	0.00	0.0%	0.00	0.00	0.0%
9:00 AM	3,236.47	809.12	4.9%	0.00	0.00	0.0%	0.00	0.00	0.0%
9:15 AM	3,305.00	826.25	5.0%	0.00	0.00	0.0%	0.00	0.00	0.0%
9:30 AM	3,358.72	839.68	5.1%	0.00	0.00	0.0%	0.00	0.00	0.0%
9:45 AM	3,407.79	851.95	5.1%	0.00	0.00	0.0%	0.00	0.00	0.0%
10:00 AM	3,438.27	859.57	5.2%	0.00	0.00	0.0%	0.00	0.00	0.0%
10:15 AM	3,459.92	864.98	5.2%	0.00	0.00	0.0%	0.00	0.00	0.0%
10:30 AM	3,469.84	867.46	5.2%	0.00	0.00	0.0%	0.00	0.00	0.0%
10:45 AM	3,482.79	870.70	5.3%	0.00	0.00	0.0%	0.00	0.00	0.0%
11:00 AM	3,482.54	870.63	5.3%	0.00	0.00	0.0%	0.00	0.00	0.0%
11:15 AM	3,472.05	868.01	5.2%	0.00	0.00	0.0%	0.00	0.00	0.0%
11:30 AM	3,433.20	858.30	5.2%	0.00	0.00	0.0%	0.00	0.00	0.0%
11:45 AM	3,405.73	851.43	5.1%	0.00	0.00	0.0%	0.00	0.00	0.0%
12:00 PM	3,362.31	840.58	5.1%	0.00	0.00	0.0%	0.00	0.00	0.0%
12:15 PM	3,333.21	833.30	5.0%	0.00	0.00	0.0%	0.00	0.00	0.0%
12:30 PM	3,283.71	820.93	5.0%	0.00	0.00	0.0%	0.00	0.00	0.0%
12:45 PM	3,251.12	812.78	4.9%	0.00	0.00	0.0%	0.00	0.00	0.0%
1:00 PM	3,194.82	798.71	4.8%	0.00	0.00	0.0%	0.00	0.00	0.0%
1:15 PM	3,268.25	817.06	4.9%	0.00	0.00	0.0%	0.00	0.00	0.0%
1:30 PM	3,351.73	837.93	5.1%	0.00	0.00	0.0%	0.00	0.00	0.0%
1:45 PM	3,458.09	864.52	5.2%	0.00	0.00	0.0%	0.00	0.00	0.0%
2:00 PM	3,538.67	884.67	5.3%	0.00	0.00	0.0%	0.00	0.00	0.0%
2:15 PM	3,639.07	909.77	5.5%	0.00	0.00	0.0%	0.00	0.00	0.0%
2:30 PM	3,717.91	929.48	5.6%	0.00	0.00	0.0%	0.00	0.00	0.0%
2:45 PM	3,814.28	953.57	5.8%	0.00	0.00	0.0%	0.00	0.00	0.0%
3:00 PM	3,893.59	973.40	5.9%	0.00	0.00	0.0%	0.00	0.00	0.0%
3:15 PM	3,987.95	996.99	6.0%	0.00	0.00	0.0%	0.00	0.00	0.0%
3:30 PM	4,069.61	1017.40	6.1%	0.00	0.00	0.0%	0.00	0.00	0.0%
3:45 PM	4,164.14	1041.04	6.3%	0.00	0.00	0.0%	0.00	0.00	0.0%
4:00 PM	4,250.02	1062.51	6.4%	0.00	0.00	0.0%	0.00	0.00	0.0%
4:15 PM	4,349.68	1087.42	6.6%	0.00	0.00	0.0%	0.00	0.00	0.0%
4:30 PM	4,554.21	1138.55	6.9%	0.00	0.00	0.0%	0.00	0.00	0.0%
4:45 PM	4,783.34	1195.84	7.2%	0.00	0.00	0.0%	0.00	0.00	0.0%
5:00 PM	5,035.86	1258.97	7.6%	0.00	0.00	0.0%	0.00	0.00	0.0%
5:15 PM	5,314.30	1328.58	8.0%	0.00	0.00	0.0%	0.00	0.00	0.0%
5:30 PM	5,630.65	1407.66	8.5%	0.00	0.00	0.0%	0.00	0.00	0.0%
5:45 PM	5,992.35	1498.09	9.0%	0.00	0.00	0.0%	0.00	0.00	0.0%
6:00 PM	6,414.41	1603.60	9.7%	0.00	0.00	0.0%	0.00	0.00	0.0%
6:15 PM	6,911.68	1727.92	10.4%	0.00	0.00	0.0%	0.00	0.00	0.0%
6:30 PM	7,790.68	1947.67	11.8%	0.00	0.00	0.0%	0.00	0.00	0.0%
6:45 PM	8,960.59	2240.15	13.5%	0.00	0.00	0.0%	0.00	0.00	0.0%
7:00 PM	11,452.27	2863.07	17.3%	0.00	0.00	0.0%	5,977.15	1494.29	9.0%
7:15 PM	18,236.83	5106.31	27.5%	13,188.47	3692.77	19.9%	15,219.84	4261.56	23.0%
7:33 PM	36,527.36	5479.10	55.1%	1,941.92	291.29	2.9%	261.97	39.30	0.4%

GRATTAN PLAYGROUND

Quantitative Shading Calculations for CPHP

JULY 19

Analysis Hours: 7:01 AM-7:30 PM (PDT)

MAY 24 SIMILAR

Analysis Time	CURRENT SHADOW			NEW SHADOW FROM CPHP			NOT USED		
	Area (sf)	Area/Time (sfh)	Coverage	Area (sf)	Area/Time (sfh)	Coverage	Area (sf)	Area/Time (sfh)	Coverage
7:01 AM	13,322.25	1731.89	20.1%	0.00	0.00	0.0%	0.00	0.00	0.0%
7:16 AM	9,518.57	2284.46	14.4%	0.00	0.00	0.0%	0.00	0.00	0.0%
7:30 AM	7,335.70	1760.57	11.1%	0.00	0.00	0.0%	0.00	0.00	0.0%
7:45 AM	5,761.86	1440.47	8.7%	0.00	0.00	0.0%	0.00	0.00	0.0%
8:00 AM	4,558.08	1139.52	6.9%	0.00	0.00	0.0%	0.00	0.00	0.0%
8:15 AM	3,774.54	943.63	5.7%	0.00	0.00	0.0%	0.00	0.00	0.0%
8:30 AM	3,303.15	825.79	5.0%	0.00	0.00	0.0%	0.00	0.00	0.0%
8:45 AM	3,248.12	812.03	4.9%	0.00	0.00	0.0%	0.00	0.00	0.0%
9:00 AM	3,295.20	823.80	5.0%	0.00	0.00	0.0%	0.00	0.00	0.0%
9:15 AM	3,361.94	840.49	5.1%	0.00	0.00	0.0%	0.00	0.00	0.0%
9:30 AM	3,414.28	853.57	5.2%	0.00	0.00	0.0%	0.00	0.00	0.0%
9:45 AM	3,461.95	865.49	5.2%	0.00	0.00	0.0%	0.00	0.00	0.0%
10:00 AM	3,493.30	873.33	5.3%	0.00	0.00	0.0%	0.00	0.00	0.0%
10:15 AM	3,513.43	878.36	5.3%	0.00	0.00	0.0%	0.00	0.00	0.0%
10:30 AM	3,521.57	880.39	5.3%	0.00	0.00	0.0%	0.00	0.00	0.0%
10:45 AM	3,533.33	883.33	5.3%	0.00	0.00	0.0%	0.00	0.00	0.0%
11:00 AM	3,531.95	882.99	5.3%	0.00	0.00	0.0%	0.00	0.00	0.0%
11:15 AM	3,523.50	880.87	5.3%	0.00	0.00	0.0%	0.00	0.00	0.0%
11:30 AM	3,483.09	870.77	5.3%	0.00	0.00	0.0%	0.00	0.00	0.0%
11:45 AM	3,454.15	863.54	5.2%	0.00	0.00	0.0%	0.00	0.00	0.0%
12:00 PM	3,409.65	852.41	5.1%	0.00	0.00	0.0%	0.00	0.00	0.0%
12:15 PM	3,379.51	844.88	5.1%	0.00	0.00	0.0%	0.00	0.00	0.0%
12:30 PM	3,329.38	832.34	5.0%	0.00	0.00	0.0%	0.00	0.00	0.0%
12:45 PM	3,295.76	823.94	5.0%	0.00	0.00	0.0%	0.00	0.00	0.0%
1:00 PM	3,239.31	809.83	4.9%	0.00	0.00	0.0%	0.00	0.00	0.0%
1:15 PM	3,313.00	828.25	5.0%	0.00	0.00	0.0%	0.00	0.00	0.0%
1:30 PM	3,398.66	849.67	5.1%	0.00	0.00	0.0%	0.00	0.00	0.0%
1:45 PM	3,506.07	876.52	5.3%	0.00	0.00	0.0%	0.00	0.00	0.0%
2:00 PM	3,588.75	897.19	5.4%	0.00	0.00	0.0%	0.00	0.00	0.0%
2:15 PM	3,690.87	922.72	5.6%	0.00	0.00	0.0%	0.00	0.00	0.0%
2:30 PM	3,771.94	942.99	5.7%	0.00	0.00	0.0%	0.00	0.00	0.0%
2:45 PM	3,870.59	967.65	5.8%	0.00	0.00	0.0%	0.00	0.00	0.0%
3:00 PM	3,952.41	988.10	6.0%	0.00	0.00	0.0%	0.00	0.00	0.0%
3:15 PM	4,049.76	1012.44	6.1%	0.00	0.00	0.0%	0.00	0.00	0.0%
3:30 PM	4,134.59	1033.65	6.2%	0.00	0.00	0.0%	0.00	0.00	0.0%
3:45 PM	4,233.11	1058.28	6.4%	0.00	0.00	0.0%	0.00	0.00	0.0%
4:00 PM	4,322.98	1080.74	6.5%	0.00	0.00	0.0%	0.00	0.00	0.0%
4:15 PM	4,425.36	1106.34	6.7%	0.00	0.00	0.0%	0.00	0.00	0.0%
4:30 PM	4,576.22	1144.05	6.9%	0.00	0.00	0.0%	0.00	0.00	0.0%
4:45 PM	4,810.94	1202.74	7.3%	0.00	0.00	0.0%	0.00	0.00	0.0%
5:00 PM	5,069.38	1267.34	7.7%	0.00	0.00	0.0%	0.00	0.00	0.0%
5:15 PM	5,357.01	1339.25	8.1%	0.00	0.00	0.0%	0.00	0.00	0.0%
5:30 PM	5,682.27	1420.57	8.6%	0.00	0.00	0.0%	0.00	0.00	0.0%
5:45 PM	6,056.87	1514.22	9.1%	0.00	0.00	0.0%	0.00	0.00	0.0%
6:00 PM	6,495.55	1623.89	9.8%	0.00	0.00	0.0%	0.00	0.00	0.0%
6:15 PM	7,015.66	1753.91	10.6%	0.00	0.00	0.0%	0.00	0.00	0.0%
6:30 PM	8,032.50	2008.12	12.1%	0.00	0.00	0.0%	0.00	0.00	0.0%
6:45 PM	9,371.05	2342.76	14.1%	0.00	0.00	0.0%	0.00	0.00	0.0%
7:00 PM	12,224.00	3056.00	18.5%	65.90	16.47	0.1%	15,255.56	3813.89	23.0%
7:15 PM	20,358.14	5089.53	30.7%	20,338.65	5084.66	30.7%	19,685.12	4921.28	29.7%
7:30 PM	36,558.30	4752.58	55.2%	5,905.33	767.69	8.9%	3,118.92	405.46	4.7%

GRATTAN PLAYGROUND

Quantitative Shading Calculations for CPHP

JULY 26

Analysis Hours: 7:07 AM-7:25 PM (PDT)

MAY 17 SIMILAR

Analysis Time	CURRENT SHADOW			NEW SHADOW FROM CPHP			NOT USED		
	Area (sf)	Area/Time (sfh)	Coverage	Area (sf)	Area/Time (sfh)	Coverage	Area (sf)	Area/Time (sfh)	Coverage
7:07 AM	13,487.62	809.26	20.4%	0.00	0.00	0.0%	0.00	0.00	0.0%
7:15 AM	11,244.52	2136.46	17.0%	0.00	0.00	0.0%	0.00	0.00	0.0%
7:30 AM	8,175.32	2043.83	12.3%	0.00	0.00	0.0%	0.00	0.00	0.0%
7:45 AM	6,245.21	1561.30	9.4%	0.00	0.00	0.0%	0.00	0.00	0.0%
8:00 AM	4,866.65	1216.66	7.3%	0.00	0.00	0.0%	0.00	0.00	0.0%
8:15 AM	4,078.32	1019.58	6.2%	0.00	0.00	0.0%	0.00	0.00	0.0%
8:30 AM	3,536.18	884.05	5.3%	0.00	0.00	0.0%	0.00	0.00	0.0%
8:45 AM	3,349.41	837.35	5.1%	0.00	0.00	0.0%	0.00	0.00	0.0%
9:00 AM	3,376.44	844.11	5.1%	0.00	0.00	0.0%	0.00	0.00	0.0%
9:15 AM	3,438.72	859.68	5.2%	0.00	0.00	0.0%	0.00	0.00	0.0%
9:30 AM	3,488.73	872.18	5.3%	0.00	0.00	0.0%	0.00	0.00	0.0%
9:45 AM	3,534.22	883.55	5.3%	0.00	0.00	0.0%	0.00	0.00	0.0%
10:00 AM	3,565.50	891.38	5.4%	0.00	0.00	0.0%	0.00	0.00	0.0%
10:15 AM	3,583.30	895.83	5.4%	0.00	0.00	0.0%	0.00	0.00	0.0%
10:30 AM	3,589.01	897.25	5.4%	0.00	0.00	0.0%	0.00	0.00	0.0%
10:45 AM	3,598.88	899.72	5.4%	0.00	0.00	0.0%	0.00	0.00	0.0%
11:00 AM	3,595.52	898.88	5.4%	0.00	0.00	0.0%	0.00	0.00	0.0%
11:15 AM	3,588.64	897.16	5.4%	0.00	0.00	0.0%	0.00	0.00	0.0%
11:30 AM	3,545.86	886.46	5.4%	0.00	0.00	0.0%	0.00	0.00	0.0%
11:45 AM	3,515.29	878.82	5.3%	0.00	0.00	0.0%	0.00	0.00	0.0%
12:00 PM	3,469.31	867.33	5.2%	0.00	0.00	0.0%	0.00	0.00	0.0%
12:15 PM	3,437.50	859.38	5.2%	0.00	0.00	0.0%	0.00	0.00	0.0%
12:30 PM	3,386.57	846.64	5.1%	0.00	0.00	0.0%	0.00	0.00	0.0%
12:45 PM	3,351.62	837.91	5.1%	0.00	0.00	0.0%	0.00	0.00	0.0%
1:00 PM	3,294.75	823.69	5.0%	0.00	0.00	0.0%	0.00	0.00	0.0%
1:15 PM	3,374.17	843.54	5.1%	0.00	0.00	0.0%	0.00	0.00	0.0%
1:30 PM	3,461.93	865.48	5.2%	0.00	0.00	0.0%	0.00	0.00	0.0%
1:45 PM	3,570.96	892.74	5.4%	0.00	0.00	0.0%	0.00	0.00	0.0%
2:00 PM	3,656.05	914.01	5.5%	0.00	0.00	0.0%	0.00	0.00	0.0%
2:15 PM	3,760.28	940.07	5.7%	0.00	0.00	0.0%	0.00	0.00	0.0%
2:30 PM	3,844.24	961.06	5.8%	0.00	0.00	0.0%	0.00	0.00	0.0%
2:45 PM	3,945.97	986.49	6.0%	0.00	0.00	0.0%	0.00	0.00	0.0%
3:00 PM	4,030.98	1007.75	6.1%	0.00	0.00	0.0%	0.00	0.00	0.0%
3:15 PM	4,132.29	1033.07	6.2%	0.00	0.00	0.0%	0.00	0.00	0.0%
3:30 PM	4,221.21	1055.30	6.4%	0.00	0.00	0.0%	0.00	0.00	0.0%
3:45 PM	4,324.78	1081.20	6.5%	0.00	0.00	0.0%	0.00	0.00	0.0%
4:00 PM	4,420.02	1105.01	6.7%	0.00	0.00	0.0%	0.00	0.00	0.0%
4:15 PM	4,529.23	1132.31	6.8%	0.00	0.00	0.0%	0.00	0.00	0.0%
4:30 PM	4,634.27	1158.57	7.0%	0.00	0.00	0.0%	0.00	0.00	0.0%
4:45 PM	4,855.31	1213.83	7.3%	0.00	0.00	0.0%	0.00	0.00	0.0%
5:00 PM	5,123.43	1280.86	7.7%	0.00	0.00	0.0%	0.00	0.00	0.0%
5:15 PM	5,423.32	1355.83	8.2%	0.00	0.00	0.0%	0.00	0.00	0.0%
5:30 PM	5,763.23	1440.81	8.7%	0.00	0.00	0.0%	0.00	0.00	0.0%
5:45 PM	6,155.45	1538.86	9.3%	0.00	0.00	0.0%	0.00	0.00	0.0%
6:00 PM	6,619.14	1654.79	10.0%	0.00	0.00	0.0%	0.00	0.00	0.0%
6:15 PM	7,213.80	1803.45	10.9%	0.00	0.00	0.0%	0.00	0.00	0.0%
6:30 PM	8,445.36	2111.34	12.7%	0.00	0.00	0.0%	0.00	0.00	0.0%
6:45 PM	10,122.96	2530.74	15.3%	0.00	0.00	0.0%	0.00	0.00	0.0%
7:00 PM	13,624.78	3406.20	20.6%	799.73	199.93	1.2%	30,710.03	7677.51	46.4%
7:15 PM	24,131.78	5067.67	36.4%	30,060.13	6312.63	45.4%	24,146.41	5070.75	36.4%
7:25 PM	36,862.51	3317.63	55.6%	13,690.08	1232.11	20.7%	9,006.44	810.58	13.6%

GRATTAN PLAYGROUND

AUGUST 2

Analysis Hours: 7:12 AM-7:18 PM (PDT)

MAY 10 SIMILAR

Analysis Time	CURRENT SHADOW			NEW SHADOW FROM CPHP			NOT USED		
	Area (sf)	Area/Time (sfh)	Coverage	Area (sf)	Area/Time (sfh)	Coverage	Area (sf)	Area/Time (sfh)	Coverage
7:12 AM	13,776.27	275.53	20.8%	0.00	0.00	0.0%	0.00	0.00	0.0%
7:15 AM	13,041.93	1956.29	19.7%	0.00	0.00	0.0%	0.00	0.00	0.0%
7:30 AM	9,347.55	2336.89	14.1%	0.00	0.00	0.0%	0.00	0.00	0.0%
7:45 AM	6,837.81	1709.45	10.3%	0.00	0.00	0.0%	0.00	0.00	0.0%
8:00 AM	5,383.46	1345.87	8.1%	0.00	0.00	0.0%	0.00	0.00	0.0%
8:15 AM	4,446.68	1111.67	6.7%	0.00	0.00	0.0%	0.00	0.00	0.0%
8:30 AM	3,813.91	953.48	5.8%	0.00	0.00	0.0%	0.00	0.00	0.0%
8:45 AM	3,483.25	870.81	5.3%	0.00	0.00	0.0%	0.00	0.00	0.0%
9:00 AM	3,484.25	871.06	5.3%	0.00	0.00	0.0%	0.00	0.00	0.0%
9:15 AM	3,537.75	884.44	5.3%	0.00	0.00	0.0%	0.00	0.00	0.0%
9:30 AM	3,583.24	895.81	5.4%	0.00	0.00	0.0%	0.00	0.00	0.0%
9:45 AM	3,625.16	906.29	5.5%	0.00	0.00	0.0%	0.00	0.00	0.0%
10:00 AM	3,653.24	913.31	5.5%	0.00	0.00	0.0%	0.00	0.00	0.0%
10:15 AM	3,669.66	917.42	5.5%	0.00	0.00	0.0%	0.00	0.00	0.0%
10:30 AM	3,671.99	918.00	5.5%	0.00	0.00	0.0%	0.00	0.00	0.0%
10:45 AM	3,679.31	919.83	5.6%	0.00	0.00	0.0%	0.00	0.00	0.0%
11:00 AM	3,673.33	918.33	5.5%	0.00	0.00	0.0%	0.00	0.00	0.0%
11:15 AM	3,666.42	916.61	5.5%	0.00	0.00	0.0%	0.00	0.00	0.0%
11:30 AM	3,620.90	905.22	5.5%	0.00	0.00	0.0%	0.00	0.00	0.0%
11:45 AM	3,588.10	897.03	5.4%	0.00	0.00	0.0%	0.00	0.00	0.0%
12:00 PM	3,540.03	885.01	5.3%	0.00	0.00	0.0%	0.00	0.00	0.0%
12:15 PM	3,506.48	876.62	5.3%	0.00	0.00	0.0%	0.00	0.00	0.0%
12:30 PM	3,454.25	863.56	5.2%	0.00	0.00	0.0%	0.00	0.00	0.0%
12:45 PM	3,417.65	854.41	5.2%	0.00	0.00	0.0%	0.00	0.00	0.0%
1:00 PM	3,360.00	840.00	5.1%	0.00	0.00	0.0%	0.00	0.00	0.0%
1:15 PM	3,453.01	863.25	5.2%	0.00	0.00	0.0%	0.00	0.00	0.0%
1:30 PM	3,543.44	885.86	5.3%	0.00	0.00	0.0%	0.00	0.00	0.0%
1:45 PM	3,654.11	913.53	5.5%	0.00	0.00	0.0%	0.00	0.00	0.0%
2:00 PM	3,742.07	935.52	5.6%	0.00	0.00	0.0%	0.00	0.00	0.0%
2:15 PM	3,848.79	962.20	5.8%	0.00	0.00	0.0%	0.00	0.00	0.0%
2:30 PM	3,936.14	984.04	5.9%	0.00	0.00	0.0%	0.00	0.00	0.0%
2:45 PM	4,041.59	1010.40	6.1%	0.00	0.00	0.0%	0.00	0.00	0.0%
3:00 PM	4,130.84	1032.71	6.2%	0.00	0.00	0.0%	0.00	0.00	0.0%
3:15 PM	4,237.24	1059.31	6.4%	0.00	0.00	0.0%	0.00	0.00	0.0%
3:30 PM	4,331.41	1082.85	6.5%	0.00	0.00	0.0%	0.00	0.00	0.0%
3:45 PM	4,441.60	1110.40	6.7%	0.00	0.00	0.0%	0.00	0.00	0.0%
4:00 PM	4,543.75	1135.94	6.9%	0.00	0.00	0.0%	0.00	0.00	0.0%
4:15 PM	4,661.77	1165.44	7.0%	0.00	0.00	0.0%	0.00	0.00	0.0%
4:30 PM	4,776.41	1194.10	7.2%	0.00	0.00	0.0%	0.00	0.00	0.0%
4:45 PM	4,926.07	1231.52	7.4%	0.00	0.00	0.0%	0.00	0.00	0.0%
5:00 PM	5,203.85	1300.96	7.9%	0.00	0.00	0.0%	0.00	0.00	0.0%
5:15 PM	5,520.55	1380.14	8.3%	0.00	0.00	0.0%	0.00	0.00	0.0%
5:30 PM	5,882.19	1470.55	8.9%	0.00	0.00	0.0%	0.00	0.00	0.0%
5:45 PM	6,300.68	1575.17	9.5%	0.00	0.00	0.0%	0.00	0.00	0.0%
6:00 PM	6,800.09	1700.02	10.3%	0.00	0.00	0.0%	0.00	0.00	0.0%
6:15 PM	7,647.77	1911.94	11.5%	0.00	0.00	0.0%	0.00	0.00	0.0%
6:30 PM	9,033.08	2258.27	13.6%	0.00	0.00	0.0%	0.00	0.00	0.0%
6:45 PM	11,319.48	2829.87	17.1%	0.00	0.00	0.0%	1,780.14	445.03	2.7%
7:00 PM	16,605.30	4151.32	25.1%	15,014.99	3753.75	22.7%	47,733.67	11933.42	72.1%
7:15 PM	31,875.20	4781.28	48.1%	30,116.69	4517.50	45.5%	25,504.83	3825.73	38.5%
7:18 PM	37,322.42	1119.67	56.3%	23,735.56	712.07	35.8%	18,734.02	562.02	28.3%

GRATTAN PLAYGROUND

Quantitative Shading Calculations for CPHP

AUGUST 9

Analysis Hours: 7:19 AM-7:10 PM (PDT)

MAY 3 SIMILAR

Analysis Time	CURRENT SHADOW			NEW SHADOW FROM CPHP			NOT USED		
	Area (sf)	Area/Time (sfh)	Coverage	Area (sf)	Area/Time (sfh)	Coverage	Area (sf)	Area/Time (sfh)	Coverage
7:19 AM	14,245.38	1282.08	21.5%	0.00	0.00	0.0%	0.00	0.00	0.0%
7:30 AM	10,870.57	2282.82	16.4%	0.00	0.00	0.0%	0.00	0.00	0.0%
7:45 AM	7,745.75	1936.44	11.7%	0.00	0.00	0.0%	0.00	0.00	0.0%
8:00 AM	6,032.68	1508.17	9.1%	0.00	0.00	0.0%	0.00	0.00	0.0%
8:15 AM	4,885.70	1221.42	7.4%	0.00	0.00	0.0%	0.00	0.00	0.0%
8:30 AM	4,148.89	1037.22	6.3%	0.00	0.00	0.0%	0.00	0.00	0.0%
8:45 AM	3,664.70	916.18	5.5%	0.00	0.00	0.0%	0.00	0.00	0.0%
9:00 AM	3,620.88	905.22	5.5%	0.00	0.00	0.0%	0.00	0.00	0.0%
9:15 AM	3,658.48	914.62	5.5%	0.00	0.00	0.0%	0.00	0.00	0.0%
9:30 AM	3,697.98	924.49	5.6%	0.00	0.00	0.0%	0.00	0.00	0.0%
9:45 AM	3,734.90	933.72	5.6%	0.00	0.00	0.0%	0.00	0.00	0.0%
10:00 AM	3,757.84	939.46	5.7%	0.00	0.00	0.0%	0.00	0.00	0.0%
10:15 AM	3,772.64	943.16	5.7%	0.00	0.00	0.0%	0.00	0.00	0.0%
10:30 AM	3,770.44	942.61	5.7%	0.00	0.00	0.0%	0.00	0.00	0.0%
10:45 AM	3,774.52	943.63	5.7%	0.00	0.00	0.0%	0.00	0.00	0.0%
11:00 AM	3,764.95	941.24	5.7%	0.00	0.00	0.0%	0.00	0.00	0.0%
11:15 AM	3,757.30	939.33	5.7%	0.00	0.00	0.0%	0.00	0.00	0.0%
11:30 AM	3,708.25	927.06	5.6%	0.00	0.00	0.0%	0.00	0.00	0.0%
11:45 AM	3,672.62	918.16	5.5%	0.00	0.00	0.0%	0.00	0.00	0.0%
12:00 PM	3,622.09	905.52	5.5%	0.00	0.00	0.0%	0.00	0.00	0.0%
12:15 PM	3,586.36	896.59	5.4%	0.00	0.00	0.0%	0.00	0.00	0.0%
12:30 PM	3,532.61	883.15	5.3%	0.00	0.00	0.0%	0.00	0.00	0.0%
12:45 PM	3,494.02	873.51	5.3%	0.00	0.00	0.0%	0.00	0.00	0.0%
1:00 PM	3,435.70	858.93	5.2%	0.00	0.00	0.0%	0.00	0.00	0.0%
1:15 PM	3,548.75	887.19	5.4%	0.00	0.00	0.0%	0.00	0.00	0.0%
1:30 PM	3,642.06	910.51	5.5%	0.00	0.00	0.0%	0.00	0.00	0.0%
1:45 PM	3,754.90	938.72	5.7%	0.00	0.00	0.0%	0.00	0.00	0.0%
2:00 PM	3,845.99	961.50	5.8%	0.00	0.00	0.0%	0.00	0.00	0.0%
2:15 PM	3,955.89	988.97	6.0%	0.00	0.00	0.0%	0.00	0.00	0.0%
2:30 PM	4,047.52	1011.88	6.1%	0.00	0.00	0.0%	0.00	0.00	0.0%
2:45 PM	4,157.16	1039.29	6.3%	0.00	0.00	0.0%	0.00	0.00	0.0%
3:00 PM	4,251.89	1062.97	6.4%	0.00	0.00	0.0%	0.00	0.00	0.0%
3:15 PM	4,364.20	1091.05	6.6%	0.00	0.00	0.0%	0.00	0.00	0.0%
3:30 PM	4,465.02	1116.26	6.7%	0.00	0.00	0.0%	0.00	0.00	0.0%
3:45 PM	4,583.41	1145.85	6.9%	0.00	0.00	0.0%	0.00	0.00	0.0%
4:00 PM	4,694.22	1173.55	7.1%	0.00	0.00	0.0%	0.00	0.00	0.0%
4:15 PM	4,823.39	1205.85	7.3%	0.00	0.00	0.0%	0.00	0.00	0.0%
4:30 PM	4,950.26	1237.57	7.5%	0.00	0.00	0.0%	0.00	0.00	0.0%
4:45 PM	5,097.44	1274.36	7.7%	0.00	0.00	0.0%	0.00	0.00	0.0%
5:00 PM	5,310.48	1327.62	8.0%	0.00	0.00	0.0%	0.00	0.00	0.0%
5:15 PM	5,649.82	1412.46	8.5%	0.00	0.00	0.0%	0.00	0.00	0.0%
5:30 PM	6,039.70	1509.92	9.1%	0.00	0.00	0.0%	0.00	0.00	0.0%
5:45 PM	6,496.66	1624.17	9.8%	0.00	0.00	0.0%	0.00	0.00	0.0%
6:00 PM	7,056.20	1764.05	10.7%	0.00	0.00	0.0%	0.00	0.00	0.0%
6:15 PM	8,301.00	2075.25	12.5%	0.00	0.00	0.0%	0.00	0.00	0.0%
6:30 PM	10,019.00	2504.75	15.1%	0.00	0.00	0.0%	0.00	0.00	0.0%
6:45 PM	13,445.43	4571.45	20.3%	0.00	0.00	0.0%	16,621.06	5651.16	25.1%
7:10 PM	37,757.30	7929.03	57.0%	28,198.34	5921.65	42.6%	26,568.25	5579.33	40.1%

AUGUST 16

Analysis Hours: 7:25 AM-7:02 PM (PDT)

APRIL 26 SIMILAR

Analysis Time	CURRENT SHADOW			NEW SHADOW FROM CPHP			NOT USED		
	Area (sf)	Area/Time (sfh)	Coverage	Area (sf)	Area/Time (sfh)	Coverage	Area (sf)	Area/Time (sfh)	Coverage
7:25 AM	14,542.43	581.70	22.0%	0.00	0.00	0.0%	0.00	0.00	0.0%
7:30 AM	12,910.20	2194.73	19.5%	0.00	0.00	0.0%	0.00	0.00	0.0%
7:45 AM	8,974.68	2243.67	13.5%	0.00	0.00	0.0%	0.00	0.00	0.0%
8:00 AM	6,823.36	1705.84	10.3%	0.00	0.00	0.0%	0.00	0.00	0.0%
8:15 AM	5,425.58	1356.39	8.2%	0.00	0.00	0.0%	0.00	0.00	0.0%
8:30 AM	4,549.56	1137.39	6.9%	0.00	0.00	0.0%	0.00	0.00	0.0%
8:45 AM	3,943.37	985.84	6.0%	0.00	0.00	0.0%	0.00	0.00	0.0%
9:00 AM	3,787.66	946.91	5.7%	0.00	0.00	0.0%	0.00	0.00	0.0%
9:15 AM	3,801.28	950.32	5.7%	0.00	0.00	0.0%	0.00	0.00	0.0%
9:30 AM	3,832.64	958.16	5.8%	0.00	0.00	0.0%	0.00	0.00	0.0%
9:45 AM	3,863.30	965.83	5.8%	0.00	0.00	0.0%	0.00	0.00	0.0%
10:00 AM	3,880.05	970.01	5.9%	0.00	0.00	0.0%	0.00	0.00	0.0%
10:15 AM	3,891.89	972.97	5.9%	0.00	0.00	0.0%	0.00	0.00	0.0%
10:30 AM	3,884.29	971.07	5.9%	0.00	0.00	0.0%	0.00	0.00	0.0%
10:45 AM	3,884.20	971.05	5.9%	0.00	0.00	0.0%	0.00	0.00	0.0%
11:00 AM	3,870.55	967.64	5.8%	0.00	0.00	0.0%	0.00	0.00	0.0%
11:15 AM	3,860.91	965.23	5.8%	0.00	0.00	0.0%	0.00	0.00	0.0%
11:30 AM	3,807.91	951.98	5.7%	0.00	0.00	0.0%	0.00	0.00	0.0%
11:45 AM	3,768.93	942.23	5.7%	0.00	0.00	0.0%	0.00	0.00	0.0%
12:00 PM	3,715.67	928.92	5.6%	0.00	0.00	0.0%	0.00	0.00	0.0%
12:15 PM	3,677.37	919.34	5.6%	0.00	0.00	0.0%	0.00	0.00	0.0%
12:30 PM	3,621.56	905.39	5.5%	0.00	0.00	0.0%	0.00	0.00	0.0%
12:45 PM	3,581.09	895.27	5.4%	0.00	0.00	0.0%	0.00	0.00	0.0%
1:00 PM	3,540.89	885.22	5.3%	0.00	0.00	0.0%	0.00	0.00	0.0%
1:15 PM	3,660.80	915.20	5.5%	0.00	0.00	0.0%	0.00	0.00	0.0%
1:30 PM	3,757.23	939.31	5.7%	0.00	0.00	0.0%	0.00	0.00	0.0%
1:45 PM	3,872.54	968.13	5.8%	0.00	0.00	0.0%	0.00	0.00	0.0%
2:00 PM	3,967.43	991.86	6.0%	0.00	0.00	0.0%	0.00	0.00	0.0%
2:15 PM	4,081.04	1020.26	6.2%	0.00	0.00	0.0%	0.00	0.00	0.0%
2:30 PM	4,177.51	1044.38	6.3%	0.00	0.00	0.0%	0.00	0.00	0.0%
2:45 PM	4,292.59	1073.15	6.5%	0.00	0.00	0.0%	0.00	0.00	0.0%
3:00 PM	4,393.45	1098.36	6.6%	0.00	0.00	0.0%	0.00	0.00	0.0%
3:15 PM	4,513.05	1128.26	6.8%	0.00	0.00	0.0%	0.00	0.00	0.0%
3:30 PM	4,622.14	1155.54	7.0%	0.00	0.00	0.0%	0.00	0.00	0.0%
3:45 PM	4,750.41	1187.60	7.2%	0.00	0.00	0.0%	0.00	0.00	0.0%
4:00 PM	4,872.52	1218.13	7.4%	0.00	0.00	0.0%	0.00	0.00	0.0%
4:15 PM	5,015.26	1253.82	7.6%	0.00	0.00	0.0%	0.00	0.00	0.0%
4:30 PM	5,157.62	1289.41	7.8%	0.00	0.00	0.0%	0.00	0.00	0.0%
4:45 PM	5,324.31	1331.08	8.0%	0.00	0.00	0.0%	0.00	0.00	0.0%
5:00 PM	5,499.15	1374.79	8.3%	0.00	0.00	0.0%	0.00	0.00	0.0%
5:15 PM	5,813.02	1453.26	8.8%	0.00	0.00	0.0%	0.00	0.00	0.0%
5:30 PM	6,240.15	1560.04	9.4%	0.00	0.00	0.0%	0.00	0.00	0.0%
5:45 PM	6,747.23	1686.81	10.2%	0.00	0.00	0.0%	0.00	0.00	0.0%
6:00 PM	7,616.50	1904.12	11.5%	0.00	0.00	0.0%	0.00	0.00	0.0%
6:15 PM	9,108.39	2277.10	13.7%	0.00	0.00	0.0%	0.00	0.00	0.0%
6:30 PM	11,572.93	2893.23	17.5%	0.00	0.00	0.0%	414.47	103.62	0.6%
6:45 PM	17,068.84	4608.59	25.8%	7,804.03	2107.09	11.8%	31,476.32	8498.61	47.5%
7:02 PM	37,300.43	5222.06	56.3%	28,936.72	4051.14	43.7%	28,076.12	3930.66	42.4%

GRATTAN PLAYGROUND

AUGUST 23

Analysis Hours: 7:31 AM-6:52 PM (PDT)

APRIL 19 SIMILAR

Analysis Time	CURRENT SHADOW			NEW SHADOW FROM CPHP			NOT USED		
	Area (sf)	Area/Time (sfh)	Coverage	Area (sf)	Area/Time (sfh)	Coverage	Area (sf)	Area/Time (sfh)	Coverage
7:31 AM	14,828.99	1631.19	22.4%	0.00	0.00	0.0%	0.00	0.00	0.0%
7:45 AM	10,629.30	2444.74	16.0%	0.00	0.00	0.0%	0.00	0.00	0.0%
8:00 AM	7,743.01	1935.75	11.7%	0.00	0.00	0.0%	0.00	0.00	0.0%
8:15 AM	6,092.71	1523.18	9.2%	0.00	0.00	0.0%	0.00	0.00	0.0%
8:30 AM	5,013.01	1253.25	7.6%	0.00	0.00	0.0%	0.00	0.00	0.0%
8:45 AM	4,298.32	1074.58	6.5%	0.00	0.00	0.0%	0.00	0.00	0.0%
9:00 AM	3,984.46	996.12	6.0%	0.00	0.00	0.0%	0.00	0.00	0.0%
9:15 AM	3,968.94	992.24	6.0%	0.00	0.00	0.0%	0.00	0.00	0.0%
9:30 AM	3,988.49	997.12	6.0%	0.00	0.00	0.0%	0.00	0.00	0.0%
9:45 AM	4,010.92	1002.73	6.1%	0.00	0.00	0.0%	0.00	0.00	0.0%
10:00 AM	4,019.94	1004.99	6.1%	0.00	0.00	0.0%	0.00	0.00	0.0%
10:15 AM	4,027.32	1006.83	6.1%	0.00	0.00	0.0%	0.00	0.00	0.0%
10:30 AM	4,013.26	1003.32	6.1%	0.00	0.00	0.0%	0.00	0.00	0.0%
10:45 AM	4,008.23	1002.06	6.1%	0.00	0.00	0.0%	0.00	0.00	0.0%
11:00 AM	3,989.71	997.43	6.0%	0.00	0.00	0.0%	0.00	0.00	0.0%
11:15 AM	3,976.22	994.05	6.0%	0.00	0.00	0.0%	0.00	0.00	0.0%
11:30 AM	3,918.57	979.64	5.9%	0.00	0.00	0.0%	0.00	0.00	0.0%
11:45 AM	3,875.89	968.97	5.9%	0.00	0.00	0.0%	0.00	0.00	0.0%
12:00 PM	3,819.50	954.87	5.8%	0.00	0.00	0.0%	0.00	0.00	0.0%
12:15 PM	3,778.25	944.56	5.7%	0.00	0.00	0.0%	0.00	0.00	0.0%
12:30 PM	3,720.27	930.07	5.6%	0.00	0.00	0.0%	0.00	0.00	0.0%
12:45 PM	3,677.48	919.37	5.6%	0.00	0.00	0.0%	0.00	0.00	0.0%
1:00 PM	3,668.95	917.24	5.5%	0.00	0.00	0.0%	0.00	0.00	0.0%
1:15 PM	3,791.59	947.90	5.7%	0.00	0.00	0.0%	0.00	0.00	0.0%
1:30 PM	3,891.27	972.82	5.9%	0.00	0.00	0.0%	0.00	0.00	0.0%
1:45 PM	4,009.84	1002.46	6.1%	0.00	0.00	0.0%	0.00	0.00	0.0%
2:00 PM	4,108.84	1027.21	6.2%	0.00	0.00	0.0%	0.00	0.00	0.0%
2:15 PM	4,226.80	1056.70	6.4%	0.00	0.00	0.0%	0.00	0.00	0.0%
2:30 PM	4,328.85	1082.21	6.5%	0.00	0.00	0.0%	0.00	0.00	0.0%
2:45 PM	4,450.62	1112.66	6.7%	0.00	0.00	0.0%	0.00	0.00	0.0%
3:00 PM	4,558.98	1139.74	6.9%	0.00	0.00	0.0%	0.00	0.00	0.0%
3:15 PM	4,687.73	1171.93	7.1%	0.00	0.00	0.0%	0.00	0.00	0.0%
3:30 PM	4,806.65	1201.66	7.3%	0.00	0.00	0.0%	0.00	0.00	0.0%
3:45 PM	4,947.68	1236.92	7.5%	0.00	0.00	0.0%	0.00	0.00	0.0%
4:00 PM	5,083.07	1270.77	7.7%	0.00	0.00	0.0%	0.00	0.00	0.0%
4:15 PM	5,243.18	1310.79	7.9%	0.00	0.00	0.0%	0.00	0.00	0.0%
4:30 PM	5,405.48	1351.37	8.2%	0.00	0.00	0.0%	0.00	0.00	0.0%
4:45 PM	5,597.16	1399.29	8.4%	0.00	0.00	0.0%	0.00	0.00	0.0%
5:00 PM	5,802.10	1450.53	8.8%	0.00	0.00	0.0%	0.00	0.00	0.0%
5:15 PM	6,048.37	1512.09	9.1%	0.00	0.00	0.0%	0.00	0.00	0.0%
5:30 PM	6,502.53	1625.63	9.8%	0.00	0.00	0.0%	0.00	0.00	0.0%
5:45 PM	7,138.86	1784.72	10.8%	0.00	0.00	0.0%	0.00	0.00	0.0%
6:00 PM	8,500.13	2125.03	12.8%	0.00	0.00	0.0%	0.00	0.00	0.0%
6:15 PM	10,514.84	2628.71	15.9%	0.00	0.00	0.0%	0.00	0.00	0.0%
6:30 PM	14,502.89	3625.72	21.9%	0.00	0.00	0.0%	3,100.06	775.01	4.7%
6:45 PM	24,538.11	4662.24	37.0%	23,813.25	4524.52	35.9%	20,690.88	3931.27	31.2%
6:52 PM	37,950.03	2277.00	57.3%	22,393.97	1343.64	33.8%	19,603.72	1176.22	29.6%

AUGUST 30

Analysis Hours: 7:37 AM-6:42 PM (PDT)

APRIL 12 SIMILAR

Analysis Time	CURRENT SHADOW			NEW SHADOW FROM CPHP			NOT USED		
	Area (sf)	Area/Time (sfh)	Coverage	Area (sf)	Area/Time (sfh)	Coverage	Area (sf)	Area/Time (sfh)	Coverage
7:37 AM	15,151.71	909.10	22.9%	0.00	0.00	0.0%	0.00	0.00	0.0%
7:45 AM	12,608.64	2395.64	19.0%	0.00	0.00	0.0%	0.00	0.00	0.0%
8:00 AM	8,947.98	2236.99	13.5%	0.00	0.00	0.0%	0.00	0.00	0.0%
8:15 AM	6,895.17	1723.79	10.4%	0.00	0.00	0.0%	0.00	0.00	0.0%
8:30 AM	5,556.63	1389.16	8.4%	0.00	0.00	0.0%	0.00	0.00	0.0%
8:45 AM	4,708.59	1177.15	7.1%	0.00	0.00	0.0%	0.00	0.00	0.0%
9:00 AM	4,218.02	1054.50	6.4%	0.00	0.00	0.0%	0.00	0.00	0.0%
9:15 AM	4,163.06	1040.76	6.3%	0.00	0.00	0.0%	0.00	0.00	0.0%
9:30 AM	4,165.05	1041.26	6.3%	0.00	0.00	0.0%	0.00	0.00	0.0%
9:45 AM	4,177.45	1044.36	6.3%	0.00	0.00	0.0%	0.00	0.00	0.0%
10:00 AM	4,177.05	1044.26	6.3%	0.00	0.00	0.0%	0.00	0.00	0.0%
10:15 AM	4,179.19	1044.80	6.3%	0.00	0.00	0.0%	0.00	0.00	0.0%
10:30 AM	4,157.54	1039.38	6.3%	0.00	0.00	0.0%	0.00	0.00	0.0%
10:45 AM	4,146.71	1036.68	6.3%	0.00	0.00	0.0%	0.00	0.00	0.0%
11:00 AM	4,122.29	1030.57	6.2%	0.00	0.00	0.0%	0.00	0.00	0.0%
11:15 AM	4,104.05	1026.01	6.2%	0.00	0.00	0.0%	0.00	0.00	0.0%
11:30 AM	4,041.18	1010.30	6.1%	0.00	0.00	0.0%	0.00	0.00	0.0%
11:45 AM	3,994.28	998.57	6.0%	0.00	0.00	0.0%	0.00	0.00	0.0%
12:00 PM	3,934.39	983.60	5.9%	0.00	0.00	0.0%	0.00	0.00	0.0%
12:15 PM	3,890.09	972.52	5.9%	0.00	0.00	0.0%	0.00	0.00	0.0%
12:30 PM	3,829.43	957.36	5.8%	0.00	0.00	0.0%	0.00	0.00	0.0%
12:45 PM	3,784.44	946.11	5.7%	0.00	0.00	0.0%	0.00	0.00	0.0%
1:00 PM	3,813.59	953.40	5.8%	0.00	0.00	0.0%	0.00	0.00	0.0%
1:15 PM	3,938.64	984.66	5.9%	0.00	0.00	0.0%	0.00	0.00	0.0%
1:30 PM	4,042.01	1010.50	6.1%	0.00	0.00	0.0%	0.00	0.00	0.0%
1:45 PM	4,164.21	1041.05	6.3%	0.00	0.00	0.0%	0.00	0.00	0.0%
2:00 PM	4,268.05	1067.01	6.4%	0.00	0.00	0.0%	0.00	0.00	0.0%
2:15 PM	4,391.44	1097.86	6.6%	0.00	0.00	0.0%	0.00	0.00	0.0%
2:30 PM	4,500.05	1125.01	6.8%	0.00	0.00	0.0%	0.00	0.00	0.0%
2:45 PM	4,629.68	1157.42	7.0%	0.00	0.00	0.0%	0.00	0.00	0.0%
3:00 PM	4,747.02	1186.75	7.2%	0.00	0.00	0.0%	0.00	0.00	0.0%
3:15 PM	4,886.52	1221.63	7.4%	0.00	0.00	0.0%	0.00	0.00	0.0%
3:30 PM	5,017.80	1254.45	7.6%	0.00	0.00	0.0%	0.00	0.00	0.0%
3:45 PM	5,173.36	1293.34	7.8%	0.00	0.00	0.0%	0.00	0.00	0.0%
4:00 PM	5,326.29	1331.57	8.0%	0.00	0.00	0.0%	0.00	0.00	0.0%
4:15 PM	5,507.92	1376.98	8.3%	0.00	0.00	0.0%	0.00	0.00	0.0%
4:30 PM	5,694.97	1423.74	8.6%	0.00	0.00	0.0%	0.00	0.00	0.0%
4:45 PM	5,918.60	1479.65	8.9%	0.00	0.00	0.0%	0.00	0.00	0.0%
5:00 PM	6,162.03	1540.51	9.3%	0.00	0.00	0.0%	0.00	0.00	0.0%
5:15 PM	6,459.31	1614.83	9.8%	0.00	0.00	0.0%	0.00	0.00	0.0%
5:30 PM	6,836.28	1709.07	10.3%	0.00	0.00	0.0%	0.00	0.00	0.0%
5:45 PM	7,949.43	1987.36	12.0%	0.00	0.00	0.0%	0.00	0.00	0.0%
6:00 PM	9,635.31	2408.83	14.5%	0.00	0.00	0.0%	0.00	0.00	0.0%
6:15 PM	12,774.27	3193.57	19.3%	0.00	0.00	0.0%	0.00	0.00	0.0%
6:30 PM	19,675.43	4525.35	29.7%	169.62	39.01	0.3%	173.40	39.88	0.3%
6:42 PM	40,242.10	4426.63	60.7%	9,832.17	1081.54	14.8%	6,346.19	698.08	9.6%

GRATTAN PLAYGROUND

Quantitative Shading Calculations for CPHP

SEPTEMBER 6

Analysis Hours: 7:44 AM-6:31 PM (PDT)

APRIL 5 SIMILAR

Analysis Time	CURRENT SHADOW			NEW SHADOW FROM CPHP			NOT USED		
	Area (sf)	Area/Time (sfh)	Coverage	Area (sf)	Area/Time (sfh)	Coverage	Area (sf)	Area/Time (sfh)	Coverage
7:44 AM	15,505.27	2015.69	23.4%	0.00	0.00	0.0%	0.00	0.00	0.0%
8:00 AM	10,489.11	2622.28	15.8%	0.00	0.00	0.0%	0.00	0.00	0.0%
8:15 AM	7,862.86	1965.71	11.9%	0.00	0.00	0.0%	0.00	0.00	0.0%
8:30 AM	6,192.74	1548.18	9.3%	0.00	0.00	0.0%	0.00	0.00	0.0%
8:45 AM	5,185.31	1296.33	7.8%	0.00	0.00	0.0%	0.00	0.00	0.0%
9:00 AM	4,504.77	1126.19	6.8%	0.00	0.00	0.0%	0.00	0.00	0.0%
9:15 AM	4,385.42	1096.36	6.6%	0.00	0.00	0.0%	0.00	0.00	0.0%
9:30 AM	4,362.84	1090.71	6.6%	0.00	0.00	0.0%	0.00	0.00	0.0%
9:45 AM	4,363.46	1090.87	6.6%	0.00	0.00	0.0%	0.00	0.00	0.0%
10:00 AM	4,352.10	1088.03	6.6%	0.00	0.00	0.0%	0.00	0.00	0.0%
10:15 AM	4,347.44	1086.86	6.6%	0.00	0.00	0.0%	0.00	0.00	0.0%
10:30 AM	4,316.95	1079.24	6.5%	0.00	0.00	0.0%	0.00	0.00	0.0%
10:45 AM	4,299.41	1074.85	6.5%	0.00	0.00	0.0%	0.00	0.00	0.0%
11:00 AM	4,268.59	1067.15	6.4%	0.00	0.00	0.0%	0.00	0.00	0.0%
11:15 AM	4,244.50	1061.12	6.4%	0.00	0.00	0.0%	0.00	0.00	0.0%
11:30 AM	4,175.82	1043.96	6.3%	0.00	0.00	0.0%	0.00	0.00	0.0%
11:45 AM	4,124.33	1031.08	6.2%	0.00	0.00	0.0%	0.00	0.00	0.0%
12:00 PM	4,060.43	1015.11	6.1%	0.00	0.00	0.0%	0.00	0.00	0.0%
12:15 PM	4,013.05	1003.26	6.1%	0.00	0.00	0.0%	0.00	0.00	0.0%
12:30 PM	3,949.70	987.43	6.0%	0.00	0.00	0.0%	0.00	0.00	0.0%
12:45 PM	3,902.01	975.50	5.9%	0.00	0.00	0.0%	0.00	0.00	0.0%
1:00 PM	3,973.98	993.49	6.0%	0.00	0.00	0.0%	0.00	0.00	0.0%
1:15 PM	4,101.99	1025.50	6.2%	0.00	0.00	0.0%	0.00	0.00	0.0%
1:30 PM	4,209.47	1052.37	6.4%	0.00	0.00	0.0%	0.00	0.00	0.0%
1:45 PM	4,336.34	1084.09	6.5%	0.00	0.00	0.0%	0.00	0.00	0.0%
2:00 PM	4,445.55	1111.39	6.7%	0.00	0.00	0.0%	0.00	0.00	0.0%
2:15 PM	4,575.21	1143.80	6.9%	0.00	0.00	0.0%	0.00	0.00	0.0%
2:30 PM	4,691.73	1172.93	7.1%	0.00	0.00	0.0%	0.00	0.00	0.0%
2:45 PM	4,830.69	1207.67	7.3%	0.00	0.00	0.0%	0.00	0.00	0.0%
3:00 PM	4,958.89	1239.72	7.5%	0.00	0.00	0.0%	0.00	0.00	0.0%
3:15 PM	5,111.34	1277.83	7.7%	0.00	0.00	0.0%	0.00	0.00	0.0%
3:30 PM	5,257.37	1314.34	7.9%	0.00	0.00	0.0%	0.00	0.00	0.0%
3:45 PM	5,431.36	1357.84	8.2%	0.00	0.00	0.0%	0.00	0.00	0.0%
4:00 PM	5,605.26	1401.32	8.5%	0.00	0.00	0.0%	0.00	0.00	0.0%
4:15 PM	5,813.40	1453.35	8.8%	0.00	0.00	0.0%	0.00	0.00	0.0%
4:30 PM	6,031.77	1507.94	9.1%	0.00	0.00	0.0%	0.00	0.00	0.0%
4:45 PM	6,296.25	1574.06	9.5%	0.00	0.00	0.0%	0.00	0.00	0.0%
5:00 PM	6,589.89	1647.47	9.9%	0.00	0.00	0.0%	0.00	0.00	0.0%
5:15 PM	6,954.50	1738.62	10.5%	0.00	0.00	0.0%	0.00	0.00	0.0%
5:30 PM	7,610.34	1902.59	11.5%	0.00	0.00	0.0%	0.00	0.00	0.0%
5:45 PM	9,033.43	2258.36	13.6%	0.00	0.00	0.0%	0.00	0.00	0.0%
6:00 PM	11,750.11	2937.53	17.7%	0.00	0.00	0.0%	0.00	0.00	0.0%
6:15 PM	16,414.59	4431.94	24.8%	0.00	0.00	0.0%	0.00	0.00	0.0%
6:31 PM	43,156.75	6041.94	65.1%	0.00	0.00	0.0%	0.00	0.00	0.0%

SEPTEMBER 13

Analysis Hours: 7:50 AM-6:21 PM (PDT)

MARCH 29 SIMILAR

Analysis Time	CURRENT SHADOW			NEW SHADOW FROM CPHP			NOT USED		
	Area (sf)	Area/Time (sfh)	Coverage	Area (sf)	Area/Time (sfh)	Coverage	Area (sf)	Area/Time (sfh)	Coverage
7:50 AM	16,021.95	1281.76	24.2%	0.00	0.00	0.0%	0.00	0.00	0.0%
8:00 AM	12,615.43	2649.24	19.0%	0.00	0.00	0.0%	0.00	0.00	0.0%
8:15 AM	9,037.01	2259.25	13.6%	0.00	0.00	0.0%	0.00	0.00	0.0%
8:30 AM	7,022.59	1755.65	10.6%	0.00	0.00	0.0%	0.00	0.00	0.0%
8:45 AM	5,754.13	1438.53	8.7%	0.00	0.00	0.0%	0.00	0.00	0.0%
9:00 AM	4,907.43	1226.86	7.4%	0.00	0.00	0.0%	0.00	0.00	0.0%
9:15 AM	4,637.45	1159.36	7.0%	0.00	0.00	0.0%	0.00	0.00	0.0%
9:30 AM	4,582.67	1145.67	6.9%	0.00	0.00	0.0%	0.00	0.00	0.0%
9:45 AM	4,569.07	1142.27	6.9%	0.00	0.00	0.0%	0.00	0.00	0.0%
10:00 AM	4,545.00	1136.25	6.9%	0.00	0.00	0.0%	0.00	0.00	0.0%
10:15 AM	4,532.08	1133.02	6.8%	0.00	0.00	0.0%	0.00	0.00	0.0%
10:30 AM	4,491.84	1122.96	6.8%	0.00	0.00	0.0%	0.00	0.00	0.0%
10:45 AM	4,466.50	1116.62	6.7%	0.00	0.00	0.0%	0.00	0.00	0.0%
11:00 AM	4,428.38	1107.09	6.7%	0.00	0.00	0.0%	0.00	0.00	0.0%
11:15 AM	4,397.51	1099.38	6.6%	0.00	0.00	0.0%	0.00	0.00	0.0%
11:30 AM	4,322.34	1080.59	6.5%	0.00	0.00	0.0%	0.00	0.00	0.0%
11:45 AM	4,266.07	1066.52	6.4%	0.00	0.00	0.0%	0.00	0.00	0.0%
12:00 PM	4,197.86	1049.47	6.3%	0.00	0.00	0.0%	0.00	0.00	0.0%
12:15 PM	4,146.98	1036.74	6.3%	0.00	0.00	0.0%	0.00	0.00	0.0%
12:30 PM	4,080.55	1020.14	6.2%	0.00	0.00	0.0%	0.00	0.00	0.0%
12:45 PM	4,040.73	1010.18	6.1%	0.00	0.00	0.0%	0.00	0.00	0.0%
1:00 PM	4,150.19	1037.55	6.3%	0.00	0.00	0.0%	0.00	0.00	0.0%
1:15 PM	4,281.80	1070.45	6.5%	0.00	0.00	0.0%	0.00	0.00	0.0%
1:30 PM	4,393.86	1098.46	6.6%	0.00	0.00	0.0%	0.00	0.00	0.0%
1:45 PM	4,526.11	1131.53	6.8%	0.00	0.00	0.0%	0.00	0.00	0.0%
2:00 PM	4,641.62	1160.41	7.0%	0.00	0.00	0.0%	0.00	0.00	0.0%
2:15 PM	4,779.02	1194.75	7.2%	0.00	0.00	0.0%	0.00	0.00	0.0%
2:30 PM	4,904.53	1226.13	7.4%	0.00	0.00	0.0%	0.00	0.00	0.0%
2:45 PM	5,054.91	1263.73	7.6%	0.00	0.00	0.0%	0.00	0.00	0.0%
3:00 PM	5,195.78	1298.95	7.8%	0.00	0.00	0.0%	0.00	0.00	0.0%
3:15 PM	5,364.25	1341.06	8.1%	0.00	0.00	0.0%	0.00	0.00	0.0%
3:30 PM	5,528.07	1382.02	8.3%	0.00	0.00	0.0%	0.00	0.00	0.0%
3:45 PM	5,724.14	1431.03	8.6%	0.00	0.00	0.0%	0.00	0.00	0.0%
4:00 PM	5,924.14	1481.04	8.9%	0.00	0.00	0.0%	0.00	0.00	0.0%
4:15 PM	6,165.36	1541.34	9.3%	0.00	0.00	0.0%	0.00	0.00	0.0%
4:30 PM	6,423.62	1605.91	9.7%	0.00	0.00	0.0%	0.00	0.00	0.0%
4:45 PM	6,740.35	1685.09	10.2%	0.00	0.00	0.0%	0.00	0.00	0.0%
5:00 PM	7,099.57	1774.89	10.7%	0.00	0.00	0.0%	0.00	0.00	0.0%
5:15 PM	7,647.15	1911.79	11.5%	0.00	0.00	0.0%	0.00	0.00	0.0%
5:30 PM	8,868.66	2217.17	13.4%	0.00	0.00	0.0%	0.00	0.00	0.0%
5:45 PM	11,070.01	2767.50	16.7%	0.00	0.00	0.0%	0.00	0.00	0.0%
6:00 PM	14,919.71	3729.93	22.5%	0.00	0.00	0.0%	0.00	0.00	0.0%
6:15 PM	31,858.61	5734.55	48.1%	0.00	0.00	0.0%	0.00	0.00	0.0%
6:21 PM	46,440.41	2322.02	70.1%	0.00	0.00	0.0%	0.00	0.00	0.0%

GRATTAN PLAYGROUND

Quantitative Shading Calculations for CPHP

SEPTEMBER 20

Analysis Hours: 7:57 AM-6:09 PM (PDT)

APPROXIMATE EQUINOXES
MARCH 22 SIMILAR

Analysis Time	CURRENT SHADOW			NEW SHADOW FROM CPHP			NOT USED		
	Area (sf)	Area/Time (sfh)	Coverage	Area (sf)	Area/Time (sfh)	Coverage	Area (sf)	Area/Time (sfh)	Coverage
7:57 AM	18,667.41	373.35	28.2%	0.00	0.00	0.0%	0.00	0.00	0.0%
8:00 AM	17,053.39	2558.01	25.7%	0.00	0.00	0.0%	0.00	0.00	0.0%
8:15 AM	11,145.37	2786.34	16.8%	0.00	0.00	0.0%	0.00	0.00	0.0%
8:30 AM	8,272.23	2068.06	12.5%	0.00	0.00	0.0%	0.00	0.00	0.0%
8:45 AM	6,625.09	1656.27	10.0%	0.00	0.00	0.0%	0.00	0.00	0.0%
9:00 AM	5,499.43	1374.86	8.3%	0.00	0.00	0.0%	0.00	0.00	0.0%
9:15 AM	4,946.59	1236.65	7.5%	0.00	0.00	0.0%	0.00	0.00	0.0%
9:30 AM	4,822.95	1205.74	7.3%	0.00	0.00	0.0%	0.00	0.00	0.0%
9:45 AM	4,795.22	1198.80	7.2%	0.00	0.00	0.0%	0.00	0.00	0.0%
10:00 AM	4,756.09	1189.02	7.2%	0.00	0.00	0.0%	0.00	0.00	0.0%
10:15 AM	4,733.20	1183.30	7.1%	0.00	0.00	0.0%	0.00	0.00	0.0%
10:30 AM	4,682.17	1170.54	7.1%	0.00	0.00	0.0%	0.00	0.00	0.0%
10:45 AM	4,648.27	1162.07	7.0%	0.00	0.00	0.0%	0.00	0.00	0.0%
11:00 AM	4,602.09	1150.52	6.9%	0.00	0.00	0.0%	0.00	0.00	0.0%
11:15 AM	4,563.39	1140.85	6.9%	0.00	0.00	0.0%	0.00	0.00	0.0%
11:30 AM	4,481.00	1120.25	6.8%	0.00	0.00	0.0%	0.00	0.00	0.0%
11:45 AM	4,419.59	1104.90	6.7%	0.00	0.00	0.0%	0.00	0.00	0.0%
12:00 PM	4,346.80	1086.70	6.6%	0.00	0.00	0.0%	0.00	0.00	0.0%
12:15 PM	4,292.34	1073.08	6.5%	0.00	0.00	0.0%	0.00	0.00	0.0%
12:30 PM	4,222.69	1055.67	6.4%	0.00	0.00	0.0%	0.00	0.00	0.0%
12:45 PM	4,226.29	1056.57	6.4%	0.00	0.00	0.0%	0.00	0.00	0.0%
1:00 PM	4,342.30	1085.57	6.6%	0.00	0.00	0.0%	0.00	0.00	0.0%
1:15 PM	4,477.82	1119.46	6.8%	0.00	0.00	0.0%	0.00	0.00	0.0%
1:30 PM	4,594.82	1148.70	6.9%	0.00	0.00	0.0%	0.00	0.00	0.0%
1:45 PM	4,733.43	1183.36	7.1%	0.00	0.00	0.0%	0.00	0.00	0.0%
2:00 PM	4,856.30	1214.07	7.3%	0.00	0.00	0.0%	0.00	0.00	0.0%
2:15 PM	5,002.86	1250.71	7.6%	0.00	0.00	0.0%	0.00	0.00	0.0%
2:30 PM	5,139.05	1284.76	7.8%	0.00	0.00	0.0%	0.00	0.00	0.0%
2:45 PM	5,302.73	1325.68	8.0%	0.00	0.00	0.0%	0.00	0.00	0.0%
3:00 PM	5,458.79	1364.70	8.2%	0.00	0.00	0.0%	0.00	0.00	0.0%
3:15 PM	5,646.05	1411.51	8.5%	0.00	0.00	0.0%	0.00	0.00	0.0%
3:30 PM	5,831.38	1457.84	8.8%	0.00	0.00	0.0%	0.00	0.00	0.0%
3:45 PM	6,055.18	1513.80	9.1%	0.00	0.00	0.0%	0.00	0.00	0.0%
4:00 PM	6,286.85	1571.71	9.5%	0.00	0.00	0.0%	0.00	0.00	0.0%
4:15 PM	6,569.66	1642.42	9.9%	0.00	0.00	0.0%	0.00	0.00	0.0%
4:30 PM	6,877.87	1719.47	10.4%	0.00	0.00	0.0%	0.00	0.00	0.0%
4:45 PM	7,262.25	1815.56	11.0%	0.00	0.00	0.0%	0.00	0.00	0.0%
5:00 PM	7,731.93	1932.98	11.7%	0.00	0.00	0.0%	0.00	0.00	0.0%
5:15 PM	8,853.55	2213.39	13.4%	0.00	0.00	0.0%	0.00	0.00	0.0%
5:30 PM	10,789.23	2697.31	16.3%	0.00	0.00	0.0%	0.00	0.00	0.0%
5:45 PM	14,201.48	3550.37	21.4%	0.00	0.00	0.0%	0.00	0.00	0.0%
6:00 PM	25,559.55	5367.51	38.6%	0.00	0.00	0.0%	0.00	0.00	0.0%
6:09 PM	52,637.25	4210.98	79.5%	0.00	0.00	0.0%	0.00	0.00	0.0%

SEPTEMBER 27

Analysis Hours: 8:03 AM-5:58 PM (PDT)

MARCH 15 SIMILAR

Analysis Time	CURRENT SHADOW			NEW SHADOW FROM CPHP			NOT USED		
	Area (sf)	Area/Time (sfh)	Coverage	Area (sf)	Area/Time (sfh)	Coverage	Area (sf)	Area/Time (sfh)	Coverage
8:03 AM	22,514.77	2251.48	34.0%	0.00	0.00	0.0%	0.00	0.00	0.0%
8:15 AM	15,925.99	3503.72	24.0%	0.00	0.00	0.0%	0.00	0.00	0.0%
8:30 AM	11,023.24	2755.81	16.6%	0.00	0.00	0.0%	0.00	0.00	0.0%
8:45 AM	8,375.32	2093.83	12.6%	0.00	0.00	0.0%	0.00	0.00	0.0%
9:00 AM	6,713.41	1678.35	10.1%	0.00	0.00	0.0%	0.00	0.00	0.0%
9:15 AM	5,767.82	1441.95	8.7%	0.00	0.00	0.0%	0.00	0.00	0.0%
9:30 AM	5,370.36	1342.59	8.1%	0.00	0.00	0.0%	0.00	0.00	0.0%
9:45 AM	5,173.81	1293.45	7.8%	0.00	0.00	0.0%	0.00	0.00	0.0%
10:00 AM	5,032.65	1258.16	7.6%	0.00	0.00	0.0%	0.00	0.00	0.0%
10:15 AM	4,954.19	1238.55	7.5%	0.00	0.00	0.0%	0.00	0.00	0.0%
10:30 AM	4,886.92	1221.73	7.4%	0.00	0.00	0.0%	0.00	0.00	0.0%
10:45 AM	4,844.84	1211.21	7.3%	0.00	0.00	0.0%	0.00	0.00	0.0%
11:00 AM	4,789.57	1197.39	7.2%	0.00	0.00	0.0%	0.00	0.00	0.0%
11:15 AM	4,747.85	1186.96	7.2%	0.00	0.00	0.0%	0.00	0.00	0.0%
11:30 AM	4,657.28	1164.32	7.0%	0.00	0.00	0.0%	0.00	0.00	0.0%
11:45 AM	4,585.26	1146.32	6.9%	0.00	0.00	0.0%	0.00	0.00	0.0%
12:00 PM	4,507.44	1126.86	6.8%	0.00	0.00	0.0%	0.00	0.00	0.0%
12:15 PM	4,449.32	1112.33	6.7%	0.00	0.00	0.0%	0.00	0.00	0.0%
12:30 PM	4,376.12	1094.03	6.6%	0.00	0.00	0.0%	0.00	0.00	0.0%
12:45 PM	4,433.17	1108.29	6.7%	0.00	0.00	0.0%	0.00	0.00	0.0%
1:00 PM	4,555.27	1138.82	6.9%	0.00	0.00	0.0%	0.00	0.00	0.0%
1:15 PM	4,692.34	1173.08	7.1%	0.00	0.00	0.0%	0.00	0.00	0.0%
1:30 PM	4,812.28	1203.07	7.3%	0.00	0.00	0.0%	0.00	0.00	0.0%
1:45 PM	4,958.35	1239.59	7.5%	0.00	0.00	0.0%	0.00	0.00	0.0%
2:00 PM	5,089.57	1272.39	7.7%	0.00	0.00	0.0%	0.00	0.00	0.0%
2:15 PM	5,247.43	1311.86	7.9%	0.00	0.00	0.0%	0.00	0.00	0.0%
2:30 PM	5,395.76	1348.94	8.1%	0.00	0.00	0.0%	0.00	0.00	0.0%
2:45 PM	5,575.42	1393.86	8.4%	0.00	0.00	0.0%	0.00	0.00	0.0%
3:00 PM	5,749.03	1437.26	8.7%	0.00	0.00	0.0%	0.00	0.00	0.0%
3:15 PM	5,958.85	1489.71	9.0%	0.00	0.00	0.0%	0.00	0.00	0.0%
3:30 PM	6,170.22	1542.55	9.3%	0.00	0.00	0.0%	0.00	0.00	0.0%
3:45 PM	6,427.27	1606.82	9.7%	0.00	0.00	0.0%	0.00	0.00	0.0%
4:00 PM	6,698.09	1674.52	10.1%	0.00	0.00	0.0%	0.00	0.00	0.0%
4:15 PM	7,032.68	1758.17	10.6%	0.00	0.00	0.0%	0.00	0.00	0.0%
4:30 PM	7,404.84	1851.21	11.2%	0.00	0.00	0.0%	0.00	0.00	0.0%
4:45 PM	7,893.74	1973.43	11.9%	0.00	0.00	0.0%	0.00	0.00	0.0%
5:00 PM	8,830.07	2207.52	13.3%	0.00	0.00	0.0%	0.00	0.00	0.0%
5:15 PM	10,518.86	2629.71	15.9%	0.00	0.00	0.0%	0.00	0.00	0.0%
5:30 PM	13,558.01	3389.50	20.5%	0.00	0.00	0.0%	0.00	0.00	0.0%
5:45 PM	19,923.21	4582.34	30.1%	0.00	0.00	0.0%	0.00	0.00	0.0%
5:58 PM	57,268.58	6299.54	86.4%	0.00	0.00	0.0%	0.00	0.00	0.0%

GRATTAN PLAYGROUND

OCTOBER 4

Analysis Hours: 8:09 AM-5:47 PM (PDT)

MARCH 8 SIMILAR

Analysis Time	CURRENT SHADOW			NEW SHADOW FROM CPHP			NOT USED		
	Area (sf)	Area/Time (sfh)	Coverage	Area (sf)	Area/Time (sfh)	Coverage	Area (sf)	Area/Time (sfh)	Coverage
8:09 AM	26,570.11	1062.80	40.1%	0.00	0.00	0.0%	0.00	0.00	0.0%
8:15 AM	23,047.70	3918.11	34.8%	0.00	0.00	0.0%	0.00	0.00	0.0%
8:30 AM	15,281.89	3820.47	23.1%	0.00	0.00	0.0%	0.00	0.00	0.0%
8:45 AM	11,385.53	2846.38	17.2%	0.00	0.00	0.0%	0.00	0.00	0.0%
9:00 AM	8,743.77	2185.94	13.2%	0.00	0.00	0.0%	0.00	0.00	0.0%
9:15 AM	7,191.93	1797.98	10.9%	0.00	0.00	0.0%	0.00	0.00	0.0%
9:30 AM	6,399.39	1599.85	9.7%	0.00	0.00	0.0%	0.00	0.00	0.0%
9:45 AM	6,013.48	1503.37	9.1%	0.00	0.00	0.0%	0.00	0.00	0.0%
10:00 AM	5,680.68	1420.17	8.6%	0.00	0.00	0.0%	0.00	0.00	0.0%
10:15 AM	5,472.80	1368.20	8.3%	0.00	0.00	0.0%	0.00	0.00	0.0%
10:30 AM	5,258.27	1314.57	7.9%	0.00	0.00	0.0%	0.00	0.00	0.0%
10:45 AM	5,143.95	1285.99	7.8%	0.00	0.00	0.0%	0.00	0.00	0.0%
11:00 AM	5,022.65	1255.66	7.6%	0.00	0.00	0.0%	0.00	0.00	0.0%
11:15 AM	4,968.53	1242.13	7.5%	0.00	0.00	0.0%	0.00	0.00	0.0%
11:30 AM	4,885.26	1221.32	7.4%	0.00	0.00	0.0%	0.00	0.00	0.0%
11:45 AM	4,828.32	1207.08	7.3%	0.00	0.00	0.0%	0.00	0.00	0.0%
12:00 PM	4,743.32	1185.83	7.2%	0.00	0.00	0.0%	0.00	0.00	0.0%
12:15 PM	4,681.09	1170.27	7.1%	0.00	0.00	0.0%	0.00	0.00	0.0%
12:30 PM	4,586.16	1146.54	6.9%	0.00	0.00	0.0%	0.00	0.00	0.0%
12:45 PM	4,667.55	1166.89	7.0%	0.00	0.00	0.0%	0.00	0.00	0.0%
1:00 PM	4,758.79	1189.70	7.2%	0.00	0.00	0.0%	0.00	0.00	0.0%
1:15 PM	4,908.91	1227.23	7.4%	0.00	0.00	0.0%	0.00	0.00	0.0%
1:30 PM	5,043.61	1260.90	7.6%	0.00	0.00	0.0%	0.00	0.00	0.0%
1:45 PM	5,198.39	1299.60	7.8%	0.00	0.00	0.0%	0.00	0.00	0.0%
2:00 PM	5,339.21	1334.80	8.1%	0.00	0.00	0.0%	0.00	0.00	0.0%
2:15 PM	5,510.01	1377.50	8.3%	0.00	0.00	0.0%	0.00	0.00	0.0%
2:30 PM	5,672.16	1418.04	8.6%	0.00	0.00	0.0%	0.00	0.00	0.0%
2:45 PM	5,870.06	1467.51	8.9%	0.00	0.00	0.0%	0.00	0.00	0.0%
3:00 PM	6,064.46	1516.12	9.2%	0.00	0.00	0.0%	0.00	0.00	0.0%
3:15 PM	6,300.98	1575.25	9.5%	0.00	0.00	0.0%	0.00	0.00	0.0%
3:30 PM	6,542.66	1635.67	9.9%	0.00	0.00	0.0%	0.00	0.00	0.0%
3:45 PM	6,839.51	1709.88	10.3%	0.00	0.00	0.0%	0.00	0.00	0.0%
4:00 PM	7,158.11	1789.53	10.8%	0.00	0.00	0.0%	0.00	0.00	0.0%
4:15 PM	7,556.72	1889.18	11.4%	0.00	0.00	0.0%	0.00	0.00	0.0%
4:30 PM	8,026.94	2006.74	12.1%	0.00	0.00	0.0%	0.00	0.00	0.0%
4:45 PM	8,873.66	2218.42	13.4%	0.00	0.00	0.0%	0.00	0.00	0.0%
5:00 PM	10,256.06	2564.01	15.5%	0.00	0.00	0.0%	0.00	0.00	0.0%
5:15 PM	12,894.16	3223.54	19.5%	0.00	0.00	0.0%	0.00	0.00	0.0%
5:30 PM	17,070.97	4609.16	25.8%	0.00	0.00	0.0%	0.00	0.00	0.0%
5:47 PM	61,747.90	8644.71	93.2%	0.00	0.00	0.0%	0.00	0.00	0.0%

GRATTAN PLAYGROUND

Quantitative Shading Calculations for CPHP

OCTOBER 11

Analysis Hours: 8:16 AM-5:37 PM (PDT)

MARCH 1 SIMILAR

Analysis Time	CURRENT SHADOW			NEW SHADOW FROM CPHP			NOT USED		
	Area (sf)	Area/Time (sfh)	Coverage	Area (sf)	Area/Time (sfh)	Coverage	Area (sf)	Area/Time (sfh)	Coverage
8:16 AM	30,626.09	3675.13	46.2%	0.00	0.00	0.0%	0.00	0.00	0.0%
8:30 AM	21,369.58	5128.70	32.3%	0.00	0.00	0.0%	0.00	0.00	0.0%
8:45 AM	15,463.50	3865.87	23.3%	0.00	0.00	0.0%	0.00	0.00	0.0%
9:00 AM	11,552.69	2888.17	17.4%	0.00	0.00	0.0%	0.00	0.00	0.0%
9:15 AM	9,352.99	2338.25	14.1%	0.00	0.00	0.0%	0.00	0.00	0.0%
9:30 AM	7,941.83	1985.46	12.0%	0.00	0.00	0.0%	0.00	0.00	0.0%
9:45 AM	7,289.06	1822.26	11.0%	0.00	0.00	0.0%	0.00	0.00	0.0%
10:00 AM	6,737.02	1684.26	10.2%	0.00	0.00	0.0%	0.00	0.00	0.0%
10:15 AM	6,369.59	1592.40	9.6%	0.00	0.00	0.0%	0.00	0.00	0.0%
10:30 AM	6,019.69	1504.92	9.1%	0.00	0.00	0.0%	0.00	0.00	0.0%
10:45 AM	5,771.57	1442.89	8.7%	0.00	0.00	0.0%	0.00	0.00	0.0%
11:00 AM	5,521.25	1380.31	8.3%	0.00	0.00	0.0%	0.00	0.00	0.0%
11:15 AM	5,409.63	1352.41	8.2%	0.00	0.00	0.0%	0.00	0.00	0.0%
11:30 AM	5,261.35	1315.34	7.9%	0.00	0.00	0.0%	0.00	0.00	0.0%
11:45 AM	5,182.78	1295.70	7.8%	0.00	0.00	0.0%	0.00	0.00	0.0%
12:00 PM	5,063.61	1265.90	7.6%	0.00	0.00	0.0%	0.00	0.00	0.0%
12:15 PM	4,996.35	1249.09	7.5%	0.00	0.00	0.0%	0.00	0.00	0.0%
12:30 PM	4,905.22	1226.30	7.4%	0.00	0.00	0.0%	0.00	0.00	0.0%
12:45 PM	5,033.68	1258.42	7.6%	0.00	0.00	0.0%	0.00	0.00	0.0%
1:00 PM	5,134.06	1283.51	7.7%	0.00	0.00	0.0%	0.00	0.00	0.0%
1:15 PM	5,273.64	1318.41	8.0%	0.00	0.00	0.0%	0.00	0.00	0.0%
1:30 PM	5,383.25	1345.81	8.1%	0.00	0.00	0.0%	0.00	0.00	0.0%
1:45 PM	5,536.80	1384.20	8.4%	0.00	0.00	0.0%	0.00	0.00	0.0%
2:00 PM	5,664.55	1416.14	8.6%	0.00	0.00	0.0%	0.00	0.00	0.0%
2:15 PM	5,841.16	1460.29	8.8%	0.00	0.00	0.0%	0.00	0.00	0.0%
2:30 PM	5,997.45	1499.36	9.1%	0.00	0.00	0.0%	0.00	0.00	0.0%
2:45 PM	6,209.83	1552.46	9.4%	0.00	0.00	0.0%	0.00	0.00	0.0%
3:00 PM	6,408.59	1602.15	9.7%	0.00	0.00	0.0%	0.00	0.00	0.0%
3:15 PM	6,671.98	1667.99	10.1%	0.00	0.00	0.0%	0.00	0.00	0.0%
3:30 PM	6,948.80	1737.20	10.5%	0.00	0.00	0.0%	0.00	0.00	0.0%
3:45 PM	7,293.01	1823.25	11.0%	0.00	0.00	0.0%	0.00	0.00	0.0%
4:00 PM	7,668.89	1917.22	11.6%	0.00	0.00	0.0%	0.00	0.00	0.0%
4:15 PM	8,148.32	2037.08	12.3%	0.00	0.00	0.0%	0.00	0.00	0.0%
4:30 PM	8,885.18	2221.30	13.4%	0.00	0.00	0.0%	0.00	0.00	0.0%
4:45 PM	10,089.20	2522.30	15.2%	0.00	0.00	0.0%	0.00	0.00	0.0%
5:00 PM	12,210.93	3052.73	18.4%	0.00	0.00	0.0%	0.00	0.00	0.0%
5:15 PM	15,965.19	3991.30	24.1%	0.00	0.00	0.0%	0.00	0.00	0.0%
5:30 PM	40,277.48	7652.72	60.8%	0.00	0.00	0.0%	0.00	0.00	0.0%
5:37 PM	64,252.75	3855.17	97.0%	0.00	0.00	0.0%	0.00	0.00	0.0%

GRATTAN PLAYGROUND

Quantitative Shading Calculations for CPHP

OCTOBER 18

Analysis Hours: 8:22 AM-5:27 PM (PDT)

FEBRUARY 22 SIMILAR

Analysis Time	CURRENT SHADOW			NEW SHADOW FROM CPHP			NOT USED		
	Area (sf)	Area/Time (sfh)	Coverage	Area (sf)	Area/Time (sfh)	Coverage	Area (sf)	Area/Time (sfh)	Coverage
8:22 AM	34,574.71	2074.48	52.2%	0.00	0.00	0.0%	0.00	0.00	0.0%
8:30 AM	29,097.92	5237.63	43.9%	0.00	0.00	0.0%	0.00	0.00	0.0%
8:45 AM	20,961.09	5240.27	31.6%	0.00	0.00	0.0%	0.00	0.00	0.0%
9:00 AM	15,458.43	3864.61	23.3%	0.00	0.00	0.0%	0.00	0.00	0.0%
9:15 AM	12,137.26	3034.32	18.3%	0.00	0.00	0.0%	0.00	0.00	0.0%
9:30 AM	10,019.34	2504.83	15.1%	0.00	0.00	0.0%	0.00	0.00	0.0%
9:45 AM	8,926.25	2231.56	13.5%	0.00	0.00	0.0%	0.00	0.00	0.0%
10:00 AM	8,129.33	2032.33	12.3%	0.00	0.00	0.0%	0.00	0.00	0.0%
10:15 AM	7,619.22	1904.80	11.5%	0.00	0.00	0.0%	0.00	0.00	0.0%
10:30 AM	7,153.88	1788.47	10.8%	0.00	0.00	0.0%	0.00	0.00	0.0%
10:45 AM	6,805.13	1701.28	10.3%	0.00	0.00	0.0%	0.00	0.00	0.0%
11:00 AM	6,396.45	1599.11	9.7%	0.00	0.00	0.0%	0.00	0.00	0.0%
11:15 AM	6,178.59	1544.65	9.3%	0.00	0.00	0.0%	0.00	0.00	0.0%
11:30 AM	5,904.95	1476.24	8.9%	0.00	0.00	0.0%	0.00	0.00	0.0%
11:45 AM	5,742.66	1435.67	8.7%	0.00	0.00	0.0%	0.00	0.00	0.0%
12:00 PM	5,569.73	1392.43	8.4%	0.00	0.00	0.0%	0.00	0.00	0.0%
12:15 PM	5,482.26	1370.57	8.3%	0.00	0.00	0.0%	0.00	0.00	0.0%
12:30 PM	5,409.17	1352.29	8.2%	0.00	0.00	0.0%	0.00	0.00	0.0%
12:45 PM	5,523.81	1380.95	8.3%	0.00	0.00	0.0%	0.00	0.00	0.0%
1:00 PM	5,593.32	1398.33	8.4%	0.00	0.00	0.0%	0.00	0.00	0.0%
1:15 PM	5,724.71	1431.18	8.6%	0.00	0.00	0.0%	0.00	0.00	0.0%
1:30 PM	5,814.16	1453.54	8.8%	0.00	0.00	0.0%	0.00	0.00	0.0%
1:45 PM	5,963.52	1490.88	9.0%	0.00	0.00	0.0%	0.00	0.00	0.0%
2:00 PM	6,088.71	1522.18	9.2%	0.00	0.00	0.0%	0.00	0.00	0.0%
2:15 PM	6,285.34	1571.33	9.5%	0.00	0.00	0.0%	0.00	0.00	0.0%
2:30 PM	6,463.00	1615.75	9.8%	0.00	0.00	0.0%	0.00	0.00	0.0%
2:45 PM	6,707.41	1676.85	10.1%	0.00	0.00	0.0%	0.00	0.00	0.0%
3:00 PM	6,942.90	1735.72	10.5%	0.00	0.00	0.0%	0.00	0.00	0.0%
3:15 PM	7,251.97	1812.99	10.9%	0.00	0.00	0.0%	0.00	0.00	0.0%
3:30 PM	7,566.77	1891.69	11.4%	0.00	0.00	0.0%	0.00	0.00	0.0%
3:45 PM	7,980.61	1995.15	12.0%	0.00	0.00	0.0%	0.00	0.00	0.0%
4:00 PM	8,429.61	2107.40	12.7%	0.00	0.00	0.0%	0.00	0.00	0.0%
4:15 PM	9,155.95	2288.99	13.8%	0.00	0.00	0.0%	0.00	0.00	0.0%
4:30 PM	10,258.45	2564.61	15.5%	0.00	0.00	0.0%	0.00	0.00	0.0%
4:45 PM	11,950.14	2987.54	18.0%	0.00	0.00	0.0%	0.00	0.00	0.0%
5:00 PM	15,253.06	3813.26	23.0%	0.00	0.00	0.0%	0.00	0.00	0.0%
5:15 PM	24,610.25	5414.26	37.1%	0.00	0.00	0.0%	0.00	0.00	0.0%
5:27 PM	66,020.20	6602.02	99.7%	0.00	0.00	0.0%	0.00	0.00	0.0%

GRATTAN PLAYGROUND

Quantitative Shading Calculations for CPHP

OCTOBER 25

Analysis Hours: 7:30 AM-4:18 PM (PST)

FEBRUARY 15 SIMILAR

Analysis Time	CURRENT SHADOW			NEW SHADOW FROM CPHP			NOT USED		
	Area (sf)	Area/Time (sfh)	Coverage	Area (sf)	Area/Time (sfh)	Coverage	Area (sf)	Area/Time (sfh)	Coverage
7:30 AM	38,536.57	5009.75	58.2%	0.00	0.00	0.0%	0.00	0.00	0.0%
7:45 AM	27,644.09	6911.02	41.7%	0.00	0.00	0.0%	0.00	0.00	0.0%
8:00 AM	20,663.98	5166.00	31.2%	0.00	0.00	0.0%	0.00	0.00	0.0%
8:15 AM	15,756.00	3939.00	23.8%	0.00	0.00	0.0%	0.00	0.00	0.0%
8:30 AM	12,724.65	3181.16	19.2%	0.00	0.00	0.0%	0.00	0.00	0.0%
8:45 AM	11,000.19	2750.05	16.6%	0.00	0.00	0.0%	0.00	0.00	0.0%
9:00 AM	9,866.16	2466.54	14.9%	0.00	0.00	0.0%	0.00	0.00	0.0%
9:15 AM	9,135.96	2283.99	13.8%	0.00	0.00	0.0%	0.00	0.00	0.0%
9:30 AM	8,519.10	2129.78	12.9%	0.00	0.00	0.0%	0.00	0.00	0.0%
9:45 AM	8,083.17	2020.79	12.2%	0.00	0.00	0.0%	0.00	0.00	0.0%
10:00 AM	7,576.00	1894.00	11.4%	0.00	0.00	0.0%	0.00	0.00	0.0%
10:15 AM	7,279.28	1819.82	11.0%	0.00	0.00	0.0%	0.00	0.00	0.0%
10:30 AM	6,893.82	1723.45	10.4%	0.00	0.00	0.0%	0.00	0.00	0.0%
10:45 AM	6,665.47	1666.37	10.1%	0.00	0.00	0.0%	0.00	0.00	0.0%
11:00 AM	6,378.69	1594.67	9.6%	0.00	0.00	0.0%	0.00	0.00	0.0%
11:15 AM	6,243.97	1560.99	9.4%	0.00	0.00	0.0%	0.00	0.00	0.0%
11:30 AM	6,105.34	1526.33	9.2%	0.00	0.00	0.0%	0.00	0.00	0.0%
11:45 AM	6,181.48	1545.37	9.3%	0.00	0.00	0.0%	0.00	0.00	0.0%
12:00 PM	6,192.89	1548.22	9.3%	0.00	0.00	0.0%	0.00	0.00	0.0%
12:15 PM	6,304.59	1576.15	9.5%	0.00	0.00	0.0%	0.00	0.00	0.0%
12:30 PM	6,360.82	1590.20	9.6%	0.00	0.00	0.0%	0.00	0.00	0.0%
12:45 PM	6,503.04	1625.76	9.8%	0.00	0.00	0.0%	0.00	0.00	0.0%
1:00 PM	6,622.83	1655.71	10.0%	0.00	0.00	0.0%	0.00	0.00	0.0%
1:15 PM	6,848.36	1712.09	10.3%	0.00	0.00	0.0%	0.00	0.00	0.0%
1:30 PM	7,054.41	1763.60	10.6%	0.00	0.00	0.0%	0.00	0.00	0.0%
1:45 PM	7,350.29	1837.57	11.1%	0.00	0.00	0.0%	0.00	0.00	0.0%
2:00 PM	7,627.83	1906.96	11.5%	0.00	0.00	0.0%	0.00	0.00	0.0%
2:15 PM	8,008.18	2002.05	12.1%	0.00	0.00	0.0%	0.00	0.00	0.0%
2:30 PM	8,398.02	2099.51	12.7%	0.00	0.00	0.0%	0.00	0.00	0.0%
2:45 PM	8,964.62	2241.16	13.5%	0.00	0.00	0.0%	0.00	0.00	0.0%
3:00 PM	9,636.73	2409.18	14.5%	0.00	0.00	0.0%	0.00	0.00	0.0%
3:15 PM	10,929.47	2732.37	16.5%	0.00	0.00	0.0%	0.00	0.00	0.0%
3:30 PM	12,289.66	3072.41	18.6%	0.00	0.00	0.0%	0.00	0.00	0.0%
3:45 PM	15,216.68	3804.17	23.0%	0.00	0.00	0.0%	0.00	0.00	0.0%
4:00 PM	20,146.79	5036.70	30.4%	0.00	0.00	0.0%	0.00	0.00	0.0%
4:15 PM	66,247.60	9937.14	100.0%	0.00	0.00	0.0%	0.00	0.00	0.0%
4:18 PM	66,248.87	1987.47	100.0%	0.00	0.00	0.0%	0.00	0.00	0.0%

GRATTAN PLAYGROUND

Quantitative Shading Calculations for CPHP

NOVEMBER 1

Analysis Hours: 7:36 AM-4:10 PM (PST)

FEBRUARY 8 SIMILAR

Analysis Time	CURRENT SHADOW			NEW SHADOW FROM CPHP			NOT USED		
	Area (sf)	Area/Time (sfh)	Coverage	Area (sf)	Area/Time (sfh)	Coverage	Area (sf)	Area/Time (sfh)	Coverage
7:36 AM	42,431.08	2970.18	64.0%	0.00	0.00	0.0%	0.00	0.00	0.0%
7:45 AM	35,424.75	6730.70	53.5%	0.00	0.00	0.0%	0.00	0.00	0.0%
8:00 AM	26,466.68	6616.67	40.0%	0.00	0.00	0.0%	0.00	0.00	0.0%
8:15 AM	20,144.36	5036.09	30.4%	0.00	0.00	0.0%	0.00	0.00	0.0%
8:30 AM	16,062.70	4015.67	24.2%	0.00	0.00	0.0%	0.00	0.00	0.0%
8:45 AM	13,605.23	3401.31	20.5%	0.00	0.00	0.0%	0.00	0.00	0.0%
9:00 AM	11,939.09	2984.77	18.0%	0.00	0.00	0.0%	0.00	0.00	0.0%
9:15 AM	10,940.58	2735.14	16.5%	0.00	0.00	0.0%	0.00	0.00	0.0%
9:30 AM	10,095.73	2523.93	15.2%	0.00	0.00	0.0%	0.00	0.00	0.0%
9:45 AM	9,556.07	2389.02	14.4%	0.00	0.00	0.0%	0.00	0.00	0.0%
10:00 AM	8,908.80	2227.20	13.4%	0.00	0.00	0.0%	0.00	0.00	0.0%
10:15 AM	8,530.78	2132.70	12.9%	0.00	0.00	0.0%	0.00	0.00	0.0%
10:30 AM	8,076.68	2019.17	12.2%	0.00	0.00	0.0%	0.00	0.00	0.0%
10:45 AM	7,806.83	1951.71	11.8%	0.00	0.00	0.0%	0.00	0.00	0.0%
11:00 AM	7,471.87	1867.97	11.3%	0.00	0.00	0.0%	0.00	0.00	0.0%
11:15 AM	7,295.25	1823.81	11.0%	0.00	0.00	0.0%	0.00	0.00	0.0%
11:30 AM	7,120.26	1780.07	10.7%	0.00	0.00	0.0%	0.00	0.00	0.0%
11:45 AM	7,167.49	1791.87	10.8%	0.00	0.00	0.0%	0.00	0.00	0.0%
12:00 PM	7,102.82	1775.70	10.7%	0.00	0.00	0.0%	0.00	0.00	0.0%
12:15 PM	7,191.91	1797.98	10.9%	0.00	0.00	0.0%	0.00	0.00	0.0%
12:30 PM	7,209.78	1802.45	10.9%	0.00	0.00	0.0%	0.00	0.00	0.0%
12:45 PM	7,349.12	1837.28	11.1%	0.00	0.00	0.0%	0.00	0.00	0.0%
1:00 PM	7,435.55	1858.89	11.2%	0.00	0.00	0.0%	0.00	0.00	0.0%
1:15 PM	7,711.31	1927.83	11.6%	0.00	0.00	0.0%	0.00	0.00	0.0%
1:30 PM	7,942.91	1985.73	12.0%	0.00	0.00	0.0%	0.00	0.00	0.0%
1:45 PM	8,335.19	2083.80	12.6%	0.00	0.00	0.0%	0.00	0.00	0.0%
2:00 PM	8,682.49	2170.62	13.1%	0.00	0.00	0.0%	0.00	0.00	0.0%
2:15 PM	9,247.34	2311.83	14.0%	0.00	0.00	0.0%	0.00	0.00	0.0%
2:30 PM	9,793.94	2448.49	14.8%	0.00	0.00	0.0%	0.00	0.00	0.0%
2:45 PM	10,685.55	2671.39	16.1%	0.00	0.00	0.0%	0.00	0.00	0.0%
3:00 PM	11,789.14	2947.29	17.8%	0.00	0.00	0.0%	0.00	0.00	0.0%
3:15 PM	13,416.31	3354.08	20.3%	0.00	0.00	0.0%	0.00	0.00	0.0%
3:30 PM	15,506.59	3876.65	23.4%	0.00	0.00	0.0%	0.00	0.00	0.0%
3:45 PM	19,615.15	4903.79	29.6%	0.00	0.00	0.0%	0.00	0.00	0.0%
4:00 PM	52,696.36	11066.24	79.5%	0.00	0.00	0.0%	0.00	0.00	0.0%
4:10 PM	66,248.86	5962.40	100.0%	0.00	0.00	0.0%	0.00	0.00	0.0%

NOVEMBER 8

Analysis Hours: 7:43 AM-4:03 PM (PST)

FEBRUARY 1 SIMILAR

Analysis Time	CURRENT SHADOW			NEW SHADOW FROM CPHP			NOT USED		
	Area (sf)	Area/Time (sfh)	Coverage	Area (sf)	Area/Time (sfh)	Coverage	Area (sf)	Area/Time (sfh)	Coverage
7:43 AM	46,071.86	460.72	69.5%	0.00	0.00	0.0%	0.00	0.00	0.0%
7:45 AM	45,003.54	5850.46	67.9%	0.00	0.00	0.0%	0.00	0.00	0.0%
8:00 AM	33,180.95	8295.24	50.1%	0.00	0.00	0.0%	0.00	0.00	0.0%
8:15 AM	25,565.31	6391.33	38.6%	0.00	0.00	0.0%	0.00	0.00	0.0%
8:30 AM	19,781.25	4945.31	29.9%	0.00	0.00	0.0%	0.00	0.00	0.0%
8:45 AM	16,613.39	4153.35	25.1%	0.00	0.00	0.0%	0.00	0.00	0.0%
9:00 AM	14,313.81	3578.45	21.6%	0.00	0.00	0.0%	0.00	0.00	0.0%
9:15 AM	12,966.38	3241.59	19.6%	0.00	0.00	0.0%	0.00	0.00	0.0%
9:30 AM	11,874.84	2968.71	17.9%	0.00	0.00	0.0%	0.00	0.00	0.0%
9:45 AM	11,183.45	2795.86	16.9%	0.00	0.00	0.0%	0.00	0.00	0.0%
10:00 AM	10,403.50	2600.88	15.7%	0.00	0.00	0.0%	0.00	0.00	0.0%
10:15 AM	9,923.09	2480.77	15.0%	0.00	0.00	0.0%	0.00	0.00	0.0%
10:30 AM	9,369.98	2342.50	14.1%	0.00	0.00	0.0%	0.00	0.00	0.0%
10:45 AM	9,040.50	2260.12	13.6%	0.00	0.00	0.0%	0.00	0.00	0.0%
11:00 AM	8,646.69	2161.67	13.1%	0.00	0.00	0.0%	0.00	0.00	0.0%
11:15 AM	8,449.60	2112.40	12.8%	0.00	0.00	0.0%	0.00	0.00	0.0%
11:30 AM	8,282.11	2070.53	12.5%	0.00	0.00	0.0%	0.00	0.00	0.0%
11:45 AM	8,321.85	2080.46	12.6%	0.00	0.00	0.0%	0.00	0.00	0.0%
12:00 PM	8,231.53	2057.88	12.4%	0.00	0.00	0.0%	0.00	0.00	0.0%
12:15 PM	8,339.07	2084.77	12.6%	0.00	0.00	0.0%	0.00	0.00	0.0%
12:30 PM	8,358.95	2089.74	12.6%	0.00	0.00	0.0%	0.00	0.00	0.0%
12:45 PM	8,537.87	2134.47	12.9%	0.00	0.00	0.0%	0.00	0.00	0.0%
1:00 PM	8,614.61	2153.65	13.0%	0.00	0.00	0.0%	0.00	0.00	0.0%
1:15 PM	8,949.48	2237.37	13.5%	0.00	0.00	0.0%	0.00	0.00	0.0%
1:30 PM	9,208.39	2302.10	13.9%	0.00	0.00	0.0%	0.00	0.00	0.0%
1:45 PM	9,687.64	2421.91	14.6%	0.00	0.00	0.0%	0.00	0.00	0.0%
2:00 PM	10,126.41	2531.60	15.3%	0.00	0.00	0.0%	0.00	0.00	0.0%
2:15 PM	10,892.23	2723.06	16.4%	0.00	0.00	0.0%	0.00	0.00	0.0%
2:30 PM	11,616.05	2904.01	17.5%	0.00	0.00	0.0%	0.00	0.00	0.0%
2:45 PM	12,758.62	3189.66	19.3%	0.00	0.00	0.0%	0.00	0.00	0.0%
3:00 PM	14,232.93	3558.23	21.5%	0.00	0.00	0.0%	0.00	0.00	0.0%
3:15 PM	16,051.29	4012.82	24.2%	0.00	0.00	0.0%	0.00	0.00	0.0%
3:30 PM	19,244.19	4811.05	29.0%	0.00	0.00	0.0%	0.00	0.00	0.0%
3:45 PM	24,492.73	6123.18	37.0%	0.00	0.00	0.0%	0.00	0.00	0.0%
4:00 PM	66,248.87	9937.33	100.0%	0.00	0.00	0.0%	0.00	0.00	0.0%
4:03 PM	66,248.86	1987.47	100.0%	0.00	0.00	0.0%	0.00	0.00	0.0%

NOVEMBER 15

Analysis Hours: 7:51 AM-3:57 PM (PST)

JANUARY 25 SIMILAR

Analysis Time	CURRENT SHADOW			NEW SHADOW FROM CPHP			NOT USED		
	Area (sf)	Area/Time (sfh)	Coverage	Area (sf)	Area/Time (sfh)	Coverage	Area (sf)	Area/Time (sfh)	Coverage
7:51 AM	49,293.22	3943.46	74.4%	0.00	0.00	0.0%	0.00	0.00	0.0%
8:00 AM	40,946.22	8189.24	61.8%	0.00	0.00	0.0%	0.00	0.00	0.0%
8:15 AM	31,667.27	7916.82	47.8%	0.00	0.00	0.0%	0.00	0.00	0.0%
8:30 AM	24,154.39	6038.60	36.5%	0.00	0.00	0.0%	0.00	0.00	0.0%
8:45 AM	19,876.01	4969.00	30.0%	0.00	0.00	0.0%	0.00	0.00	0.0%
9:00 AM	16,867.07	4216.77	25.5%	0.00	0.00	0.0%	0.00	0.00	0.0%
9:15 AM	15,123.40	3780.85	22.8%	0.00	0.00	0.0%	0.00	0.00	0.0%
9:30 AM	13,745.97	3436.49	20.7%	0.00	0.00	0.0%	0.00	0.00	0.0%
9:45 AM	12,916.82	3229.20	19.5%	0.00	0.00	0.0%	0.00	0.00	0.0%
10:00 AM	11,995.34	2998.83	18.1%	0.00	0.00	0.0%	0.00	0.00	0.0%
10:15 AM	11,381.18	2845.30	17.2%	0.00	0.00	0.0%	0.00	0.00	0.0%
10:30 AM	10,739.85	2684.96	16.2%	0.00	0.00	0.0%	0.00	0.00	0.0%
10:45 AM	10,344.86	2586.21	15.6%	0.00	0.00	0.0%	0.00	0.00	0.0%
11:00 AM	9,880.39	2470.10	14.9%	0.00	0.00	0.0%	0.00	0.00	0.0%
11:15 AM	9,648.78	2412.20	14.6%	0.00	0.00	0.0%	0.00	0.00	0.0%
11:30 AM	9,457.96	2364.49	14.3%	0.00	0.00	0.0%	0.00	0.00	0.0%
11:45 AM	9,485.77	2371.44	14.3%	0.00	0.00	0.0%	0.00	0.00	0.0%
12:00 PM	9,386.37	2346.59	14.2%	0.00	0.00	0.0%	0.00	0.00	0.0%
12:15 PM	9,515.15	2378.79	14.4%	0.00	0.00	0.0%	0.00	0.00	0.0%
12:30 PM	9,544.59	2386.15	14.4%	0.00	0.00	0.0%	0.00	0.00	0.0%
12:45 PM	9,775.96	2443.99	14.8%	0.00	0.00	0.0%	0.00	0.00	0.0%
1:00 PM	9,883.57	2470.89	14.9%	0.00	0.00	0.0%	0.00	0.00	0.0%
1:15 PM	10,260.23	2565.06	15.5%	0.00	0.00	0.0%	0.00	0.00	0.0%
1:30 PM	10,556.42	2639.11	15.9%	0.00	0.00	0.0%	0.00	0.00	0.0%
1:45 PM	11,095.22	2773.80	16.7%	0.00	0.00	0.0%	0.00	0.00	0.0%
2:00 PM	11,628.70	2907.18	17.6%	0.00	0.00	0.0%	0.00	0.00	0.0%
2:15 PM	12,545.85	3136.46	18.9%	0.00	0.00	0.0%	0.00	0.00	0.0%
2:30 PM	13,457.44	3364.36	20.3%	0.00	0.00	0.0%	0.00	0.00	0.0%
2:45 PM	14,864.65	3716.16	22.4%	0.00	0.00	0.0%	0.00	0.00	0.0%
3:00 PM	16,541.89	4135.47	25.0%	0.00	0.00	0.0%	0.00	0.00	0.0%
3:15 PM	18,966.52	4741.63	28.6%	0.00	0.00	0.0%	0.00	0.00	0.0%
3:30 PM	23,038.48	5759.62	34.8%	0.00	0.00	0.0%	0.00	0.00	0.0%
3:45 PM	48,245.68	11096.51	72.8%	0.00	0.00	0.0%	0.00	0.00	0.0%
3:57 PM	66,248.87	7287.38	100.0%	0.00	0.00	0.0%	0.00	0.00	0.0%

GRATTAN PLAYGROUND

Quantitative Shading Calculations for CPHP

NOVEMBER 22

Analysis Hours: 7:57 AM-3:54 PM (PST)

JANUARY 18 SIMILAR

Analysis Time	CURRENT SHADOW			NEW SHADOW FROM CPHP			NOT USED		
	Area (sf)	Area/Time (sfh)	Coverage	Area (sf)	Area/Time (sfh)	Coverage	Area (sf)	Area/Time (sfh)	Coverage
7:57 AM	51,515.16	1030.30	77.8%	0.00	0.00	0.0%	0.00	0.00	0.0%
8:00 AM	49,683.49	7452.52	75.0%	0.00	0.00	0.0%	0.00	0.00	0.0%
8:15 AM	38,191.59	9547.90	57.6%	0.00	0.00	0.0%	0.00	0.00	0.0%
8:30 AM	29,203.84	7300.96	44.1%	0.00	0.00	0.0%	0.00	0.00	0.0%
8:45 AM	23,488.79	5872.20	35.5%	0.00	0.00	0.0%	0.00	0.00	0.0%
9:00 AM	19,615.00	4903.75	29.6%	0.00	0.00	0.0%	0.00	0.00	0.0%
9:15 AM	17,347.09	4336.77	26.2%	0.00	0.00	0.0%	0.00	0.00	0.0%
9:30 AM	15,626.89	3906.72	23.6%	0.00	0.00	0.0%	0.00	0.00	0.0%
9:45 AM	14,620.70	3655.18	22.1%	0.00	0.00	0.0%	0.00	0.00	0.0%
10:00 AM	13,589.41	3397.35	20.5%	0.00	0.00	0.0%	0.00	0.00	0.0%
10:15 AM	12,848.27	3212.07	19.4%	0.00	0.00	0.0%	0.00	0.00	0.0%
10:30 AM	12,101.19	3025.30	18.3%	0.00	0.00	0.0%	0.00	0.00	0.0%
10:45 AM	11,634.50	2908.63	17.6%	0.00	0.00	0.0%	0.00	0.00	0.0%
11:00 AM	11,102.05	2775.51	16.8%	0.00	0.00	0.0%	0.00	0.00	0.0%
11:15 AM	10,835.05	2708.76	16.4%	0.00	0.00	0.0%	0.00	0.00	0.0%
11:30 AM	10,605.95	2651.49	16.0%	0.00	0.00	0.0%	0.00	0.00	0.0%
11:45 AM	10,621.83	2655.46	16.0%	0.00	0.00	0.0%	0.00	0.00	0.0%
12:00 PM	10,504.30	2626.08	15.9%	0.00	0.00	0.0%	0.00	0.00	0.0%
12:15 PM	10,640.41	2660.10	16.1%	0.00	0.00	0.0%	0.00	0.00	0.0%
12:30 PM	10,658.84	2664.71	16.1%	0.00	0.00	0.0%	0.00	0.00	0.0%
12:45 PM	10,919.64	2729.91	16.5%	0.00	0.00	0.0%	0.00	0.00	0.0%
1:00 PM	11,056.70	2764.17	16.7%	0.00	0.00	0.0%	0.00	0.00	0.0%
1:15 PM	11,472.59	2868.15	17.3%	0.00	0.00	0.0%	0.00	0.00	0.0%
1:30 PM	11,802.83	2950.71	17.8%	0.00	0.00	0.0%	0.00	0.00	0.0%
1:45 PM	12,415.64	3103.91	18.7%	0.00	0.00	0.0%	0.00	0.00	0.0%
2:00 PM	13,044.94	3261.24	19.7%	0.00	0.00	0.0%	0.00	0.00	0.0%
2:15 PM	14,108.07	3527.02	21.3%	0.00	0.00	0.0%	0.00	0.00	0.0%
2:30 PM	15,168.26	3792.07	22.9%	0.00	0.00	0.0%	0.00	0.00	0.0%
2:45 PM	16,782.02	4195.51	25.3%	0.00	0.00	0.0%	0.00	0.00	0.0%
3:00 PM	18,609.23	4652.31	28.1%	0.00	0.00	0.0%	0.00	0.00	0.0%
3:15 PM	21,635.59	5408.90	32.7%	0.00	0.00	0.0%	0.00	0.00	0.0%
3:30 PM	28,343.02	7085.76	42.8%	0.00	0.00	0.0%	0.00	0.00	0.0%
3:45 PM	66,248.86	13249.77	100.0%	0.00	0.00	0.0%	0.00	0.00	0.0%
3:54 PM	66,248.87	5299.91	100.0%	0.00	0.00	0.0%	0.00	0.00	0.0%

GRATTAN PLAYGROUND

Quantitative Shading Calculations for CPHP

NOVEMBER 29

Analysis Hours: 8:04 AM-3:51 PM (PST)

JANUARY 11 SIMILAR

Analysis Time	CURRENT SHADOW			NEW SHADOW FROM CPHP			NOT USED		
	Area (sf)	Area/Time (sfh)	Coverage	Area (sf)	Area/Time (sfh)	Coverage	Area (sf)	Area/Time (sfh)	Coverage
8:04 AM	53,176.63	4785.90	80.3%	0.00	0.00	0.0%	0.00	0.00	0.0%
8:15 AM	44,920.67	9433.34	67.8%	0.00	0.00	0.0%	0.00	0.00	0.0%
8:30 AM	34,785.81	8696.45	52.5%	0.00	0.00	0.0%	0.00	0.00	0.0%
8:45 AM	27,337.91	6834.48	41.3%	0.00	0.00	0.0%	0.00	0.00	0.0%
9:00 AM	22,481.43	5620.36	33.9%	0.00	0.00	0.0%	0.00	0.00	0.0%
9:15 AM	19,552.52	4888.13	29.5%	0.00	0.00	0.0%	0.00	0.00	0.0%
9:30 AM	17,430.62	4357.66	26.3%	0.00	0.00	0.0%	0.00	0.00	0.0%
9:45 AM	16,205.44	4051.36	24.5%	0.00	0.00	0.0%	0.00	0.00	0.0%
10:00 AM	15,058.41	3764.60	22.7%	0.00	0.00	0.0%	0.00	0.00	0.0%
10:15 AM	14,211.21	3552.80	21.5%	0.00	0.00	0.0%	0.00	0.00	0.0%
10:30 AM	13,365.88	3341.47	20.2%	0.00	0.00	0.0%	0.00	0.00	0.0%
10:45 AM	12,836.25	3209.06	19.4%	0.00	0.00	0.0%	0.00	0.00	0.0%
11:00 AM	12,228.66	3057.16	18.5%	0.00	0.00	0.0%	0.00	0.00	0.0%
11:15 AM	11,914.80	2978.70	18.0%	0.00	0.00	0.0%	0.00	0.00	0.0%
11:30 AM	11,630.64	2907.66	17.6%	0.00	0.00	0.0%	0.00	0.00	0.0%
11:45 AM	11,641.53	2910.38	17.6%	0.00	0.00	0.0%	0.00	0.00	0.0%
12:00 PM	11,511.90	2877.97	17.4%	0.00	0.00	0.0%	0.00	0.00	0.0%
12:15 PM	11,656.50	2914.13	17.6%	0.00	0.00	0.0%	0.00	0.00	0.0%
12:30 PM	11,654.89	2913.72	17.6%	0.00	0.00	0.0%	0.00	0.00	0.0%
12:45 PM	11,927.11	2981.78	18.0%	0.00	0.00	0.0%	0.00	0.00	0.0%
1:00 PM	12,087.59	3021.90	18.2%	0.00	0.00	0.0%	0.00	0.00	0.0%
1:15 PM	12,532.14	3133.03	18.9%	0.00	0.00	0.0%	0.00	0.00	0.0%
1:30 PM	12,889.15	3222.29	19.5%	0.00	0.00	0.0%	0.00	0.00	0.0%
1:45 PM	13,562.16	3390.54	20.5%	0.00	0.00	0.0%	0.00	0.00	0.0%
2:00 PM	14,262.82	3565.71	21.5%	0.00	0.00	0.0%	0.00	0.00	0.0%
2:15 PM	15,418.00	3854.50	23.3%	0.00	0.00	0.0%	0.00	0.00	0.0%
2:30 PM	16,569.34	4142.34	25.0%	0.00	0.00	0.0%	0.00	0.00	0.0%
2:45 PM	18,339.95	4584.99	27.7%	0.00	0.00	0.0%	0.00	0.00	0.0%
3:00 PM	20,279.34	5069.83	30.6%	0.00	0.00	0.0%	0.00	0.00	0.0%
3:15 PM	25,363.66	6340.92	38.3%	0.00	0.00	0.0%	0.00	0.00	0.0%
3:30 PM	50,622.07	12655.52	76.4%	0.00	0.00	0.0%	0.00	0.00	0.0%
3:45 PM	66,248.85	11924.79	100.0%	0.00	0.00	0.0%	0.00	0.00	0.0%
3:51 PM	66,248.87	3312.44	100.0%	0.00	0.00	0.0%	0.00	0.00	0.0%

GRATTAN PLAYGROUND

Quantitative Shading Calculations for CPHP

DECEMBER 6

Analysis Hours: 8:10 AM-3:51 PM (PST)

JANUARY 4 SIMILAR

Analysis Time	CURRENT SHADOW			NEW SHADOW FROM CPHP			NOT USED		
	Area (sf)	Area/Time (sfh)	Coverage	Area (sf)	Area/Time (sfh)	Coverage	Area (sf)	Area/Time (sfh)	Coverage
8:10 AM	54,550.12	2182.00	82.3%	0.00	0.00	0.0%	0.00	0.00	0.0%
8:15 AM	50,963.20	8663.74	76.9%	0.00	0.00	0.0%	0.00	0.00	0.0%
8:30 AM	40,096.30	10024.08	60.5%	0.00	0.00	0.0%	0.00	0.00	0.0%
8:45 AM	31,260.94	7815.24	47.2%	0.00	0.00	0.0%	0.00	0.00	0.0%
9:00 AM	25,364.14	6341.03	38.3%	0.00	0.00	0.0%	0.00	0.00	0.0%
9:15 AM	21,597.00	5399.25	32.6%	0.00	0.00	0.0%	0.00	0.00	0.0%
9:30 AM	19,036.28	4759.07	28.7%	0.00	0.00	0.0%	0.00	0.00	0.0%
9:45 AM	17,584.20	4396.05	26.5%	0.00	0.00	0.0%	0.00	0.00	0.0%
10:00 AM	16,310.76	4077.69	24.6%	0.00	0.00	0.0%	0.00	0.00	0.0%
10:15 AM	15,376.78	3844.20	23.2%	0.00	0.00	0.0%	0.00	0.00	0.0%
10:30 AM	14,435.84	3608.96	21.8%	0.00	0.00	0.0%	0.00	0.00	0.0%
10:45 AM	13,847.86	3461.96	20.9%	0.00	0.00	0.0%	0.00	0.00	0.0%
11:00 AM	13,172.55	3293.14	19.9%	0.00	0.00	0.0%	0.00	0.00	0.0%
11:15 AM	12,816.96	3204.24	19.3%	0.00	0.00	0.0%	0.00	0.00	0.0%
11:30 AM	12,465.81	3116.45	18.8%	0.00	0.00	0.0%	0.00	0.00	0.0%
11:45 AM	12,476.65	3119.16	18.8%	0.00	0.00	0.0%	0.00	0.00	0.0%
12:00 PM	12,307.34	3076.83	18.6%	0.00	0.00	0.0%	0.00	0.00	0.0%
12:15 PM	12,436.19	3109.05	18.8%	0.00	0.00	0.0%	0.00	0.00	0.0%
12:30 PM	12,437.41	3109.35	18.8%	0.00	0.00	0.0%	0.00	0.00	0.0%
12:45 PM	12,711.27	3177.82	19.2%	0.00	0.00	0.0%	0.00	0.00	0.0%
1:00 PM	12,876.93	3219.23	19.4%	0.00	0.00	0.0%	0.00	0.00	0.0%
1:15 PM	13,336.63	3334.16	20.1%	0.00	0.00	0.0%	0.00	0.00	0.0%
1:30 PM	13,707.32	3426.83	20.7%	0.00	0.00	0.0%	0.00	0.00	0.0%
1:45 PM	14,411.32	3602.83	21.8%	0.00	0.00	0.0%	0.00	0.00	0.0%
2:00 PM	15,142.20	3785.55	22.9%	0.00	0.00	0.0%	0.00	0.00	0.0%
2:15 PM	16,352.91	4088.23	24.7%	0.00	0.00	0.0%	0.00	0.00	0.0%
2:30 PM	17,560.66	4390.17	26.5%	0.00	0.00	0.0%	0.00	0.00	0.0%
2:45 PM	19,411.77	4852.94	29.3%	0.00	0.00	0.0%	0.00	0.00	0.0%
3:00 PM	21,448.98	5362.24	32.4%	0.00	0.00	0.0%	0.00	0.00	0.0%
3:15 PM	32,328.03	8082.01	48.8%	0.00	0.00	0.0%	0.00	0.00	0.0%
3:30 PM	65,408.94	16352.24	98.7%	0.00	0.00	0.0%	0.00	0.00	0.0%
3:45 PM	66,248.85	11262.30	100.0%	0.00	0.00	0.0%	0.00	0.00	0.0%
3:51 PM	66,248.86	3312.44	100.0%	0.00	0.00	0.0%	0.00	0.00	0.0%

DECEMBER 13

Analysis Hours: 8:15 AM-3:52 PM (PST)

DECEMBER 28 SIMILAR

Analysis Time	CURRENT SHADOW			NEW SHADOW FROM CPHP			NOT USED		
	Area (sf)	Area/Time (sfh)	Coverage	Area (sf)	Area/Time (sfh)	Coverage	Area (sf)	Area/Time (sfh)	Coverage
8:15 AM	55,518.80	6662.26	83.8%	0.00	0.00	0.0%	0.00	0.00	0.0%
8:30 AM	45,003.93	11250.98	67.9%	0.00	0.00	0.0%	0.00	0.00	0.0%
8:45 AM	34,971.38	8742.84	52.8%	0.00	0.00	0.0%	0.00	0.00	0.0%
9:00 AM	27,900.86	6975.22	42.1%	0.00	0.00	0.0%	0.00	0.00	0.0%
9:15 AM	23,518.31	5879.58	35.5%	0.00	0.00	0.0%	0.00	0.00	0.0%
9:30 AM	20,385.07	5096.27	30.8%	0.00	0.00	0.0%	0.00	0.00	0.0%
9:45 AM	18,659.87	4664.97	28.2%	0.00	0.00	0.0%	0.00	0.00	0.0%
10:00 AM	17,256.71	4314.18	26.0%	0.00	0.00	0.0%	0.00	0.00	0.0%
10:15 AM	16,267.34	4066.84	24.6%	0.00	0.00	0.0%	0.00	0.00	0.0%
10:30 AM	15,226.41	3806.60	23.0%	0.00	0.00	0.0%	0.00	0.00	0.0%
10:45 AM	14,581.26	3645.32	22.0%	0.00	0.00	0.0%	0.00	0.00	0.0%
11:00 AM	13,857.98	3464.49	20.9%	0.00	0.00	0.0%	0.00	0.00	0.0%
11:15 AM	13,462.92	3365.73	20.3%	0.00	0.00	0.0%	0.00	0.00	0.0%
11:30 AM	13,018.70	3254.68	19.7%	0.00	0.00	0.0%	0.00	0.00	0.0%
11:45 AM	13,044.13	3261.03	19.7%	0.00	0.00	0.0%	0.00	0.00	0.0%
12:00 PM	12,841.84	3210.46	19.4%	0.00	0.00	0.0%	0.00	0.00	0.0%
12:15 PM	12,958.19	3239.55	19.6%	0.00	0.00	0.0%	0.00	0.00	0.0%
12:30 PM	12,938.26	3234.57	19.5%	0.00	0.00	0.0%	0.00	0.00	0.0%
12:45 PM	13,202.04	3300.51	19.9%	0.00	0.00	0.0%	0.00	0.00	0.0%
1:00 PM	13,359.11	3339.78	20.2%	0.00	0.00	0.0%	0.00	0.00	0.0%
1:15 PM	13,818.82	3454.70	20.9%	0.00	0.00	0.0%	0.00	0.00	0.0%
1:30 PM	14,186.58	3546.64	21.4%	0.00	0.00	0.0%	0.00	0.00	0.0%
1:45 PM	14,890.13	3722.53	22.5%	0.00	0.00	0.0%	0.00	0.00	0.0%
2:00 PM	15,615.84	3903.96	23.6%	0.00	0.00	0.0%	0.00	0.00	0.0%
2:15 PM	16,837.05	4209.26	25.4%	0.00	0.00	0.0%	0.00	0.00	0.0%
2:30 PM	18,058.42	4514.61	27.3%	0.00	0.00	0.0%	0.00	0.00	0.0%
2:45 PM	19,911.01	4977.75	30.1%	0.00	0.00	0.0%	0.00	0.00	0.0%
3:00 PM	21,965.34	5491.33	33.2%	0.00	0.00	0.0%	0.00	0.00	0.0%
3:15 PM	34,305.48	8576.37	51.8%	0.00	0.00	0.0%	0.00	0.00	0.0%
3:30 PM	66,248.86	16562.22	100.0%	0.00	0.00	0.0%	0.00	0.00	0.0%
3:45 PM	66,248.86	11924.80	100.0%	0.00	0.00	0.0%	0.00	0.00	0.0%
3:52 PM	66,248.87	3974.93	100.0%	0.00	0.00	0.0%	0.00	0.00	0.0%

GRATTAN PLAYGROUND

DECEMBER 20

Analysis Hours: 8:19 AM-3:54 PM (PST)

WINTER SOLSTICE
DECEMBER 21 SIMILAR

Analysis Time	CURRENT SHADOW			NEW SHADOW FROM CPHP			NOT USED		
	Area (sf)	Area/Time (sfh)	Coverage	Area (sf)	Area/Time (sfh)	Coverage	Area (sf)	Area/Time (sfh)	Coverage
8:19 AM	55,894.48	4471.56	84.4%	0.00	0.00	0.0%	0.00	0.00	0.0%
8:30 AM	48,337.54	10150.88	73.0%	0.00	0.00	0.0%	0.00	0.00	0.0%
8:45 AM	38,028.00	9507.00	57.4%	0.00	0.00	0.0%	0.00	0.00	0.0%
9:00 AM	29,733.38	7433.34	44.9%	0.00	0.00	0.0%	0.00	0.00	0.0%
9:15 AM	24,984.88	6246.22	37.7%	0.00	0.00	0.0%	0.00	0.00	0.0%
9:30 AM	21,310.09	5327.52	32.2%	0.00	0.00	0.0%	0.00	0.00	0.0%
9:45 AM	19,333.07	4833.27	29.2%	0.00	0.00	0.0%	0.00	0.00	0.0%
10:00 AM	17,804.09	4451.02	26.9%	0.00	0.00	0.0%	0.00	0.00	0.0%
10:15 AM	16,784.87	4196.22	25.3%	0.00	0.00	0.0%	0.00	0.00	0.0%
10:30 AM	15,652.47	3913.12	23.6%	0.00	0.00	0.0%	0.00	0.00	0.0%
10:45 AM	14,970.68	3742.67	22.6%	0.00	0.00	0.0%	0.00	0.00	0.0%
11:00 AM	14,212.18	3553.05	21.5%	0.00	0.00	0.0%	0.00	0.00	0.0%
11:15 AM	13,784.73	3446.18	20.8%	0.00	0.00	0.0%	0.00	0.00	0.0%
11:30 AM	13,266.06	3316.51	20.0%	0.00	0.00	0.0%	0.00	0.00	0.0%
11:45 AM	13,294.07	3323.52	20.1%	0.00	0.00	0.0%	0.00	0.00	0.0%
12:00 PM	13,057.20	3264.30	19.7%	0.00	0.00	0.0%	0.00	0.00	0.0%
12:15 PM	13,155.90	3288.97	19.9%	0.00	0.00	0.0%	0.00	0.00	0.0%
12:30 PM	13,121.34	3280.34	19.8%	0.00	0.00	0.0%	0.00	0.00	0.0%
12:45 PM	13,365.07	3341.27	20.2%	0.00	0.00	0.0%	0.00	0.00	0.0%
1:00 PM	13,504.16	3376.04	20.4%	0.00	0.00	0.0%	0.00	0.00	0.0%
1:15 PM	13,946.66	3486.66	21.1%	0.00	0.00	0.0%	0.00	0.00	0.0%
1:30 PM	14,296.93	3574.23	21.6%	0.00	0.00	0.0%	0.00	0.00	0.0%
1:45 PM	14,977.35	3744.34	22.6%	0.00	0.00	0.0%	0.00	0.00	0.0%
2:00 PM	15,666.18	3916.54	23.6%	0.00	0.00	0.0%	0.00	0.00	0.0%
2:15 PM	16,850.00	4212.50	25.4%	0.00	0.00	0.0%	0.00	0.00	0.0%
2:30 PM	18,052.82	4513.21	27.3%	0.00	0.00	0.0%	0.00	0.00	0.0%
2:45 PM	19,831.06	4957.76	29.9%	0.00	0.00	0.0%	0.00	0.00	0.0%
3:00 PM	21,833.16	5458.29	33.0%	0.00	0.00	0.0%	0.00	0.00	0.0%
3:15 PM	28,688.62	7172.16	43.3%	0.00	0.00	0.0%	0.00	0.00	0.0%
3:30 PM	66,248.86	16562.21	100.0%	0.00	0.00	0.0%	0.00	0.00	0.0%
3:45 PM	66,248.87	13912.26	100.0%	0.00	0.00	0.0%	0.00	0.00	0.0%
3:54 PM	66,248.86	5299.91	100.0%	0.00	0.00	0.0%	0.00	0.00	0.0%

THEORETICAL ANNUAL AVAILABLE SUNLIGHT (TAAS)	GRATTAN PLAYGROUND
Area of Grattan Playground	1.52 acres (66,249 sf)
Hours of annual available sunlight	3721.4 hrs
TAAS for Grattan Playground	246,538,524 sfh

EXISTING (CURRENT) LEVELS OF SHADOW (ROUGH APPROXIMATE)	GRATTAN PLAYGROUND
Existing annual total shading on park (sfh)	34,143,738 sfh
Existing shading as percentage of TAAS	13.85%

NEW SHADOW CAST BY THE PROPOSED CPHP PROJECT	GRATTAN PLAYGROUND
Additional annual shading on Grattan Playground from Project	716,661 sfh
Additional annual shading from Project as percentage of TAAS	0.29%
Combined total annual shading existing + Project (sfh)	34,860,399 sfh
Combined total annual shading from existing + Project as percentage of TAAS	14.14%
Number of days when new shading from Project would occur	141-153 days annually
Dates when new shadow from Project would be cast on Grattan Playground	Between Apr 6 - Sep 5
Annual range in duration of new Project shadow (duration variance +/- 7 min.)	Zero to approx. 37 min
Range in area of new Project shadow (sf)	Zero to 30,117 sf
Average daily duration of new Project shadow (when present)	Approx. 24 min.
MAXIMUM NEW SHADING BY THE PROPOSED PROJECT	GRATTAN PLAYGROUND
Dates of maximum new shading from proposed Project (max sfh)	May 10 & Aug 2
Total new shading on date(s) of maximum shading (sfh)	8,983.32 sfh
Percentage new shadow on date(s) of maximum shading	1.12%
Date and duration of longest duration of new shading (duration variance +/- 7 min.)	Approx. 37 min on Jul 19 & May 24
Date and time of largest area of new Project shadow	30,117 sf on Aug 2/May 10 at 7:15 PM
Percentage of Grattan Playground covered by largest new shadow	45.46%

JUNE 21

Analysis Hours: 6:46 AM-7:36 PM (PDT)

SUMMER SOLSTICE

Analysis Time	CURRENT SHADOW			NEW SHADOW FROM CPHP			NOT USED		
	Area (sf)	Area/Time (sfh)	Coverage	Area (sf)	Area/Time (sfh)	Coverage	Area (sf)	Area/Time (sfh)	Coverage
6:46 AM	23,887.24	2627.60	91.0%	0.00	0.00	0.0%	0.00	0.00	0.0%
7:00 AM	18,012.82	4142.95	68.6%	0.00	0.00	0.0%	0.00	0.00	0.0%
7:15 AM	9,300.23	2325.06	35.4%	0.00	0.00	0.0%	0.00	0.00	0.0%
7:30 AM	4,259.11	1064.78	16.2%	0.00	0.00	0.0%	0.00	0.00	0.0%
7:45 AM	1,828.68	457.17	7.0%	0.00	0.00	0.0%	0.00	0.00	0.0%
8:00 AM	810.06	202.51	3.1%	0.00	0.00	0.0%	0.00	0.00	0.0%
8:15 AM	524.08	131.02	2.0%	0.00	0.00	0.0%	0.00	0.00	0.0%
8:30 AM	347.60	86.90	1.3%	0.00	0.00	0.0%	0.00	0.00	0.0%
8:45 AM	324.50	81.13	1.2%	0.00	0.00	0.0%	0.00	0.00	0.0%
9:00 AM	364.10	91.03	1.4%	0.00	0.00	0.0%	0.00	0.00	0.0%
9:15 AM	395.47	98.87	1.5%	0.00	0.00	0.0%	0.00	0.00	0.0%
9:30 AM	410.04	102.51	1.6%	0.00	0.00	0.0%	0.00	0.00	0.0%
9:45 AM	417.60	104.40	1.6%	0.00	0.00	0.0%	0.00	0.00	0.0%
10:00 AM	414.69	103.67	1.6%	0.00	0.00	0.0%	0.00	0.00	0.0%
10:15 AM	404.31	101.08	1.5%	0.00	0.00	0.0%	0.00	0.00	0.0%
10:30 AM	393.89	98.47	1.5%	0.00	0.00	0.0%	0.00	0.00	0.0%
10:45 AM	386.17	96.54	1.5%	0.00	0.00	0.0%	0.00	0.00	0.0%
11:00 AM	371.87	92.97	1.4%	0.00	0.00	0.0%	0.00	0.00	0.0%
11:15 AM	362.21	90.55	1.4%	0.00	0.00	0.0%	0.00	0.00	0.0%
11:30 AM	344.63	86.16	1.3%	0.00	0.00	0.0%	0.00	0.00	0.0%
11:45 AM	333.55	83.39	1.3%	0.00	0.00	0.0%	0.00	0.00	0.0%
12:00 PM	313.26	78.32	1.2%	0.00	0.00	0.0%	0.00	0.00	0.0%
12:15 PM	301.05	75.26	1.1%	0.00	0.00	0.0%	0.00	0.00	0.0%
12:30 PM	278.62	69.66	1.1%	0.00	0.00	0.0%	0.00	0.00	0.0%
12:45 PM	265.59	66.40	1.0%	0.00	0.00	0.0%	0.00	0.00	0.0%
1:00 PM	239.84	59.96	0.9%	0.00	0.00	0.0%	0.00	0.00	0.0%
1:15 PM	232.12	58.03	0.9%	0.00	0.00	0.0%	0.00	0.00	0.0%
1:30 PM	235.09	58.77	0.9%	0.00	0.00	0.0%	0.00	0.00	0.0%
1:45 PM	280.92	70.23	1.1%	0.00	0.00	0.0%	0.00	0.00	0.0%
2:00 PM	327.72	81.93	1.2%	0.00	0.00	0.0%	0.00	0.00	0.0%
2:15 PM	385.51	96.38	1.5%	0.00	0.00	0.0%	0.00	0.00	0.0%
2:30 PM	434.56	108.64	1.7%	0.00	0.00	0.0%	0.00	0.00	0.0%
2:45 PM	492.71	123.18	1.9%	0.00	0.00	0.0%	0.00	0.00	0.0%
3:00 PM	543.29	135.82	2.1%	0.00	0.00	0.0%	0.00	0.00	0.0%
3:15 PM	597.35	149.34	2.3%	0.00	0.00	0.0%	0.00	0.00	0.0%
3:30 PM	647.22	161.80	2.5%	0.00	0.00	0.0%	0.00	0.00	0.0%
3:45 PM	714.77	178.69	2.7%	0.00	0.00	0.0%	0.00	0.00	0.0%
4:00 PM	788.04	197.01	3.0%	0.00	0.00	0.0%	0.00	0.00	0.0%
4:15 PM	934.42	233.61	3.6%	0.00	0.00	0.0%	0.00	0.00	0.0%
4:30 PM	1,117.65	279.41	4.3%	0.00	0.00	0.0%	0.00	0.00	0.0%
4:45 PM	1,313.65	328.41	5.0%	0.00	0.00	0.0%	0.00	0.00	0.0%
5:00 PM	1,531.93	382.98	5.8%	0.00	0.00	0.0%	0.00	0.00	0.0%
5:15 PM	1,771.30	442.83	6.7%	0.00	0.00	0.0%	0.00	0.00	0.0%
5:30 PM	2,053.14	513.29	7.8%	0.00	0.00	0.0%	0.00	0.00	0.0%
5:45 PM	2,400.59	600.15	9.1%	0.00	0.00	0.0%	0.00	0.00	0.0%
6:00 PM	2,809.81	702.45	10.7%	0.00	0.00	0.0%	0.00	0.00	0.0%
6:15 PM	3,365.05	841.26	12.8%	0.00	0.00	0.0%	0.00	0.00	0.0%
6:30 PM	4,146.50	1036.62	15.8%	0.00	0.00	0.0%	0.00	0.00	0.0%
6:45 PM	5,785.52	1446.38	22.0%	0.00	0.00	0.0%	0.00	0.00	0.0%
7:00 PM	9,091.41	2272.85	34.6%	0.00	0.00	0.0%	0.00	0.00	0.0%
7:15 PM	13,894.47	4168.34	52.9%	0.00	0.00	0.0%	0.00	0.00	0.0%
7:36 PM	22,486.73	4047.61	85.7%	0.00	0.00	0.0%	0.00	0.00	0.0%

JUNE 28

Analysis Hours: 6:48 AM-7:36 PM (PDT)

JUNE 14 SIMILAR

Analysis Time	CURRENT SHADOW			NEW SHADOW FROM CPHP			NOT USED		
	Area (sf)	Area/Time (sfh)	Coverage	Area (sf)	Area/Time (sfh)	Coverage	Area (sf)	Area/Time (sfh)	Coverage
6:48 AM	23,742.24	2374.22	90.5%	0.00	0.00	0.0%	0.00	0.00	0.0%
7:00 AM	18,647.93	4102.54	71.1%	0.00	0.00	0.0%	0.00	0.00	0.0%
7:15 AM	10,129.55	2532.39	38.6%	0.00	0.00	0.0%	0.00	0.00	0.0%
7:30 AM	4,666.90	1166.73	17.8%	0.00	0.00	0.0%	0.00	0.00	0.0%
7:45 AM	2,032.14	508.04	7.7%	0.00	0.00	0.0%	0.00	0.00	0.0%
8:00 AM	878.98	219.75	3.3%	0.00	0.00	0.0%	0.00	0.00	0.0%
8:15 AM	561.48	140.37	2.1%	0.00	0.00	0.0%	0.00	0.00	0.0%
8:30 AM	378.15	94.54	1.4%	0.00	0.00	0.0%	0.00	0.00	0.0%
8:45 AM	332.22	83.05	1.3%	0.00	0.00	0.0%	0.00	0.00	0.0%
9:00 AM	369.16	92.29	1.4%	0.00	0.00	0.0%	0.00	0.00	0.0%
9:15 AM	400.94	100.24	1.5%	0.00	0.00	0.0%	0.00	0.00	0.0%
9:30 AM	416.47	104.12	1.6%	0.00	0.00	0.0%	0.00	0.00	0.0%
9:45 AM	423.88	105.97	1.6%	0.00	0.00	0.0%	0.00	0.00	0.0%
10:00 AM	421.48	105.37	1.6%	0.00	0.00	0.0%	0.00	0.00	0.0%
10:15 AM	410.60	102.65	1.6%	0.00	0.00	0.0%	0.00	0.00	0.0%
10:30 AM	399.36	99.84	1.5%	0.00	0.00	0.0%	0.00	0.00	0.0%
10:45 AM	392.05	98.01	1.5%	0.00	0.00	0.0%	0.00	0.00	0.0%
11:00 AM	377.13	94.28	1.4%	0.00	0.00	0.0%	0.00	0.00	0.0%
11:15 AM	367.22	91.80	1.4%	0.00	0.00	0.0%	0.00	0.00	0.0%
11:30 AM	349.69	87.42	1.3%	0.00	0.00	0.0%	0.00	0.00	0.0%
11:45 AM	338.86	84.72	1.3%	0.00	0.00	0.0%	0.00	0.00	0.0%
12:00 PM	318.17	79.54	1.2%	0.00	0.00	0.0%	0.00	0.00	0.0%
12:15 PM	305.90	76.48	1.2%	0.00	0.00	0.0%	0.00	0.00	0.0%
12:30 PM	283.27	70.82	1.1%	0.00	0.00	0.0%	0.00	0.00	0.0%
12:45 PM	269.93	67.48	1.0%	0.00	0.00	0.0%	0.00	0.00	0.0%
1:00 PM	244.39	61.10	0.9%	0.00	0.00	0.0%	0.00	0.00	0.0%
1:15 PM	235.80	58.95	0.9%	0.00	0.00	0.0%	0.00	0.00	0.0%
1:30 PM	234.12	58.53	0.9%	0.00	0.00	0.0%	0.00	0.00	0.0%
1:45 PM	279.90	69.97	1.1%	0.00	0.00	0.0%	0.00	0.00	0.0%
2:00 PM	326.14	81.53	1.2%	0.00	0.00	0.0%	0.00	0.00	0.0%
2:15 PM	383.36	95.84	1.5%	0.00	0.00	0.0%	0.00	0.00	0.0%
2:30 PM	433.69	108.42	1.7%	0.00	0.00	0.0%	0.00	0.00	0.0%
2:45 PM	490.87	122.72	1.9%	0.00	0.00	0.0%	0.00	0.00	0.0%
3:00 PM	542.17	135.54	2.1%	0.00	0.00	0.0%	0.00	0.00	0.0%
3:15 PM	596.79	149.20	2.3%	0.00	0.00	0.0%	0.00	0.00	0.0%
3:30 PM	646.09	161.52	2.5%	0.00	0.00	0.0%	0.00	0.00	0.0%
3:45 PM	713.33	178.33	2.7%	0.00	0.00	0.0%	0.00	0.00	0.0%
4:00 PM	782.62	195.65	3.0%	0.00	0.00	0.0%	0.00	0.00	0.0%
4:15 PM	916.39	229.10	3.5%	0.00	0.00	0.0%	0.00	0.00	0.0%
4:30 PM	1,097.31	274.33	4.2%	0.00	0.00	0.0%	0.00	0.00	0.0%
4:45 PM	1,292.65	323.16	4.9%	0.00	0.00	0.0%	0.00	0.00	0.0%
5:00 PM	1,508.12	377.03	5.7%	0.00	0.00	0.0%	0.00	0.00	0.0%
5:15 PM	1,745.35	436.34	6.7%	0.00	0.00	0.0%	0.00	0.00	0.0%
5:30 PM	2,021.72	505.43	7.7%	0.00	0.00	0.0%	0.00	0.00	0.0%
5:45 PM	2,363.34	590.84	9.0%	0.00	0.00	0.0%	0.00	0.00	0.0%
6:00 PM	2,771.18	692.79	10.6%	0.00	0.00	0.0%	0.00	0.00	0.0%
6:15 PM	3,306.30	826.57	12.6%	0.00	0.00	0.0%	0.00	0.00	0.0%
6:30 PM	4,064.54	1016.14	15.5%	0.00	0.00	0.0%	0.00	0.00	0.0%
6:45 PM	5,573.12	1393.28	21.2%	0.00	0.00	0.0%	0.00	0.00	0.0%
7:00 PM	8,734.05	2183.51	33.3%	0.00	0.00	0.0%	0.00	0.00	0.0%
7:15 PM	13,460.07	4038.02	51.3%	0.00	0.00	0.0%	0.00	0.00	0.0%
7:36 PM	22,369.42	4026.50	85.2%	0.00	0.00	0.0%	0.00	0.00	0.0%

JULY 5

Analysis Hours: 6:52 AM-7:36 PM (PDT)

JUNE 7 SIMILAR

Analysis Time	CURRENT SHADOW			NEW SHADOW FROM CPHP			NOT USED		
	Area (sf)	Area/Time (sfh)	Coverage	Area (sf)	Area/Time (sfh)	Coverage	Area (sf)	Area/Time (sfh)	Coverage
6:52 AM	23,314.57	1398.87	88.8%	0.00	0.00	0.0%	0.00	0.00	0.0%
7:00 AM	19,660.27	3735.45	74.9%	0.00	0.00	0.0%	0.00	0.00	0.0%
7:15 AM	11,353.89	2838.47	43.3%	0.00	0.00	0.0%	0.00	0.00	0.0%
7:30 AM	5,158.53	1289.63	19.7%	0.00	0.00	0.0%	0.00	0.00	0.0%
7:45 AM	2,352.36	588.09	9.0%	0.00	0.00	0.0%	0.00	0.00	0.0%
8:00 AM	1,030.23	257.56	3.9%	0.00	0.00	0.0%	0.00	0.00	0.0%
8:15 AM	631.89	157.97	2.4%	0.00	0.00	0.0%	0.00	0.00	0.0%
8:30 AM	458.22	114.55	1.7%	0.00	0.00	0.0%	0.00	0.00	0.0%
8:45 AM	370.95	92.74	1.4%	0.00	0.00	0.0%	0.00	0.00	0.0%
9:00 AM	397.01	99.25	1.5%	0.00	0.00	0.0%	0.00	0.00	0.0%
9:15 AM	424.19	106.05	1.6%	0.00	0.00	0.0%	0.00	0.00	0.0%
9:30 AM	438.09	109.52	1.7%	0.00	0.00	0.0%	0.00	0.00	0.0%
9:45 AM	444.17	111.04	1.7%	0.00	0.00	0.0%	0.00	0.00	0.0%
10:00 AM	440.54	110.13	1.7%	0.00	0.00	0.0%	0.00	0.00	0.0%
10:15 AM	428.53	107.13	1.6%	0.00	0.00	0.0%	0.00	0.00	0.0%
10:30 AM	415.91	103.98	1.6%	0.00	0.00	0.0%	0.00	0.00	0.0%
10:45 AM	406.82	101.70	1.6%	0.00	0.00	0.0%	0.00	0.00	0.0%
11:00 AM	391.18	97.80	1.5%	0.00	0.00	0.0%	0.00	0.00	0.0%
11:15 AM	380.86	95.22	1.5%	0.00	0.00	0.0%	0.00	0.00	0.0%
11:30 AM	362.01	90.50	1.4%	0.00	0.00	0.0%	0.00	0.00	0.0%
11:45 AM	350.97	87.74	1.3%	0.00	0.00	0.0%	0.00	0.00	0.0%
12:00 PM	329.92	82.48	1.3%	0.00	0.00	0.0%	0.00	0.00	0.0%
12:15 PM	316.74	79.18	1.2%	0.00	0.00	0.0%	0.00	0.00	0.0%
12:30 PM	293.95	73.49	1.1%	0.00	0.00	0.0%	0.00	0.00	0.0%
12:45 PM	280.26	70.06	1.1%	0.00	0.00	0.0%	0.00	0.00	0.0%
1:00 PM	254.50	63.63	1.0%	0.00	0.00	0.0%	0.00	0.00	0.0%
1:15 PM	245.00	61.25	0.9%	0.00	0.00	0.0%	0.00	0.00	0.0%
1:30 PM	240.30	60.07	0.9%	0.00	0.00	0.0%	0.00	0.00	0.0%
1:45 PM	285.98	71.49	1.1%	0.00	0.00	0.0%	0.00	0.00	0.0%
2:00 PM	331.71	82.93	1.3%	0.00	0.00	0.0%	0.00	0.00	0.0%
2:15 PM	389.60	97.40	1.5%	0.00	0.00	0.0%	0.00	0.00	0.0%
2:30 PM	439.88	109.97	1.7%	0.00	0.00	0.0%	0.00	0.00	0.0%
2:45 PM	497.66	124.42	1.9%	0.00	0.00	0.0%	0.00	0.00	0.0%
3:00 PM	549.22	137.30	2.1%	0.00	0.00	0.0%	0.00	0.00	0.0%
3:15 PM	604.96	151.24	2.3%	0.00	0.00	0.0%	0.00	0.00	0.0%
3:30 PM	655.39	163.85	2.5%	0.00	0.00	0.0%	0.00	0.00	0.0%
3:45 PM	722.84	180.71	2.8%	0.00	0.00	0.0%	0.00	0.00	0.0%
4:00 PM	790.54	197.63	3.0%	0.00	0.00	0.0%	0.00	0.00	0.0%
4:15 PM	899.52	224.88	3.4%	0.00	0.00	0.0%	0.00	0.00	0.0%
4:30 PM	1,076.21	269.05	4.1%	0.00	0.00	0.0%	0.00	0.00	0.0%
4:45 PM	1,270.06	317.52	4.8%	0.00	0.00	0.0%	0.00	0.00	0.0%
5:00 PM	1,485.28	371.32	5.7%	0.00	0.00	0.0%	0.00	0.00	0.0%
5:15 PM	1,721.54	430.38	6.6%	0.00	0.00	0.0%	0.00	0.00	0.0%
5:30 PM	1,994.23	498.56	7.6%	0.00	0.00	0.0%	0.00	0.00	0.0%
5:45 PM	2,334.98	583.75	8.9%	0.00	0.00	0.0%	0.00	0.00	0.0%
6:00 PM	2,741.60	685.40	10.4%	0.00	0.00	0.0%	0.00	0.00	0.0%
6:15 PM	3,267.51	816.88	12.4%	0.00	0.00	0.0%	0.00	0.00	0.0%
6:30 PM	4,019.78	1004.95	15.3%	0.00	0.00	0.0%	0.00	0.00	0.0%
6:45 PM	5,466.48	1366.62	20.8%	0.00	0.00	0.0%	0.00	0.00	0.0%
7:00 PM	8,514.49	2128.62	32.4%	0.00	0.00	0.0%	0.00	0.00	0.0%
7:15 PM	13,257.99	3977.40	50.5%	0.00	0.00	0.0%	0.00	0.00	0.0%
7:36 PM	21,990.65	3958.32	83.8%	0.00	0.00	0.0%	0.00	0.00	0.0%

GAMBLE PARK

Quantitative Shading Calculations for CPHP

JULY 12

Analysis Hours: 6:56 AM-7:33 PM (PDT)

MAY 31 SIMILAR

Analysis Time	CURRENT SHADOW			NEW SHADOW FROM CPHP			NOT USED		
	Area (sf)	Area/Time (sfh)	Coverage	Area (sf)	Area/Time (sfh)	Coverage	Area (sf)	Area/Time (sfh)	Coverage
6:56 AM	22,613.14	678.39	86.2%	0.00	0.00	0.0%	0.00	0.00	0.0%
7:00 AM	20,956.50	3143.47	79.8%	0.00	0.00	0.0%	0.00	0.00	0.0%
7:15 AM	12,799.66	3199.92	48.8%	0.00	0.00	0.0%	0.00	0.00	0.0%
7:30 AM	5,834.06	1458.51	22.2%	0.00	0.00	0.0%	0.00	0.00	0.0%
7:45 AM	2,848.59	712.15	10.9%	0.00	0.00	0.0%	0.00	0.00	0.0%
8:00 AM	1,333.52	333.38	5.1%	0.00	0.00	0.0%	0.00	0.00	0.0%
8:15 AM	760.04	190.01	2.9%	0.00	0.00	0.0%	0.00	0.00	0.0%
8:30 AM	604.61	151.15	2.3%	0.00	0.00	0.0%	0.00	0.00	0.0%
8:45 AM	445.60	111.40	1.7%	0.00	0.00	0.0%	0.00	0.00	0.0%
9:00 AM	452.96	113.24	1.7%	0.00	0.00	0.0%	0.00	0.00	0.0%
9:15 AM	468.90	117.22	1.8%	0.00	0.00	0.0%	0.00	0.00	0.0%
9:30 AM	476.82	119.20	1.8%	0.00	0.00	0.0%	0.00	0.00	0.0%
9:45 AM	479.83	119.96	1.8%	0.00	0.00	0.0%	0.00	0.00	0.0%
10:00 AM	473.60	118.40	1.8%	0.00	0.00	0.0%	0.00	0.00	0.0%
10:15 AM	458.53	114.63	1.7%	0.00	0.00	0.0%	0.00	0.00	0.0%
10:30 AM	442.63	110.66	1.7%	0.00	0.00	0.0%	0.00	0.00	0.0%
10:45 AM	431.80	107.95	1.6%	0.00	0.00	0.0%	0.00	0.00	0.0%
11:00 AM	414.53	103.63	1.6%	0.00	0.00	0.0%	0.00	0.00	0.0%
11:15 AM	402.12	100.53	1.5%	0.00	0.00	0.0%	0.00	0.00	0.0%
11:30 AM	382.85	95.71	1.5%	0.00	0.00	0.0%	0.00	0.00	0.0%
11:45 AM	369.82	92.46	1.4%	0.00	0.00	0.0%	0.00	0.00	0.0%
12:00 PM	347.85	86.96	1.3%	0.00	0.00	0.0%	0.00	0.00	0.0%
12:15 PM	333.85	83.46	1.3%	0.00	0.00	0.0%	0.00	0.00	0.0%
12:30 PM	310.25	77.56	1.2%	0.00	0.00	0.0%	0.00	0.00	0.0%
12:45 PM	295.69	73.92	1.1%	0.00	0.00	0.0%	0.00	0.00	0.0%
1:00 PM	269.37	67.34	1.0%	0.00	0.00	0.0%	0.00	0.00	0.0%
1:15 PM	259.00	64.75	1.0%	0.00	0.00	0.0%	0.00	0.00	0.0%
1:30 PM	253.07	63.27	1.0%	0.00	0.00	0.0%	0.00	0.00	0.0%
1:45 PM	299.11	74.78	1.1%	0.00	0.00	0.0%	0.00	0.00	0.0%
2:00 PM	344.84	86.21	1.3%	0.00	0.00	0.0%	0.00	0.00	0.0%
2:15 PM	403.24	100.81	1.5%	0.00	0.00	0.0%	0.00	0.00	0.0%
2:30 PM	454.39	113.60	1.7%	0.00	0.00	0.0%	0.00	0.00	0.0%
2:45 PM	512.84	128.21	2.0%	0.00	0.00	0.0%	0.00	0.00	0.0%
3:00 PM	565.31	141.33	2.2%	0.00	0.00	0.0%	0.00	0.00	0.0%
3:15 PM	622.49	155.62	2.4%	0.00	0.00	0.0%	0.00	0.00	0.0%
3:30 PM	675.37	168.84	2.6%	0.00	0.00	0.0%	0.00	0.00	0.0%
3:45 PM	744.81	186.20	2.8%	0.00	0.00	0.0%	0.00	0.00	0.0%
4:00 PM	812.00	203.00	3.1%	0.00	0.00	0.0%	0.00	0.00	0.0%
4:15 PM	893.85	223.46	3.4%	0.00	0.00	0.0%	0.00	0.00	0.0%
4:30 PM	1,054.04	263.51	4.0%	0.00	0.00	0.0%	0.00	0.00	0.0%
4:45 PM	1,248.30	312.07	4.8%	0.00	0.00	0.0%	0.00	0.00	0.0%
5:00 PM	1,463.46	365.86	5.6%	0.00	0.00	0.0%	0.00	0.00	0.0%
5:15 PM	1,700.39	425.10	6.5%	0.00	0.00	0.0%	0.00	0.00	0.0%
5:30 PM	1,971.60	492.90	7.5%	0.00	0.00	0.0%	0.00	0.00	0.0%
5:45 PM	2,313.73	578.43	8.8%	0.00	0.00	0.0%	0.00	0.00	0.0%
6:00 PM	2,726.47	681.62	10.4%	0.00	0.00	0.0%	0.00	0.00	0.0%
6:15 PM	3,246.31	811.58	12.4%	0.00	0.00	0.0%	0.00	0.00	0.0%
6:30 PM	4,012.07	1003.02	15.3%	0.00	0.00	0.0%	0.00	0.00	0.0%
6:45 PM	5,458.97	1364.74	20.8%	0.00	0.00	0.0%	0.00	0.00	0.0%
7:00 PM	8,445.31	2111.33	32.2%	0.00	0.00	0.0%	0.00	0.00	0.0%
7:15 PM	13,386.44	3748.20	51.0%	0.00	0.00	0.0%	0.00	0.00	0.0%
7:33 PM	21,324.74	3198.71	81.3%	0.00	0.00	0.0%	0.00	0.00	0.0%

GAMBLE PARK

Quantitative Shading Calculations for CPHP

JULY 19

Analysis Hours: 7:01 AM-7:30 PM (PDT)

MAY 24 SIMILAR

Analysis Time	CURRENT SHADOW			NEW SHADOW FROM CPHP			NOT USED		
	Area (sf)	Area/Time (sfh)	Coverage	Area (sf)	Area/Time (sfh)	Coverage	Area (sf)	Area/Time (sfh)	Coverage
7:01 AM	21,405.87	2782.76	81.6%	0.00	0.00	0.0%	0.00	0.00	0.0%
7:16 AM	13,900.50	3336.12	53.0%	0.00	0.00	0.0%	0.00	0.00	0.0%
7:30 AM	7,113.17	1707.16	27.1%	0.00	0.00	0.0%	0.00	0.00	0.0%
7:45 AM	3,671.27	917.82	14.0%	0.00	0.00	0.0%	0.00	0.00	0.0%
8:00 AM	1,842.99	460.75	7.0%	0.00	0.00	0.0%	0.00	0.00	0.0%
8:15 AM	1,054.19	263.55	4.0%	0.00	0.00	0.0%	0.00	0.00	0.0%
8:30 AM	839.85	209.96	3.2%	0.00	0.00	0.0%	0.00	0.00	0.0%
8:45 AM	596.53	149.13	2.3%	0.00	0.00	0.0%	0.00	0.00	0.0%
9:00 AM	543.29	135.82	2.1%	0.00	0.00	0.0%	0.00	0.00	0.0%
9:15 AM	543.19	135.80	2.1%	0.00	0.00	0.0%	0.00	0.00	0.0%
9:30 AM	534.55	133.64	2.0%	0.00	0.00	0.0%	0.00	0.00	0.0%
9:45 AM	530.21	132.55	2.0%	0.00	0.00	0.0%	0.00	0.00	0.0%
10:00 AM	519.58	129.90	2.0%	0.00	0.00	0.0%	0.00	0.00	0.0%
10:15 AM	501.29	125.32	1.9%	0.00	0.00	0.0%	0.00	0.00	0.0%
10:30 AM	479.88	119.97	1.8%	0.00	0.00	0.0%	0.00	0.00	0.0%
10:45 AM	466.55	116.64	1.8%	0.00	0.00	0.0%	0.00	0.00	0.0%
11:00 AM	446.42	111.60	1.7%	0.00	0.00	0.0%	0.00	0.00	0.0%
11:15 AM	432.06	108.01	1.6%	0.00	0.00	0.0%	0.00	0.00	0.0%
11:30 AM	410.34	102.59	1.6%	0.00	0.00	0.0%	0.00	0.00	0.0%
11:45 AM	395.63	98.91	1.5%	0.00	0.00	0.0%	0.00	0.00	0.0%
12:00 PM	372.53	93.13	1.4%	0.00	0.00	0.0%	0.00	0.00	0.0%
12:15 PM	357.15	89.29	1.4%	0.00	0.00	0.0%	0.00	0.00	0.0%
12:30 PM	332.12	83.03	1.3%	0.00	0.00	0.0%	0.00	0.00	0.0%
12:45 PM	316.28	79.07	1.2%	0.00	0.00	0.0%	0.00	0.00	0.0%
1:00 PM	289.25	72.31	1.1%	0.00	0.00	0.0%	0.00	0.00	0.0%
1:15 PM	277.65	69.41	1.1%	0.00	0.00	0.0%	0.00	0.00	0.0%
1:30 PM	273.36	68.34	1.0%	0.00	0.00	0.0%	0.00	0.00	0.0%
1:45 PM	319.60	79.90	1.2%	0.00	0.00	0.0%	0.00	0.00	0.0%
2:00 PM	366.45	91.61	1.4%	0.00	0.00	0.0%	0.00	0.00	0.0%
2:15 PM	425.52	106.38	1.6%	0.00	0.00	0.0%	0.00	0.00	0.0%
2:30 PM	477.63	119.41	1.8%	0.00	0.00	0.0%	0.00	0.00	0.0%
2:45 PM	537.16	134.29	2.0%	0.00	0.00	0.0%	0.00	0.00	0.0%
3:00 PM	592.14	148.03	2.3%	0.00	0.00	0.0%	0.00	0.00	0.0%
3:15 PM	650.34	162.58	2.5%	0.00	0.00	0.0%	0.00	0.00	0.0%
3:30 PM	706.28	176.57	2.7%	0.00	0.00	0.0%	0.00	0.00	0.0%
3:45 PM	778.48	194.62	3.0%	0.00	0.00	0.0%	0.00	0.00	0.0%
4:00 PM	847.87	211.97	3.2%	0.00	0.00	0.0%	0.00	0.00	0.0%
4:15 PM	923.18	230.80	3.5%	0.00	0.00	0.0%	0.00	0.00	0.0%
4:30 PM	1,040.34	260.09	4.0%	0.00	0.00	0.0%	0.00	0.00	0.0%
4:45 PM	1,230.01	307.50	4.7%	0.00	0.00	0.0%	0.00	0.00	0.0%
5:00 PM	1,447.87	361.97	5.5%	0.00	0.00	0.0%	0.00	0.00	0.0%
5:15 PM	1,685.77	421.44	6.4%	0.00	0.00	0.0%	0.00	0.00	0.0%
5:30 PM	1,958.52	489.63	7.5%	0.00	0.00	0.0%	0.00	0.00	0.0%
5:45 PM	2,305.60	576.40	8.8%	0.00	0.00	0.0%	0.00	0.00	0.0%
6:00 PM	2,728.67	682.17	10.4%	0.00	0.00	0.0%	0.00	0.00	0.0%
6:15 PM	3,248.97	812.24	12.4%	0.00	0.00	0.0%	0.00	0.00	0.0%
6:30 PM	4,083.75	1020.94	15.6%	0.00	0.00	0.0%	0.00	0.00	0.0%
6:45 PM	5,574.55	1393.64	21.2%	0.00	0.00	0.0%	0.00	0.00	0.0%
7:00 PM	8,598.60	2149.65	32.8%	0.00	0.00	0.0%	0.00	0.00	0.0%
7:15 PM	13,906.84	3476.71	53.0%	0.00	0.00	0.0%	0.00	0.00	0.0%
7:30 PM	20,366.76	2647.68	77.6%	0.00	0.00	0.0%	0.00	0.00	0.0%

GAMBLE PARK

JULY 26

Analysis Hours: 7:07 AM-7:25 PM (PDT)

MAY 17 SIMILAR

Analysis Time	CURRENT SHADOW			NEW SHADOW FROM CPHP			NOT USED		
	Area (sf)	Area/Time (sfh)	Coverage	Area (sf)	Area/Time (sfh)	Coverage	Area (sf)	Area/Time (sfh)	Coverage
7:07 AM	19,859.95	1191.60	75.7%	0.00	0.00	0.0%	0.00	0.00	0.0%
7:15 AM	16,289.60	3095.02	62.1%	0.00	0.00	0.0%	0.00	0.00	0.0%
7:30 AM	9,299.36	2324.84	35.4%	0.00	0.00	0.0%	0.00	0.00	0.0%
7:45 AM	5,053.13	1263.28	19.3%	0.00	0.00	0.0%	0.00	0.00	0.0%
8:00 AM	2,721.16	680.29	10.4%	0.00	0.00	0.0%	0.00	0.00	0.0%
8:15 AM	1,574.69	393.67	6.0%	0.00	0.00	0.0%	0.00	0.00	0.0%
8:30 AM	1,196.90	299.22	4.6%	0.00	0.00	0.0%	0.00	0.00	0.0%
8:45 AM	841.99	210.50	3.2%	0.00	0.00	0.0%	0.00	0.00	0.0%
9:00 AM	680.33	170.08	2.6%	0.00	0.00	0.0%	0.00	0.00	0.0%
9:15 AM	649.47	162.37	2.5%	0.00	0.00	0.0%	0.00	0.00	0.0%
9:30 AM	619.93	154.98	2.4%	0.00	0.00	0.0%	0.00	0.00	0.0%
9:45 AM	598.73	149.68	2.3%	0.00	0.00	0.0%	0.00	0.00	0.0%
10:00 AM	579.67	144.92	2.2%	0.00	0.00	0.0%	0.00	0.00	0.0%
10:15 AM	558.16	139.54	2.1%	0.00	0.00	0.0%	0.00	0.00	0.0%
10:30 AM	529.09	132.27	2.0%	0.00	0.00	0.0%	0.00	0.00	0.0%
10:45 AM	510.80	127.70	1.9%	0.00	0.00	0.0%	0.00	0.00	0.0%
11:00 AM	487.24	121.81	1.9%	0.00	0.00	0.0%	0.00	0.00	0.0%
11:15 AM	469.92	117.48	1.8%	0.00	0.00	0.0%	0.00	0.00	0.0%
11:30 AM	445.29	111.32	1.7%	0.00	0.00	0.0%	0.00	0.00	0.0%
11:45 AM	428.43	107.11	1.6%	0.00	0.00	0.0%	0.00	0.00	0.0%
12:00 PM	403.44	100.86	1.5%	0.00	0.00	0.0%	0.00	0.00	0.0%
12:15 PM	385.77	96.44	1.5%	0.00	0.00	0.0%	0.00	0.00	0.0%
12:30 PM	359.81	89.95	1.4%	0.00	0.00	0.0%	0.00	0.00	0.0%
12:45 PM	342.13	85.53	1.3%	0.00	0.00	0.0%	0.00	0.00	0.0%
1:00 PM	314.18	78.55	1.2%	0.00	0.00	0.0%	0.00	0.00	0.0%
1:15 PM	301.36	75.34	1.1%	0.00	0.00	0.0%	0.00	0.00	0.0%
1:30 PM	300.69	75.17	1.1%	0.00	0.00	0.0%	0.00	0.00	0.0%
1:45 PM	347.24	86.81	1.3%	0.00	0.00	0.0%	0.00	0.00	0.0%
2:00 PM	396.44	99.11	1.5%	0.00	0.00	0.0%	0.00	0.00	0.0%
2:15 PM	455.71	113.93	1.7%	0.00	0.00	0.0%	0.00	0.00	0.0%
2:30 PM	508.65	127.16	1.9%	0.00	0.00	0.0%	0.00	0.00	0.0%
2:45 PM	570.42	142.61	2.2%	0.00	0.00	0.0%	0.00	0.00	0.0%
3:00 PM	626.07	156.52	2.4%	0.00	0.00	0.0%	0.00	0.00	0.0%
3:15 PM	687.53	171.88	2.6%	0.00	0.00	0.0%	0.00	0.00	0.0%
3:30 PM	749.25	187.31	2.9%	0.00	0.00	0.0%	0.00	0.00	0.0%
3:45 PM	824.36	206.09	3.1%	0.00	0.00	0.0%	0.00	0.00	0.0%
4:00 PM	896.36	224.09	3.4%	0.00	0.00	0.0%	0.00	0.00	0.0%
4:15 PM	973.61	243.40	3.7%	0.00	0.00	0.0%	0.00	0.00	0.0%
4:30 PM	1,055.06	263.76	4.0%	0.00	0.00	0.0%	0.00	0.00	0.0%
4:45 PM	1,215.34	303.84	4.6%	0.00	0.00	0.0%	0.00	0.00	0.0%
5:00 PM	1,435.61	358.90	5.5%	0.00	0.00	0.0%	0.00	0.00	0.0%
5:15 PM	1,675.96	418.99	6.4%	0.00	0.00	0.0%	0.00	0.00	0.0%
5:30 PM	1,956.37	489.09	7.5%	0.00	0.00	0.0%	0.00	0.00	0.0%
5:45 PM	2,313.93	578.48	8.8%	0.00	0.00	0.0%	0.00	0.00	0.0%
6:00 PM	2,746.19	686.55	10.5%	0.00	0.00	0.0%	0.00	0.00	0.0%
6:15 PM	3,267.97	816.99	12.5%	0.00	0.00	0.0%	0.00	0.00	0.0%
6:30 PM	4,232.34	1058.08	16.1%	0.00	0.00	0.0%	0.00	0.00	0.0%
6:45 PM	5,815.51	1453.88	22.2%	0.00	0.00	0.0%	0.00	0.00	0.0%
7:00 PM	9,024.01	2256.00	34.4%	0.00	0.00	0.0%	0.00	0.00	0.0%
7:15 PM	14,747.30	3096.93	56.2%	0.00	0.00	0.0%	0.00	0.00	0.0%
7:25 PM	19,013.15	1711.18	72.4%	0.00	0.00	0.0%	0.00	0.00	0.0%

GAMBLE PARK

Quantitative Shading Calculations for CPHP

AUGUST 2

Analysis Hours: 7:12 AM-7:18 PM (PDT)

MAY 10 SIMILAR

Analysis Time	CURRENT SHADOW			NEW SHADOW FROM CPHP			NOT USED		
	Area (sf)	Area/Time (sfh)	Coverage	Area (sf)	Area/Time (sfh)	Coverage	Area (sf)	Area/Time (sfh)	Coverage
7:12 AM	18,679.61	373.59	71.2%	0.00	0.00	0.0%	0.00	0.00	0.0%
7:15 AM	17,435.70	2615.36	66.4%	0.00	0.00	0.0%	0.00	0.00	0.0%
7:30 AM	11,765.35	2941.34	44.8%	0.00	0.00	0.0%	0.00	0.00	0.0%
7:45 AM	6,985.07	1746.27	26.6%	0.00	0.00	0.0%	0.00	0.00	0.0%
8:00 AM	4,132.19	1033.05	15.7%	0.00	0.00	0.0%	0.00	0.00	0.0%
8:15 AM	2,380.41	595.10	9.1%	0.00	0.00	0.0%	0.00	0.00	0.0%
8:30 AM	1,705.44	426.36	6.5%	0.00	0.00	0.0%	0.00	0.00	0.0%
8:45 AM	1,191.58	297.90	4.5%	0.00	0.00	0.0%	0.00	0.00	0.0%
9:00 AM	875.71	218.93	3.3%	0.00	0.00	0.0%	0.00	0.00	0.0%
9:15 AM	800.71	200.18	3.1%	0.00	0.00	0.0%	0.00	0.00	0.0%
9:30 AM	738.93	184.73	2.8%	0.00	0.00	0.0%	0.00	0.00	0.0%
9:45 AM	692.74	173.19	2.6%	0.00	0.00	0.0%	0.00	0.00	0.0%
10:00 AM	653.81	163.45	2.5%	0.00	0.00	0.0%	0.00	0.00	0.0%
10:15 AM	628.21	157.05	2.4%	0.00	0.00	0.0%	0.00	0.00	0.0%
10:30 AM	588.92	147.23	2.2%	0.00	0.00	0.0%	0.00	0.00	0.0%
10:45 AM	564.65	141.16	2.2%	0.00	0.00	0.0%	0.00	0.00	0.0%
11:00 AM	536.09	134.02	2.0%	0.00	0.00	0.0%	0.00	0.00	0.0%
11:15 AM	514.73	128.68	2.0%	0.00	0.00	0.0%	0.00	0.00	0.0%
11:30 AM	487.39	121.85	1.9%	0.00	0.00	0.0%	0.00	0.00	0.0%
11:45 AM	467.62	116.90	1.8%	0.00	0.00	0.0%	0.00	0.00	0.0%
12:00 PM	439.98	109.99	1.7%	0.00	0.00	0.0%	0.00	0.00	0.0%
12:15 PM	420.10	105.03	1.6%	0.00	0.00	0.0%	0.00	0.00	0.0%
12:30 PM	392.31	98.08	1.5%	0.00	0.00	0.0%	0.00	0.00	0.0%
12:45 PM	372.74	93.18	1.4%	0.00	0.00	0.0%	0.00	0.00	0.0%
1:00 PM	342.74	85.69	1.3%	0.00	0.00	0.0%	0.00	0.00	0.0%
1:15 PM	329.71	82.43	1.3%	0.00	0.00	0.0%	0.00	0.00	0.0%
1:30 PM	335.18	83.80	1.3%	0.00	0.00	0.0%	0.00	0.00	0.0%
1:45 PM	382.85	95.71	1.5%	0.00	0.00	0.0%	0.00	0.00	0.0%
2:00 PM	434.31	108.58	1.7%	0.00	0.00	0.0%	0.00	0.00	0.0%
2:15 PM	494.65	123.66	1.9%	0.00	0.00	0.0%	0.00	0.00	0.0%
2:30 PM	549.68	137.42	2.1%	0.00	0.00	0.0%	0.00	0.00	0.0%
2:45 PM	612.42	153.11	2.3%	0.00	0.00	0.0%	0.00	0.00	0.0%
3:00 PM	670.52	167.63	2.6%	0.00	0.00	0.0%	0.00	0.00	0.0%
3:15 PM	734.85	183.71	2.8%	0.00	0.00	0.0%	0.00	0.00	0.0%
3:30 PM	804.13	201.03	3.1%	0.00	0.00	0.0%	0.00	0.00	0.0%
3:45 PM	882.61	220.65	3.4%	0.00	0.00	0.0%	0.00	0.00	0.0%
4:00 PM	958.08	239.52	3.7%	0.00	0.00	0.0%	0.00	0.00	0.0%
4:15 PM	1,038.81	259.70	4.0%	0.00	0.00	0.0%	0.00	0.00	0.0%
4:30 PM	1,119.49	279.87	4.3%	0.00	0.00	0.0%	0.00	0.00	0.0%
4:45 PM	1,226.22	306.56	4.7%	0.00	0.00	0.0%	0.00	0.00	0.0%
5:00 PM	1,433.31	358.33	5.5%	0.00	0.00	0.0%	0.00	0.00	0.0%
5:15 PM	1,678.98	419.74	6.4%	0.00	0.00	0.0%	0.00	0.00	0.0%
5:30 PM	1,980.33	495.08	7.5%	0.00	0.00	0.0%	0.00	0.00	0.0%
5:45 PM	2,350.06	587.51	9.0%	0.00	0.00	0.0%	0.00	0.00	0.0%
6:00 PM	2,797.95	699.49	10.7%	0.00	0.00	0.0%	0.00	0.00	0.0%
6:15 PM	3,337.26	834.31	12.7%	0.00	0.00	0.0%	0.00	0.00	0.0%
6:30 PM	4,474.83	1118.71	17.1%	0.00	0.00	0.0%	0.00	0.00	0.0%
6:45 PM	6,218.34	1554.59	23.7%	0.00	0.00	0.0%	0.00	0.00	0.0%
7:00 PM	9,843.27	2460.82	37.5%	0.00	0.00	0.0%	0.00	0.00	0.0%
7:15 PM	16,197.52	2429.63	61.7%	0.00	0.00	0.0%	0.00	0.00	0.0%
7:18 PM	17,561.24	526.84	66.9%	0.00	0.00	0.0%	0.00	0.00	0.0%

AUGUST 9

Analysis Hours: 7:19 AM-7:10 PM (PDT)

MAY 3 SIMILAR

Analysis Time	CURRENT SHADOW			NEW SHADOW FROM CPHP			NOT USED		
	Area (sf)	Area/Time (sfh)	Coverage	Area (sf)	Area/Time (sfh)	Coverage	Area (sf)	Area/Time (sfh)	Coverage
7:19 AM	19,922.13	1792.99	75.9%	0.00	0.00	0.0%	0.00	0.00	0.0%
7:30 AM	15,230.71	3198.45	58.0%	0.00	0.00	0.0%	0.00	0.00	0.0%
7:45 AM	9,865.29	2466.32	37.6%	0.00	0.00	0.0%	0.00	0.00	0.0%
8:00 AM	6,128.52	1532.13	23.4%	0.00	0.00	0.0%	0.00	0.00	0.0%
8:15 AM	3,667.49	916.87	14.0%	0.00	0.00	0.0%	0.00	0.00	0.0%
8:30 AM	2,418.52	604.63	9.2%	0.00	0.00	0.0%	0.00	0.00	0.0%
8:45 AM	1,673.41	418.35	6.4%	0.00	0.00	0.0%	0.00	0.00	0.0%
9:00 AM	1,142.38	285.59	4.4%	0.00	0.00	0.0%	0.00	0.00	0.0%
9:15 AM	1,002.63	250.66	3.8%	0.00	0.00	0.0%	0.00	0.00	0.0%
9:30 AM	898.04	224.51	3.4%	0.00	0.00	0.0%	0.00	0.00	0.0%
9:45 AM	818.03	204.51	3.1%	0.00	0.00	0.0%	0.00	0.00	0.0%
10:00 AM	747.42	186.85	2.8%	0.00	0.00	0.0%	0.00	0.00	0.0%
10:15 AM	708.38	177.09	2.7%	0.00	0.00	0.0%	0.00	0.00	0.0%
10:30 AM	659.58	164.90	2.5%	0.00	0.00	0.0%	0.00	0.00	0.0%
10:45 AM	628.52	157.13	2.4%	0.00	0.00	0.0%	0.00	0.00	0.0%
11:00 AM	594.18	148.55	2.3%	0.00	0.00	0.0%	0.00	0.00	0.0%
11:15 AM	568.17	142.04	2.2%	0.00	0.00	0.0%	0.00	0.00	0.0%
11:30 AM	536.04	134.01	2.0%	0.00	0.00	0.0%	0.00	0.00	0.0%
11:45 AM	512.58	128.15	2.0%	0.00	0.00	0.0%	0.00	0.00	0.0%
12:00 PM	482.13	120.53	1.8%	0.00	0.00	0.0%	0.00	0.00	0.0%
12:15 PM	459.44	114.86	1.8%	0.00	0.00	0.0%	0.00	0.00	0.0%
12:30 PM	429.40	107.35	1.6%	0.00	0.00	0.0%	0.00	0.00	0.0%
12:45 PM	407.28	101.82	1.6%	0.00	0.00	0.0%	0.00	0.00	0.0%
1:00 PM	375.14	93.78	1.4%	0.00	0.00	0.0%	0.00	0.00	0.0%
1:15 PM	362.42	90.60	1.4%	0.00	0.00	0.0%	0.00	0.00	0.0%
1:30 PM	377.18	94.30	1.4%	0.00	0.00	0.0%	0.00	0.00	0.0%
1:45 PM	427.51	106.88	1.6%	0.00	0.00	0.0%	0.00	0.00	0.0%
2:00 PM	480.50	120.12	1.8%	0.00	0.00	0.0%	0.00	0.00	0.0%
2:15 PM	542.37	135.59	2.1%	0.00	0.00	0.0%	0.00	0.00	0.0%
2:30 PM	598.58	149.64	2.3%	0.00	0.00	0.0%	0.00	0.00	0.0%
2:45 PM	663.67	165.92	2.5%	0.00	0.00	0.0%	0.00	0.00	0.0%
3:00 PM	724.22	181.05	2.8%	0.00	0.00	0.0%	0.00	0.00	0.0%
3:15 PM	795.09	198.77	3.0%	0.00	0.00	0.0%	0.00	0.00	0.0%
3:30 PM	871.01	217.75	3.3%	0.00	0.00	0.0%	0.00	0.00	0.0%
3:45 PM	953.53	238.38	3.6%	0.00	0.00	0.0%	0.00	0.00	0.0%
4:00 PM	1,032.17	258.04	3.9%	0.00	0.00	0.0%	0.00	0.00	0.0%
4:15 PM	1,118.52	279.63	4.3%	0.00	0.00	0.0%	0.00	0.00	0.0%
4:30 PM	1,203.18	300.80	4.6%	0.00	0.00	0.0%	0.00	0.00	0.0%
4:45 PM	1,297.91	324.48	4.9%	0.00	0.00	0.0%	0.00	0.00	0.0%
5:00 PM	1,441.59	360.40	5.5%	0.00	0.00	0.0%	0.00	0.00	0.0%
5:15 PM	1,692.98	423.24	6.5%	0.00	0.00	0.0%	0.00	0.00	0.0%
5:30 PM	2,034.29	508.57	7.8%	0.00	0.00	0.0%	0.00	0.00	0.0%
5:45 PM	2,416.38	604.09	9.2%	0.00	0.00	0.0%	0.00	0.00	0.0%
6:00 PM	2,885.17	721.29	11.0%	0.00	0.00	0.0%	0.00	0.00	0.0%
6:15 PM	3,581.75	895.44	13.6%	0.00	0.00	0.0%	0.00	0.00	0.0%
6:30 PM	4,821.67	1205.42	18.4%	0.00	0.00	0.0%	0.00	0.00	0.0%
6:45 PM	6,834.50	2323.73	26.0%	0.00	0.00	0.0%	0.00	0.00	0.0%
7:10 PM	16,000.65	3360.14	61.0%	0.00	0.00	0.0%	0.00	0.00	0.0%

AUGUST 16

Analysis Hours: 7:25 AM-7:02 PM (PDT)

APRIL 26 SIMILAR

Analysis Time	CURRENT SHADOW			NEW SHADOW FROM CPHP			NOT USED		
	Area (sf)	Area/Time (sfh)	Coverage	Area (sf)	Area/Time (sfh)	Coverage	Area (sf)	Area/Time (sfh)	Coverage
7:25 AM	21,292.44	851.70	81.1%	0.00	0.00	0.0%	0.00	0.00	0.0%
7:30 AM	19,517.66	3318.00	74.4%	0.00	0.00	0.0%	0.00	0.00	0.0%
7:45 AM	13,718.15	3429.54	52.3%	0.00	0.00	0.0%	0.00	0.00	0.0%
8:00 AM	8,996.11	2249.03	34.3%	0.00	0.00	0.0%	0.00	0.00	0.0%
8:15 AM	5,469.50	1367.37	20.8%	0.00	0.00	0.0%	0.00	0.00	0.0%
8:30 AM	3,456.21	864.05	13.2%	0.00	0.00	0.0%	0.00	0.00	0.0%
8:45 AM	2,337.90	584.47	8.9%	0.00	0.00	0.0%	0.00	0.00	0.0%
9:00 AM	1,523.55	380.89	5.8%	0.00	0.00	0.0%	0.00	0.00	0.0%
9:15 AM	1,269.04	317.26	4.8%	0.00	0.00	0.0%	0.00	0.00	0.0%
9:30 AM	1,107.12	276.78	4.2%	0.00	0.00	0.0%	0.00	0.00	0.0%
9:45 AM	983.58	245.89	3.7%	0.00	0.00	0.0%	0.00	0.00	0.0%
10:00 AM	871.52	217.88	3.3%	0.00	0.00	0.0%	0.00	0.00	0.0%
10:15 AM	802.70	200.67	3.1%	0.00	0.00	0.0%	0.00	0.00	0.0%
10:30 AM	740.98	185.24	2.8%	0.00	0.00	0.0%	0.00	0.00	0.0%
10:45 AM	700.51	175.13	2.7%	0.00	0.00	0.0%	0.00	0.00	0.0%
11:00 AM	659.99	165.00	2.5%	0.00	0.00	0.0%	0.00	0.00	0.0%
11:15 AM	628.01	157.00	2.4%	0.00	0.00	0.0%	0.00	0.00	0.0%
11:30 AM	591.63	147.91	2.3%	0.00	0.00	0.0%	0.00	0.00	0.0%
11:45 AM	564.14	141.03	2.1%	0.00	0.00	0.0%	0.00	0.00	0.0%
12:00 PM	529.65	132.41	2.0%	0.00	0.00	0.0%	0.00	0.00	0.0%
12:15 PM	503.90	125.97	1.9%	0.00	0.00	0.0%	0.00	0.00	0.0%
12:30 PM	470.84	117.71	1.8%	0.00	0.00	0.0%	0.00	0.00	0.0%
12:45 PM	445.90	111.48	1.7%	0.00	0.00	0.0%	0.00	0.00	0.0%
1:00 PM	412.64	103.16	1.6%	0.00	0.00	0.0%	0.00	0.00	0.0%
1:15 PM	399.61	99.90	1.5%	0.00	0.00	0.0%	0.00	0.00	0.0%
1:30 PM	424.96	106.24	1.6%	0.00	0.00	0.0%	0.00	0.00	0.0%
1:45 PM	479.12	119.78	1.8%	0.00	0.00	0.0%	0.00	0.00	0.0%
2:00 PM	533.43	133.36	2.0%	0.00	0.00	0.0%	0.00	0.00	0.0%
2:15 PM	597.81	149.45	2.3%	0.00	0.00	0.0%	0.00	0.00	0.0%
2:30 PM	656.88	164.22	2.5%	0.00	0.00	0.0%	0.00	0.00	0.0%
2:45 PM	723.61	180.90	2.8%	0.00	0.00	0.0%	0.00	0.00	0.0%
3:00 PM	787.27	196.82	3.0%	0.00	0.00	0.0%	0.00	0.00	0.0%
3:15 PM	867.13	216.78	3.3%	0.00	0.00	0.0%	0.00	0.00	0.0%
3:30 PM	947.86	236.97	3.6%	0.00	0.00	0.0%	0.00	0.00	0.0%
3:45 PM	1,035.03	258.76	3.9%	0.00	0.00	0.0%	0.00	0.00	0.0%
4:00 PM	1,118.93	279.73	4.3%	0.00	0.00	0.0%	0.00	0.00	0.0%
4:15 PM	1,211.20	302.80	4.6%	0.00	0.00	0.0%	0.00	0.00	0.0%
4:30 PM	1,303.89	325.97	5.0%	0.00	0.00	0.0%	0.00	0.00	0.0%
4:45 PM	1,404.75	351.19	5.4%	0.00	0.00	0.0%	0.00	0.00	0.0%
5:00 PM	1,513.84	378.46	5.8%	0.00	0.00	0.0%	0.00	0.00	0.0%
5:15 PM	1,751.12	437.78	6.7%	0.00	0.00	0.0%	0.00	0.00	0.0%
5:30 PM	2,116.04	529.01	8.1%	0.00	0.00	0.0%	0.00	0.00	0.0%
5:45 PM	2,516.32	629.08	9.6%	0.00	0.00	0.0%	0.00	0.00	0.0%
6:00 PM	3,019.30	754.82	11.5%	0.00	0.00	0.0%	0.00	0.00	0.0%
6:15 PM	3,961.28	990.32	15.1%	0.00	0.00	0.0%	0.00	0.00	0.0%
6:30 PM	5,292.20	1323.05	20.2%	0.00	0.00	0.0%	0.00	0.00	0.0%
6:45 PM	7,777.60	2099.95	29.6%	0.00	0.00	0.0%	0.00	0.00	0.0%
7:02 PM	14,039.02	1965.46	53.5%	0.00	0.00	0.0%	0.00	0.00	0.0%

GAMBLE PARK

AUGUST 23

Analysis Hours: 7:31 AM-6:52 PM (PDT)

APRIL 19 SIMILAR

Analysis Time	CURRENT SHADOW			NEW SHADOW FROM CPHP			NOT USED		
	Area (sf)	Area/Time (sfh)	Coverage	Area (sf)	Area/Time (sfh)	Coverage	Area (sf)	Area/Time (sfh)	Coverage
7:31 AM	22,290.28	2451.93	84.9%	0.00	0.00	0.0%	0.00	0.00	0.0%
7:45 AM	18,383.77	4228.27	70.0%	0.00	0.00	0.0%	0.00	0.00	0.0%
8:00 AM	12,652.41	3163.10	48.2%	0.00	0.00	0.0%	0.00	0.00	0.0%
8:15 AM	7,909.22	1977.31	30.1%	0.00	0.00	0.0%	0.00	0.00	0.0%
8:30 AM	4,893.76	1223.44	18.6%	0.00	0.00	0.0%	0.00	0.00	0.0%
8:45 AM	3,233.43	808.36	12.3%	0.00	0.00	0.0%	0.00	0.00	0.0%
9:00 AM	2,060.86	515.21	7.9%	0.00	0.00	0.0%	0.00	0.00	0.0%
9:15 AM	1,602.59	400.65	6.1%	0.00	0.00	0.0%	0.00	0.00	0.0%
9:30 AM	1,369.75	342.44	5.2%	0.00	0.00	0.0%	0.00	0.00	0.0%
9:45 AM	1,190.10	297.53	4.5%	0.00	0.00	0.0%	0.00	0.00	0.0%
10:00 AM	1,028.39	257.10	3.9%	0.00	0.00	0.0%	0.00	0.00	0.0%
10:15 AM	921.50	230.37	3.5%	0.00	0.00	0.0%	0.00	0.00	0.0%
10:30 AM	833.31	208.33	3.2%	0.00	0.00	0.0%	0.00	0.00	0.0%
10:45 AM	782.72	195.68	3.0%	0.00	0.00	0.0%	0.00	0.00	0.0%
11:00 AM	732.85	183.21	2.8%	0.00	0.00	0.0%	0.00	0.00	0.0%
11:15 AM	694.84	173.71	2.6%	0.00	0.00	0.0%	0.00	0.00	0.0%
11:30 AM	652.63	163.16	2.5%	0.00	0.00	0.0%	0.00	0.00	0.0%
11:45 AM	620.09	155.02	2.4%	0.00	0.00	0.0%	0.00	0.00	0.0%
12:00 PM	581.10	145.28	2.2%	0.00	0.00	0.0%	0.00	0.00	0.0%
12:15 PM	551.67	137.92	2.1%	0.00	0.00	0.0%	0.00	0.00	0.0%
12:30 PM	515.96	128.99	2.0%	0.00	0.00	0.0%	0.00	0.00	0.0%
12:45 PM	487.04	121.76	1.9%	0.00	0.00	0.0%	0.00	0.00	0.0%
1:00 PM	454.74	113.69	1.7%	0.00	0.00	0.0%	0.00	0.00	0.0%
1:15 PM	443.76	110.94	1.7%	0.00	0.00	0.0%	0.00	0.00	0.0%
1:30 PM	480.80	120.20	1.8%	0.00	0.00	0.0%	0.00	0.00	0.0%
1:45 PM	539.05	134.76	2.1%	0.00	0.00	0.0%	0.00	0.00	0.0%
2:00 PM	595.87	148.97	2.3%	0.00	0.00	0.0%	0.00	0.00	0.0%
2:15 PM	662.19	165.55	2.5%	0.00	0.00	0.0%	0.00	0.00	0.0%
2:30 PM	722.84	180.71	2.8%	0.00	0.00	0.0%	0.00	0.00	0.0%
2:45 PM	793.91	198.48	3.0%	0.00	0.00	0.0%	0.00	0.00	0.0%
3:00 PM	861.51	215.38	3.3%	0.00	0.00	0.0%	0.00	0.00	0.0%
3:15 PM	951.08	237.77	3.6%	0.00	0.00	0.0%	0.00	0.00	0.0%
3:30 PM	1,037.89	259.47	4.0%	0.00	0.00	0.0%	0.00	0.00	0.0%
3:45 PM	1,130.17	282.54	4.3%	0.00	0.00	0.0%	0.00	0.00	0.0%
4:00 PM	1,219.94	304.99	4.6%	0.00	0.00	0.0%	0.00	0.00	0.0%
4:15 PM	1,320.49	330.12	5.0%	0.00	0.00	0.0%	0.00	0.00	0.0%
4:30 PM	1,420.44	355.11	5.4%	0.00	0.00	0.0%	0.00	0.00	0.0%
4:45 PM	1,532.23	383.06	5.8%	0.00	0.00	0.0%	0.00	0.00	0.0%
5:00 PM	1,658.39	414.60	6.3%	0.00	0.00	0.0%	0.00	0.00	0.0%
5:15 PM	1,891.63	472.91	7.2%	0.00	0.00	0.0%	0.00	0.00	0.0%
5:30 PM	2,241.12	560.28	8.5%	0.00	0.00	0.0%	0.00	0.00	0.0%
5:45 PM	2,671.14	667.78	10.2%	0.00	0.00	0.0%	0.00	0.00	0.0%
6:00 PM	3,380.28	845.07	12.9%	0.00	0.00	0.0%	0.00	0.00	0.0%
6:15 PM	4,481.07	1120.27	17.1%	0.00	0.00	0.0%	0.00	0.00	0.0%
6:30 PM	6,100.06	1525.01	23.2%	0.00	0.00	0.0%	0.00	0.00	0.0%
6:45 PM	9,222.77	1752.33	35.1%	0.00	0.00	0.0%	0.00	0.00	0.0%
6:52 PM	11,960.13	717.61	45.6%	0.00	0.00	0.0%	0.00	0.00	0.0%

AUGUST 30

Analysis Hours: 7:37 AM-6:42 PM (PDT)

APRIL 12 SIMILAR

Analysis Time	CURRENT SHADOW			NEW SHADOW FROM CPHP			NOT USED		
	Area (sf)	Area/Time (sfh)	Coverage	Area (sf)	Area/Time (sfh)	Coverage	Area (sf)	Area/Time (sfh)	Coverage
7:37 AM	22,971.52	1378.29	87.5%	0.00	0.00	0.0%	0.00	0.00	0.0%
7:45 AM	21,494.98	4084.05	81.9%	0.00	0.00	0.0%	0.00	0.00	0.0%
8:00 AM	17,755.46	4438.86	67.7%	0.00	0.00	0.0%	0.00	0.00	0.0%
8:15 AM	11,299.42	2824.85	43.1%	0.00	0.00	0.0%	0.00	0.00	0.0%
8:30 AM	6,889.78	1722.45	26.3%	0.00	0.00	0.0%	0.00	0.00	0.0%
8:45 AM	4,398.24	1099.56	16.8%	0.00	0.00	0.0%	0.00	0.00	0.0%
9:00 AM	2,780.17	695.04	10.6%	0.00	0.00	0.0%	0.00	0.00	0.0%
9:15 AM	2,022.64	505.66	7.7%	0.00	0.00	0.0%	0.00	0.00	0.0%
9:30 AM	1,697.52	424.38	6.5%	0.00	0.00	0.0%	0.00	0.00	0.0%
9:45 AM	1,453.24	363.31	5.5%	0.00	0.00	0.0%	0.00	0.00	0.0%
10:00 AM	1,229.29	307.32	4.7%	0.00	0.00	0.0%	0.00	0.00	0.0%
10:15 AM	1,074.58	268.64	4.1%	0.00	0.00	0.0%	0.00	0.00	0.0%
10:30 AM	948.06	237.02	3.6%	0.00	0.00	0.0%	0.00	0.00	0.0%
10:45 AM	872.80	218.20	3.3%	0.00	0.00	0.0%	0.00	0.00	0.0%
11:00 AM	813.33	203.33	3.1%	0.00	0.00	0.0%	0.00	0.00	0.0%
11:15 AM	768.11	192.03	2.9%	0.00	0.00	0.0%	0.00	0.00	0.0%
11:30 AM	719.57	179.89	2.7%	0.00	0.00	0.0%	0.00	0.00	0.0%
11:45 AM	681.76	170.44	2.6%	0.00	0.00	0.0%	0.00	0.00	0.0%
12:00 PM	638.33	159.58	2.4%	0.00	0.00	0.0%	0.00	0.00	0.0%
12:15 PM	604.04	151.01	2.3%	0.00	0.00	0.0%	0.00	0.00	0.0%
12:30 PM	564.90	141.23	2.2%	0.00	0.00	0.0%	0.00	0.00	0.0%
12:45 PM	532.66	133.17	2.0%	0.00	0.00	0.0%	0.00	0.00	0.0%
1:00 PM	500.17	125.04	1.9%	0.00	0.00	0.0%	0.00	0.00	0.0%
1:15 PM	502.47	125.62	1.9%	0.00	0.00	0.0%	0.00	0.00	0.0%
1:30 PM	543.65	135.91	2.1%	0.00	0.00	0.0%	0.00	0.00	0.0%
1:45 PM	606.34	151.59	2.3%	0.00	0.00	0.0%	0.00	0.00	0.0%
2:00 PM	665.20	166.30	2.5%	0.00	0.00	0.0%	0.00	0.00	0.0%
2:15 PM	733.93	183.48	2.8%	0.00	0.00	0.0%	0.00	0.00	0.0%
2:30 PM	799.17	199.79	3.0%	0.00	0.00	0.0%	0.00	0.00	0.0%
2:45 PM	872.19	218.05	3.3%	0.00	0.00	0.0%	0.00	0.00	0.0%
3:00 PM	950.16	237.54	3.6%	0.00	0.00	0.0%	0.00	0.00	0.0%
3:15 PM	1,044.99	261.25	4.0%	0.00	0.00	0.0%	0.00	0.00	0.0%
3:30 PM	1,139.16	284.79	4.3%	0.00	0.00	0.0%	0.00	0.00	0.0%
3:45 PM	1,238.74	309.69	4.7%	0.00	0.00	0.0%	0.00	0.00	0.0%
4:00 PM	1,335.72	333.93	5.1%	0.00	0.00	0.0%	0.00	0.00	0.0%
4:15 PM	1,443.63	360.91	5.5%	0.00	0.00	0.0%	0.00	0.00	0.0%
4:30 PM	1,553.79	388.45	5.9%	0.00	0.00	0.0%	0.00	0.00	0.0%
4:45 PM	1,677.39	419.35	6.4%	0.00	0.00	0.0%	0.00	0.00	0.0%
5:00 PM	1,882.44	470.61	7.2%	0.00	0.00	0.0%	0.00	0.00	0.0%
5:15 PM	2,140.41	535.10	8.2%	0.00	0.00	0.0%	0.00	0.00	0.0%
5:30 PM	2,429.71	607.43	9.3%	0.00	0.00	0.0%	0.00	0.00	0.0%
5:45 PM	2,966.26	741.56	11.3%	0.00	0.00	0.0%	0.00	0.00	0.0%
6:00 PM	3,874.37	968.59	14.8%	0.00	0.00	0.0%	0.00	0.00	0.0%
6:15 PM	5,196.55	1299.14	19.8%	0.00	0.00	0.0%	0.00	0.00	0.0%
6:30 PM	7,241.11	1665.46	27.6%	0.00	0.00	0.0%	0.00	0.00	0.0%
6:42 PM	10,437.30	1148.10	39.8%	0.00	0.00	0.0%	0.00	0.00	0.0%

GAMBLE PARK

SEPTEMBER 6

Analysis Hours: 7:44 AM-6:31 PM (PDT)

APRIL 5 SIMILAR

Analysis Time	CURRENT SHADOW			NEW SHADOW FROM CPHP			NOT USED		
	Area (sf)	Area/Time (sfh)	Coverage	Area (sf)	Area/Time (sfh)	Coverage	Area (sf)	Area/Time (sfh)	Coverage
7:44 AM	24,411.53	3173.50	93.0%	0.00	0.00	0.0%	0.00	0.00	0.0%
8:00 AM	21,570.04	5392.51	82.2%	0.00	0.00	0.0%	0.00	0.00	0.0%
8:15 AM	15,179.25	3794.81	57.8%	0.00	0.00	0.0%	0.00	0.00	0.0%
8:30 AM	9,292.11	2323.03	35.4%	0.00	0.00	0.0%	0.00	0.00	0.0%
8:45 AM	5,890.88	1472.72	22.4%	0.00	0.00	0.0%	0.00	0.00	0.0%
9:00 AM	3,824.60	956.15	14.6%	0.00	0.00	0.0%	0.00	0.00	0.0%
9:15 AM	2,661.79	665.45	10.1%	0.00	0.00	0.0%	0.00	0.00	0.0%
9:30 AM	2,176.74	544.19	8.3%	0.00	0.00	0.0%	0.00	0.00	0.0%
9:45 AM	1,812.44	453.11	6.9%	0.00	0.00	0.0%	0.00	0.00	0.0%
10:00 AM	1,490.18	372.55	5.7%	0.00	0.00	0.0%	0.00	0.00	0.0%
10:15 AM	1,271.09	317.77	4.8%	0.00	0.00	0.0%	0.00	0.00	0.0%
10:30 AM	1,098.85	274.71	4.2%	0.00	0.00	0.0%	0.00	0.00	0.0%
10:45 AM	987.46	246.86	3.8%	0.00	0.00	0.0%	0.00	0.00	0.0%
11:00 AM	902.44	225.61	3.4%	0.00	0.00	0.0%	0.00	0.00	0.0%
11:15 AM	847.51	211.88	3.2%	0.00	0.00	0.0%	0.00	0.00	0.0%
11:30 AM	791.82	197.95	3.0%	0.00	0.00	0.0%	0.00	0.00	0.0%
11:45 AM	747.82	186.96	2.8%	0.00	0.00	0.0%	0.00	0.00	0.0%
12:00 PM	699.13	174.78	2.7%	0.00	0.00	0.0%	0.00	0.00	0.0%
12:15 PM	660.71	165.18	2.5%	0.00	0.00	0.0%	0.00	0.00	0.0%
12:30 PM	617.33	154.33	2.4%	0.00	0.00	0.0%	0.00	0.00	0.0%
12:45 PM	580.34	145.08	2.2%	0.00	0.00	0.0%	0.00	0.00	0.0%
1:00 PM	549.68	137.42	2.1%	0.00	0.00	0.0%	0.00	0.00	0.0%
1:15 PM	569.40	142.35	2.2%	0.00	0.00	0.0%	0.00	0.00	0.0%
1:30 PM	615.28	153.82	2.3%	0.00	0.00	0.0%	0.00	0.00	0.0%
1:45 PM	680.69	170.17	2.6%	0.00	0.00	0.0%	0.00	0.00	0.0%
2:00 PM	741.69	185.42	2.8%	0.00	0.00	0.0%	0.00	0.00	0.0%
2:15 PM	814.09	203.52	3.1%	0.00	0.00	0.0%	0.00	0.00	0.0%
2:30 PM	882.46	220.61	3.4%	0.00	0.00	0.0%	0.00	0.00	0.0%
2:45 PM	961.30	240.32	3.7%	0.00	0.00	0.0%	0.00	0.00	0.0%
3:00 PM	1,048.98	262.24	4.0%	0.00	0.00	0.0%	0.00	0.00	0.0%
3:15 PM	1,149.74	287.43	4.4%	0.00	0.00	0.0%	0.00	0.00	0.0%
3:30 PM	1,251.47	312.87	4.8%	0.00	0.00	0.0%	0.00	0.00	0.0%
3:45 PM	1,360.35	340.09	5.2%	0.00	0.00	0.0%	0.00	0.00	0.0%
4:00 PM	1,466.01	366.50	5.6%	0.00	0.00	0.0%	0.00	0.00	0.0%
4:15 PM	1,583.43	395.86	6.0%	0.00	0.00	0.0%	0.00	0.00	0.0%
4:30 PM	1,704.47	426.12	6.5%	0.00	0.00	0.0%	0.00	0.00	0.0%
4:45 PM	1,888.06	472.01	7.2%	0.00	0.00	0.0%	0.00	0.00	0.0%
5:00 PM	2,157.12	539.28	8.2%	0.00	0.00	0.0%	0.00	0.00	0.0%
5:15 PM	2,459.30	614.82	9.4%	0.00	0.00	0.0%	0.00	0.00	0.0%
5:30 PM	2,785.03	696.26	10.6%	0.00	0.00	0.0%	0.00	0.00	0.0%
5:45 PM	3,469.75	867.44	13.2%	0.00	0.00	0.0%	0.00	0.00	0.0%
6:00 PM	4,546.21	1136.55	17.3%	0.00	0.00	0.0%	0.00	0.00	0.0%
6:15 PM	6,186.10	1670.25	23.6%	0.00	0.00	0.0%	0.00	0.00	0.0%
6:31 PM	9,527.14	1333.80	36.3%	0.00	0.00	0.0%	0.00	0.00	0.0%

GAMBLE PARK

SEPTEMBER 13

Analysis Hours: 7:50 AM-6:21 PM (PDT)

MARCH 29 SIMILAR

Analysis Time	CURRENT SHADOW			NEW SHADOW FROM CPHP			NOT USED		
	Area (sf)	Area/Time (sfh)	Coverage	Area (sf)	Area/Time (sfh)	Coverage	Area (sf)	Area/Time (sfh)	Coverage
7:50 AM	25,174.32	2013.95	95.9%	0.00	0.00	0.0%	0.00	0.00	0.0%
8:00 AM	23,931.34	5025.58	91.2%	0.00	0.00	0.0%	0.00	0.00	0.0%
8:15 AM	19,779.42	4944.86	75.4%	0.00	0.00	0.0%	0.00	0.00	0.0%
8:30 AM	12,557.48	3139.37	47.8%	0.00	0.00	0.0%	0.00	0.00	0.0%
8:45 AM	7,983.21	1995.80	30.4%	0.00	0.00	0.0%	0.00	0.00	0.0%
9:00 AM	5,263.02	1315.76	20.1%	0.00	0.00	0.0%	0.00	0.00	0.0%
9:15 AM	3,519.26	879.81	13.4%	0.00	0.00	0.0%	0.00	0.00	0.0%
9:30 AM	2,853.03	713.26	10.9%	0.00	0.00	0.0%	0.00	0.00	0.0%
9:45 AM	2,374.73	593.68	9.0%	0.00	0.00	0.0%	0.00	0.00	0.0%
10:00 AM	1,916.11	479.03	7.3%	0.00	0.00	0.0%	0.00	0.00	0.0%
10:15 AM	1,592.37	398.09	6.1%	0.00	0.00	0.0%	0.00	0.00	0.0%
10:30 AM	1,331.38	332.84	5.1%	0.00	0.00	0.0%	0.00	0.00	0.0%
10:45 AM	1,153.16	288.29	4.4%	0.00	0.00	0.0%	0.00	0.00	0.0%
11:00 AM	1,019.09	254.77	3.9%	0.00	0.00	0.0%	0.00	0.00	0.0%
11:15 AM	935.60	233.90	3.6%	0.00	0.00	0.0%	0.00	0.00	0.0%
11:30 AM	869.84	217.46	3.3%	0.00	0.00	0.0%	0.00	0.00	0.0%
11:45 AM	818.79	204.70	3.1%	0.00	0.00	0.0%	0.00	0.00	0.0%
12:00 PM	764.38	191.09	2.9%	0.00	0.00	0.0%	0.00	0.00	0.0%
12:15 PM	720.44	180.11	2.7%	0.00	0.00	0.0%	0.00	0.00	0.0%
12:30 PM	672.82	168.20	2.6%	0.00	0.00	0.0%	0.00	0.00	0.0%
12:45 PM	630.82	157.70	2.4%	0.00	0.00	0.0%	0.00	0.00	0.0%
1:00 PM	602.00	150.50	2.3%	0.00	0.00	0.0%	0.00	0.00	0.0%
1:15 PM	642.31	160.58	2.4%	0.00	0.00	0.0%	0.00	0.00	0.0%
1:30 PM	694.38	173.59	2.6%	0.00	0.00	0.0%	0.00	0.00	0.0%
1:45 PM	762.39	190.60	2.9%	0.00	0.00	0.0%	0.00	0.00	0.0%
2:00 PM	827.07	206.77	3.2%	0.00	0.00	0.0%	0.00	0.00	0.0%
2:15 PM	903.36	225.84	3.4%	0.00	0.00	0.0%	0.00	0.00	0.0%
2:30 PM	974.63	243.66	3.7%	0.00	0.00	0.0%	0.00	0.00	0.0%
2:45 PM	1,063.39	265.85	4.1%	0.00	0.00	0.0%	0.00	0.00	0.0%
3:00 PM	1,156.38	289.09	4.4%	0.00	0.00	0.0%	0.00	0.00	0.0%
3:15 PM	1,264.75	316.19	4.8%	0.00	0.00	0.0%	0.00	0.00	0.0%
3:30 PM	1,375.32	343.83	5.2%	0.00	0.00	0.0%	0.00	0.00	0.0%
3:45 PM	1,494.32	373.58	5.7%	0.00	0.00	0.0%	0.00	0.00	0.0%
4:00 PM	1,610.97	402.74	6.1%	0.00	0.00	0.0%	0.00	0.00	0.0%
4:15 PM	1,741.06	435.26	6.6%	0.00	0.00	0.0%	0.00	0.00	0.0%
4:30 PM	1,886.98	471.75	7.2%	0.00	0.00	0.0%	0.00	0.00	0.0%
4:45 PM	2,178.53	544.63	8.3%	0.00	0.00	0.0%	0.00	0.00	0.0%
5:00 PM	2,491.95	622.99	9.5%	0.00	0.00	0.0%	0.00	0.00	0.0%
5:15 PM	2,877.15	719.29	11.0%	0.00	0.00	0.0%	0.00	0.00	0.0%
5:30 PM	3,465.97	866.49	13.2%	0.00	0.00	0.0%	0.00	0.00	0.0%
5:45 PM	4,251.96	1062.99	16.2%	0.00	0.00	0.0%	0.00	0.00	0.0%
6:00 PM	5,522.48	1380.62	21.0%	0.00	0.00	0.0%	0.00	0.00	0.0%
6:15 PM	7,429.50	1337.31	28.3%	0.00	0.00	0.0%	0.00	0.00	0.0%
6:21 PM	8,710.85	435.54	33.2%	0.00	0.00	0.0%	0.00	0.00	0.0%

SEPTEMBER 20

Analysis Hours: 7:57 AM-6:09 PM (PDT)

APPROXIMATE EQUINOXES
MARCH 22 SIMILAR

Analysis Time	CURRENT SHADOW			NEW SHADOW FROM CPHP			NOT USED		
	Area (sf)	Area/Time (sfh)	Coverage	Area (sf)	Area/Time (sfh)	Coverage	Area (sf)	Area/Time (sfh)	Coverage
7:57 AM	25,351.62	507.03	96.6%	0.00	0.00	0.0%	0.00	0.00	0.0%
8:00 AM	25,018.79	3752.82	95.3%	0.00	0.00	0.0%	0.00	0.00	0.0%
8:15 AM	22,489.95	5622.49	85.7%	0.00	0.00	0.0%	0.00	0.00	0.0%
8:30 AM	16,575.47	4143.87	63.2%	0.00	0.00	0.0%	0.00	0.00	0.0%
8:45 AM	11,153.64	2788.41	42.5%	0.00	0.00	0.0%	0.00	0.00	0.0%
9:00 AM	7,303.85	1825.96	27.8%	0.00	0.00	0.0%	0.00	0.00	0.0%
9:15 AM	4,728.83	1182.21	18.0%	0.00	0.00	0.0%	0.00	0.00	0.0%
9:30 AM	3,654.15	913.54	13.9%	0.00	0.00	0.0%	0.00	0.00	0.0%
9:45 AM	3,028.85	757.21	11.5%	0.00	0.00	0.0%	0.00	0.00	0.0%
10:00 AM	2,442.49	610.62	9.3%	0.00	0.00	0.0%	0.00	0.00	0.0%
10:15 AM	2,011.81	502.95	7.7%	0.00	0.00	0.0%	0.00	0.00	0.0%
10:30 AM	1,664.47	416.12	6.3%	0.00	0.00	0.0%	0.00	0.00	0.0%
10:45 AM	1,414.61	353.65	5.4%	0.00	0.00	0.0%	0.00	0.00	0.0%
11:00 AM	1,220.30	305.07	4.6%	0.00	0.00	0.0%	0.00	0.00	0.0%
11:15 AM	1,086.89	271.72	4.1%	0.00	0.00	0.0%	0.00	0.00	0.0%
11:30 AM	974.74	243.68	3.7%	0.00	0.00	0.0%	0.00	0.00	0.0%
11:45 AM	904.38	226.09	3.4%	0.00	0.00	0.0%	0.00	0.00	0.0%
12:00 PM	834.12	208.53	3.2%	0.00	0.00	0.0%	0.00	0.00	0.0%
12:15 PM	784.87	196.22	3.0%	0.00	0.00	0.0%	0.00	0.00	0.0%
12:30 PM	730.91	182.73	2.8%	0.00	0.00	0.0%	0.00	0.00	0.0%
12:45 PM	689.37	172.34	2.6%	0.00	0.00	0.0%	0.00	0.00	0.0%
1:00 PM	671.85	167.96	2.6%	0.00	0.00	0.0%	0.00	0.00	0.0%
1:15 PM	722.38	180.59	2.8%	0.00	0.00	0.0%	0.00	0.00	0.0%
1:30 PM	779.60	194.90	3.0%	0.00	0.00	0.0%	0.00	0.00	0.0%
1:45 PM	852.42	213.10	3.2%	0.00	0.00	0.0%	0.00	0.00	0.0%
2:00 PM	920.47	230.12	3.5%	0.00	0.00	0.0%	0.00	0.00	0.0%
2:15 PM	1,000.79	250.20	3.8%	0.00	0.00	0.0%	0.00	0.00	0.0%
2:30 PM	1,077.59	269.40	4.1%	0.00	0.00	0.0%	0.00	0.00	0.0%
2:45 PM	1,174.41	293.60	4.5%	0.00	0.00	0.0%	0.00	0.00	0.0%
3:00 PM	1,273.23	318.31	4.9%	0.00	0.00	0.0%	0.00	0.00	0.0%
3:15 PM	1,389.68	347.42	5.3%	0.00	0.00	0.0%	0.00	0.00	0.0%
3:30 PM	1,511.54	377.88	5.8%	0.00	0.00	0.0%	0.00	0.00	0.0%
3:45 PM	1,644.49	411.12	6.3%	0.00	0.00	0.0%	0.00	0.00	0.0%
4:00 PM	1,772.63	443.16	6.8%	0.00	0.00	0.0%	0.00	0.00	0.0%
4:15 PM	1,916.77	479.19	7.3%	0.00	0.00	0.0%	0.00	0.00	0.0%
4:30 PM	2,181.29	545.32	8.3%	0.00	0.00	0.0%	0.00	0.00	0.0%
4:45 PM	2,527.81	631.95	9.6%	0.00	0.00	0.0%	0.00	0.00	0.0%
5:00 PM	2,938.92	734.73	11.2%	0.00	0.00	0.0%	0.00	0.00	0.0%
5:15 PM	3,551.55	887.89	13.5%	0.00	0.00	0.0%	0.00	0.00	0.0%
5:30 PM	4,357.47	1089.37	16.6%	0.00	0.00	0.0%	0.00	0.00	0.0%
5:45 PM	5,478.95	1369.74	20.9%	0.00	0.00	0.0%	0.00	0.00	0.0%
6:00 PM	6,750.50	1417.60	25.7%	0.00	0.00	0.0%	0.00	0.00	0.0%
6:09 PM	8,222.39	657.79	31.3%	0.00	0.00	0.0%	0.00	0.00	0.0%

GAMBLE PARK

Quantitative Shading Calculations for CPHP

SEPTEMBER 27

Analysis Hours: 8:03 AM-5:58 PM (PDT)

MARCH 15 SIMILAR

Analysis Time	CURRENT SHADOW			NEW SHADOW FROM CPHP			NOT USED		
	Area (sf)	Area/Time (sfh)	Coverage	Area (sf)	Area/Time (sfh)	Coverage	Area (sf)	Area/Time (sfh)	Coverage
8:03 AM	25,762.12	2576.21	98.2%	0.00	0.00	0.0%	0.00	0.00	0.0%
8:15 AM	24,060.46	5293.30	91.7%	0.00	0.00	0.0%	0.00	0.00	0.0%
8:30 AM	20,515.09	5128.77	78.2%	0.00	0.00	0.0%	0.00	0.00	0.0%
8:45 AM	14,650.73	3662.68	55.8%	0.00	0.00	0.0%	0.00	0.00	0.0%
9:00 AM	9,993.23	2498.31	38.1%	0.00	0.00	0.0%	0.00	0.00	0.0%
9:15 AM	6,457.37	1614.34	24.6%	0.00	0.00	0.0%	0.00	0.00	0.0%
9:30 AM	4,725.25	1181.31	18.0%	0.00	0.00	0.0%	0.00	0.00	0.0%
9:45 AM	3,904.77	976.19	14.9%	0.00	0.00	0.0%	0.00	0.00	0.0%
10:00 AM	3,143.35	785.84	12.0%	0.00	0.00	0.0%	0.00	0.00	0.0%
10:15 AM	2,530.78	632.69	9.6%	0.00	0.00	0.0%	0.00	0.00	0.0%
10:30 AM	2,048.24	512.06	7.8%	0.00	0.00	0.0%	0.00	0.00	0.0%
10:45 AM	1,728.38	432.10	6.6%	0.00	0.00	0.0%	0.00	0.00	0.0%
11:00 AM	1,473.27	368.32	5.6%	0.00	0.00	0.0%	0.00	0.00	0.0%
11:15 AM	1,303.17	325.79	5.0%	0.00	0.00	0.0%	0.00	0.00	0.0%
11:30 AM	1,153.36	288.34	4.4%	0.00	0.00	0.0%	0.00	0.00	0.0%
11:45 AM	1,056.54	264.13	4.0%	0.00	0.00	0.0%	0.00	0.00	0.0%
12:00 PM	962.52	240.63	3.7%	0.00	0.00	0.0%	0.00	0.00	0.0%
12:15 PM	889.20	222.30	3.4%	0.00	0.00	0.0%	0.00	0.00	0.0%
12:30 PM	803.93	200.98	3.1%	0.00	0.00	0.0%	0.00	0.00	0.0%
12:45 PM	753.85	188.46	2.9%	0.00	0.00	0.0%	0.00	0.00	0.0%
1:00 PM	756.87	189.22	2.9%	0.00	0.00	0.0%	0.00	0.00	0.0%
1:15 PM	812.56	203.14	3.1%	0.00	0.00	0.0%	0.00	0.00	0.0%
1:30 PM	873.11	218.28	3.3%	0.00	0.00	0.0%	0.00	0.00	0.0%
1:45 PM	948.42	237.11	3.6%	0.00	0.00	0.0%	0.00	0.00	0.0%
2:00 PM	1,021.59	255.40	3.9%	0.00	0.00	0.0%	0.00	0.00	0.0%
2:15 PM	1,106.25	276.56	4.2%	0.00	0.00	0.0%	0.00	0.00	0.0%
2:30 PM	1,191.48	297.87	4.5%	0.00	0.00	0.0%	0.00	0.00	0.0%
2:45 PM	1,295.05	323.76	4.9%	0.00	0.00	0.0%	0.00	0.00	0.0%
3:00 PM	1,401.89	350.47	5.3%	0.00	0.00	0.0%	0.00	0.00	0.0%
3:15 PM	1,524.98	381.24	5.8%	0.00	0.00	0.0%	0.00	0.00	0.0%
3:30 PM	1,659.51	414.88	6.3%	0.00	0.00	0.0%	0.00	0.00	0.0%
3:45 PM	1,808.09	452.02	6.9%	0.00	0.00	0.0%	0.00	0.00	0.0%
4:00 PM	1,951.72	487.93	7.4%	0.00	0.00	0.0%	0.00	0.00	0.0%
4:15 PM	2,184.25	546.06	8.3%	0.00	0.00	0.0%	0.00	0.00	0.0%
4:30 PM	2,540.23	635.06	9.7%	0.00	0.00	0.0%	0.00	0.00	0.0%
4:45 PM	2,978.27	744.57	11.3%	0.00	0.00	0.0%	0.00	0.00	0.0%
5:00 PM	3,584.92	896.23	13.7%	0.00	0.00	0.0%	0.00	0.00	0.0%
5:15 PM	4,433.81	1108.45	16.9%	0.00	0.00	0.0%	0.00	0.00	0.0%
5:30 PM	5,522.13	1380.53	21.0%	0.00	0.00	0.0%	0.00	0.00	0.0%
5:45 PM	7,029.07	1616.69	26.8%	0.00	0.00	0.0%	0.00	0.00	0.0%
5:58 PM	8,438.52	928.24	32.2%	0.00	0.00	0.0%	0.00	0.00	0.0%

OCTOBER 4

Analysis Hours: 8:09 AM-5:47 PM (PDT)

MARCH 8 SIMILAR

Analysis Time	CURRENT SHADOW			NEW SHADOW FROM CPHP			NOT USED		
	Area (sf)	Area/Time (sfh)	Coverage	Area (sf)	Area/Time (sfh)	Coverage	Area (sf)	Area/Time (sfh)	Coverage
8:09 AM	25,765.80	1030.63	98.2%	0.00	0.00	0.0%	0.00	0.00	0.0%
8:15 AM	24,397.89	4147.64	93.0%	0.00	0.00	0.0%	0.00	0.00	0.0%
8:30 AM	22,584.43	5646.11	86.1%	0.00	0.00	0.0%	0.00	0.00	0.0%
8:45 AM	17,794.34	4448.58	67.8%	0.00	0.00	0.0%	0.00	0.00	0.0%
9:00 AM	12,959.59	3239.90	49.4%	0.00	0.00	0.0%	0.00	0.00	0.0%
9:15 AM	8,654.34	2163.59	33.0%	0.00	0.00	0.0%	0.00	0.00	0.0%
9:30 AM	6,166.33	1541.58	23.5%	0.00	0.00	0.0%	0.00	0.00	0.0%
9:45 AM	4,953.90	1238.47	18.9%	0.00	0.00	0.0%	0.00	0.00	0.0%
10:00 AM	4,012.48	1003.12	15.3%	0.00	0.00	0.0%	0.00	0.00	0.0%
10:15 AM	3,281.11	820.28	12.5%	0.00	0.00	0.0%	0.00	0.00	0.0%
10:30 AM	2,581.72	645.43	9.8%	0.00	0.00	0.0%	0.00	0.00	0.0%
10:45 AM	2,103.78	525.94	8.0%	0.00	0.00	0.0%	0.00	0.00	0.0%
11:00 AM	1,766.20	441.55	6.7%	0.00	0.00	0.0%	0.00	0.00	0.0%
11:15 AM	1,554.66	388.67	5.9%	0.00	0.00	0.0%	0.00	0.00	0.0%
11:30 AM	1,370.77	342.69	5.2%	0.00	0.00	0.0%	0.00	0.00	0.0%
11:45 AM	1,247.28	311.82	4.8%	0.00	0.00	0.0%	0.00	0.00	0.0%
12:00 PM	1,131.34	282.84	4.3%	0.00	0.00	0.0%	0.00	0.00	0.0%
12:15 PM	1,048.57	262.14	4.0%	0.00	0.00	0.0%	0.00	0.00	0.0%
12:30 PM	947.14	236.79	3.6%	0.00	0.00	0.0%	0.00	0.00	0.0%
12:45 PM	889.77	222.44	3.4%	0.00	0.00	0.0%	0.00	0.00	0.0%
1:00 PM	877.66	219.41	3.3%	0.00	0.00	0.0%	0.00	0.00	0.0%
1:15 PM	919.25	229.81	3.5%	0.00	0.00	0.0%	0.00	0.00	0.0%
1:30 PM	974.33	243.58	3.7%	0.00	0.00	0.0%	0.00	0.00	0.0%
1:45 PM	1,052.40	263.10	4.0%	0.00	0.00	0.0%	0.00	0.00	0.0%
2:00 PM	1,128.68	282.17	4.3%	0.00	0.00	0.0%	0.00	0.00	0.0%
2:15 PM	1,220.71	305.18	4.7%	0.00	0.00	0.0%	0.00	0.00	0.0%
2:30 PM	1,312.22	328.05	5.0%	0.00	0.00	0.0%	0.00	0.00	0.0%
2:45 PM	1,423.20	355.80	5.4%	0.00	0.00	0.0%	0.00	0.00	0.0%
3:00 PM	1,538.47	384.62	5.9%	0.00	0.00	0.0%	0.00	0.00	0.0%
3:15 PM	1,675.71	418.93	6.4%	0.00	0.00	0.0%	0.00	0.00	0.0%
3:30 PM	1,821.38	455.34	6.9%	0.00	0.00	0.0%	0.00	0.00	0.0%
3:45 PM	1,987.59	496.90	7.6%	0.00	0.00	0.0%	0.00	0.00	0.0%
4:00 PM	2,168.77	542.19	8.3%	0.00	0.00	0.0%	0.00	0.00	0.0%
4:15 PM	2,539.00	634.75	9.7%	0.00	0.00	0.0%	0.00	0.00	0.0%
4:30 PM	2,967.64	741.91	11.3%	0.00	0.00	0.0%	0.00	0.00	0.0%
4:45 PM	3,607.65	901.91	13.7%	0.00	0.00	0.0%	0.00	0.00	0.0%
5:00 PM	4,434.98	1108.75	16.9%	0.00	0.00	0.0%	0.00	0.00	0.0%
5:15 PM	5,502.10	1375.52	21.0%	0.00	0.00	0.0%	0.00	0.00	0.0%
5:30 PM	7,121.04	1922.68	27.1%	0.00	0.00	0.0%	0.00	0.00	0.0%
5:47 PM	8,803.54	1232.50	33.5%	0.00	0.00	0.0%	0.00	0.00	0.0%

OCTOBER 11

Analysis Hours: 8:16 AM-5:37 PM (PDT)

MARCH 1 SIMILAR

Analysis Time	CURRENT SHADOW			NEW SHADOW FROM CPHP			NOT USED		
	Area (sf)	Area/Time (sfh)	Coverage	Area (sf)	Area/Time (sfh)	Coverage	Area (sf)	Area/Time (sfh)	Coverage
8:16 AM	25,508.43	3061.01	97.2%	0.00	0.00	0.0%	0.00	0.00	0.0%
8:30 AM	23,033.14	5527.95	87.8%	0.00	0.00	0.0%	0.00	0.00	0.0%
8:45 AM	19,869.81	4967.45	75.7%	0.00	0.00	0.0%	0.00	0.00	0.0%
9:00 AM	15,636.30	3909.07	59.6%	0.00	0.00	0.0%	0.00	0.00	0.0%
9:15 AM	11,321.29	2830.32	43.1%	0.00	0.00	0.0%	0.00	0.00	0.0%
9:30 AM	8,119.43	2029.86	30.9%	0.00	0.00	0.0%	0.00	0.00	0.0%
9:45 AM	6,397.07	1599.27	24.4%	0.00	0.00	0.0%	0.00	0.00	0.0%
10:00 AM	5,032.38	1258.10	19.2%	0.00	0.00	0.0%	0.00	0.00	0.0%
10:15 AM	4,125.29	1031.32	15.7%	0.00	0.00	0.0%	0.00	0.00	0.0%
10:30 AM	3,290.46	822.61	12.5%	0.00	0.00	0.0%	0.00	0.00	0.0%
10:45 AM	2,677.06	669.27	10.2%	0.00	0.00	0.0%	0.00	0.00	0.0%
11:00 AM	2,199.22	549.81	8.4%	0.00	0.00	0.0%	0.00	0.00	0.0%
11:15 AM	1,893.78	473.44	7.2%	0.00	0.00	0.0%	0.00	0.00	0.0%
11:30 AM	1,641.12	410.28	6.3%	0.00	0.00	0.0%	0.00	0.00	0.0%
11:45 AM	1,475.41	368.85	5.6%	0.00	0.00	0.0%	0.00	0.00	0.0%
12:00 PM	1,328.47	332.12	5.1%	0.00	0.00	0.0%	0.00	0.00	0.0%
12:15 PM	1,229.09	307.27	4.7%	0.00	0.00	0.0%	0.00	0.00	0.0%
12:30 PM	1,121.84	280.46	4.3%	0.00	0.00	0.0%	0.00	0.00	0.0%
12:45 PM	1,064.20	266.05	4.1%	0.00	0.00	0.0%	0.00	0.00	0.0%
1:00 PM	1,056.79	264.20	4.0%	0.00	0.00	0.0%	0.00	0.00	0.0%
1:15 PM	1,093.28	273.32	4.2%	0.00	0.00	0.0%	0.00	0.00	0.0%
1:30 PM	1,128.63	282.16	4.3%	0.00	0.00	0.0%	0.00	0.00	0.0%
1:45 PM	1,190.71	297.68	4.5%	0.00	0.00	0.0%	0.00	0.00	0.0%
2:00 PM	1,251.77	312.94	4.8%	0.00	0.00	0.0%	0.00	0.00	0.0%
2:15 PM	1,345.94	336.49	5.1%	0.00	0.00	0.0%	0.00	0.00	0.0%
2:30 PM	1,436.89	359.22	5.5%	0.00	0.00	0.0%	0.00	0.00	0.0%
2:45 PM	1,559.62	389.90	5.9%	0.00	0.00	0.0%	0.00	0.00	0.0%
3:00 PM	1,684.19	421.05	6.4%	0.00	0.00	0.0%	0.00	0.00	0.0%
3:15 PM	1,834.10	458.53	7.0%	0.00	0.00	0.0%	0.00	0.00	0.0%
3:30 PM	1,993.57	498.39	7.6%	0.00	0.00	0.0%	0.00	0.00	0.0%
3:45 PM	2,185.99	546.50	8.3%	0.00	0.00	0.0%	0.00	0.00	0.0%
4:00 PM	2,511.77	627.94	9.6%	0.00	0.00	0.0%	0.00	0.00	0.0%
4:15 PM	2,961.00	740.25	11.3%	0.00	0.00	0.0%	0.00	0.00	0.0%
4:30 PM	3,583.03	895.76	13.7%	0.00	0.00	0.0%	0.00	0.00	0.0%
4:45 PM	4,421.95	1105.49	16.8%	0.00	0.00	0.0%	0.00	0.00	0.0%
5:00 PM	5,421.83	1355.46	20.7%	0.00	0.00	0.0%	0.00	0.00	0.0%
5:15 PM	6,859.63	1714.91	26.1%	0.00	0.00	0.0%	0.00	0.00	0.0%
5:30 PM	8,869.09	1685.13	33.8%	0.00	0.00	0.0%	0.00	0.00	0.0%
5:37 PM	9,432.36	565.94	35.9%	0.00	0.00	0.0%	0.00	0.00	0.0%

OCTOBER 18

Analysis Hours: 8:22 AM-5:27 PM (PDT)

FEBRUARY 22 SIMILAR

Analysis Time	CURRENT SHADOW			NEW SHADOW FROM CPHP			NOT USED		
	Area (sf)	Area/Time (sfh)	Coverage	Area (sf)	Area/Time (sfh)	Coverage	Area (sf)	Area/Time (sfh)	Coverage
8:22 AM	25,165.02	1509.90	95.9%	0.00	0.00	0.0%	0.00	0.00	0.0%
8:30 AM	23,892.15	4300.59	91.0%	0.00	0.00	0.0%	0.00	0.00	0.0%
8:45 AM	21,181.21	5295.30	80.7%	0.00	0.00	0.0%	0.00	0.00	0.0%
9:00 AM	17,658.58	4414.64	67.3%	0.00	0.00	0.0%	0.00	0.00	0.0%
9:15 AM	13,690.15	3422.54	52.2%	0.00	0.00	0.0%	0.00	0.00	0.0%
9:30 AM	10,241.86	2560.46	39.0%	0.00	0.00	0.0%	0.00	0.00	0.0%
9:45 AM	8,219.12	2054.78	31.3%	0.00	0.00	0.0%	0.00	0.00	0.0%
10:00 AM	6,416.80	1604.20	24.4%	0.00	0.00	0.0%	0.00	0.00	0.0%
10:15 AM	5,149.24	1287.31	19.6%	0.00	0.00	0.0%	0.00	0.00	0.0%
10:30 AM	4,089.83	1022.46	15.6%	0.00	0.00	0.0%	0.00	0.00	0.0%
10:45 AM	3,391.27	847.82	12.9%	0.00	0.00	0.0%	0.00	0.00	0.0%
11:00 AM	2,764.69	691.17	10.5%	0.00	0.00	0.0%	0.00	0.00	0.0%
11:15 AM	2,364.31	591.08	9.0%	0.00	0.00	0.0%	0.00	0.00	0.0%
11:30 AM	2,025.50	506.38	7.7%	0.00	0.00	0.0%	0.00	0.00	0.0%
11:45 AM	1,792.05	448.01	6.8%	0.00	0.00	0.0%	0.00	0.00	0.0%
12:00 PM	1,593.19	398.30	6.1%	0.00	0.00	0.0%	0.00	0.00	0.0%
12:15 PM	1,457.79	364.45	5.6%	0.00	0.00	0.0%	0.00	0.00	0.0%
12:30 PM	1,322.39	330.60	5.0%	0.00	0.00	0.0%	0.00	0.00	0.0%
12:45 PM	1,264.24	316.06	4.8%	0.00	0.00	0.0%	0.00	0.00	0.0%
1:00 PM	1,251.93	312.98	4.8%	0.00	0.00	0.0%	0.00	0.00	0.0%
1:15 PM	1,287.44	321.86	4.9%	0.00	0.00	0.0%	0.00	0.00	0.0%
1:30 PM	1,316.66	329.17	5.0%	0.00	0.00	0.0%	0.00	0.00	0.0%
1:45 PM	1,377.67	344.42	5.2%	0.00	0.00	0.0%	0.00	0.00	0.0%
2:00 PM	1,433.16	358.29	5.5%	0.00	0.00	0.0%	0.00	0.00	0.0%
2:15 PM	1,524.41	381.10	5.8%	0.00	0.00	0.0%	0.00	0.00	0.0%
2:30 PM	1,609.23	402.31	6.1%	0.00	0.00	0.0%	0.00	0.00	0.0%
2:45 PM	1,730.63	432.66	6.6%	0.00	0.00	0.0%	0.00	0.00	0.0%
3:00 PM	1,853.21	463.30	7.1%	0.00	0.00	0.0%	0.00	0.00	0.0%
3:15 PM	2,013.70	503.42	7.7%	0.00	0.00	0.0%	0.00	0.00	0.0%
3:30 PM	2,187.32	546.83	8.3%	0.00	0.00	0.0%	0.00	0.00	0.0%
3:45 PM	2,470.84	617.71	9.4%	0.00	0.00	0.0%	0.00	0.00	0.0%
4:00 PM	2,917.77	729.44	11.1%	0.00	0.00	0.0%	0.00	0.00	0.0%
4:15 PM	3,526.97	881.74	13.4%	0.00	0.00	0.0%	0.00	0.00	0.0%
4:30 PM	4,348.53	1087.13	16.6%	0.00	0.00	0.0%	0.00	0.00	0.0%
4:45 PM	5,365.32	1341.33	20.4%	0.00	0.00	0.0%	0.00	0.00	0.0%
5:00 PM	6,641.51	1660.38	25.3%	0.00	0.00	0.0%	0.00	0.00	0.0%
5:15 PM	8,357.68	1838.69	31.8%	0.00	0.00	0.0%	0.00	0.00	0.0%
5:27 PM	10,438.37	1043.84	39.8%	0.00	0.00	0.0%	0.00	0.00	0.0%

GAMBLE PARK

Quantitative Shading Calculations for CPHP

OCTOBER 25

Analysis Hours: 7:30 AM-4:18 PM (PST)

FEBRUARY 15 SIMILAR

Analysis Time	CURRENT SHADOW			NEW SHADOW FROM CPHP			NOT USED		
	Area (sf)	Area/Time (sfh)	Coverage	Area (sf)	Area/Time (sfh)	Coverage	Area (sf)	Area/Time (sfh)	Coverage
7:30 AM	25,184.29	3273.96	96.0%	0.00	0.00	0.0%	0.00	0.00	0.0%
7:45 AM	22,124.37	5531.09	84.3%	0.00	0.00	0.0%	0.00	0.00	0.0%
8:00 AM	19,151.52	4787.88	73.0%	0.00	0.00	0.0%	0.00	0.00	0.0%
8:15 AM	15,603.70	3900.92	59.5%	0.00	0.00	0.0%	0.00	0.00	0.0%
8:30 AM	12,179.68	3044.92	46.4%	0.00	0.00	0.0%	0.00	0.00	0.0%
8:45 AM	10,076.11	2519.03	38.4%	0.00	0.00	0.0%	0.00	0.00	0.0%
9:00 AM	8,034.36	2008.59	30.6%	0.00	0.00	0.0%	0.00	0.00	0.0%
9:15 AM	6,400.24	1600.06	24.4%	0.00	0.00	0.0%	0.00	0.00	0.0%
9:30 AM	5,058.85	1264.71	19.3%	0.00	0.00	0.0%	0.00	0.00	0.0%
9:45 AM	4,140.88	1035.22	15.8%	0.00	0.00	0.0%	0.00	0.00	0.0%
10:00 AM	3,440.37	860.09	13.1%	0.00	0.00	0.0%	0.00	0.00	0.0%
10:15 AM	2,964.52	741.13	11.3%	0.00	0.00	0.0%	0.00	0.00	0.0%
10:30 AM	2,528.73	632.18	9.6%	0.00	0.00	0.0%	0.00	0.00	0.0%
10:45 AM	2,232.13	558.03	8.5%	0.00	0.00	0.0%	0.00	0.00	0.0%
11:00 AM	1,928.22	482.05	7.3%	0.00	0.00	0.0%	0.00	0.00	0.0%
11:15 AM	1,741.31	435.33	6.6%	0.00	0.00	0.0%	0.00	0.00	0.0%
11:30 AM	1,572.65	393.16	6.0%	0.00	0.00	0.0%	0.00	0.00	0.0%
11:45 AM	1,499.12	374.78	5.7%	0.00	0.00	0.0%	0.00	0.00	0.0%
12:00 PM	1,463.61	365.90	5.6%	0.00	0.00	0.0%	0.00	0.00	0.0%
12:15 PM	1,492.79	373.20	5.7%	0.00	0.00	0.0%	0.00	0.00	0.0%
12:30 PM	1,517.47	379.37	5.8%	0.00	0.00	0.0%	0.00	0.00	0.0%
12:45 PM	1,577.45	394.36	6.0%	0.00	0.00	0.0%	0.00	0.00	0.0%
1:00 PM	1,632.79	408.20	6.2%	0.00	0.00	0.0%	0.00	0.00	0.0%
1:15 PM	1,729.15	432.29	6.6%	0.00	0.00	0.0%	0.00	0.00	0.0%
1:30 PM	1,816.63	454.16	6.9%	0.00	0.00	0.0%	0.00	0.00	0.0%
1:45 PM	1,943.70	485.92	7.4%	0.00	0.00	0.0%	0.00	0.00	0.0%
2:00 PM	2,074.50	518.63	7.9%	0.00	0.00	0.0%	0.00	0.00	0.0%
2:15 PM	2,257.32	564.33	8.6%	0.00	0.00	0.0%	0.00	0.00	0.0%
2:30 PM	2,451.53	612.88	9.3%	0.00	0.00	0.0%	0.00	0.00	0.0%
2:45 PM	2,895.54	723.89	11.0%	0.00	0.00	0.0%	0.00	0.00	0.0%
3:00 PM	3,429.38	857.35	13.1%	0.00	0.00	0.0%	0.00	0.00	0.0%
3:15 PM	4,297.43	1074.36	16.4%	0.00	0.00	0.0%	0.00	0.00	0.0%
3:30 PM	5,260.57	1315.14	20.0%	0.00	0.00	0.0%	0.00	0.00	0.0%
3:45 PM	6,446.74	1611.68	24.6%	0.00	0.00	0.0%	0.00	0.00	0.0%
4:00 PM	8,283.03	2070.76	31.6%	0.00	0.00	0.0%	0.00	0.00	0.0%
4:15 PM	10,457.58	1568.64	39.8%	0.00	0.00	0.0%	0.00	0.00	0.0%
4:18 PM	11,336.00	340.08	43.2%	820.63	24.62	3.1%	0.00	0.00	0.0%

NOVEMBER 1

Analysis Hours: 7:36 AM-4:10 PM (PST)

FEBRUARY 8 SIMILAR

Analysis Time	CURRENT SHADOW			NEW SHADOW FROM CPHP			NOT USED		
	Area (sf)	Area/Time (sfh)	Coverage	Area (sf)	Area/Time (sfh)	Coverage	Area (sf)	Area/Time (sfh)	Coverage
7:36 AM	25,310.75	1771.75	96.4%	0.00	0.00	0.0%	0.00	0.00	0.0%
7:45 AM	23,476.19	4460.48	89.4%	0.00	0.00	0.0%	0.00	0.00	0.0%
8:00 AM	20,129.22	5032.30	76.7%	0.00	0.00	0.0%	0.00	0.00	0.0%
8:15 AM	17,099.40	4274.85	65.2%	0.00	0.00	0.0%	0.00	0.00	0.0%
8:30 AM	13,845.83	3461.46	52.8%	0.00	0.00	0.0%	0.00	0.00	0.0%
8:45 AM	11,672.87	2918.22	44.5%	0.00	0.00	0.0%	0.00	0.00	0.0%
9:00 AM	9,727.74	2431.94	37.1%	0.00	0.00	0.0%	0.00	0.00	0.0%
9:15 AM	7,859.15	1964.79	29.9%	0.00	0.00	0.0%	0.00	0.00	0.0%
9:30 AM	6,192.85	1548.21	23.6%	0.00	0.00	0.0%	0.00	0.00	0.0%
9:45 AM	5,055.17	1263.79	19.3%	0.00	0.00	0.0%	0.00	0.00	0.0%
10:00 AM	4,192.69	1048.17	16.0%	0.00	0.00	0.0%	0.00	0.00	0.0%
10:15 AM	3,598.97	899.74	13.7%	0.00	0.00	0.0%	0.00	0.00	0.0%
10:30 AM	3,113.16	778.29	11.9%	0.00	0.00	0.0%	0.00	0.00	0.0%
10:45 AM	2,762.80	690.70	10.5%	0.00	0.00	0.0%	0.00	0.00	0.0%
11:00 AM	2,341.42	585.36	8.9%	0.00	0.00	0.0%	0.00	0.00	0.0%
11:15 AM	2,094.22	523.56	8.0%	0.00	0.00	0.0%	0.00	0.00	0.0%
11:30 AM	1,871.60	467.90	7.1%	0.00	0.00	0.0%	0.00	0.00	0.0%
11:45 AM	1,777.03	444.26	6.8%	0.00	0.00	0.0%	0.00	0.00	0.0%
12:00 PM	1,702.02	425.51	6.5%	0.00	0.00	0.0%	0.00	0.00	0.0%
12:15 PM	1,708.25	427.06	6.5%	0.00	0.00	0.0%	0.00	0.00	0.0%
12:30 PM	1,726.29	431.57	6.6%	0.00	0.00	0.0%	0.00	0.00	0.0%
12:45 PM	1,782.60	445.65	6.8%	0.00	0.00	0.0%	0.00	0.00	0.0%
1:00 PM	1,835.68	458.92	7.0%	0.00	0.00	0.0%	0.00	0.00	0.0%
1:15 PM	1,937.21	484.30	7.4%	0.00	0.00	0.0%	0.00	0.00	0.0%
1:30 PM	2,030.87	507.72	7.7%	0.00	0.00	0.0%	0.00	0.00	0.0%
1:45 PM	2,165.91	541.48	8.3%	0.00	0.00	0.0%	0.00	0.00	0.0%
2:00 PM	2,318.94	579.73	8.8%	0.00	0.00	0.0%	0.00	0.00	0.0%
2:15 PM	2,528.22	632.06	9.6%	0.00	0.00	0.0%	0.00	0.00	0.0%
2:30 PM	2,832.70	708.17	10.8%	0.00	0.00	0.0%	0.00	0.00	0.0%
2:45 PM	3,400.72	850.18	13.0%	0.00	0.00	0.0%	0.00	0.00	0.0%
3:00 PM	4,187.38	1046.84	16.0%	0.00	0.00	0.0%	0.00	0.00	0.0%
3:15 PM	5,242.53	1310.63	20.0%	0.00	0.00	0.0%	0.00	0.00	0.0%
3:30 PM	6,369.38	1592.34	24.3%	0.00	0.00	0.0%	0.00	0.00	0.0%
3:45 PM	7,941.57	1985.39	30.3%	0.00	0.00	0.0%	0.00	0.00	0.0%
4:00 PM	10,075.80	2115.92	38.4%	0.00	0.00	0.0%	0.00	0.00	0.0%
4:10 PM	11,907.91	1071.71	45.4%	358.84	32.30	1.4%	0.00	0.00	0.0%

NOVEMBER 8

Analysis Hours: 7:43 AM-4:03 PM (PST)

FEBRUARY 1 SIMILAR

Analysis Time	CURRENT SHADOW			NEW SHADOW FROM CPHP			NOT USED		
	Area (sf)	Area/Time (sfh)	Coverage	Area (sf)	Area/Time (sfh)	Coverage	Area (sf)	Area/Time (sfh)	Coverage
7:43 AM	25,422.44	254.22	96.9%	0.00	0.00	0.0%	0.00	0.00	0.0%
7:45 AM	25,320.25	3291.63	96.5%	0.00	0.00	0.0%	0.00	0.00	0.0%
8:00 AM	21,220.14	5305.04	80.9%	0.00	0.00	0.0%	0.00	0.00	0.0%
8:15 AM	18,160.84	4540.21	69.2%	0.00	0.00	0.0%	0.00	0.00	0.0%
8:30 AM	15,345.52	3836.38	58.5%	0.00	0.00	0.0%	0.00	0.00	0.0%
8:45 AM	13,185.53	3296.38	50.2%	0.00	0.00	0.0%	0.00	0.00	0.0%
9:00 AM	11,293.70	2823.42	43.0%	0.00	0.00	0.0%	0.00	0.00	0.0%
9:15 AM	9,440.64	2360.16	36.0%	0.00	0.00	0.0%	0.00	0.00	0.0%
9:30 AM	7,599.79	1899.95	29.0%	0.00	0.00	0.0%	0.00	0.00	0.0%
9:45 AM	6,152.48	1538.12	23.4%	0.00	0.00	0.0%	0.00	0.00	0.0%
10:00 AM	5,047.61	1261.90	19.2%	0.00	0.00	0.0%	0.00	0.00	0.0%
10:15 AM	4,310.67	1077.67	16.4%	0.00	0.00	0.0%	0.00	0.00	0.0%
10:30 AM	3,714.19	928.55	14.2%	0.00	0.00	0.0%	0.00	0.00	0.0%
10:45 AM	3,276.46	819.11	12.5%	0.00	0.00	0.0%	0.00	0.00	0.0%
11:00 AM	2,834.23	708.56	10.8%	0.00	0.00	0.0%	0.00	0.00	0.0%
11:15 AM	2,498.18	624.54	9.5%	0.00	0.00	0.0%	0.00	0.00	0.0%
11:30 AM	2,233.82	558.45	8.5%	0.00	0.00	0.0%	0.00	0.00	0.0%
11:45 AM	2,119.72	529.93	8.1%	0.00	0.00	0.0%	0.00	0.00	0.0%
12:00 PM	2,003.28	500.82	7.6%	0.00	0.00	0.0%	0.00	0.00	0.0%
12:15 PM	1,981.56	495.39	7.6%	0.00	0.00	0.0%	0.00	0.00	0.0%
12:30 PM	1,968.89	492.22	7.5%	0.00	0.00	0.0%	0.00	0.00	0.0%
12:45 PM	2,009.76	502.44	7.7%	0.00	0.00	0.0%	0.00	0.00	0.0%
1:00 PM	2,048.09	512.02	7.8%	0.00	0.00	0.0%	0.00	0.00	0.0%
1:15 PM	2,154.06	538.51	8.2%	0.00	0.00	0.0%	0.00	0.00	0.0%
1:30 PM	2,255.63	563.91	8.6%	0.00	0.00	0.0%	0.00	0.00	0.0%
1:45 PM	2,402.38	600.59	9.2%	0.00	0.00	0.0%	0.00	0.00	0.0%
2:00 PM	2,589.23	647.31	9.9%	0.00	0.00	0.0%	0.00	0.00	0.0%
2:15 PM	2,830.09	707.52	10.8%	0.00	0.00	0.0%	0.00	0.00	0.0%
2:30 PM	3,296.38	824.10	12.6%	0.00	0.00	0.0%	0.00	0.00	0.0%
2:45 PM	4,013.19	1003.30	15.3%	0.00	0.00	0.0%	0.00	0.00	0.0%
3:00 PM	5,081.38	1270.35	19.4%	0.00	0.00	0.0%	0.00	0.00	0.0%
3:15 PM	6,375.26	1593.81	24.3%	0.00	0.00	0.0%	0.00	0.00	0.0%
3:30 PM	7,821.34	1955.34	29.8%	0.00	0.00	0.0%	0.00	0.00	0.0%
3:45 PM	10,024.19	2506.05	38.2%	0.00	0.00	0.0%	0.00	0.00	0.0%
4:00 PM	12,212.43	1831.86	46.5%	0.00	0.00	0.0%	0.00	0.00	0.0%
4:03 PM	12,784.08	383.52	48.7%	81.29	2.44	0.3%	0.00	0.00	0.0%

GAMBLE PARK

NOVEMBER 15

Analysis Hours: 7:51 AM-3:57 PM (PST)

JANUARY 25 SIMILAR

Analysis Time	CURRENT SHADOW			NEW SHADOW FROM CPHP			NOT USED		
	Area (sf)	Area/Time (sfh)	Coverage	Area (sf)	Area/Time (sfh)	Coverage	Area (sf)	Area/Time (sfh)	Coverage
7:51 AM	25,553.96	2044.32	97.4%	0.00	0.00	0.0%	0.00	0.00	0.0%
8:00 AM	23,016.28	4603.26	87.7%	0.00	0.00	0.0%	0.00	0.00	0.0%
8:15 AM	19,238.53	4809.63	73.3%	0.00	0.00	0.0%	0.00	0.00	0.0%
8:30 AM	16,563.97	4140.99	63.1%	0.00	0.00	0.0%	0.00	0.00	0.0%
8:45 AM	14,498.11	3624.53	55.2%	0.00	0.00	0.0%	0.00	0.00	0.0%
9:00 AM	12,715.26	3178.81	48.4%	0.00	0.00	0.0%	0.00	0.00	0.0%
9:15 AM	10,991.27	2747.82	41.9%	0.00	0.00	0.0%	0.00	0.00	0.0%
9:30 AM	9,010.06	2252.52	34.3%	0.00	0.00	0.0%	0.00	0.00	0.0%
9:45 AM	7,454.99	1863.75	28.4%	0.00	0.00	0.0%	0.00	0.00	0.0%
10:00 AM	6,056.48	1514.12	23.1%	0.00	0.00	0.0%	0.00	0.00	0.0%
10:15 AM	5,096.15	1274.04	19.4%	0.00	0.00	0.0%	0.00	0.00	0.0%
10:30 AM	4,329.47	1082.37	16.5%	0.00	0.00	0.0%	0.00	0.00	0.0%
10:45 AM	3,835.54	958.88	14.6%	0.00	0.00	0.0%	0.00	0.00	0.0%
11:00 AM	3,330.57	832.64	12.7%	0.00	0.00	0.0%	0.00	0.00	0.0%
11:15 AM	2,923.29	730.82	11.1%	0.00	0.00	0.0%	0.00	0.00	0.0%
11:30 AM	2,643.49	660.87	10.1%	0.00	0.00	0.0%	0.00	0.00	0.0%
11:45 AM	2,525.77	631.44	9.6%	0.00	0.00	0.0%	0.00	0.00	0.0%
12:00 PM	2,377.39	594.35	9.1%	0.00	0.00	0.0%	0.00	0.00	0.0%
12:15 PM	2,311.63	577.91	8.8%	0.00	0.00	0.0%	0.00	0.00	0.0%
12:30 PM	2,267.69	566.92	8.6%	0.00	0.00	0.0%	0.00	0.00	0.0%
12:45 PM	2,289.76	572.44	8.7%	0.00	0.00	0.0%	0.00	0.00	0.0%
1:00 PM	2,285.01	571.25	8.7%	0.00	0.00	0.0%	0.00	0.00	0.0%
1:15 PM	2,388.68	597.17	9.1%	0.00	0.00	0.0%	0.00	0.00	0.0%
1:30 PM	2,503.95	625.99	9.5%	0.00	0.00	0.0%	0.00	0.00	0.0%
1:45 PM	2,676.96	669.24	10.2%	0.00	0.00	0.0%	0.00	0.00	0.0%
2:00 PM	2,884.56	721.14	11.0%	0.00	0.00	0.0%	0.00	0.00	0.0%
2:15 PM	3,218.11	804.53	12.3%	0.00	0.00	0.0%	0.00	0.00	0.0%
2:30 PM	3,811.93	952.98	14.5%	0.00	0.00	0.0%	0.00	0.00	0.0%
2:45 PM	4,715.90	1178.97	18.0%	0.00	0.00	0.0%	0.00	0.00	0.0%
3:00 PM	5,951.42	1487.86	22.7%	0.00	0.00	0.0%	0.00	0.00	0.0%
3:15 PM	7,567.45	1891.86	28.8%	0.00	0.00	0.0%	0.00	0.00	0.0%
3:30 PM	9,372.63	2343.16	35.7%	0.00	0.00	0.0%	0.00	0.00	0.0%
3:45 PM	11,620.60	2672.74	44.3%	0.00	0.00	0.0%	0.00	0.00	0.0%
3:57 PM	13,768.83	1514.57	52.5%	0.00	0.00	0.0%	0.00	0.00	0.0%

NOVEMBER 22

Analysis Hours: 7:57 AM-3:54 PM (PST)

JANUARY 18 SIMILAR

Analysis Time	CURRENT SHADOW			NEW SHADOW FROM CPHP			NOT USED		
	Area (sf)	Area/Time (sfh)	Coverage	Area (sf)	Area/Time (sfh)	Coverage	Area (sf)	Area/Time (sfh)	Coverage
7:57 AM	25,760.53	515.21	98.2%	0.00	0.00	0.0%	0.00	0.00	0.0%
8:00 AM	25,623.45	3843.52	97.6%	0.00	0.00	0.0%	0.00	0.00	0.0%
8:15 AM	20,756.15	5189.04	79.1%	0.00	0.00	0.0%	0.00	0.00	0.0%
8:30 AM	17,464.42	4366.10	66.5%	0.00	0.00	0.0%	0.00	0.00	0.0%
8:45 AM	15,537.63	3884.41	59.2%	0.00	0.00	0.0%	0.00	0.00	0.0%
9:00 AM	13,939.03	3484.76	53.1%	0.00	0.00	0.0%	0.00	0.00	0.0%
9:15 AM	12,362.96	3090.74	47.1%	0.00	0.00	0.0%	0.00	0.00	0.0%
9:30 AM	10,402.09	2600.52	39.6%	0.00	0.00	0.0%	0.00	0.00	0.0%
9:45 AM	8,708.96	2177.24	33.2%	0.00	0.00	0.0%	0.00	0.00	0.0%
10:00 AM	7,182.76	1795.69	27.4%	0.00	0.00	0.0%	0.00	0.00	0.0%
10:15 AM	6,024.69	1506.17	23.0%	0.00	0.00	0.0%	0.00	0.00	0.0%
10:30 AM	4,996.36	1249.09	19.0%	0.00	0.00	0.0%	0.00	0.00	0.0%
10:45 AM	4,383.37	1095.84	16.7%	0.00	0.00	0.0%	0.00	0.00	0.0%
11:00 AM	3,833.24	958.31	14.6%	0.00	0.00	0.0%	0.00	0.00	0.0%
11:15 AM	3,402.30	850.58	13.0%	0.00	0.00	0.0%	0.00	0.00	0.0%
11:30 AM	3,036.21	759.05	11.6%	0.00	0.00	0.0%	0.00	0.00	0.0%
11:45 AM	2,910.67	727.67	11.1%	0.00	0.00	0.0%	0.00	0.00	0.0%
12:00 PM	2,763.57	690.89	10.5%	0.00	0.00	0.0%	0.00	0.00	0.0%
12:15 PM	2,702.46	675.61	10.3%	0.00	0.00	0.0%	0.00	0.00	0.0%
12:30 PM	2,619.63	654.91	10.0%	0.00	0.00	0.0%	0.00	0.00	0.0%
12:45 PM	2,633.94	658.48	10.0%	0.00	0.00	0.0%	0.00	0.00	0.0%
1:00 PM	2,595.31	648.83	9.9%	0.00	0.00	0.0%	0.00	0.00	0.0%
1:15 PM	2,657.03	664.26	10.1%	0.00	0.00	0.0%	0.00	0.00	0.0%
1:30 PM	2,761.22	690.30	10.5%	0.00	0.00	0.0%	0.00	0.00	0.0%
1:45 PM	2,948.94	737.23	11.2%	0.00	0.00	0.0%	0.00	0.00	0.0%
2:00 PM	3,178.81	794.70	12.1%	0.00	0.00	0.0%	0.00	0.00	0.0%
2:15 PM	3,622.67	905.67	13.8%	0.00	0.00	0.0%	0.00	0.00	0.0%
2:30 PM	4,316.59	1079.15	16.4%	0.00	0.00	0.0%	0.00	0.00	0.0%
2:45 PM	5,381.72	1345.43	20.5%	0.00	0.00	0.0%	0.00	0.00	0.0%
3:00 PM	6,750.60	1687.65	25.7%	0.00	0.00	0.0%	0.00	0.00	0.0%
3:15 PM	8,561.96	2140.49	32.6%	0.00	0.00	0.0%	0.00	0.00	0.0%
3:30 PM	10,769.56	2692.39	41.0%	0.00	0.00	0.0%	0.00	0.00	0.0%
3:45 PM	12,912.79	2582.56	49.2%	0.00	0.00	0.0%	0.00	0.00	0.0%
3:54 PM	14,535.97	1162.88	55.4%	0.00	0.00	0.0%	0.00	0.00	0.0%

GAMBLE PARK

Quantitative Shading Calculations for CPHP

NOVEMBER 29

Analysis Hours: 8:04 AM-3:51 PM (PST)

JANUARY 11 SIMILAR

Analysis Time	CURRENT SHADOW			NEW SHADOW FROM CPHP			NOT USED		
	Area (sf)	Area/Time (sfh)	Coverage	Area (sf)	Area/Time (sfh)	Coverage	Area (sf)	Area/Time (sfh)	Coverage
8:04 AM	25,961.59	2336.54	98.9%	0.00	0.00	0.0%	0.00	0.00	0.0%
8:15 AM	22,630.16	4752.33	86.2%	0.00	0.00	0.0%	0.00	0.00	0.0%
8:30 AM	18,620.59	4655.15	70.9%	0.00	0.00	0.0%	0.00	0.00	0.0%
8:45 AM	16,108.46	4027.12	61.4%	0.00	0.00	0.0%	0.00	0.00	0.0%
9:00 AM	14,900.89	3725.22	56.8%	0.00	0.00	0.0%	0.00	0.00	0.0%
9:15 AM	13,502.93	3375.73	51.4%	0.00	0.00	0.0%	0.00	0.00	0.0%
9:30 AM	11,704.55	2926.14	44.6%	0.00	0.00	0.0%	0.00	0.00	0.0%
9:45 AM	9,933.04	2483.26	37.8%	0.00	0.00	0.0%	0.00	0.00	0.0%
10:00 AM	8,234.14	2058.53	31.4%	0.00	0.00	0.0%	0.00	0.00	0.0%
10:15 AM	6,957.69	1739.42	26.5%	0.00	0.00	0.0%	0.00	0.00	0.0%
10:30 AM	5,747.25	1436.81	21.9%	0.00	0.00	0.0%	0.00	0.00	0.0%
10:45 AM	4,948.69	1237.17	18.9%	0.00	0.00	0.0%	0.00	0.00	0.0%
11:00 AM	4,309.29	1077.32	16.4%	0.00	0.00	0.0%	0.00	0.00	0.0%
11:15 AM	3,833.95	958.49	14.6%	0.00	0.00	0.0%	0.00	0.00	0.0%
11:30 AM	3,420.65	855.16	13.0%	0.00	0.00	0.0%	0.00	0.00	0.0%
11:45 AM	3,269.66	817.42	12.5%	0.00	0.00	0.0%	0.00	0.00	0.0%
12:00 PM	3,106.77	776.69	11.8%	0.00	0.00	0.0%	0.00	0.00	0.0%
12:15 PM	3,037.33	759.33	11.6%	0.00	0.00	0.0%	0.00	0.00	0.0%
12:30 PM	2,951.03	737.76	11.2%	0.00	0.00	0.0%	0.00	0.00	0.0%
12:45 PM	2,947.15	736.79	11.2%	0.00	0.00	0.0%	0.00	0.00	0.0%
1:00 PM	2,894.32	723.58	11.0%	0.00	0.00	0.0%	0.00	0.00	0.0%
1:15 PM	2,945.57	736.39	11.2%	0.00	0.00	0.0%	0.00	0.00	0.0%
1:30 PM	3,021.85	755.46	11.5%	0.00	0.00	0.0%	0.00	0.00	0.0%
1:45 PM	3,221.12	805.28	12.3%	0.00	0.00	0.0%	0.00	0.00	0.0%
2:00 PM	3,454.06	863.52	13.2%	0.00	0.00	0.0%	0.00	0.00	0.0%
2:15 PM	3,974.97	993.74	15.1%	0.00	0.00	0.0%	0.00	0.00	0.0%
2:30 PM	4,730.92	1182.73	18.0%	0.00	0.00	0.0%	0.00	0.00	0.0%
2:45 PM	5,909.83	1477.46	22.5%	0.00	0.00	0.0%	0.00	0.00	0.0%
3:00 PM	7,352.85	1838.21	28.0%	0.00	0.00	0.0%	0.00	0.00	0.0%
3:15 PM	9,285.52	2321.38	35.4%	0.00	0.00	0.0%	0.00	0.00	0.0%
3:30 PM	11,698.78	2924.69	44.6%	0.00	0.00	0.0%	0.00	0.00	0.0%
3:45 PM	14,003.00	2520.54	53.4%	0.00	0.00	0.0%	0.00	0.00	0.0%
3:51 PM	15,176.65	758.83	57.8%	0.00	0.00	0.0%	0.00	0.00	0.0%

GAMBLE PARK

DECEMBER 6

Analysis Hours: 8:10 AM-3:51 PM (PST)

JANUARY 4 SIMILAR

Analysis Time	CURRENT SHADOW			NEW SHADOW FROM CPHP			NOT USED		
	Area (sf)	Area/Time (sfh)	Coverage	Area (sf)	Area/Time (sfh)	Coverage	Area (sf)	Area/Time (sfh)	Coverage
8:10 AM	26,066.44	1042.66	99.3%	0.00	0.00	0.0%	0.00	0.00	0.0%
8:15 AM	24,948.89	4241.31	95.1%	0.00	0.00	0.0%	0.00	0.00	0.0%
8:30 AM	20,049.31	5012.33	76.4%	0.00	0.00	0.0%	0.00	0.00	0.0%
8:45 AM	16,738.36	4184.59	63.8%	0.00	0.00	0.0%	0.00	0.00	0.0%
9:00 AM	15,511.11	3877.78	59.1%	0.00	0.00	0.0%	0.00	0.00	0.0%
9:15 AM	14,383.55	3595.89	54.8%	0.00	0.00	0.0%	0.00	0.00	0.0%
9:30 AM	12,783.62	3195.91	48.7%	0.00	0.00	0.0%	0.00	0.00	0.0%
9:45 AM	11,007.00	2751.75	41.9%	0.00	0.00	0.0%	0.00	0.00	0.0%
10:00 AM	9,202.23	2300.56	35.1%	0.00	0.00	0.0%	0.00	0.00	0.0%
10:15 AM	7,808.67	1952.17	29.8%	0.00	0.00	0.0%	0.00	0.00	0.0%
10:30 AM	6,485.26	1621.32	24.7%	0.00	0.00	0.0%	0.00	0.00	0.0%
10:45 AM	5,534.39	1383.60	21.1%	0.00	0.00	0.0%	0.00	0.00	0.0%
11:00 AM	4,736.70	1184.17	18.0%	0.00	0.00	0.0%	0.00	0.00	0.0%
11:15 AM	4,196.37	1049.09	16.0%	0.00	0.00	0.0%	0.00	0.00	0.0%
11:30 AM	3,742.59	935.65	14.3%	0.00	0.00	0.0%	0.00	0.00	0.0%
11:45 AM	3,552.62	888.16	13.5%	0.00	0.00	0.0%	0.00	0.00	0.0%
12:00 PM	3,371.39	842.85	12.8%	0.00	0.00	0.0%	0.00	0.00	0.0%
12:15 PM	3,302.46	825.62	12.6%	0.00	0.00	0.0%	0.00	0.00	0.0%
12:30 PM	3,217.44	804.36	12.3%	0.00	0.00	0.0%	0.00	0.00	0.0%
12:45 PM	3,212.89	803.22	12.2%	0.00	0.00	0.0%	0.00	0.00	0.0%
1:00 PM	3,146.68	786.67	12.0%	0.00	0.00	0.0%	0.00	0.00	0.0%
1:15 PM	3,191.49	797.87	12.2%	0.00	0.00	0.0%	0.00	0.00	0.0%
1:30 PM	3,237.62	809.41	12.3%	0.00	0.00	0.0%	0.00	0.00	0.0%
1:45 PM	3,449.31	862.33	13.1%	0.00	0.00	0.0%	0.00	0.00	0.0%
2:00 PM	3,687.62	921.90	14.1%	0.00	0.00	0.0%	0.00	0.00	0.0%
2:15 PM	4,241.69	1060.42	16.2%	0.00	0.00	0.0%	0.00	0.00	0.0%
2:30 PM	5,010.46	1252.62	19.1%	0.00	0.00	0.0%	0.00	0.00	0.0%
2:45 PM	6,237.35	1559.34	23.8%	0.00	0.00	0.0%	0.00	0.00	0.0%
3:00 PM	7,715.01	1928.75	29.4%	0.00	0.00	0.0%	0.00	0.00	0.0%
3:15 PM	9,694.17	2423.54	36.9%	0.00	0.00	0.0%	0.00	0.00	0.0%
3:30 PM	12,211.46	3052.87	46.5%	0.00	0.00	0.0%	0.00	0.00	0.0%
3:45 PM	14,602.80	2482.48	55.6%	0.00	0.00	0.0%	0.00	0.00	0.0%
3:51 PM	15,607.38	780.37	59.5%	0.00	0.00	0.0%	0.00	0.00	0.0%

GAMBLE PARK

Quantitative Shading Calculations for CPHP

DECEMBER 13

Analysis Hours: 8:15 AM-3:52 PM (PST)

DECEMBER 28 SIMILAR

Analysis Time	CURRENT SHADOW			NEW SHADOW FROM CPHP			NOT USED		
	Area (sf)	Area/Time (sfh)	Coverage	Area (sf)	Area/Time (sfh)	Coverage	Area (sf)	Area/Time (sfh)	Coverage
8:15 AM	26,079.42	3129.53	99.4%	0.00	0.00	0.0%	0.00	0.00	0.0%
8:30 AM	21,528.50	5382.13	82.0%	0.00	0.00	0.0%	0.00	0.00	0.0%
8:45 AM	17,562.42	4390.60	66.9%	0.00	0.00	0.0%	0.00	0.00	0.0%
9:00 AM	15,835.92	3958.98	60.3%	0.00	0.00	0.0%	0.00	0.00	0.0%
9:15 AM	14,955.25	3738.81	57.0%	0.00	0.00	0.0%	0.00	0.00	0.0%
9:30 AM	13,546.16	3386.54	51.6%	0.00	0.00	0.0%	0.00	0.00	0.0%
9:45 AM	11,873.21	2968.30	45.2%	0.00	0.00	0.0%	0.00	0.00	0.0%
10:00 AM	10,023.12	2505.78	38.2%	0.00	0.00	0.0%	0.00	0.00	0.0%
10:15 AM	8,508.16	2127.04	32.4%	0.00	0.00	0.0%	0.00	0.00	0.0%
10:30 AM	7,132.94	1783.24	27.2%	0.00	0.00	0.0%	0.00	0.00	0.0%
10:45 AM	6,049.37	1512.34	23.0%	0.00	0.00	0.0%	0.00	0.00	0.0%
11:00 AM	5,131.56	1282.89	19.6%	0.00	0.00	0.0%	0.00	0.00	0.0%
11:15 AM	4,496.86	1124.21	17.1%	0.00	0.00	0.0%	0.00	0.00	0.0%
11:30 AM	3,970.02	992.50	15.1%	0.00	0.00	0.0%	0.00	0.00	0.0%
11:45 AM	3,748.47	937.12	14.3%	0.00	0.00	0.0%	0.00	0.00	0.0%
12:00 PM	3,570.61	892.65	13.6%	0.00	0.00	0.0%	0.00	0.00	0.0%
12:15 PM	3,496.88	874.22	13.3%	0.00	0.00	0.0%	0.00	0.00	0.0%
12:30 PM	3,397.70	849.43	12.9%	0.00	0.00	0.0%	0.00	0.00	0.0%
12:45 PM	3,393.16	848.29	12.9%	0.00	0.00	0.0%	0.00	0.00	0.0%
1:00 PM	3,324.23	831.06	12.7%	0.00	0.00	0.0%	0.00	0.00	0.0%
1:15 PM	3,357.08	839.27	12.8%	0.00	0.00	0.0%	0.00	0.00	0.0%
1:30 PM	3,394.54	848.63	12.9%	0.00	0.00	0.0%	0.00	0.00	0.0%
1:45 PM	3,583.49	895.87	13.7%	0.00	0.00	0.0%	0.00	0.00	0.0%
2:00 PM	3,825.83	956.46	14.6%	0.00	0.00	0.0%	0.00	0.00	0.0%
2:15 PM	4,358.75	1089.69	16.6%	0.00	0.00	0.0%	0.00	0.00	0.0%
2:30 PM	5,118.63	1279.66	19.5%	0.00	0.00	0.0%	0.00	0.00	0.0%
2:45 PM	6,329.37	1582.34	24.1%	0.00	0.00	0.0%	0.00	0.00	0.0%
3:00 PM	7,787.77	1946.94	29.7%	0.00	0.00	0.0%	0.00	0.00	0.0%
3:15 PM	9,734.03	2433.51	37.1%	0.00	0.00	0.0%	0.00	0.00	0.0%
3:30 PM	12,330.82	3082.70	47.0%	0.00	0.00	0.0%	0.00	0.00	0.0%
3:45 PM	14,768.86	2658.39	56.3%	0.00	0.00	0.0%	0.00	0.00	0.0%
3:52 PM	15,847.11	950.83	60.4%	0.00	0.00	0.0%	0.00	0.00	0.0%

GAMBLE PARK

Quantitative Shading Calculations for CPHP

DECEMBER 20

Analysis Hours: 8:19 AM-3:54 PM (PST)

WINTER SOLSTICE
DECEMBER 21 SIMILAR

Analysis Time	CURRENT SHADOW			NEW SHADOW FROM CPHP			NOT USED		
	Area (sf)	Area/Time (sfh)	Coverage	Area (sf)	Area/Time (sfh)	Coverage	Area (sf)	Area/Time (sfh)	Coverage
8:19 AM	26,075.53	2086.04	99.4%	0.00	0.00	0.0%	0.00	0.00	0.0%
8:30 AM	22,809.14	4789.92	86.9%	0.00	0.00	0.0%	0.00	0.00	0.0%
8:45 AM	18,511.10	4627.77	70.5%	0.00	0.00	0.0%	0.00	0.00	0.0%
9:00 AM	16,058.75	4014.69	61.2%	0.00	0.00	0.0%	0.00	0.00	0.0%
9:15 AM	15,293.09	3823.27	58.3%	0.00	0.00	0.0%	0.00	0.00	0.0%
9:30 AM	14,031.87	3507.97	53.5%	0.00	0.00	0.0%	0.00	0.00	0.0%
9:45 AM	12,454.37	3113.59	47.5%	0.00	0.00	0.0%	0.00	0.00	0.0%
10:00 AM	10,599.83	2649.96	40.4%	0.00	0.00	0.0%	0.00	0.00	0.0%
10:15 AM	9,006.95	2251.74	34.3%	0.00	0.00	0.0%	0.00	0.00	0.0%
10:30 AM	7,577.67	1894.42	28.9%	0.00	0.00	0.0%	0.00	0.00	0.0%
10:45 AM	6,414.09	1603.52	24.4%	0.00	0.00	0.0%	0.00	0.00	0.0%
11:00 AM	5,425.05	1356.26	20.7%	0.00	0.00	0.0%	0.00	0.00	0.0%
11:15 AM	4,720.24	1180.06	18.0%	0.00	0.00	0.0%	0.00	0.00	0.0%
11:30 AM	4,112.52	1028.13	15.7%	0.00	0.00	0.0%	0.00	0.00	0.0%
11:45 AM	3,846.73	961.68	14.7%	0.00	0.00	0.0%	0.00	0.00	0.0%
12:00 PM	3,662.02	915.50	14.0%	0.00	0.00	0.0%	0.00	0.00	0.0%
12:15 PM	3,580.32	895.08	13.6%	0.00	0.00	0.0%	0.00	0.00	0.0%
12:30 PM	3,476.95	869.24	13.2%	0.00	0.00	0.0%	0.00	0.00	0.0%
12:45 PM	3,473.53	868.38	13.2%	0.00	0.00	0.0%	0.00	0.00	0.0%
1:00 PM	3,399.70	849.92	13.0%	0.00	0.00	0.0%	0.00	0.00	0.0%
1:15 PM	3,423.00	855.75	13.0%	0.00	0.00	0.0%	0.00	0.00	0.0%
1:30 PM	3,439.35	859.84	13.1%	0.00	0.00	0.0%	0.00	0.00	0.0%
1:45 PM	3,606.58	901.65	13.7%	0.00	0.00	0.0%	0.00	0.00	0.0%
2:00 PM	3,832.93	958.23	14.6%	0.00	0.00	0.0%	0.00	0.00	0.0%
2:15 PM	4,305.35	1076.34	16.4%	0.00	0.00	0.0%	0.00	0.00	0.0%
2:30 PM	5,038.97	1259.74	19.2%	0.00	0.00	0.0%	0.00	0.00	0.0%
2:45 PM	6,173.23	1543.31	23.5%	0.00	0.00	0.0%	0.00	0.00	0.0%
3:00 PM	7,582.98	1895.75	28.9%	0.00	0.00	0.0%	0.00	0.00	0.0%
3:15 PM	9,450.25	2362.56	36.0%	0.00	0.00	0.0%	0.00	0.00	0.0%
3:30 PM	11,962.94	2990.73	45.6%	0.00	0.00	0.0%	0.00	0.00	0.0%
3:45 PM	14,356.22	3014.81	54.7%	0.00	0.00	0.0%	0.00	0.00	0.0%
3:54 PM	15,941.79	1275.34	60.7%	0.00	0.00	0.0%	0.00	0.00	0.0%

THEORETICAL ANNUAL AVAILABLE SUNLIGHT (TAAS)	GAMBLE PARK
Area of Gamble Park	0.60 acres (26,245 sf)
Hours of annual available sunlight	3721.4 hrs
TAAS for Gamble Park	97,669,356 sfh

EXISTING (CURRENT) LEVELS OF SHADOW (ROUGH APPROXIMATE)	GAMBLE PARK
Existing annual total shading on park (sfh)	14,872,388 sfh
Existing shading as percentage of TAAS	15.227%

NEW SHADOW CAST BY THE PROPOSED CPHP PROJECT	GAMBLE PARK
Additional annual shading on Gamble Park from Project	801 sfh
Additional annual shading from Project as percentage of TAAS	0.001%
Combined total annual shading existing + Project (sfh)	14,873,189 sfh
Combined total annual shading from existing + Project as percentage of TAAS	15.228%
Number of days when new shading from Project would occur	42-54 days annually
Dates when new shadow from Project would be cast on Gamble Park	Between 1/26 - 2/21 & 10/19 - 11/14
Annual range in duration of new Project shadow (duration variance +/- 4 min.)	Zero
Range in area of new Project shadow (sf)	Zero to 821 sf
Average daily duration of new Project shadow (when present)	Approx. 4 min.
MAXIMUM NEW SHADING BY THE PROPOSED PROJECT	GAMBLE PARK
Dates of maximum new shading from proposed Project (max sfh)	Feb 8 & Nov 1
Total new shading on date(s) of maximum shading (sfh)	32.30 sfh
Percentage new shadow on date(s) of maximum shading	0.014%
Date and duration of longest duration of new shading (duration variance +/- 4 min.)	Approx. 5 min on Nov 1 & Feb 8
Date and time of largest area of new Project shadow	821 sf on Oct 25/Feb 15 at 4:18 PM
Percentage of Gamble Park covered by largest new shadow	3.127%

GRATTAN ELEMENTARY

JUNE 21

Analysis Hours: 6:46 AM-7:36 PM (PDT)

SUMMER SOLSTICE

Analysis Time	CURRENT SHADOW			NEW SHADOW FROM CPHP			NOT USED		
	Area (sf)	Area/Time (sfh)	Coverage	Area (sf)	Area/Time (sfh)	Coverage	Area (sf)	Area/Time (sfh)	Coverage
6:46 AM	18,441.16	2028.53	60.7%	0.00	0.00	0.0%	0.00	0.00	0.0%
7:00 AM	16,089.63	3700.61	52.9%	0.00	0.00	0.0%	0.00	0.00	0.0%
7:15 AM	14,075.16	3518.79	46.3%	0.00	0.00	0.0%	0.00	0.00	0.0%
7:30 AM	12,366.53	3091.63	40.7%	0.00	0.00	0.0%	0.00	0.00	0.0%
7:45 AM	10,807.71	2701.93	35.6%	0.00	0.00	0.0%	0.00	0.00	0.0%
8:00 AM	9,603.19	2400.80	31.6%	0.00	0.00	0.0%	0.00	0.00	0.0%
8:15 AM	8,735.82	2183.96	28.7%	0.00	0.00	0.0%	0.00	0.00	0.0%
8:30 AM	7,995.48	1998.87	26.3%	0.00	0.00	0.0%	0.00	0.00	0.0%
8:45 AM	7,300.83	1825.21	24.0%	0.00	0.00	0.0%	0.00	0.00	0.0%
9:00 AM	6,731.28	1682.82	22.1%	0.00	0.00	0.0%	0.00	0.00	0.0%
9:15 AM	6,238.77	1559.69	20.5%	0.00	0.00	0.0%	0.00	0.00	0.0%
9:30 AM	5,942.21	1485.55	19.5%	0.00	0.00	0.0%	0.00	0.00	0.0%
9:45 AM	5,662.50	1415.63	18.6%	0.00	0.00	0.0%	0.00	0.00	0.0%
10:00 AM	5,394.05	1348.51	17.7%	0.00	0.00	0.0%	0.00	0.00	0.0%
10:15 AM	5,144.46	1286.12	16.9%	0.00	0.00	0.0%	0.00	0.00	0.0%
10:30 AM	4,892.59	1223.15	16.1%	0.00	0.00	0.0%	0.00	0.00	0.0%
10:45 AM	4,656.73	1164.18	15.3%	0.00	0.00	0.0%	0.00	0.00	0.0%
11:00 AM	4,426.81	1106.70	14.6%	0.00	0.00	0.0%	0.00	0.00	0.0%
11:15 AM	4,208.34	1052.09	13.8%	0.00	0.00	0.0%	0.00	0.00	0.0%
11:30 AM	3,993.30	998.32	13.1%	0.00	0.00	0.0%	0.00	0.00	0.0%
11:45 AM	3,784.61	946.15	12.5%	0.00	0.00	0.0%	0.00	0.00	0.0%
12:00 PM	3,578.38	894.59	11.8%	0.00	0.00	0.0%	0.00	0.00	0.0%
12:15 PM	3,374.28	843.57	11.1%	0.00	0.00	0.0%	0.00	0.00	0.0%
12:30 PM	3,179.22	794.80	10.5%	0.00	0.00	0.0%	0.00	0.00	0.0%
12:45 PM	3,055.34	763.84	10.1%	0.00	0.00	0.0%	0.00	0.00	0.0%
1:00 PM	2,993.53	748.38	9.8%	0.00	0.00	0.0%	0.00	0.00	0.0%
1:15 PM	3,150.14	787.53	10.4%	0.00	0.00	0.0%	0.00	0.00	0.0%
1:30 PM	3,347.51	836.88	11.0%	0.00	0.00	0.0%	0.00	0.00	0.0%
1:45 PM	3,588.28	897.07	11.8%	0.00	0.00	0.0%	0.00	0.00	0.0%
2:00 PM	3,829.00	957.25	12.6%	0.00	0.00	0.0%	0.00	0.00	0.0%
2:15 PM	4,080.66	1020.16	13.4%	0.00	0.00	0.0%	0.00	0.00	0.0%
2:30 PM	4,330.81	1082.70	14.2%	0.00	0.00	0.0%	0.00	0.00	0.0%
2:45 PM	4,594.05	1148.51	15.1%	0.00	0.00	0.0%	0.00	0.00	0.0%
3:00 PM	4,856.23	1214.06	16.0%	0.00	0.00	0.0%	0.00	0.00	0.0%
3:15 PM	5,134.52	1283.63	16.9%	0.00	0.00	0.0%	0.00	0.00	0.0%
3:30 PM	5,415.44	1353.86	17.8%	0.00	0.00	0.0%	0.00	0.00	0.0%
3:45 PM	5,715.25	1428.81	18.8%	0.00	0.00	0.0%	0.00	0.00	0.0%
4:00 PM	6,018.00	1504.50	19.8%	0.00	0.00	0.0%	0.00	0.00	0.0%
4:15 PM	6,360.09	1590.02	20.9%	0.00	0.00	0.0%	0.00	0.00	0.0%
4:30 PM	6,729.21	1682.30	22.1%	0.00	0.00	0.0%	0.00	0.00	0.0%
4:45 PM	7,142.89	1785.72	23.5%	0.00	0.00	0.0%	0.00	0.00	0.0%
5:00 PM	7,712.14	1928.03	25.4%	0.00	0.00	0.0%	0.00	0.00	0.0%
5:15 PM	8,378.60	2094.65	27.6%	0.00	0.00	0.0%	0.00	0.00	0.0%
5:30 PM	9,042.28	2260.57	29.7%	0.00	0.00	0.0%	0.00	0.00	0.0%
5:45 PM	9,702.02	2425.50	31.9%	0.00	0.00	0.0%	0.00	0.00	0.0%
6:00 PM	10,457.82	2614.46	34.4%	0.00	0.00	0.0%	0.00	0.00	0.0%
6:15 PM	11,417.93	2854.48	37.6%	0.00	0.00	0.0%	0.00	0.00	0.0%
6:30 PM	12,731.09	3182.77	41.9%	0.00	0.00	0.0%	0.00	0.00	0.0%
6:45 PM	14,350.13	3587.53	47.2%	0.00	0.00	0.0%	0.00	0.00	0.0%
7:00 PM	16,670.50	4167.62	54.8%	0.00	0.00	0.0%	0.00	0.00	0.0%
7:15 PM	19,081.80	5724.54	62.8%	0.00	0.00	0.0%	0.00	0.00	0.0%
7:36 PM	24,570.16	4422.63	80.8%	0.00	0.00	0.0%	0.00	0.00	0.0%

GRATTAN ELEMENTARY

JUNE 28

Analysis Hours: 6:48 AM-7:36 PM (PDT)

JUNE 14 SIMILAR

Analysis Time	CURRENT SHADOW			NEW SHADOW FROM CPHP			NOT USED		
	Area (sf)	Area/Time (sfh)	Coverage	Area (sf)	Area/Time (sfh)	Coverage	Area (sf)	Area/Time (sfh)	Coverage
6:48 AM	18,390.43	1839.04	60.5%	0.00	0.00	0.0%	0.00	0.00	0.0%
7:00 AM	16,387.94	3605.35	53.9%	0.00	0.00	0.0%	0.00	0.00	0.0%
7:15 AM	14,303.82	3575.96	47.1%	0.00	0.00	0.0%	0.00	0.00	0.0%
7:30 AM	12,585.23	3146.31	41.4%	0.00	0.00	0.0%	0.00	0.00	0.0%
7:45 AM	11,000.96	2750.24	36.2%	0.00	0.00	0.0%	0.00	0.00	0.0%
8:00 AM	9,747.59	2436.90	32.1%	0.00	0.00	0.0%	0.00	0.00	0.0%
8:15 AM	8,837.01	2209.25	29.1%	0.00	0.00	0.0%	0.00	0.00	0.0%
8:30 AM	8,093.79	2023.45	26.6%	0.00	0.00	0.0%	0.00	0.00	0.0%
8:45 AM	7,385.95	1846.49	24.3%	0.00	0.00	0.0%	0.00	0.00	0.0%
9:00 AM	6,803.19	1700.80	22.4%	0.00	0.00	0.0%	0.00	0.00	0.0%
9:15 AM	6,290.26	1572.57	20.7%	0.00	0.00	0.0%	0.00	0.00	0.0%
9:30 AM	5,987.93	1496.98	19.7%	0.00	0.00	0.0%	0.00	0.00	0.0%
9:45 AM	5,704.62	1426.15	18.8%	0.00	0.00	0.0%	0.00	0.00	0.0%
10:00 AM	5,432.80	1358.20	17.9%	0.00	0.00	0.0%	0.00	0.00	0.0%
10:15 AM	5,180.16	1295.04	17.0%	0.00	0.00	0.0%	0.00	0.00	0.0%
10:30 AM	4,925.00	1231.25	16.2%	0.00	0.00	0.0%	0.00	0.00	0.0%
10:45 AM	4,687.19	1171.80	15.4%	0.00	0.00	0.0%	0.00	0.00	0.0%
11:00 AM	4,455.05	1113.76	14.7%	0.00	0.00	0.0%	0.00	0.00	0.0%
11:15 AM	4,235.41	1058.85	13.9%	0.00	0.00	0.0%	0.00	0.00	0.0%
11:30 AM	4,019.25	1004.81	13.2%	0.00	0.00	0.0%	0.00	0.00	0.0%
11:45 AM	3,809.52	952.38	12.5%	0.00	0.00	0.0%	0.00	0.00	0.0%
12:00 PM	3,602.78	900.69	11.9%	0.00	0.00	0.0%	0.00	0.00	0.0%
12:15 PM	3,397.55	849.39	11.2%	0.00	0.00	0.0%	0.00	0.00	0.0%
12:30 PM	3,199.80	799.95	10.5%	0.00	0.00	0.0%	0.00	0.00	0.0%
12:45 PM	3,066.70	766.67	10.1%	0.00	0.00	0.0%	0.00	0.00	0.0%
1:00 PM	3,000.04	750.01	9.9%	0.00	0.00	0.0%	0.00	0.00	0.0%
1:15 PM	3,134.44	783.61	10.3%	0.00	0.00	0.0%	0.00	0.00	0.0%
1:30 PM	3,329.34	832.34	11.0%	0.00	0.00	0.0%	0.00	0.00	0.0%
1:45 PM	3,569.69	892.42	11.7%	0.00	0.00	0.0%	0.00	0.00	0.0%
2:00 PM	3,809.94	952.48	12.5%	0.00	0.00	0.0%	0.00	0.00	0.0%
2:15 PM	4,061.82	1015.46	13.4%	0.00	0.00	0.0%	0.00	0.00	0.0%
2:30 PM	4,312.39	1078.10	14.2%	0.00	0.00	0.0%	0.00	0.00	0.0%
2:45 PM	4,575.52	1143.88	15.1%	0.00	0.00	0.0%	0.00	0.00	0.0%
3:00 PM	4,838.44	1209.61	15.9%	0.00	0.00	0.0%	0.00	0.00	0.0%
3:15 PM	5,115.33	1278.83	16.8%	0.00	0.00	0.0%	0.00	0.00	0.0%
3:30 PM	5,396.44	1349.11	17.8%	0.00	0.00	0.0%	0.00	0.00	0.0%
3:45 PM	5,697.60	1424.40	18.7%	0.00	0.00	0.0%	0.00	0.00	0.0%
4:00 PM	6,000.30	1500.07	19.7%	0.00	0.00	0.0%	0.00	0.00	0.0%
4:15 PM	6,339.09	1584.77	20.9%	0.00	0.00	0.0%	0.00	0.00	0.0%
4:30 PM	6,706.67	1676.67	22.1%	0.00	0.00	0.0%	0.00	0.00	0.0%
4:45 PM	7,113.47	1778.37	23.4%	0.00	0.00	0.0%	0.00	0.00	0.0%
5:00 PM	7,659.63	1914.91	25.2%	0.00	0.00	0.0%	0.00	0.00	0.0%
5:15 PM	8,313.26	2078.32	27.3%	0.00	0.00	0.0%	0.00	0.00	0.0%
5:30 PM	8,984.48	2246.12	29.6%	0.00	0.00	0.0%	0.00	0.00	0.0%
5:45 PM	9,635.30	2408.82	31.7%	0.00	0.00	0.0%	0.00	0.00	0.0%
6:00 PM	10,387.64	2596.91	34.2%	0.00	0.00	0.0%	0.00	0.00	0.0%
6:15 PM	11,314.09	2828.52	37.2%	0.00	0.00	0.0%	0.00	0.00	0.0%
6:30 PM	12,605.78	3151.45	41.5%	0.00	0.00	0.0%	0.00	0.00	0.0%
6:45 PM	14,188.33	3547.08	46.7%	0.00	0.00	0.0%	0.00	0.00	0.0%
7:00 PM	16,457.27	4114.32	54.1%	0.00	0.00	0.0%	0.00	0.00	0.0%
7:15 PM	18,908.24	5672.47	62.2%	0.00	0.00	0.0%	0.00	0.00	0.0%
7:36 PM	24,515.88	4412.86	80.7%	0.00	0.00	0.0%	0.00	0.00	0.0%

JULY 5

Analysis Hours: 6:52 AM-7:36 PM (PDT)

JUNE 7 SIMILAR

Analysis Time	CURRENT SHADOW			NEW SHADOW FROM CPHP			NOT USED		
	Area (sf)	Area/Time (sfh)	Coverage	Area (sf)	Area/Time (sfh)	Coverage	Area (sf)	Area/Time (sfh)	Coverage
6:52 AM	18,231.91	1093.91	60.0%	0.00	0.00	0.0%	0.00	0.00	0.0%
7:00 AM	16,798.03	3191.62	55.3%	0.00	0.00	0.0%	0.00	0.00	0.0%
7:15 AM	14,633.03	3658.26	48.1%	0.00	0.00	0.0%	0.00	0.00	0.0%
7:30 AM	12,895.55	3223.89	42.4%	0.00	0.00	0.0%	0.00	0.00	0.0%
7:45 AM	11,292.03	2823.01	37.1%	0.00	0.00	0.0%	0.00	0.00	0.0%
8:00 AM	9,972.25	2493.06	32.8%	0.00	0.00	0.0%	0.00	0.00	0.0%
8:15 AM	8,994.86	2248.71	29.6%	0.00	0.00	0.0%	0.00	0.00	0.0%
8:30 AM	8,251.21	2062.80	27.1%	0.00	0.00	0.0%	0.00	0.00	0.0%
8:45 AM	7,516.81	1879.20	24.7%	0.00	0.00	0.0%	0.00	0.00	0.0%
9:00 AM	6,907.49	1726.87	22.7%	0.00	0.00	0.0%	0.00	0.00	0.0%
9:15 AM	6,381.89	1595.47	21.0%	0.00	0.00	0.0%	0.00	0.00	0.0%
9:30 AM	6,069.13	1517.28	20.0%	0.00	0.00	0.0%	0.00	0.00	0.0%
9:45 AM	5,776.29	1444.07	19.0%	0.00	0.00	0.0%	0.00	0.00	0.0%
10:00 AM	5,497.25	1374.31	18.1%	0.00	0.00	0.0%	0.00	0.00	0.0%
10:15 AM	5,234.04	1308.51	17.2%	0.00	0.00	0.0%	0.00	0.00	0.0%
10:30 AM	4,973.19	1243.30	16.4%	0.00	0.00	0.0%	0.00	0.00	0.0%
10:45 AM	4,730.62	1182.65	15.6%	0.00	0.00	0.0%	0.00	0.00	0.0%
11:00 AM	4,495.15	1123.79	14.8%	0.00	0.00	0.0%	0.00	0.00	0.0%
11:15 AM	4,272.38	1068.09	14.1%	0.00	0.00	0.0%	0.00	0.00	0.0%
11:30 AM	4,053.62	1013.40	13.3%	0.00	0.00	0.0%	0.00	0.00	0.0%
11:45 AM	3,841.34	960.34	12.6%	0.00	0.00	0.0%	0.00	0.00	0.0%
12:00 PM	3,632.00	908.00	11.9%	0.00	0.00	0.0%	0.00	0.00	0.0%
12:15 PM	3,425.49	856.37	11.3%	0.00	0.00	0.0%	0.00	0.00	0.0%
12:30 PM	3,223.70	805.92	10.6%	0.00	0.00	0.0%	0.00	0.00	0.0%
12:45 PM	3,084.50	771.12	10.1%	0.00	0.00	0.0%	0.00	0.00	0.0%
1:00 PM	3,012.30	753.07	9.9%	0.00	0.00	0.0%	0.00	0.00	0.0%
1:15 PM	3,130.26	782.57	10.3%	0.00	0.00	0.0%	0.00	0.00	0.0%
1:30 PM	3,326.16	831.54	10.9%	0.00	0.00	0.0%	0.00	0.00	0.0%
1:45 PM	3,565.64	891.41	11.7%	0.00	0.00	0.0%	0.00	0.00	0.0%
2:00 PM	3,806.53	951.63	12.5%	0.00	0.00	0.0%	0.00	0.00	0.0%
2:15 PM	4,059.87	1014.97	13.4%	0.00	0.00	0.0%	0.00	0.00	0.0%
2:30 PM	4,312.06	1078.02	14.2%	0.00	0.00	0.0%	0.00	0.00	0.0%
2:45 PM	4,575.80	1143.95	15.1%	0.00	0.00	0.0%	0.00	0.00	0.0%
3:00 PM	4,839.87	1209.97	15.9%	0.00	0.00	0.0%	0.00	0.00	0.0%
3:15 PM	5,119.99	1280.00	16.8%	0.00	0.00	0.0%	0.00	0.00	0.0%
3:30 PM	5,402.63	1350.66	17.8%	0.00	0.00	0.0%	0.00	0.00	0.0%
3:45 PM	5,705.87	1426.47	18.8%	0.00	0.00	0.0%	0.00	0.00	0.0%
4:00 PM	6,015.32	1503.83	19.8%	0.00	0.00	0.0%	0.00	0.00	0.0%
4:15 PM	6,351.92	1587.98	20.9%	0.00	0.00	0.0%	0.00	0.00	0.0%
4:30 PM	6,722.52	1680.63	22.1%	0.00	0.00	0.0%	0.00	0.00	0.0%
4:45 PM	7,132.55	1783.14	23.5%	0.00	0.00	0.0%	0.00	0.00	0.0%
5:00 PM	7,630.64	1907.66	25.1%	0.00	0.00	0.0%	0.00	0.00	0.0%
5:15 PM	8,275.32	2068.83	27.2%	0.00	0.00	0.0%	0.00	0.00	0.0%
5:30 PM	8,940.37	2235.09	29.4%	0.00	0.00	0.0%	0.00	0.00	0.0%
5:45 PM	9,585.09	2396.27	31.5%	0.00	0.00	0.0%	0.00	0.00	0.0%
6:00 PM	10,332.86	2583.21	34.0%	0.00	0.00	0.0%	0.00	0.00	0.0%
6:15 PM	11,260.13	2815.03	37.0%	0.00	0.00	0.0%	0.00	0.00	0.0%
6:30 PM	12,527.92	3131.98	41.2%	0.00	0.00	0.0%	0.00	0.00	0.0%
6:45 PM	14,099.00	3524.75	46.4%	0.00	0.00	0.0%	0.00	0.00	0.0%
7:00 PM	16,383.09	4095.77	53.9%	0.00	0.00	0.0%	0.00	0.00	0.0%
7:15 PM	18,896.97	5669.09	62.2%	0.00	0.00	0.0%	0.00	0.00	0.0%
7:36 PM	24,337.07	4380.67	80.1%	0.00	0.00	0.0%	0.00	0.00	0.0%

GRATTAN ELEMENTARY

JULY 12

Analysis Hours: 6:56 AM-7:33 PM (PDT)

MAY 31 SIMILAR

Analysis Time	CURRENT SHADOW			NEW SHADOW FROM CPHP			NOT USED		
	Area (sf)	Area/Time (sfh)	Coverage	Area (sf)	Area/Time (sfh)	Coverage	Area (sf)	Area/Time (sfh)	Coverage
6:56 AM	17,976.88	539.31	59.1%	0.00	0.00	0.0%	0.00	0.00	0.0%
7:00 AM	17,291.44	2593.72	56.9%	0.00	0.00	0.0%	0.00	0.00	0.0%
7:15 AM	15,054.48	3763.62	49.5%	0.00	0.00	0.0%	0.00	0.00	0.0%
7:30 AM	13,302.88	3325.72	43.8%	0.00	0.00	0.0%	0.00	0.00	0.0%
7:45 AM	11,687.53	2921.88	38.4%	0.00	0.00	0.0%	0.00	0.00	0.0%
8:00 AM	10,286.83	2571.71	33.8%	0.00	0.00	0.0%	0.00	0.00	0.0%
8:15 AM	9,219.44	2304.86	30.3%	0.00	0.00	0.0%	0.00	0.00	0.0%
8:30 AM	8,450.17	2112.54	27.8%	0.00	0.00	0.0%	0.00	0.00	0.0%
8:45 AM	7,700.51	1925.13	25.3%	0.00	0.00	0.0%	0.00	0.00	0.0%
9:00 AM	7,044.50	1761.13	23.2%	0.00	0.00	0.0%	0.00	0.00	0.0%
9:15 AM	6,532.34	1633.09	21.5%	0.00	0.00	0.0%	0.00	0.00	0.0%
9:30 AM	6,184.04	1546.01	20.3%	0.00	0.00	0.0%	0.00	0.00	0.0%
9:45 AM	5,877.34	1469.33	19.3%	0.00	0.00	0.0%	0.00	0.00	0.0%
10:00 AM	5,585.75	1396.44	18.4%	0.00	0.00	0.0%	0.00	0.00	0.0%
10:15 AM	5,305.06	1326.27	17.5%	0.00	0.00	0.0%	0.00	0.00	0.0%
10:30 AM	5,036.11	1259.03	16.6%	0.00	0.00	0.0%	0.00	0.00	0.0%
10:45 AM	4,786.68	1196.67	15.7%	0.00	0.00	0.0%	0.00	0.00	0.0%
11:00 AM	4,545.77	1136.44	15.0%	0.00	0.00	0.0%	0.00	0.00	0.0%
11:15 AM	4,317.84	1079.46	14.2%	0.00	0.00	0.0%	0.00	0.00	0.0%
11:30 AM	4,095.01	1023.75	13.5%	0.00	0.00	0.0%	0.00	0.00	0.0%
11:45 AM	3,879.02	969.75	12.8%	0.00	0.00	0.0%	0.00	0.00	0.0%
12:00 PM	3,666.53	916.63	12.1%	0.00	0.00	0.0%	0.00	0.00	0.0%
12:15 PM	3,456.80	864.20	11.4%	0.00	0.00	0.0%	0.00	0.00	0.0%
12:30 PM	3,251.93	812.98	10.7%	0.00	0.00	0.0%	0.00	0.00	0.0%
12:45 PM	3,106.42	776.61	10.2%	0.00	0.00	0.0%	0.00	0.00	0.0%
1:00 PM	3,029.46	757.36	10.0%	0.00	0.00	0.0%	0.00	0.00	0.0%
1:15 PM	3,137.58	784.40	10.3%	0.00	0.00	0.0%	0.00	0.00	0.0%
1:30 PM	3,336.43	834.11	11.0%	0.00	0.00	0.0%	0.00	0.00	0.0%
1:45 PM	3,577.85	894.46	11.8%	0.00	0.00	0.0%	0.00	0.00	0.0%
2:00 PM	3,820.34	955.09	12.6%	0.00	0.00	0.0%	0.00	0.00	0.0%
2:15 PM	4,075.56	1018.89	13.4%	0.00	0.00	0.0%	0.00	0.00	0.0%
2:30 PM	4,330.38	1082.59	14.2%	0.00	0.00	0.0%	0.00	0.00	0.0%
2:45 PM	4,596.85	1149.21	15.1%	0.00	0.00	0.0%	0.00	0.00	0.0%
3:00 PM	4,863.45	1215.86	16.0%	0.00	0.00	0.0%	0.00	0.00	0.0%
3:15 PM	5,147.21	1286.80	16.9%	0.00	0.00	0.0%	0.00	0.00	0.0%
3:30 PM	5,433.74	1358.44	17.9%	0.00	0.00	0.0%	0.00	0.00	0.0%
3:45 PM	5,741.82	1435.45	18.9%	0.00	0.00	0.0%	0.00	0.00	0.0%
4:00 PM	6,061.95	1515.49	19.9%	0.00	0.00	0.0%	0.00	0.00	0.0%
4:15 PM	6,403.73	1600.93	21.1%	0.00	0.00	0.0%	0.00	0.00	0.0%
4:30 PM	6,777.53	1694.38	22.3%	0.00	0.00	0.0%	0.00	0.00	0.0%
4:45 PM	7,193.31	1798.33	23.7%	0.00	0.00	0.0%	0.00	0.00	0.0%
5:00 PM	7,629.19	1907.30	25.1%	0.00	0.00	0.0%	0.00	0.00	0.0%
5:15 PM	8,269.06	2067.27	27.2%	0.00	0.00	0.0%	0.00	0.00	0.0%
5:30 PM	8,899.08	2224.77	29.3%	0.00	0.00	0.0%	0.00	0.00	0.0%
5:45 PM	9,550.84	2387.71	31.4%	0.00	0.00	0.0%	0.00	0.00	0.0%
6:00 PM	10,292.12	2573.03	33.9%	0.00	0.00	0.0%	0.00	0.00	0.0%
6:15 PM	11,247.30	2811.82	37.0%	0.00	0.00	0.0%	0.00	0.00	0.0%
6:30 PM	12,494.53	3123.63	41.1%	0.00	0.00	0.0%	0.00	0.00	0.0%
6:45 PM	14,080.50	3520.13	46.3%	0.00	0.00	0.0%	0.00	0.00	0.0%
7:00 PM	16,422.67	4105.67	54.0%	0.00	0.00	0.0%	0.00	0.00	0.0%
7:15 PM	19,093.57	5346.20	62.8%	0.00	0.00	0.0%	0.00	0.00	0.0%
7:33 PM	24,049.06	3607.36	79.1%	0.00	0.00	0.0%	0.00	0.00	0.0%

JULY 19

Analysis Hours: 7:01 AM-7:30 PM (PDT)

MAY 24 SIMILAR

Analysis Time	CURRENT SHADOW			NEW SHADOW FROM CPHP			NOT USED		
	Area (sf)	Area/Time (sfh)	Coverage	Area (sf)	Area/Time (sfh)	Coverage	Area (sf)	Area/Time (sfh)	Coverage
7:01 AM	17,650.12	2294.52	58.1%	0.00	0.00	0.0%	0.00	0.00	0.0%
7:16 AM	15,404.10	3696.98	50.7%	0.00	0.00	0.0%	0.00	0.00	0.0%
7:30 AM	13,780.89	3307.41	45.3%	0.00	0.00	0.0%	0.00	0.00	0.0%
7:45 AM	12,173.78	3043.44	40.0%	0.00	0.00	0.0%	0.00	0.00	0.0%
8:00 AM	10,686.03	2671.51	35.2%	0.00	0.00	0.0%	0.00	0.00	0.0%
8:15 AM	9,524.55	2381.14	31.3%	0.00	0.00	0.0%	0.00	0.00	0.0%
8:30 AM	8,705.45	2176.36	28.6%	0.00	0.00	0.0%	0.00	0.00	0.0%
8:45 AM	7,927.00	1981.75	26.1%	0.00	0.00	0.0%	0.00	0.00	0.0%
9:00 AM	7,209.65	1802.41	23.7%	0.00	0.00	0.0%	0.00	0.00	0.0%
9:15 AM	6,719.43	1679.86	22.1%	0.00	0.00	0.0%	0.00	0.00	0.0%
9:30 AM	6,326.86	1581.71	20.8%	0.00	0.00	0.0%	0.00	0.00	0.0%
9:45 AM	6,002.75	1500.69	19.7%	0.00	0.00	0.0%	0.00	0.00	0.0%
10:00 AM	5,684.03	1421.01	18.7%	0.00	0.00	0.0%	0.00	0.00	0.0%
10:15 AM	5,389.39	1347.35	17.7%	0.00	0.00	0.0%	0.00	0.00	0.0%
10:30 AM	5,110.07	1277.52	16.8%	0.00	0.00	0.0%	0.00	0.00	0.0%
10:45 AM	4,851.02	1212.75	16.0%	0.00	0.00	0.0%	0.00	0.00	0.0%
11:00 AM	4,603.44	1150.86	15.1%	0.00	0.00	0.0%	0.00	0.00	0.0%
11:15 AM	4,368.99	1092.25	14.4%	0.00	0.00	0.0%	0.00	0.00	0.0%
11:30 AM	4,140.76	1035.19	13.6%	0.00	0.00	0.0%	0.00	0.00	0.0%
11:45 AM	3,919.70	979.92	12.9%	0.00	0.00	0.0%	0.00	0.00	0.0%
12:00 PM	3,703.21	925.80	12.2%	0.00	0.00	0.0%	0.00	0.00	0.0%
12:15 PM	3,489.32	872.33	11.5%	0.00	0.00	0.0%	0.00	0.00	0.0%
12:30 PM	3,280.34	820.08	10.8%	0.00	0.00	0.0%	0.00	0.00	0.0%
12:45 PM	3,129.23	782.31	10.3%	0.00	0.00	0.0%	0.00	0.00	0.0%
1:00 PM	3,050.84	762.71	10.0%	0.00	0.00	0.0%	0.00	0.00	0.0%
1:15 PM	3,159.39	789.85	10.4%	0.00	0.00	0.0%	0.00	0.00	0.0%
1:30 PM	3,363.62	840.91	11.1%	0.00	0.00	0.0%	0.00	0.00	0.0%
1:45 PM	3,607.40	901.85	11.9%	0.00	0.00	0.0%	0.00	0.00	0.0%
2:00 PM	3,852.88	963.22	12.7%	0.00	0.00	0.0%	0.00	0.00	0.0%
2:15 PM	4,111.19	1027.80	13.5%	0.00	0.00	0.0%	0.00	0.00	0.0%
2:30 PM	4,369.72	1092.43	14.4%	0.00	0.00	0.0%	0.00	0.00	0.0%
2:45 PM	4,641.25	1160.31	15.3%	0.00	0.00	0.0%	0.00	0.00	0.0%
3:00 PM	4,913.21	1228.30	16.2%	0.00	0.00	0.0%	0.00	0.00	0.0%
3:15 PM	5,201.39	1300.35	17.1%	0.00	0.00	0.0%	0.00	0.00	0.0%
3:30 PM	5,493.48	1373.37	18.1%	0.00	0.00	0.0%	0.00	0.00	0.0%
3:45 PM	5,809.16	1452.29	19.1%	0.00	0.00	0.0%	0.00	0.00	0.0%
4:00 PM	6,137.94	1534.48	20.2%	0.00	0.00	0.0%	0.00	0.00	0.0%
4:15 PM	6,498.75	1624.69	21.4%	0.00	0.00	0.0%	0.00	0.00	0.0%
4:30 PM	6,876.86	1719.21	22.6%	0.00	0.00	0.0%	0.00	0.00	0.0%
4:45 PM	7,301.31	1825.33	24.0%	0.00	0.00	0.0%	0.00	0.00	0.0%
5:00 PM	7,730.59	1932.65	25.4%	0.00	0.00	0.0%	0.00	0.00	0.0%
5:15 PM	8,304.69	2076.17	27.3%	0.00	0.00	0.0%	0.00	0.00	0.0%
5:30 PM	8,877.53	2219.38	29.2%	0.00	0.00	0.0%	0.00	0.00	0.0%
5:45 PM	9,545.60	2386.40	31.4%	0.00	0.00	0.0%	0.00	0.00	0.0%
6:00 PM	10,281.35	2570.34	33.8%	0.00	0.00	0.0%	0.00	0.00	0.0%
6:15 PM	11,296.53	2824.13	37.2%	0.00	0.00	0.0%	0.00	0.00	0.0%
6:30 PM	12,519.78	3129.95	41.2%	0.00	0.00	0.0%	0.00	0.00	0.0%
6:45 PM	14,162.32	3540.58	46.6%	0.00	0.00	0.0%	0.00	0.00	0.0%
7:00 PM	16,625.19	4156.30	54.7%	0.00	0.00	0.0%	0.00	0.00	0.0%
7:15 PM	19,488.72	4872.18	64.1%	0.00	0.00	0.0%	0.00	0.00	0.0%
7:30 PM	23,637.83	3072.92	77.8%	0.00	0.00	0.0%	0.00	0.00	0.0%

GRATTAN ELEMENTARY

JULY 26

Analysis Hours: 7:07 AM-7:25 PM (PDT)

MAY 17 SIMILAR

Analysis Time	CURRENT SHADOW			NEW SHADOW FROM CPHP			NOT USED		
	Area (sf)	Area/Time (sfh)	Coverage	Area (sf)	Area/Time (sfh)	Coverage	Area (sf)	Area/Time (sfh)	Coverage
7:07 AM	17,411.34	1044.68	57.3%	0.00	0.00	0.0%	0.00	0.00	0.0%
7:15 AM	16,219.70	3081.74	53.4%	0.00	0.00	0.0%	0.00	0.00	0.0%
7:30 AM	14,368.66	3592.16	47.3%	0.00	0.00	0.0%	0.00	0.00	0.0%
7:45 AM	12,780.87	3195.22	42.0%	0.00	0.00	0.0%	0.00	0.00	0.0%
8:00 AM	11,217.53	2804.38	36.9%	0.00	0.00	0.0%	0.00	0.00	0.0%
8:15 AM	9,942.07	2485.52	32.7%	0.00	0.00	0.0%	0.00	0.00	0.0%
8:30 AM	9,019.32	2254.83	29.7%	0.00	0.00	0.0%	0.00	0.00	0.0%
8:45 AM	8,194.42	2048.61	27.0%	0.00	0.00	0.0%	0.00	0.00	0.0%
9:00 AM	7,466.66	1866.66	24.6%	0.00	0.00	0.0%	0.00	0.00	0.0%
9:15 AM	6,942.99	1735.75	22.8%	0.00	0.00	0.0%	0.00	0.00	0.0%
9:30 AM	6,499.88	1624.97	21.4%	0.00	0.00	0.0%	0.00	0.00	0.0%
9:45 AM	6,139.78	1534.94	20.2%	0.00	0.00	0.0%	0.00	0.00	0.0%
10:00 AM	5,797.76	1449.44	19.1%	0.00	0.00	0.0%	0.00	0.00	0.0%
10:15 AM	5,487.14	1371.79	18.1%	0.00	0.00	0.0%	0.00	0.00	0.0%
10:30 AM	5,195.16	1298.79	17.1%	0.00	0.00	0.0%	0.00	0.00	0.0%
10:45 AM	4,926.00	1231.50	16.2%	0.00	0.00	0.0%	0.00	0.00	0.0%
11:00 AM	4,669.41	1167.35	15.4%	0.00	0.00	0.0%	0.00	0.00	0.0%
11:15 AM	4,427.06	1106.77	14.6%	0.00	0.00	0.0%	0.00	0.00	0.0%
11:30 AM	4,191.81	1047.95	13.8%	0.00	0.00	0.0%	0.00	0.00	0.0%
11:45 AM	3,964.92	991.23	13.0%	0.00	0.00	0.0%	0.00	0.00	0.0%
12:00 PM	3,742.49	935.62	12.3%	0.00	0.00	0.0%	0.00	0.00	0.0%
12:15 PM	3,523.07	880.77	11.6%	0.00	0.00	0.0%	0.00	0.00	0.0%
12:30 PM	3,309.25	827.31	10.9%	0.00	0.00	0.0%	0.00	0.00	0.0%
12:45 PM	3,155.07	788.77	10.4%	0.00	0.00	0.0%	0.00	0.00	0.0%
1:00 PM	3,076.75	769.19	10.1%	0.00	0.00	0.0%	0.00	0.00	0.0%
1:15 PM	3,194.75	798.69	10.5%	0.00	0.00	0.0%	0.00	0.00	0.0%
1:30 PM	3,405.98	851.49	11.2%	0.00	0.00	0.0%	0.00	0.00	0.0%
1:45 PM	3,653.44	913.36	12.0%	0.00	0.00	0.0%	0.00	0.00	0.0%
2:00 PM	3,903.16	975.79	12.8%	0.00	0.00	0.0%	0.00	0.00	0.0%
2:15 PM	4,166.61	1041.65	13.7%	0.00	0.00	0.0%	0.00	0.00	0.0%
2:30 PM	4,429.96	1107.49	14.6%	0.00	0.00	0.0%	0.00	0.00	0.0%
2:45 PM	4,706.81	1176.70	15.5%	0.00	0.00	0.0%	0.00	0.00	0.0%
3:00 PM	4,984.57	1246.14	16.4%	0.00	0.00	0.0%	0.00	0.00	0.0%
3:15 PM	5,279.57	1319.89	17.4%	0.00	0.00	0.0%	0.00	0.00	0.0%
3:30 PM	5,580.15	1395.04	18.4%	0.00	0.00	0.0%	0.00	0.00	0.0%
3:45 PM	5,905.63	1476.41	19.4%	0.00	0.00	0.0%	0.00	0.00	0.0%
4:00 PM	6,246.15	1561.54	20.5%	0.00	0.00	0.0%	0.00	0.00	0.0%
4:15 PM	6,622.15	1655.54	21.8%	0.00	0.00	0.0%	0.00	0.00	0.0%
4:30 PM	7,026.30	1756.58	23.1%	0.00	0.00	0.0%	0.00	0.00	0.0%
4:45 PM	7,456.41	1864.10	24.5%	0.00	0.00	0.0%	0.00	0.00	0.0%
5:00 PM	7,899.66	1974.91	26.0%	0.00	0.00	0.0%	0.00	0.00	0.0%
5:15 PM	8,357.42	2089.36	27.5%	0.00	0.00	0.0%	0.00	0.00	0.0%
5:30 PM	8,877.19	2219.30	29.2%	0.00	0.00	0.0%	0.00	0.00	0.0%
5:45 PM	9,553.48	2388.37	31.4%	0.00	0.00	0.0%	0.00	0.00	0.0%
6:00 PM	10,328.30	2582.07	34.0%	0.00	0.00	0.0%	0.00	0.00	0.0%
6:15 PM	11,365.42	2841.36	37.4%	0.00	0.00	0.0%	0.00	0.00	0.0%
6:30 PM	12,596.62	3149.15	41.4%	0.00	0.00	0.0%	0.00	0.00	0.0%
6:45 PM	14,369.55	3592.39	47.3%	0.00	0.00	0.0%	0.00	0.00	0.0%
7:00 PM	16,958.03	4239.51	55.8%	0.00	0.00	0.0%	0.00	0.00	0.0%
7:15 PM	20,080.68	4216.94	66.1%	0.00	0.00	0.0%	0.00	0.00	0.0%
7:25 PM	23,080.97	2077.29	75.9%	0.00	0.00	0.0%	0.00	0.00	0.0%

AUGUST 2

Analysis Hours: 7:12 AM-7:18 PM (PDT)

MAY 10 SIMILAR

Analysis Time	CURRENT SHADOW			NEW SHADOW FROM CPHP			NOT USED		
	Area (sf)	Area/Time (sfh)	Coverage	Area (sf)	Area/Time (sfh)	Coverage	Area (sf)	Area/Time (sfh)	Coverage
7:12 AM	17,276.79	345.54	56.8%	0.00	0.00	0.0%	0.00	0.00	0.0%
7:15 AM	16,920.88	2538.13	55.7%	0.00	0.00	0.0%	0.00	0.00	0.0%
7:30 AM	15,012.27	3753.07	49.4%	0.00	0.00	0.0%	0.00	0.00	0.0%
7:45 AM	13,457.28	3364.32	44.3%	0.00	0.00	0.0%	0.00	0.00	0.0%
8:00 AM	11,894.70	2973.67	39.1%	0.00	0.00	0.0%	0.00	0.00	0.0%
8:15 AM	10,453.32	2613.33	34.4%	0.00	0.00	0.0%	0.00	0.00	0.0%
8:30 AM	9,371.59	2342.90	30.8%	0.00	0.00	0.0%	0.00	0.00	0.0%
8:45 AM	8,517.02	2129.25	28.0%	0.00	0.00	0.0%	0.00	0.00	0.0%
9:00 AM	7,770.20	1942.55	25.6%	0.00	0.00	0.0%	0.00	0.00	0.0%
9:15 AM	7,192.33	1798.08	23.7%	0.00	0.00	0.0%	0.00	0.00	0.0%
9:30 AM	6,676.90	1669.23	22.0%	0.00	0.00	0.0%	0.00	0.00	0.0%
9:45 AM	6,285.47	1571.37	20.7%	0.00	0.00	0.0%	0.00	0.00	0.0%
10:00 AM	5,921.55	1480.39	19.5%	0.00	0.00	0.0%	0.00	0.00	0.0%
10:15 AM	5,593.09	1398.27	18.4%	0.00	0.00	0.0%	0.00	0.00	0.0%
10:30 AM	5,287.32	1321.83	17.4%	0.00	0.00	0.0%	0.00	0.00	0.0%
10:45 AM	5,005.23	1251.31	16.5%	0.00	0.00	0.0%	0.00	0.00	0.0%
11:00 AM	4,737.84	1184.46	15.6%	0.00	0.00	0.0%	0.00	0.00	0.0%
11:15 AM	4,486.51	1121.63	14.8%	0.00	0.00	0.0%	0.00	0.00	0.0%
11:30 AM	4,243.35	1060.84	14.0%	0.00	0.00	0.0%	0.00	0.00	0.0%
11:45 AM	4,009.41	1002.35	13.2%	0.00	0.00	0.0%	0.00	0.00	0.0%
12:00 PM	3,779.85	944.96	12.4%	0.00	0.00	0.0%	0.00	0.00	0.0%
12:15 PM	3,554.86	888.71	11.7%	0.00	0.00	0.0%	0.00	0.00	0.0%
12:30 PM	3,335.35	833.84	11.0%	0.00	0.00	0.0%	0.00	0.00	0.0%
12:45 PM	3,180.73	795.18	10.5%	0.00	0.00	0.0%	0.00	0.00	0.0%
1:00 PM	3,106.59	776.65	10.2%	0.00	0.00	0.0%	0.00	0.00	0.0%
1:15 PM	3,248.36	812.09	10.7%	0.00	0.00	0.0%	0.00	0.00	0.0%
1:30 PM	3,467.62	866.91	11.4%	0.00	0.00	0.0%	0.00	0.00	0.0%
1:45 PM	3,721.11	930.28	12.2%	0.00	0.00	0.0%	0.00	0.00	0.0%
2:00 PM	3,974.82	993.70	13.1%	0.00	0.00	0.0%	0.00	0.00	0.0%
2:15 PM	4,244.33	1061.08	14.0%	0.00	0.00	0.0%	0.00	0.00	0.0%
2:30 PM	4,514.30	1128.58	14.9%	0.00	0.00	0.0%	0.00	0.00	0.0%
2:45 PM	4,797.48	1199.37	15.8%	0.00	0.00	0.0%	0.00	0.00	0.0%
3:00 PM	5,084.12	1271.03	16.7%	0.00	0.00	0.0%	0.00	0.00	0.0%
3:15 PM	5,388.05	1347.01	17.7%	0.00	0.00	0.0%	0.00	0.00	0.0%
3:30 PM	5,699.77	1424.94	18.8%	0.00	0.00	0.0%	0.00	0.00	0.0%
3:45 PM	6,038.42	1509.61	19.9%	0.00	0.00	0.0%	0.00	0.00	0.0%
4:00 PM	6,393.57	1598.39	21.0%	0.00	0.00	0.0%	0.00	0.00	0.0%
4:15 PM	6,789.38	1697.34	22.3%	0.00	0.00	0.0%	0.00	0.00	0.0%
4:30 PM	7,217.55	1804.39	23.7%	0.00	0.00	0.0%	0.00	0.00	0.0%
4:45 PM	7,664.90	1916.23	25.2%	0.00	0.00	0.0%	0.00	0.00	0.0%
5:00 PM	8,132.19	2033.05	26.8%	0.00	0.00	0.0%	0.00	0.00	0.0%
5:15 PM	8,515.59	2128.90	28.0%	0.00	0.00	0.0%	0.00	0.00	0.0%
5:30 PM	8,911.05	2227.76	29.3%	0.00	0.00	0.0%	0.00	0.00	0.0%
5:45 PM	9,537.02	2384.25	31.4%	0.00	0.00	0.0%	0.00	0.00	0.0%
6:00 PM	10,428.20	2607.05	34.3%	0.00	0.00	0.0%	0.00	0.00	0.0%
6:15 PM	11,497.99	2874.50	37.8%	0.00	0.00	0.0%	0.00	0.00	0.0%
6:30 PM	12,858.55	3214.64	42.3%	0.00	0.00	0.0%	0.00	0.00	0.0%
6:45 PM	14,779.34	3694.83	48.6%	0.00	0.00	0.0%	0.00	0.00	0.0%
7:00 PM	17,565.47	4391.37	57.8%	0.00	0.00	0.0%	0.00	0.00	0.0%
7:15 PM	21,264.88	3189.73	70.0%	0.00	0.00	0.0%	0.00	0.00	0.0%
7:18 PM	22,424.65	672.74	73.8%	0.00	0.00	0.0%	0.00	0.00	0.0%

GRATTAN ELEMENTARY

AUGUST 9

Analysis Hours: 7:19 AM-7:10 PM (PDT)

MAY 3 SIMILAR

Analysis Time	CURRENT SHADOW			NEW SHADOW FROM CPHP			NOT USED		
	Area (sf)	Area/Time (sfh)	Coverage	Area (sf)	Area/Time (sfh)	Coverage	Area (sf)	Area/Time (sfh)	Coverage
7:19 AM	17,271.91	1554.47	56.8%	0.00	0.00	0.0%	0.00	0.00	0.0%
7:30 AM	15,814.11	3320.96	52.0%	0.00	0.00	0.0%	0.00	0.00	0.0%
7:45 AM	14,280.25	3570.06	47.0%	0.00	0.00	0.0%	0.00	0.00	0.0%
8:00 AM	12,684.03	3171.01	41.7%	0.00	0.00	0.0%	0.00	0.00	0.0%
8:15 AM	11,044.97	2761.24	36.3%	0.00	0.00	0.0%	0.00	0.00	0.0%
8:30 AM	9,785.25	2446.31	32.2%	0.00	0.00	0.0%	0.00	0.00	0.0%
8:45 AM	8,930.10	2232.53	29.4%	0.00	0.00	0.0%	0.00	0.00	0.0%
9:00 AM	8,117.44	2029.36	26.7%	0.00	0.00	0.0%	0.00	0.00	0.0%
9:15 AM	7,444.74	1861.19	24.5%	0.00	0.00	0.0%	0.00	0.00	0.0%
9:30 AM	6,868.28	1717.07	22.6%	0.00	0.00	0.0%	0.00	0.00	0.0%
9:45 AM	6,444.87	1611.22	21.2%	0.00	0.00	0.0%	0.00	0.00	0.0%
10:00 AM	6,057.02	1514.25	19.9%	0.00	0.00	0.0%	0.00	0.00	0.0%
10:15 AM	5,708.54	1427.13	18.8%	0.00	0.00	0.0%	0.00	0.00	0.0%
10:30 AM	5,386.31	1346.58	17.7%	0.00	0.00	0.0%	0.00	0.00	0.0%
10:45 AM	5,090.47	1272.62	16.7%	0.00	0.00	0.0%	0.00	0.00	0.0%
11:00 AM	4,811.07	1202.77	15.8%	0.00	0.00	0.0%	0.00	0.00	0.0%
11:15 AM	4,548.89	1137.22	15.0%	0.00	0.00	0.0%	0.00	0.00	0.0%
11:30 AM	4,296.46	1074.12	14.1%	0.00	0.00	0.0%	0.00	0.00	0.0%
11:45 AM	4,054.02	1013.50	13.3%	0.00	0.00	0.0%	0.00	0.00	0.0%
12:00 PM	3,817.75	954.44	12.6%	0.00	0.00	0.0%	0.00	0.00	0.0%
12:15 PM	3,585.35	896.34	11.8%	0.00	0.00	0.0%	0.00	0.00	0.0%
12:30 PM	3,359.80	839.95	11.1%	0.00	0.00	0.0%	0.00	0.00	0.0%
12:45 PM	3,208.17	802.04	10.6%	0.00	0.00	0.0%	0.00	0.00	0.0%
1:00 PM	3,142.89	785.72	10.3%	0.00	0.00	0.0%	0.00	0.00	0.0%
1:15 PM	3,317.66	829.42	10.9%	0.00	0.00	0.0%	0.00	0.00	0.0%
1:30 PM	3,546.14	886.53	11.7%	0.00	0.00	0.0%	0.00	0.00	0.0%
1:45 PM	3,806.60	951.65	12.5%	0.00	0.00	0.0%	0.00	0.00	0.0%
2:00 PM	4,068.19	1017.05	13.4%	0.00	0.00	0.0%	0.00	0.00	0.0%
2:15 PM	4,344.39	1086.10	14.3%	0.00	0.00	0.0%	0.00	0.00	0.0%
2:30 PM	4,621.36	1155.34	15.2%	0.00	0.00	0.0%	0.00	0.00	0.0%
2:45 PM	4,913.24	1228.31	16.2%	0.00	0.00	0.0%	0.00	0.00	0.0%
3:00 PM	5,210.06	1302.52	17.1%	0.00	0.00	0.0%	0.00	0.00	0.0%
3:15 PM	5,524.87	1381.22	18.2%	0.00	0.00	0.0%	0.00	0.00	0.0%
3:30 PM	5,850.59	1462.65	19.2%	0.00	0.00	0.0%	0.00	0.00	0.0%
3:45 PM	6,204.89	1551.22	20.4%	0.00	0.00	0.0%	0.00	0.00	0.0%
4:00 PM	6,580.18	1645.04	21.6%	0.00	0.00	0.0%	0.00	0.00	0.0%
4:15 PM	6,999.73	1749.93	23.0%	0.00	0.00	0.0%	0.00	0.00	0.0%
4:30 PM	7,445.56	1861.39	24.5%	0.00	0.00	0.0%	0.00	0.00	0.0%
4:45 PM	7,915.54	1978.88	26.0%	0.00	0.00	0.0%	0.00	0.00	0.0%
5:00 PM	8,406.84	2101.71	27.7%	0.00	0.00	0.0%	0.00	0.00	0.0%
5:15 PM	8,721.39	2180.35	28.7%	0.00	0.00	0.0%	0.00	0.00	0.0%
5:30 PM	9,078.92	2269.73	29.9%	0.00	0.00	0.0%	0.00	0.00	0.0%
5:45 PM	9,558.87	2389.72	31.4%	0.00	0.00	0.0%	0.00	0.00	0.0%
6:00 PM	10,553.69	2638.42	34.7%	0.00	0.00	0.0%	0.00	0.00	0.0%
6:15 PM	11,711.27	2927.82	38.5%	0.00	0.00	0.0%	0.00	0.00	0.0%
6:30 PM	13,260.04	3315.01	43.6%	0.00	0.00	0.0%	0.00	0.00	0.0%
6:45 PM	15,414.03	5240.77	50.7%	0.00	0.00	0.0%	0.00	0.00	0.0%
7:10 PM	21,613.25	4538.78	71.1%	0.00	0.00	0.0%	0.00	0.00	0.0%

AUGUST 16

Analysis Hours: 7:25 AM-7:02 PM (PDT)

APRIL 26 SIMILAR

Analysis Time	CURRENT SHADOW			NEW SHADOW FROM CPHP			NOT USED		
	Area (sf)	Area/Time (sfh)	Coverage	Area (sf)	Area/Time (sfh)	Coverage	Area (sf)	Area/Time (sfh)	Coverage
7:25 AM	17,558.00	702.32	57.8%	0.00	0.00	0.0%	0.00	0.00	0.0%
7:30 AM	16,961.53	2883.46	55.8%	0.00	0.00	0.0%	0.00	0.00	0.0%
7:45 AM	15,240.96	3810.24	50.1%	0.00	0.00	0.0%	0.00	0.00	0.0%
8:00 AM	13,564.75	3391.19	44.6%	0.00	0.00	0.0%	0.00	0.00	0.0%
8:15 AM	11,753.41	2938.35	38.7%	0.00	0.00	0.0%	0.00	0.00	0.0%
8:30 AM	10,410.03	2602.51	34.2%	0.00	0.00	0.0%	0.00	0.00	0.0%
8:45 AM	9,401.93	2350.48	30.9%	0.00	0.00	0.0%	0.00	0.00	0.0%
9:00 AM	8,487.24	2121.81	27.9%	0.00	0.00	0.0%	0.00	0.00	0.0%
9:15 AM	7,719.28	1929.82	25.4%	0.00	0.00	0.0%	0.00	0.00	0.0%
9:30 AM	7,097.64	1774.41	23.3%	0.00	0.00	0.0%	0.00	0.00	0.0%
9:45 AM	6,621.03	1655.26	21.8%	0.00	0.00	0.0%	0.00	0.00	0.0%
10:00 AM	6,206.43	1551.61	20.4%	0.00	0.00	0.0%	0.00	0.00	0.0%
10:15 AM	5,835.31	1458.83	19.2%	0.00	0.00	0.0%	0.00	0.00	0.0%
10:30 AM	5,494.13	1373.53	18.1%	0.00	0.00	0.0%	0.00	0.00	0.0%
10:45 AM	5,182.75	1295.69	17.0%	0.00	0.00	0.0%	0.00	0.00	0.0%
11:00 AM	4,889.78	1222.44	16.1%	0.00	0.00	0.0%	0.00	0.00	0.0%
11:15 AM	4,615.71	1153.93	15.2%	0.00	0.00	0.0%	0.00	0.00	0.0%
11:30 AM	4,353.00	1088.25	14.3%	0.00	0.00	0.0%	0.00	0.00	0.0%
11:45 AM	4,100.82	1025.20	13.5%	0.00	0.00	0.0%	0.00	0.00	0.0%
12:00 PM	3,855.20	963.80	12.7%	0.00	0.00	0.0%	0.00	0.00	0.0%
12:15 PM	3,615.22	903.80	11.9%	0.00	0.00	0.0%	0.00	0.00	0.0%
12:30 PM	3,384.41	846.10	11.1%	0.00	0.00	0.0%	0.00	0.00	0.0%
12:45 PM	3,239.97	809.99	10.7%	0.00	0.00	0.0%	0.00	0.00	0.0%
1:00 PM	3,203.45	800.86	10.5%	0.00	0.00	0.0%	0.00	0.00	0.0%
1:15 PM	3,402.59	850.65	11.2%	0.00	0.00	0.0%	0.00	0.00	0.0%
1:30 PM	3,641.36	910.34	12.0%	0.00	0.00	0.0%	0.00	0.00	0.0%
1:45 PM	3,908.48	977.12	12.9%	0.00	0.00	0.0%	0.00	0.00	0.0%
2:00 PM	4,177.69	1044.42	13.7%	0.00	0.00	0.0%	0.00	0.00	0.0%
2:15 PM	4,463.16	1115.79	14.7%	0.00	0.00	0.0%	0.00	0.00	0.0%
2:30 PM	4,748.73	1187.18	15.6%	0.00	0.00	0.0%	0.00	0.00	0.0%
2:45 PM	5,051.49	1262.87	16.6%	0.00	0.00	0.0%	0.00	0.00	0.0%
3:00 PM	5,359.60	1339.90	17.6%	0.00	0.00	0.0%	0.00	0.00	0.0%
3:15 PM	5,688.87	1422.22	18.7%	0.00	0.00	0.0%	0.00	0.00	0.0%
3:30 PM	6,029.94	1507.49	19.8%	0.00	0.00	0.0%	0.00	0.00	0.0%
3:45 PM	6,404.46	1601.11	21.1%	0.00	0.00	0.0%	0.00	0.00	0.0%
4:00 PM	6,805.36	1701.34	22.4%	0.00	0.00	0.0%	0.00	0.00	0.0%
4:15 PM	7,257.74	1814.44	23.9%	0.00	0.00	0.0%	0.00	0.00	0.0%
4:30 PM	7,719.81	1929.95	25.4%	0.00	0.00	0.0%	0.00	0.00	0.0%
4:45 PM	8,216.84	2054.21	27.0%	0.00	0.00	0.0%	0.00	0.00	0.0%
5:00 PM	8,626.75	2156.69	28.4%	0.00	0.00	0.0%	0.00	0.00	0.0%
5:15 PM	8,969.55	2242.39	29.5%	0.00	0.00	0.0%	0.00	0.00	0.0%
5:30 PM	9,246.19	2311.55	30.4%	0.00	0.00	0.0%	0.00	0.00	0.0%
5:45 PM	9,707.09	2426.77	31.9%	0.00	0.00	0.0%	0.00	0.00	0.0%
6:00 PM	10,656.69	2664.17	35.1%	0.00	0.00	0.0%	0.00	0.00	0.0%
6:15 PM	12,031.23	3007.81	39.6%	0.00	0.00	0.0%	0.00	0.00	0.0%
6:30 PM	13,817.84	3454.46	45.5%	0.00	0.00	0.0%	0.00	0.00	0.0%
6:45 PM	16,108.98	4349.42	53.0%	0.00	0.00	0.0%	0.00	0.00	0.0%
7:02 PM	20,676.89	2894.76	68.0%	0.00	0.00	0.0%	0.00	0.00	0.0%

AUGUST 23

Analysis Hours: 7:31 AM-6:52 PM (PDT)

APRIL 19 SIMILAR

Analysis Time	CURRENT SHADOW			NEW SHADOW FROM CPHP			NOT USED		
	Area (sf)	Area/Time (sfh)	Coverage	Area (sf)	Area/Time (sfh)	Coverage	Area (sf)	Area/Time (sfh)	Coverage
7:31 AM	18,175.38	1999.29	59.8%	0.00	0.00	0.0%	0.00	0.00	0.0%
7:45 AM	16,277.36	3743.79	53.5%	0.00	0.00	0.0%	0.00	0.00	0.0%
8:00 AM	14,452.03	3613.01	47.5%	0.00	0.00	0.0%	0.00	0.00	0.0%
8:15 AM	12,703.91	3175.98	41.8%	0.00	0.00	0.0%	0.00	0.00	0.0%
8:30 AM	11,087.64	2771.91	36.5%	0.00	0.00	0.0%	0.00	0.00	0.0%
8:45 AM	9,875.99	2469.00	32.5%	0.00	0.00	0.0%	0.00	0.00	0.0%
9:00 AM	8,862.98	2215.74	29.2%	0.00	0.00	0.0%	0.00	0.00	0.0%
9:15 AM	8,007.23	2001.81	26.3%	0.00	0.00	0.0%	0.00	0.00	0.0%
9:30 AM	7,335.16	1833.79	24.1%	0.00	0.00	0.0%	0.00	0.00	0.0%
9:45 AM	6,805.09	1701.27	22.4%	0.00	0.00	0.0%	0.00	0.00	0.0%
10:00 AM	6,362.12	1590.53	20.9%	0.00	0.00	0.0%	0.00	0.00	0.0%
10:15 AM	5,966.46	1491.61	19.6%	0.00	0.00	0.0%	0.00	0.00	0.0%
10:30 AM	5,604.39	1401.10	18.4%	0.00	0.00	0.0%	0.00	0.00	0.0%
10:45 AM	5,276.19	1319.05	17.4%	0.00	0.00	0.0%	0.00	0.00	0.0%
11:00 AM	4,967.41	1241.85	16.3%	0.00	0.00	0.0%	0.00	0.00	0.0%
11:15 AM	4,680.61	1170.15	15.4%	0.00	0.00	0.0%	0.00	0.00	0.0%
11:30 AM	4,405.63	1101.41	14.5%	0.00	0.00	0.0%	0.00	0.00	0.0%
11:45 AM	4,143.61	1035.90	13.6%	0.00	0.00	0.0%	0.00	0.00	0.0%
12:00 PM	3,888.54	972.13	12.8%	0.00	0.00	0.0%	0.00	0.00	0.0%
12:15 PM	3,639.81	909.95	12.0%	0.00	0.00	0.0%	0.00	0.00	0.0%
12:30 PM	3,404.68	851.17	11.2%	0.00	0.00	0.0%	0.00	0.00	0.0%
12:45 PM	3,274.26	818.57	10.8%	0.00	0.00	0.0%	0.00	0.00	0.0%
1:00 PM	3,291.91	822.98	10.8%	0.00	0.00	0.0%	0.00	0.00	0.0%
1:15 PM	3,508.62	877.15	11.5%	0.00	0.00	0.0%	0.00	0.00	0.0%
1:30 PM	3,758.10	939.53	12.4%	0.00	0.00	0.0%	0.00	0.00	0.0%
1:45 PM	4,034.07	1008.52	13.3%	0.00	0.00	0.0%	0.00	0.00	0.0%
2:00 PM	4,313.48	1078.37	14.2%	0.00	0.00	0.0%	0.00	0.00	0.0%
2:15 PM	4,607.60	1151.90	15.2%	0.00	0.00	0.0%	0.00	0.00	0.0%
2:30 PM	4,904.14	1226.04	16.1%	0.00	0.00	0.0%	0.00	0.00	0.0%
2:45 PM	5,220.57	1305.14	17.2%	0.00	0.00	0.0%	0.00	0.00	0.0%
3:00 PM	5,541.62	1385.40	18.2%	0.00	0.00	0.0%	0.00	0.00	0.0%
3:15 PM	5,887.12	1471.78	19.4%	0.00	0.00	0.0%	0.00	0.00	0.0%
3:30 PM	6,247.87	1561.97	20.6%	0.00	0.00	0.0%	0.00	0.00	0.0%
3:45 PM	6,647.43	1661.86	21.9%	0.00	0.00	0.0%	0.00	0.00	0.0%
4:00 PM	7,081.21	1770.30	23.3%	0.00	0.00	0.0%	0.00	0.00	0.0%
4:15 PM	7,552.87	1888.22	24.8%	0.00	0.00	0.0%	0.00	0.00	0.0%
4:30 PM	8,038.28	2009.57	26.4%	0.00	0.00	0.0%	0.00	0.00	0.0%
4:45 PM	8,544.39	2136.10	28.1%	0.00	0.00	0.0%	0.00	0.00	0.0%
5:00 PM	8,895.19	2223.80	29.3%	0.00	0.00	0.0%	0.00	0.00	0.0%
5:15 PM	9,222.03	2305.51	30.3%	0.00	0.00	0.0%	0.00	0.00	0.0%
5:30 PM	9,517.13	2379.28	31.3%	0.00	0.00	0.0%	0.00	0.00	0.0%
5:45 PM	10,029.41	2507.35	33.0%	0.00	0.00	0.0%	0.00	0.00	0.0%
6:00 PM	10,857.18	2714.29	35.7%	0.00	0.00	0.0%	0.00	0.00	0.0%
6:15 PM	12,517.98	3129.49	41.2%	0.00	0.00	0.0%	0.00	0.00	0.0%
6:30 PM	14,552.32	3638.08	47.9%	0.00	0.00	0.0%	0.00	0.00	0.0%
6:45 PM	17,575.15	3339.28	57.8%	7,190.80	1366.25	23.7%	0.00	0.00	0.0%
6:52 PM	19,621.03	1177.26	64.5%	4,637.91	278.27	15.3%	0.00	0.00	0.0%

AUGUST 30

Analysis Hours: 7:37 AM-6:42 PM (PDT)

APRIL 12 SIMILAR

Analysis Time	CURRENT SHADOW			NEW SHADOW FROM CPHP			NOT USED		
	Area (sf)	Area/Time (sfh)	Coverage	Area (sf)	Area/Time (sfh)	Coverage	Area (sf)	Area/Time (sfh)	Coverage
7:37 AM	18,520.39	1111.22	60.9%	0.00	0.00	0.0%	0.00	0.00	0.0%
7:45 AM	17,379.90	3302.18	57.2%	0.00	0.00	0.0%	0.00	0.00	0.0%
8:00 AM	15,512.50	3878.13	51.0%	0.00	0.00	0.0%	0.00	0.00	0.0%
8:15 AM	13,693.48	3423.37	45.0%	0.00	0.00	0.0%	0.00	0.00	0.0%
8:30 AM	11,801.98	2950.50	38.8%	0.00	0.00	0.0%	0.00	0.00	0.0%
8:45 AM	10,390.60	2597.65	34.2%	0.00	0.00	0.0%	0.00	0.00	0.0%
9:00 AM	9,283.34	2320.84	30.5%	0.00	0.00	0.0%	0.00	0.00	0.0%
9:15 AM	8,331.73	2082.93	27.4%	0.00	0.00	0.0%	0.00	0.00	0.0%
9:30 AM	7,597.76	1899.44	25.0%	0.00	0.00	0.0%	0.00	0.00	0.0%
9:45 AM	7,010.32	1752.58	23.1%	0.00	0.00	0.0%	0.00	0.00	0.0%
10:00 AM	6,534.12	1633.53	21.5%	0.00	0.00	0.0%	0.00	0.00	0.0%
10:15 AM	6,110.90	1527.73	20.1%	0.00	0.00	0.0%	0.00	0.00	0.0%
10:30 AM	5,724.95	1431.24	18.8%	0.00	0.00	0.0%	0.00	0.00	0.0%
10:45 AM	5,377.87	1344.47	17.7%	0.00	0.00	0.0%	0.00	0.00	0.0%
11:00 AM	5,051.95	1262.99	16.6%	0.00	0.00	0.0%	0.00	0.00	0.0%
11:15 AM	4,750.25	1187.56	15.6%	0.00	0.00	0.0%	0.00	0.00	0.0%
11:30 AM	4,462.22	1115.55	14.7%	0.00	0.00	0.0%	0.00	0.00	0.0%
11:45 AM	4,188.56	1047.14	13.8%	0.00	0.00	0.0%	0.00	0.00	0.0%
12:00 PM	3,922.73	980.68	12.9%	0.00	0.00	0.0%	0.00	0.00	0.0%
12:15 PM	3,664.33	916.08	12.1%	0.00	0.00	0.0%	0.00	0.00	0.0%
12:30 PM	3,434.14	858.54	11.3%	0.00	0.00	0.0%	0.00	0.00	0.0%
12:45 PM	3,318.14	829.53	10.9%	0.00	0.00	0.0%	0.00	0.00	0.0%
1:00 PM	3,393.23	848.31	11.2%	0.00	0.00	0.0%	0.00	0.00	0.0%
1:15 PM	3,630.03	907.51	11.9%	0.00	0.00	0.0%	0.00	0.00	0.0%
1:30 PM	3,890.57	972.64	12.8%	0.00	0.00	0.0%	0.00	0.00	0.0%
1:45 PM	4,178.61	1044.65	13.7%	0.00	0.00	0.0%	0.00	0.00	0.0%
2:00 PM	4,466.62	1116.65	14.7%	0.00	0.00	0.0%	0.00	0.00	0.0%
2:15 PM	4,773.31	1193.33	15.7%	0.00	0.00	0.0%	0.00	0.00	0.0%
2:30 PM	5,082.24	1270.56	16.7%	0.00	0.00	0.0%	0.00	0.00	0.0%
2:45 PM	5,412.43	1353.11	17.8%	0.00	0.00	0.0%	0.00	0.00	0.0%
3:00 PM	5,749.15	1437.29	18.9%	0.00	0.00	0.0%	0.00	0.00	0.0%
3:15 PM	6,114.40	1528.60	20.1%	0.00	0.00	0.0%	0.00	0.00	0.0%
3:30 PM	6,500.09	1625.02	21.4%	0.00	0.00	0.0%	0.00	0.00	0.0%
3:45 PM	6,932.70	1733.17	22.8%	0.00	0.00	0.0%	0.00	0.00	0.0%
4:00 PM	7,402.42	1850.61	24.4%	0.00	0.00	0.0%	0.00	0.00	0.0%
4:15 PM	7,887.42	1971.86	25.9%	0.00	0.00	0.0%	0.00	0.00	0.0%
4:30 PM	8,410.91	2102.73	27.7%	0.00	0.00	0.0%	0.00	0.00	0.0%
4:45 PM	8,822.23	2205.56	29.0%	0.00	0.00	0.0%	0.00	0.00	0.0%
5:00 PM	9,189.87	2297.47	30.2%	0.00	0.00	0.0%	0.00	0.00	0.0%
5:15 PM	9,461.08	2365.27	31.1%	0.00	0.00	0.0%	0.00	0.00	0.0%
5:30 PM	9,849.13	2462.28	32.4%	0.00	0.00	0.0%	0.00	0.00	0.0%
5:45 PM	10,383.50	2595.88	34.2%	0.00	0.00	0.0%	0.00	0.00	0.0%
6:00 PM	11,318.75	2829.69	37.2%	0.00	0.00	0.0%	0.00	0.00	0.0%
6:15 PM	13,139.50	3284.88	43.2%	0.00	0.00	0.0%	0.00	0.00	0.0%
6:30 PM	15,751.23	3622.78	51.8%	1.26	0.29	0.0%	0.00	0.00	0.0%
6:42 PM	18,912.69	2080.40	62.2%	11,322.41	1245.47	37.2%	0.00	0.00	0.0%

GRATTAN ELEMENTARY

SEPTEMBER 6

Analysis Hours: 7:44 AM-6:31 PM (PDT)

APRIL 5 SIMILAR

Analysis Time	CURRENT SHADOW			NEW SHADOW FROM CPHP			NOT USED		
	Area (sf)	Area/Time (sfh)	Coverage	Area (sf)	Area/Time (sfh)	Coverage	Area (sf)	Area/Time (sfh)	Coverage
7:44 AM	18,882.50	2454.72	62.1%	0.00	0.00	0.0%	0.00	0.00	0.0%
8:00 AM	16,502.43	4125.61	54.3%	0.00	0.00	0.0%	0.00	0.00	0.0%
8:15 AM	14,665.87	3666.47	48.2%	0.00	0.00	0.0%	0.00	0.00	0.0%
8:30 AM	12,595.24	3148.81	41.4%	0.00	0.00	0.0%	0.00	0.00	0.0%
8:45 AM	10,982.38	2745.59	36.1%	0.00	0.00	0.0%	0.00	0.00	0.0%
9:00 AM	9,764.42	2441.11	32.1%	0.00	0.00	0.0%	0.00	0.00	0.0%
9:15 AM	8,711.79	2177.95	28.7%	0.00	0.00	0.0%	0.00	0.00	0.0%
9:30 AM	7,886.05	1971.51	25.9%	0.00	0.00	0.0%	0.00	0.00	0.0%
9:45 AM	7,236.34	1809.09	23.8%	0.00	0.00	0.0%	0.00	0.00	0.0%
10:00 AM	6,722.10	1680.53	22.1%	0.00	0.00	0.0%	0.00	0.00	0.0%
10:15 AM	6,268.21	1567.05	20.6%	0.00	0.00	0.0%	0.00	0.00	0.0%
10:30 AM	5,855.80	1463.95	19.3%	0.00	0.00	0.0%	0.00	0.00	0.0%
10:45 AM	5,488.16	1372.04	18.1%	0.00	0.00	0.0%	0.00	0.00	0.0%
11:00 AM	5,142.56	1285.64	16.9%	0.00	0.00	0.0%	0.00	0.00	0.0%
11:15 AM	4,824.76	1206.19	15.9%	0.00	0.00	0.0%	0.00	0.00	0.0%
11:30 AM	4,522.06	1130.52	14.9%	0.00	0.00	0.0%	0.00	0.00	0.0%
11:45 AM	4,235.35	1058.84	13.9%	0.00	0.00	0.0%	0.00	0.00	0.0%
12:00 PM	3,957.14	989.28	13.0%	0.00	0.00	0.0%	0.00	0.00	0.0%
12:15 PM	3,687.79	921.95	12.1%	0.00	0.00	0.0%	0.00	0.00	0.0%
12:30 PM	3,466.79	866.70	11.4%	0.00	0.00	0.0%	0.00	0.00	0.0%
12:45 PM	3,368.12	842.03	11.1%	0.00	0.00	0.0%	0.00	0.00	0.0%
1:00 PM	3,507.48	876.87	11.5%	0.00	0.00	0.0%	0.00	0.00	0.0%
1:15 PM	3,767.05	941.76	12.4%	0.00	0.00	0.0%	0.00	0.00	0.0%
1:30 PM	4,040.26	1010.07	13.3%	0.00	0.00	0.0%	0.00	0.00	0.0%
1:45 PM	4,338.28	1084.57	14.3%	0.00	0.00	0.0%	0.00	0.00	0.0%
2:00 PM	4,638.38	1159.59	15.3%	0.00	0.00	0.0%	0.00	0.00	0.0%
2:15 PM	4,957.94	1239.49	16.3%	0.00	0.00	0.0%	0.00	0.00	0.0%
2:30 PM	5,281.64	1320.41	17.4%	0.00	0.00	0.0%	0.00	0.00	0.0%
2:45 PM	5,627.98	1407.00	18.5%	0.00	0.00	0.0%	0.00	0.00	0.0%
3:00 PM	5,982.55	1495.64	19.7%	0.00	0.00	0.0%	0.00	0.00	0.0%
3:15 PM	6,373.24	1593.31	21.0%	0.00	0.00	0.0%	0.00	0.00	0.0%
3:30 PM	6,788.38	1697.09	22.3%	0.00	0.00	0.0%	0.00	0.00	0.0%
3:45 PM	7,261.48	1815.37	23.9%	0.00	0.00	0.0%	0.00	0.00	0.0%
4:00 PM	7,744.84	1936.21	25.5%	0.00	0.00	0.0%	0.00	0.00	0.0%
4:15 PM	8,266.19	2066.55	27.2%	0.00	0.00	0.0%	0.00	0.00	0.0%
4:30 PM	8,737.02	2184.25	28.7%	0.00	0.00	0.0%	0.00	0.00	0.0%
4:45 PM	9,159.27	2289.82	30.1%	0.00	0.00	0.0%	0.00	0.00	0.0%
5:00 PM	9,431.64	2357.91	31.0%	0.00	0.00	0.0%	0.00	0.00	0.0%
5:15 PM	9,832.53	2458.13	32.3%	0.00	0.00	0.0%	0.00	0.00	0.0%
5:30 PM	10,277.53	2569.38	33.8%	0.00	0.00	0.0%	0.00	0.00	0.0%
5:45 PM	10,865.38	2716.34	35.7%	0.00	0.00	0.0%	0.00	0.00	0.0%
6:00 PM	11,886.68	2971.67	39.1%	0.00	0.00	0.0%	0.00	0.00	0.0%
6:15 PM	14,035.89	3789.69	46.2%	0.00	0.00	0.0%	0.00	0.00	0.0%
6:31 PM	18,473.23	2586.25	60.8%	11,865.89	1661.22	39.0%	0.00	0.00	0.0%

GRATTAN ELEMENTARY

SEPTEMBER 13

Analysis Hours: 7:50 AM-6:21 PM (PDT)

MARCH 29 SIMILAR

Analysis Time	CURRENT SHADOW			NEW SHADOW FROM CPHP			NOT USED		
	Area (sf)	Area/Time (sfh)	Coverage	Area (sf)	Area/Time (sfh)	Coverage	Area (sf)	Area/Time (sfh)	Coverage
7:50 AM	19,087.03	1526.96	62.8%	0.00	0.00	0.0%	0.00	0.00	0.0%
8:00 AM	17,559.69	3687.54	57.8%	0.00	0.00	0.0%	0.00	0.00	0.0%
8:15 AM	15,624.21	3906.05	51.4%	0.00	0.00	0.0%	0.00	0.00	0.0%
8:30 AM	13,541.55	3385.39	44.5%	0.00	0.00	0.0%	0.00	0.00	0.0%
8:45 AM	11,705.32	2926.33	38.5%	0.00	0.00	0.0%	0.00	0.00	0.0%
9:00 AM	10,316.34	2579.09	33.9%	0.00	0.00	0.0%	0.00	0.00	0.0%
9:15 AM	9,144.34	2286.09	30.1%	0.00	0.00	0.0%	0.00	0.00	0.0%
9:30 AM	8,202.41	2050.60	27.0%	0.00	0.00	0.0%	0.00	0.00	0.0%
9:45 AM	7,481.32	1870.33	24.6%	0.00	0.00	0.0%	0.00	0.00	0.0%
10:00 AM	6,925.60	1731.40	22.8%	0.00	0.00	0.0%	0.00	0.00	0.0%
10:15 AM	6,438.36	1609.59	21.2%	0.00	0.00	0.0%	0.00	0.00	0.0%
10:30 AM	5,996.28	1499.07	19.7%	0.00	0.00	0.0%	0.00	0.00	0.0%
10:45 AM	5,605.46	1401.37	18.4%	0.00	0.00	0.0%	0.00	0.00	0.0%
11:00 AM	5,239.75	1309.94	17.2%	0.00	0.00	0.0%	0.00	0.00	0.0%
11:15 AM	4,903.55	1225.89	16.1%	0.00	0.00	0.0%	0.00	0.00	0.0%
11:30 AM	4,584.83	1146.21	15.1%	0.00	0.00	0.0%	0.00	0.00	0.0%
11:45 AM	4,283.98	1070.99	14.1%	0.00	0.00	0.0%	0.00	0.00	0.0%
12:00 PM	3,992.19	998.05	13.1%	0.00	0.00	0.0%	0.00	0.00	0.0%
12:15 PM	3,711.84	927.96	12.2%	0.00	0.00	0.0%	0.00	0.00	0.0%
12:30 PM	3,500.80	875.20	11.5%	0.00	0.00	0.0%	0.00	0.00	0.0%
12:45 PM	3,438.64	859.66	11.3%	0.00	0.00	0.0%	0.00	0.00	0.0%
1:00 PM	3,635.62	908.90	12.0%	0.00	0.00	0.0%	0.00	0.00	0.0%
1:15 PM	3,919.34	979.83	12.9%	0.00	0.00	0.0%	0.00	0.00	0.0%
1:30 PM	4,204.78	1051.19	13.8%	0.00	0.00	0.0%	0.00	0.00	0.0%
1:45 PM	4,516.44	1129.11	14.9%	0.00	0.00	0.0%	0.00	0.00	0.0%
2:00 PM	4,829.23	1207.31	15.9%	0.00	0.00	0.0%	0.00	0.00	0.0%
2:15 PM	5,163.53	1290.88	17.0%	0.00	0.00	0.0%	0.00	0.00	0.0%
2:30 PM	5,503.54	1375.88	18.1%	0.00	0.00	0.0%	0.00	0.00	0.0%
2:45 PM	5,866.89	1466.72	19.3%	0.00	0.00	0.0%	0.00	0.00	0.0%
3:00 PM	6,245.56	1561.39	20.5%	0.00	0.00	0.0%	0.00	0.00	0.0%
3:15 PM	6,666.27	1666.57	21.9%	0.00	0.00	0.0%	0.00	0.00	0.0%
3:30 PM	7,119.25	1779.81	23.4%	0.00	0.00	0.0%	0.00	0.00	0.0%
3:45 PM	7,621.41	1905.35	25.1%	0.00	0.00	0.0%	0.00	0.00	0.0%
4:00 PM	8,125.82	2031.46	26.7%	0.00	0.00	0.0%	0.00	0.00	0.0%
4:15 PM	8,661.35	2165.34	28.5%	0.00	0.00	0.0%	0.00	0.00	0.0%
4:30 PM	9,088.60	2272.15	29.9%	0.00	0.00	0.0%	0.00	0.00	0.0%
4:45 PM	9,424.00	2356.00	31.0%	0.00	0.00	0.0%	0.00	0.00	0.0%
5:00 PM	9,770.37	2442.59	32.1%	0.00	0.00	0.0%	0.00	0.00	0.0%
5:15 PM	10,217.56	2554.39	33.6%	0.00	0.00	0.0%	0.00	0.00	0.0%
5:30 PM	10,763.50	2690.88	35.4%	0.00	0.00	0.0%	0.00	0.00	0.0%
5:45 PM	11,507.09	2876.77	37.9%	0.00	0.00	0.0%	0.00	0.00	0.0%
6:00 PM	12,681.67	3170.42	41.7%	0.00	0.00	0.0%	0.00	0.00	0.0%
6:15 PM	15,938.41	2868.91	52.4%	2,074.08	373.33	6.8%	0.00	0.00	0.0%
6:21 PM	18,258.47	912.92	60.1%	8,548.76	427.44	28.1%	0.00	0.00	0.0%

SEPTEMBER 20

Analysis Hours: 7:57 AM-6:09 PM (PDT)

APPROXIMATE EQUINOXES
MARCH 22 SIMILAR

Analysis Time	CURRENT SHADOW			NEW SHADOW FROM CPHP			NOT USED		
	Area (sf)	Area/Time (sfh)	Coverage	Area (sf)	Area/Time (sfh)	Coverage	Area (sf)	Area/Time (sfh)	Coverage
7:57 AM	19,348.42	386.97	63.7%	0.00	0.00	0.0%	0.00	0.00	0.0%
8:00 AM	18,759.99	2814.00	61.7%	0.00	0.00	0.0%	0.00	0.00	0.0%
8:15 AM	16,580.90	4145.23	54.5%	0.00	0.00	0.0%	0.00	0.00	0.0%
8:30 AM	14,579.96	3644.99	48.0%	0.00	0.00	0.0%	0.00	0.00	0.0%
8:45 AM	12,554.53	3138.63	41.3%	0.00	0.00	0.0%	0.00	0.00	0.0%
9:00 AM	10,938.03	2734.51	36.0%	0.00	0.00	0.0%	0.00	0.00	0.0%
9:15 AM	9,606.46	2401.62	31.6%	0.00	0.00	0.0%	0.00	0.00	0.0%
9:30 AM	8,563.05	2140.76	28.2%	0.00	0.00	0.0%	0.00	0.00	0.0%
9:45 AM	7,763.22	1940.80	25.5%	0.00	0.00	0.0%	0.00	0.00	0.0%
10:00 AM	7,148.05	1787.01	23.5%	0.00	0.00	0.0%	0.00	0.00	0.0%
10:15 AM	6,622.86	1655.71	21.8%	0.00	0.00	0.0%	0.00	0.00	0.0%
10:30 AM	6,148.16	1537.04	20.2%	0.00	0.00	0.0%	0.00	0.00	0.0%
10:45 AM	5,732.05	1433.01	18.9%	0.00	0.00	0.0%	0.00	0.00	0.0%
11:00 AM	5,342.87	1335.72	17.6%	0.00	0.00	0.0%	0.00	0.00	0.0%
11:15 AM	4,987.97	1246.99	16.4%	0.00	0.00	0.0%	0.00	0.00	0.0%
11:30 AM	4,650.26	1162.57	15.3%	0.00	0.00	0.0%	0.00	0.00	0.0%
11:45 AM	4,333.72	1083.43	14.3%	0.00	0.00	0.0%	0.00	0.00	0.0%
12:00 PM	4,027.73	1006.93	13.3%	0.00	0.00	0.0%	0.00	0.00	0.0%
12:15 PM	3,736.74	934.19	12.3%	0.00	0.00	0.0%	0.00	0.00	0.0%
12:30 PM	3,544.35	886.09	11.7%	0.00	0.00	0.0%	0.00	0.00	0.0%
12:45 PM	3,566.82	891.70	11.7%	0.00	0.00	0.0%	0.00	0.00	0.0%
1:00 PM	3,782.38	945.59	12.4%	0.00	0.00	0.0%	0.00	0.00	0.0%
1:15 PM	4,086.59	1021.65	13.4%	0.00	0.00	0.0%	0.00	0.00	0.0%
1:30 PM	4,385.71	1096.43	14.4%	0.00	0.00	0.0%	0.00	0.00	0.0%
1:45 PM	4,710.80	1177.70	15.5%	0.00	0.00	0.0%	0.00	0.00	0.0%
2:00 PM	5,038.61	1259.65	16.6%	0.00	0.00	0.0%	0.00	0.00	0.0%
2:15 PM	5,389.89	1347.47	17.7%	0.00	0.00	0.0%	0.00	0.00	0.0%
2:30 PM	5,744.11	1436.03	18.9%	0.00	0.00	0.0%	0.00	0.00	0.0%
2:45 PM	6,131.27	1532.82	20.2%	0.00	0.00	0.0%	0.00	0.00	0.0%
3:00 PM	6,537.09	1634.27	21.5%	0.00	0.00	0.0%	0.00	0.00	0.0%
3:15 PM	6,992.39	1748.10	23.0%	0.00	0.00	0.0%	0.00	0.00	0.0%
3:30 PM	7,490.84	1872.71	24.6%	0.00	0.00	0.0%	0.00	0.00	0.0%
3:45 PM	8,006.80	2001.70	26.3%	0.00	0.00	0.0%	0.00	0.00	0.0%
4:00 PM	8,550.59	2137.65	28.1%	0.00	0.00	0.0%	0.00	0.00	0.0%
4:15 PM	9,019.81	2254.95	29.7%	0.00	0.00	0.0%	0.00	0.00	0.0%
4:30 PM	9,409.82	2352.46	31.0%	0.00	0.00	0.0%	0.00	0.00	0.0%
4:45 PM	9,714.64	2428.66	32.0%	0.00	0.00	0.0%	0.00	0.00	0.0%
5:00 PM	10,114.01	2528.50	33.3%	0.00	0.00	0.0%	0.00	0.00	0.0%
5:15 PM	10,620.80	2655.20	34.9%	0.00	0.00	0.0%	0.00	0.00	0.0%
5:30 PM	11,305.79	2826.45	37.2%	0.00	0.00	0.0%	0.00	0.00	0.0%
5:45 PM	12,284.84	3071.21	40.4%	0.00	0.00	0.0%	0.00	0.00	0.0%
6:00 PM	14,452.96	3035.12	47.5%	0.00	0.00	0.0%	0.00	0.00	0.0%
6:09 PM	17,775.80	1422.06	58.5%	0.00	0.00	0.0%	0.00	0.00	0.0%

GRATTAN ELEMENTARY

SEPTEMBER 27

Analysis Hours: 8:03 AM-5:58 PM (PDT)

MARCH 15 SIMILAR

Analysis Time	CURRENT SHADOW			NEW SHADOW FROM CPHP			NOT USED		
	Area (sf)	Area/Time (sfh)	Coverage	Area (sf)	Area/Time (sfh)	Coverage	Area (sf)	Area/Time (sfh)	Coverage
8:03 AM	20,067.96	2006.80	66.0%	0.00	0.00	0.0%	0.00	0.00	0.0%
8:15 AM	17,905.01	3939.10	58.9%	0.00	0.00	0.0%	0.00	0.00	0.0%
8:30 AM	15,801.02	3950.25	52.0%	0.00	0.00	0.0%	0.00	0.00	0.0%
8:45 AM	13,595.53	3398.88	44.7%	0.00	0.00	0.0%	0.00	0.00	0.0%
9:00 AM	11,653.30	2913.32	38.3%	0.00	0.00	0.0%	0.00	0.00	0.0%
9:15 AM	10,148.57	2537.14	33.4%	0.00	0.00	0.0%	0.00	0.00	0.0%
9:30 AM	8,987.09	2246.77	29.6%	0.00	0.00	0.0%	0.00	0.00	0.0%
9:45 AM	8,084.95	2021.24	26.6%	0.00	0.00	0.0%	0.00	0.00	0.0%
10:00 AM	7,391.25	1847.81	24.3%	0.00	0.00	0.0%	0.00	0.00	0.0%
10:15 AM	6,823.79	1705.95	22.4%	0.00	0.00	0.0%	0.00	0.00	0.0%
10:30 AM	6,312.34	1578.08	20.8%	0.00	0.00	0.0%	0.00	0.00	0.0%
10:45 AM	5,868.05	1467.01	19.3%	0.00	0.00	0.0%	0.00	0.00	0.0%
11:00 AM	5,454.03	1363.51	17.9%	0.00	0.00	0.0%	0.00	0.00	0.0%
11:15 AM	5,077.50	1269.37	16.7%	0.00	0.00	0.0%	0.00	0.00	0.0%
11:30 AM	4,719.21	1179.80	15.5%	0.00	0.00	0.0%	0.00	0.00	0.0%
11:45 AM	4,386.39	1096.60	14.4%	0.00	0.00	0.0%	0.00	0.00	0.0%
12:00 PM	4,065.57	1016.39	13.4%	0.00	0.00	0.0%	0.00	0.00	0.0%
12:15 PM	3,765.15	941.29	12.4%	0.00	0.00	0.0%	0.00	0.00	0.0%
12:30 PM	3,602.75	900.69	11.9%	0.00	0.00	0.0%	0.00	0.00	0.0%
12:45 PM	3,716.06	929.02	12.2%	0.00	0.00	0.0%	0.00	0.00	0.0%
1:00 PM	3,966.80	991.70	13.0%	0.00	0.00	0.0%	0.00	0.00	0.0%
1:15 PM	4,276.45	1069.11	14.1%	0.00	0.00	0.0%	0.00	0.00	0.0%
1:30 PM	4,582.87	1145.72	15.1%	0.00	0.00	0.0%	0.00	0.00	0.0%
1:45 PM	4,924.41	1231.10	16.2%	0.00	0.00	0.0%	0.00	0.00	0.0%
2:00 PM	5,267.26	1316.82	17.3%	0.00	0.00	0.0%	0.00	0.00	0.0%
2:15 PM	5,635.07	1408.77	18.5%	0.00	0.00	0.0%	0.00	0.00	0.0%
2:30 PM	6,010.30	1502.58	19.8%	0.00	0.00	0.0%	0.00	0.00	0.0%
2:45 PM	6,424.43	1606.11	21.1%	0.00	0.00	0.0%	0.00	0.00	0.0%
3:00 PM	6,861.52	1715.38	22.6%	0.00	0.00	0.0%	0.00	0.00	0.0%
3:15 PM	7,361.55	1840.39	24.2%	0.00	0.00	0.0%	0.00	0.00	0.0%
3:30 PM	7,880.22	1970.05	25.9%	0.00	0.00	0.0%	0.00	0.00	0.0%
3:45 PM	8,427.81	2106.95	27.7%	0.00	0.00	0.0%	0.00	0.00	0.0%
4:00 PM	8,932.09	2233.02	29.4%	0.00	0.00	0.0%	0.00	0.00	0.0%
4:15 PM	9,405.20	2351.30	30.9%	0.00	0.00	0.0%	0.00	0.00	0.0%
4:30 PM	9,690.75	2422.69	31.9%	0.00	0.00	0.0%	0.00	0.00	0.0%
4:45 PM	10,052.53	2513.13	33.1%	0.00	0.00	0.0%	0.00	0.00	0.0%
5:00 PM	10,486.92	2621.73	34.5%	0.00	0.00	0.0%	0.00	0.00	0.0%
5:15 PM	11,070.87	2767.72	36.4%	0.00	0.00	0.0%	0.00	0.00	0.0%
5:30 PM	11,889.87	2972.47	39.1%	0.00	0.00	0.0%	0.00	0.00	0.0%
5:45 PM	13,438.84	3090.93	44.2%	0.00	0.00	0.0%	0.00	0.00	0.0%
5:58 PM	17,536.78	1929.05	57.7%	0.00	0.00	0.0%	0.00	0.00	0.0%

GRATTAN ELEMENTARY

OCTOBER 4

Analysis Hours: 8:09 AM-5:47 PM (PDT)

MARCH 8 SIMILAR

Analysis Time	CURRENT SHADOW			NEW SHADOW FROM CPHP			NOT USED		
	Area (sf)	Area/Time (sfh)	Coverage	Area (sf)	Area/Time (sfh)	Coverage	Area (sf)	Area/Time (sfh)	Coverage
8:09 AM	21,503.23	860.13	70.7%	0.00	0.00	0.0%	0.00	0.00	0.0%
8:15 AM	20,193.80	3432.95	66.4%	0.00	0.00	0.0%	0.00	0.00	0.0%
8:30 AM	17,461.24	4365.31	57.4%	0.00	0.00	0.0%	0.00	0.00	0.0%
8:45 AM	14,970.46	3742.62	49.2%	0.00	0.00	0.0%	0.00	0.00	0.0%
9:00 AM	12,663.71	3165.93	41.7%	0.00	0.00	0.0%	0.00	0.00	0.0%
9:15 AM	10,846.90	2711.73	35.7%	0.00	0.00	0.0%	0.00	0.00	0.0%
9:30 AM	9,507.64	2376.91	31.3%	0.00	0.00	0.0%	0.00	0.00	0.0%
9:45 AM	8,468.75	2117.19	27.9%	0.00	0.00	0.0%	0.00	0.00	0.0%
10:00 AM	7,666.06	1916.52	25.2%	0.00	0.00	0.0%	0.00	0.00	0.0%
10:15 AM	7,049.65	1762.41	23.2%	0.00	0.00	0.0%	0.00	0.00	0.0%
10:30 AM	6,496.61	1624.15	21.4%	0.00	0.00	0.0%	0.00	0.00	0.0%
10:45 AM	6,021.11	1505.28	19.8%	0.00	0.00	0.0%	0.00	0.00	0.0%
11:00 AM	5,579.09	1394.77	18.4%	0.00	0.00	0.0%	0.00	0.00	0.0%
11:15 AM	5,178.57	1294.64	17.0%	0.00	0.00	0.0%	0.00	0.00	0.0%
11:30 AM	4,796.94	1199.24	15.8%	0.00	0.00	0.0%	0.00	0.00	0.0%
11:45 AM	4,446.35	1111.59	14.6%	0.00	0.00	0.0%	0.00	0.00	0.0%
12:00 PM	4,109.05	1027.26	13.5%	0.00	0.00	0.0%	0.00	0.00	0.0%
12:15 PM	3,813.60	953.40	12.5%	0.00	0.00	0.0%	0.00	0.00	0.0%
12:30 PM	3,675.64	918.91	12.1%	0.00	0.00	0.0%	0.00	0.00	0.0%
12:45 PM	3,848.41	962.10	12.7%	0.00	0.00	0.0%	0.00	0.00	0.0%
1:00 PM	4,095.96	1023.99	13.5%	0.00	0.00	0.0%	0.00	0.00	0.0%
1:15 PM	4,445.00	1111.25	14.6%	0.00	0.00	0.0%	0.00	0.00	0.0%
1:30 PM	4,791.34	1197.84	15.8%	0.00	0.00	0.0%	0.00	0.00	0.0%
1:45 PM	5,149.07	1287.27	16.9%	0.00	0.00	0.0%	0.00	0.00	0.0%
2:00 PM	5,506.70	1376.67	18.1%	0.00	0.00	0.0%	0.00	0.00	0.0%
2:15 PM	5,895.28	1473.82	19.4%	0.00	0.00	0.0%	0.00	0.00	0.0%
2:30 PM	6,294.61	1573.65	20.7%	0.00	0.00	0.0%	0.00	0.00	0.0%
2:45 PM	6,738.99	1684.75	22.2%	0.00	0.00	0.0%	0.00	0.00	0.0%
3:00 PM	7,212.69	1803.17	23.7%	0.00	0.00	0.0%	0.00	0.00	0.0%
3:15 PM	7,753.16	1938.29	25.5%	0.00	0.00	0.0%	0.00	0.00	0.0%
3:30 PM	8,284.50	2071.13	27.3%	0.00	0.00	0.0%	0.00	0.00	0.0%
3:45 PM	8,830.05	2207.51	29.0%	0.00	0.00	0.0%	0.00	0.00	0.0%
4:00 PM	9,314.82	2328.71	30.6%	0.00	0.00	0.0%	0.00	0.00	0.0%
4:15 PM	9,730.39	2432.60	32.0%	0.00	0.00	0.0%	0.00	0.00	0.0%
4:30 PM	10,068.39	2517.10	33.1%	0.00	0.00	0.0%	0.00	0.00	0.0%
4:45 PM	10,480.21	2620.05	34.5%	0.00	0.00	0.0%	0.00	0.00	0.0%
5:00 PM	10,962.53	2740.63	36.1%	0.00	0.00	0.0%	0.00	0.00	0.0%
5:15 PM	11,674.94	2918.73	38.4%	0.00	0.00	0.0%	0.00	0.00	0.0%
5:30 PM	12,679.12	3423.36	41.7%	0.00	0.00	0.0%	0.00	0.00	0.0%
5:47 PM	16,462.27	2304.72	54.2%	0.00	0.00	0.0%	0.00	0.00	0.0%

GRATTAN ELEMENTARY

OCTOBER 11

Analysis Hours: 8:16 AM-5:37 PM (PDT)

MARCH 1 SIMILAR

Analysis Time	CURRENT SHADOW			NEW SHADOW FROM CPHP			NOT USED		
	Area (sf)	Area/Time (sfh)	Coverage	Area (sf)	Area/Time (sfh)	Coverage	Area (sf)	Area/Time (sfh)	Coverage
8:16 AM	22,335.55	2680.27	73.5%	0.00	0.00	0.0%	0.00	0.00	0.0%
8:30 AM	19,718.27	4732.38	64.9%	0.00	0.00	0.0%	0.00	0.00	0.0%
8:45 AM	16,912.34	4228.09	55.6%	0.00	0.00	0.0%	0.00	0.00	0.0%
9:00 AM	14,111.57	3527.89	46.4%	0.00	0.00	0.0%	0.00	0.00	0.0%
9:15 AM	11,972.88	2993.22	39.4%	0.00	0.00	0.0%	0.00	0.00	0.0%
9:30 AM	10,251.34	2562.84	33.7%	0.00	0.00	0.0%	0.00	0.00	0.0%
9:45 AM	8,945.12	2236.28	29.4%	0.00	0.00	0.0%	0.00	0.00	0.0%
10:00 AM	7,984.50	1996.12	26.3%	0.00	0.00	0.0%	0.00	0.00	0.0%
10:15 AM	7,304.80	1826.20	24.0%	0.00	0.00	0.0%	0.00	0.00	0.0%
10:30 AM	6,704.84	1676.21	22.1%	0.00	0.00	0.0%	0.00	0.00	0.0%
10:45 AM	6,192.91	1548.23	20.4%	0.00	0.00	0.0%	0.00	0.00	0.0%
11:00 AM	5,719.84	1429.96	18.8%	0.00	0.00	0.0%	0.00	0.00	0.0%
11:15 AM	5,292.10	1323.03	17.4%	0.00	0.00	0.0%	0.00	0.00	0.0%
11:30 AM	4,885.56	1221.39	16.1%	0.00	0.00	0.0%	0.00	0.00	0.0%
11:45 AM	4,515.44	1128.86	14.9%	0.00	0.00	0.0%	0.00	0.00	0.0%
12:00 PM	4,160.96	1040.24	13.7%	0.00	0.00	0.0%	0.00	0.00	0.0%
12:15 PM	3,869.59	967.40	12.7%	0.00	0.00	0.0%	0.00	0.00	0.0%
12:30 PM	3,769.29	942.32	12.4%	0.00	0.00	0.0%	0.00	0.00	0.0%
12:45 PM	4,017.30	1004.33	13.2%	0.00	0.00	0.0%	0.00	0.00	0.0%
1:00 PM	4,310.98	1077.74	14.2%	0.00	0.00	0.0%	0.00	0.00	0.0%
1:15 PM	4,659.93	1164.98	15.3%	0.00	0.00	0.0%	0.00	0.00	0.0%
1:30 PM	5,005.26	1251.32	16.5%	0.00	0.00	0.0%	0.00	0.00	0.0%
1:45 PM	5,378.57	1344.64	17.7%	0.00	0.00	0.0%	0.00	0.00	0.0%
2:00 PM	5,755.50	1438.88	18.9%	0.00	0.00	0.0%	0.00	0.00	0.0%
2:15 PM	6,165.98	1541.50	20.3%	0.00	0.00	0.0%	0.00	0.00	0.0%
2:30 PM	6,590.83	1647.71	21.7%	0.00	0.00	0.0%	0.00	0.00	0.0%
2:45 PM	7,069.29	1767.32	23.3%	0.00	0.00	0.0%	0.00	0.00	0.0%
3:00 PM	7,587.46	1896.87	25.0%	0.00	0.00	0.0%	0.00	0.00	0.0%
3:15 PM	8,145.64	2036.41	26.8%	0.00	0.00	0.0%	0.00	0.00	0.0%
3:30 PM	8,710.16	2177.54	28.7%	0.00	0.00	0.0%	0.00	0.00	0.0%
3:45 PM	9,219.09	2304.77	30.3%	0.00	0.00	0.0%	0.00	0.00	0.0%
4:00 PM	9,708.60	2427.15	31.9%	0.00	0.00	0.0%	0.00	0.00	0.0%
4:15 PM	10,116.70	2529.17	33.3%	0.00	0.00	0.0%	0.00	0.00	0.0%
4:30 PM	10,533.41	2633.35	34.7%	0.00	0.00	0.0%	0.00	0.00	0.0%
4:45 PM	11,033.49	2758.37	36.3%	0.00	0.00	0.0%	0.00	0.00	0.0%
5:00 PM	11,766.80	2941.70	38.7%	0.00	0.00	0.0%	0.00	0.00	0.0%
5:15 PM	12,723.45	3180.86	41.9%	0.00	0.00	0.0%	0.00	0.00	0.0%
5:30 PM	14,730.77	2798.85	48.5%	0.00	0.00	0.0%	0.00	0.00	0.0%
5:37 PM	17,393.62	1043.62	57.2%	0.00	0.00	0.0%	0.00	0.00	0.0%

OCTOBER 18

Analysis Hours: 8:22 AM-5:27 PM (PDT)

FEBRUARY 22 SIMILAR

Analysis Time	CURRENT SHADOW			NEW SHADOW FROM CPHP			NOT USED		
	Area (sf)	Area/Time (sfh)	Coverage	Area (sf)	Area/Time (sfh)	Coverage	Area (sf)	Area/Time (sfh)	Coverage
8:22 AM	22,905.48	1374.33	75.4%	0.00	0.00	0.0%	0.00	0.00	0.0%
8:30 AM	21,625.43	3892.58	71.1%	0.00	0.00	0.0%	0.00	0.00	0.0%
8:45 AM	18,996.62	4749.15	62.5%	0.00	0.00	0.0%	0.00	0.00	0.0%
9:00 AM	15,894.21	3973.55	52.3%	0.00	0.00	0.0%	0.00	0.00	0.0%
9:15 AM	13,377.71	3344.43	44.0%	0.00	0.00	0.0%	0.00	0.00	0.0%
9:30 AM	11,244.34	2811.09	37.0%	0.00	0.00	0.0%	0.00	0.00	0.0%
9:45 AM	9,728.05	2432.01	32.0%	0.00	0.00	0.0%	0.00	0.00	0.0%
10:00 AM	8,496.64	2124.16	28.0%	0.00	0.00	0.0%	0.00	0.00	0.0%
10:15 AM	7,643.27	1910.82	25.1%	0.00	0.00	0.0%	0.00	0.00	0.0%
10:30 AM	6,934.62	1733.66	22.8%	0.00	0.00	0.0%	0.00	0.00	0.0%
10:45 AM	6,382.50	1595.62	21.0%	0.00	0.00	0.0%	0.00	0.00	0.0%
11:00 AM	5,879.40	1469.85	19.3%	0.00	0.00	0.0%	0.00	0.00	0.0%
11:15 AM	5,422.14	1355.54	17.8%	0.00	0.00	0.0%	0.00	0.00	0.0%
11:30 AM	4,987.29	1246.82	16.4%	0.00	0.00	0.0%	0.00	0.00	0.0%
11:45 AM	4,596.26	1149.07	15.1%	0.00	0.00	0.0%	0.00	0.00	0.0%
12:00 PM	4,224.07	1056.02	13.9%	0.00	0.00	0.0%	0.00	0.00	0.0%
12:15 PM	3,933.71	983.43	12.9%	0.00	0.00	0.0%	0.00	0.00	0.0%
12:30 PM	3,910.19	977.55	12.9%	0.00	0.00	0.0%	0.00	0.00	0.0%
12:45 PM	4,175.46	1043.87	13.7%	0.00	0.00	0.0%	0.00	0.00	0.0%
1:00 PM	4,494.32	1123.58	14.8%	0.00	0.00	0.0%	0.00	0.00	0.0%
1:15 PM	4,858.06	1214.52	16.0%	0.00	0.00	0.0%	0.00	0.00	0.0%
1:30 PM	5,219.69	1304.92	17.2%	0.00	0.00	0.0%	0.00	0.00	0.0%
1:45 PM	5,611.02	1402.75	18.5%	0.00	0.00	0.0%	0.00	0.00	0.0%
2:00 PM	6,008.09	1502.02	19.8%	0.00	0.00	0.0%	0.00	0.00	0.0%
2:15 PM	6,442.78	1610.69	21.2%	0.00	0.00	0.0%	0.00	0.00	0.0%
2:30 PM	6,897.05	1724.26	22.7%	0.00	0.00	0.0%	0.00	0.00	0.0%
2:45 PM	7,413.07	1853.27	24.4%	0.00	0.00	0.0%	0.00	0.00	0.0%
3:00 PM	7,961.78	1990.44	26.2%	0.00	0.00	0.0%	0.00	0.00	0.0%
3:15 PM	8,533.84	2133.46	28.1%	0.00	0.00	0.0%	0.00	0.00	0.0%
3:30 PM	9,066.57	2266.64	29.8%	0.00	0.00	0.0%	0.00	0.00	0.0%
3:45 PM	9,618.19	2404.55	31.6%	0.00	0.00	0.0%	0.00	0.00	0.0%
4:00 PM	10,103.55	2525.89	33.2%	0.00	0.00	0.0%	0.00	0.00	0.0%
4:15 PM	10,610.71	2652.68	34.9%	0.00	0.00	0.0%	0.00	0.00	0.0%
4:30 PM	11,140.98	2785.25	36.7%	0.00	0.00	0.0%	0.00	0.00	0.0%
4:45 PM	11,901.75	2975.44	39.2%	0.00	0.00	0.0%	0.00	0.00	0.0%
5:00 PM	12,908.23	3227.06	42.5%	0.00	0.00	0.0%	0.00	0.00	0.0%
5:15 PM	14,364.74	3160.24	47.3%	0.00	0.00	0.0%	0.00	0.00	0.0%
5:27 PM	18,511.08	1851.11	60.9%	0.00	0.00	0.0%	0.00	0.00	0.0%

OCTOBER 25

Analysis Hours: 7:30 AM-4:18 PM (PST)

FEBRUARY 15 SIMILAR

Analysis Time	CURRENT SHADOW			NEW SHADOW FROM CPHP			NOT USED		
	Area (sf)	Area/Time (sfh)	Coverage	Area (sf)	Area/Time (sfh)	Coverage	Area (sf)	Area/Time (sfh)	Coverage
7:30 AM	23,440.73	3047.29	77.1%	0.00	0.00	0.0%	0.00	0.00	0.0%
7:45 AM	20,755.38	5188.84	68.3%	0.00	0.00	0.0%	0.00	0.00	0.0%
8:00 AM	17,696.57	4424.14	58.2%	0.00	0.00	0.0%	0.00	0.00	0.0%
8:15 AM	15,047.92	3761.98	49.5%	0.00	0.00	0.0%	0.00	0.00	0.0%
8:30 AM	12,613.59	3153.40	41.5%	0.00	0.00	0.0%	0.00	0.00	0.0%
8:45 AM	10,804.85	2701.21	35.5%	0.00	0.00	0.0%	0.00	0.00	0.0%
9:00 AM	9,272.44	2318.11	30.5%	0.00	0.00	0.0%	0.00	0.00	0.0%
9:15 AM	8,188.65	2047.16	26.9%	0.00	0.00	0.0%	0.00	0.00	0.0%
9:30 AM	7,367.71	1841.93	24.2%	0.00	0.00	0.0%	0.00	0.00	0.0%
9:45 AM	6,700.69	1675.17	22.0%	0.00	0.00	0.0%	0.00	0.00	0.0%
10:00 AM	6,095.12	1523.78	20.1%	0.00	0.00	0.0%	0.00	0.00	0.0%
10:15 AM	5,568.67	1392.17	18.3%	0.00	0.00	0.0%	0.00	0.00	0.0%
10:30 AM	5,100.58	1275.15	16.8%	0.00	0.00	0.0%	0.00	0.00	0.0%
10:45 AM	4,686.66	1171.66	15.4%	0.00	0.00	0.0%	0.00	0.00	0.0%
11:00 AM	4,294.80	1073.70	14.1%	0.00	0.00	0.0%	0.00	0.00	0.0%
11:15 AM	4,011.19	1002.80	13.2%	0.00	0.00	0.0%	0.00	0.00	0.0%
11:30 AM	4,055.63	1013.91	13.3%	0.00	0.00	0.0%	0.00	0.00	0.0%
11:45 AM	4,330.13	1082.53	14.2%	0.00	0.00	0.0%	0.00	0.00	0.0%
12:00 PM	4,668.79	1167.20	15.4%	0.00	0.00	0.0%	0.00	0.00	0.0%
12:15 PM	5,048.14	1262.04	16.6%	0.00	0.00	0.0%	0.00	0.00	0.0%
12:30 PM	5,423.50	1355.88	17.8%	0.00	0.00	0.0%	0.00	0.00	0.0%
12:45 PM	5,833.31	1458.33	19.2%	0.00	0.00	0.0%	0.00	0.00	0.0%
1:00 PM	6,248.14	1562.03	20.6%	0.00	0.00	0.0%	0.00	0.00	0.0%
1:15 PM	6,708.09	1677.02	22.1%	0.00	0.00	0.0%	0.00	0.00	0.0%
1:30 PM	7,190.83	1797.71	23.7%	0.00	0.00	0.0%	0.00	0.00	0.0%
1:45 PM	7,749.01	1937.25	25.5%	0.00	0.00	0.0%	0.00	0.00	0.0%
2:00 PM	8,309.28	2077.32	27.3%	0.00	0.00	0.0%	0.00	0.00	0.0%
2:15 PM	8,900.67	2225.17	29.3%	0.00	0.00	0.0%	0.00	0.00	0.0%
2:30 PM	9,433.73	2358.43	31.0%	0.00	0.00	0.0%	0.00	0.00	0.0%
2:45 PM	10,022.82	2505.70	33.0%	0.00	0.00	0.0%	0.00	0.00	0.0%
3:00 PM	10,578.38	2644.59	34.8%	0.00	0.00	0.0%	0.00	0.00	0.0%
3:15 PM	11,269.10	2817.28	37.1%	0.00	0.00	0.0%	0.00	0.00	0.0%
3:30 PM	12,070.27	3017.57	39.7%	0.00	0.00	0.0%	0.00	0.00	0.0%
3:45 PM	13,164.13	3291.03	43.3%	0.00	0.00	0.0%	0.00	0.00	0.0%
4:00 PM	14,424.49	3606.12	47.5%	0.00	0.00	0.0%	0.00	0.00	0.0%
4:15 PM	17,437.55	2615.63	57.4%	0.00	0.00	0.0%	0.00	0.00	0.0%
4:18 PM	19,572.19	587.17	64.4%	0.00	0.00	0.0%	0.00	0.00	0.0%

GRATTAN ELEMENTARY

NOVEMBER 1

Analysis Hours: 7:36 AM-4:10 PM (PST)

FEBRUARY 8 SIMILAR

Analysis Time	CURRENT SHADOW			NEW SHADOW FROM CPHP			NOT USED		
	Area (sf)	Area/Time (sfh)	Coverage	Area (sf)	Area/Time (sfh)	Coverage	Area (sf)	Area/Time (sfh)	Coverage
7:36 AM	23,855.47	1669.88	78.5%	0.00	0.00	0.0%	0.00	0.00	0.0%
7:45 AM	22,334.75	4243.60	73.5%	0.00	0.00	0.0%	0.00	0.00	0.0%
8:00 AM	19,480.13	4870.03	64.1%	0.00	0.00	0.0%	0.00	0.00	0.0%
8:15 AM	16,572.42	4143.11	54.5%	0.00	0.00	0.0%	0.00	0.00	0.0%
8:30 AM	14,150.42	3537.61	46.6%	0.00	0.00	0.0%	0.00	0.00	0.0%
8:45 AM	12,187.36	3046.84	40.1%	0.00	0.00	0.0%	0.00	0.00	0.0%
9:00 AM	10,445.13	2611.28	34.4%	0.00	0.00	0.0%	0.00	0.00	0.0%
9:15 AM	9,144.16	2286.04	30.1%	0.00	0.00	0.0%	0.00	0.00	0.0%
9:30 AM	8,009.61	2002.40	26.3%	0.00	0.00	0.0%	0.00	0.00	0.0%
9:45 AM	7,181.23	1795.31	23.6%	0.00	0.00	0.0%	0.00	0.00	0.0%
10:00 AM	6,478.54	1619.63	21.3%	0.00	0.00	0.0%	0.00	0.00	0.0%
10:15 AM	5,887.39	1471.85	19.4%	0.00	0.00	0.0%	0.00	0.00	0.0%
10:30 AM	5,323.84	1330.96	17.5%	0.00	0.00	0.0%	0.00	0.00	0.0%
10:45 AM	4,846.99	1211.75	15.9%	0.00	0.00	0.0%	0.00	0.00	0.0%
11:00 AM	4,393.57	1098.39	14.5%	0.00	0.00	0.0%	0.00	0.00	0.0%
11:15 AM	4,101.36	1025.34	13.5%	0.00	0.00	0.0%	0.00	0.00	0.0%
11:30 AM	4,194.19	1048.55	13.8%	0.00	0.00	0.0%	0.00	0.00	0.0%
11:45 AM	4,477.93	1119.48	14.7%	0.00	0.00	0.0%	0.00	0.00	0.0%
12:00 PM	4,833.24	1208.31	15.9%	0.00	0.00	0.0%	0.00	0.00	0.0%
12:15 PM	5,226.25	1306.56	17.2%	0.00	0.00	0.0%	0.00	0.00	0.0%
12:30 PM	5,616.73	1404.18	18.5%	0.00	0.00	0.0%	0.00	0.00	0.0%
12:45 PM	6,042.44	1510.61	19.9%	0.00	0.00	0.0%	0.00	0.00	0.0%
1:00 PM	6,476.52	1619.13	21.3%	0.00	0.00	0.0%	0.00	0.00	0.0%
1:15 PM	6,961.48	1740.37	22.9%	0.00	0.00	0.0%	0.00	0.00	0.0%
1:30 PM	7,473.71	1868.43	24.6%	0.00	0.00	0.0%	0.00	0.00	0.0%
1:45 PM	8,062.82	2015.70	26.5%	0.00	0.00	0.0%	0.00	0.00	0.0%
2:00 PM	8,637.31	2159.33	28.4%	0.00	0.00	0.0%	0.00	0.00	0.0%
2:15 PM	9,244.22	2311.05	30.4%	0.00	0.00	0.0%	0.00	0.00	0.0%
2:30 PM	9,842.23	2460.56	32.4%	0.00	0.00	0.0%	0.00	0.00	0.0%
2:45 PM	10,572.53	2643.13	34.8%	0.00	0.00	0.0%	0.00	0.00	0.0%
3:00 PM	11,351.34	2837.84	37.3%	0.00	0.00	0.0%	0.00	0.00	0.0%
3:15 PM	12,210.30	3052.58	40.2%	0.00	0.00	0.0%	0.00	0.00	0.0%
3:30 PM	13,126.01	3281.50	43.2%	0.00	0.00	0.0%	0.00	0.00	0.0%
3:45 PM	14,023.33	3505.83	46.1%	0.00	0.00	0.0%	0.00	0.00	0.0%
4:00 PM	15,897.00	3338.37	52.3%	0.00	0.00	0.0%	0.00	0.00	0.0%
4:10 PM	30,388.70	2734.98	100.0%	0.00	0.00	0.0%	0.00	0.00	0.0%

GRATTAN ELEMENTARY

NOVEMBER 8

Analysis Hours: 7:43 AM-4:03 PM (PST)

FEBRUARY 1 SIMILAR

Analysis Time	CURRENT SHADOW			NEW SHADOW FROM CPHP			NOT USED		
	Area (sf)	Area/Time (sfh)	Coverage	Area (sf)	Area/Time (sfh)	Coverage	Area (sf)	Area/Time (sfh)	Coverage
7:43 AM	24,145.33	241.45	79.4%	0.00	0.00	0.0%	0.00	0.00	0.0%
7:45 AM	23,923.07	3110.00	78.7%	0.00	0.00	0.0%	0.00	0.00	0.0%
8:00 AM	21,296.50	5324.12	70.1%	0.00	0.00	0.0%	0.00	0.00	0.0%
8:15 AM	18,424.57	4606.14	60.6%	0.00	0.00	0.0%	0.00	0.00	0.0%
8:30 AM	15,798.03	3949.51	52.0%	0.00	0.00	0.0%	0.00	0.00	0.0%
8:45 AM	13,650.69	3412.67	44.9%	0.00	0.00	0.0%	0.00	0.00	0.0%
9:00 AM	11,854.80	2963.70	39.0%	0.00	0.00	0.0%	0.00	0.00	0.0%
9:15 AM	10,388.21	2597.05	34.2%	0.00	0.00	0.0%	0.00	0.00	0.0%
9:30 AM	9,007.96	2251.99	29.6%	0.00	0.00	0.0%	0.00	0.00	0.0%
9:45 AM	7,970.77	1992.69	26.2%	0.00	0.00	0.0%	0.00	0.00	0.0%
10:00 AM	7,053.64	1763.41	23.2%	0.00	0.00	0.0%	0.00	0.00	0.0%
10:15 AM	6,327.63	1581.91	20.8%	0.00	0.00	0.0%	0.00	0.00	0.0%
10:30 AM	5,655.05	1413.76	18.6%	0.00	0.00	0.0%	0.00	0.00	0.0%
10:45 AM	5,120.98	1280.25	16.8%	0.00	0.00	0.0%	0.00	0.00	0.0%
11:00 AM	4,630.53	1157.63	15.2%	0.00	0.00	0.0%	0.00	0.00	0.0%
11:15 AM	4,322.61	1080.65	14.2%	0.00	0.00	0.0%	0.00	0.00	0.0%
11:30 AM	4,407.57	1101.89	14.5%	0.00	0.00	0.0%	0.00	0.00	0.0%
11:45 AM	4,684.59	1171.15	15.4%	0.00	0.00	0.0%	0.00	0.00	0.0%
12:00 PM	5,026.63	1256.66	16.5%	0.00	0.00	0.0%	0.00	0.00	0.0%
12:15 PM	5,426.82	1356.70	17.9%	0.00	0.00	0.0%	0.00	0.00	0.0%
12:30 PM	5,815.44	1453.86	19.1%	0.00	0.00	0.0%	0.00	0.00	0.0%
12:45 PM	6,261.50	1565.38	20.6%	0.00	0.00	0.0%	0.00	0.00	0.0%
1:00 PM	6,705.60	1676.40	22.1%	0.00	0.00	0.0%	0.00	0.00	0.0%
1:15 PM	7,223.65	1805.91	23.8%	0.00	0.00	0.0%	0.00	0.00	0.0%
1:30 PM	7,758.77	1939.69	25.5%	0.00	0.00	0.0%	0.00	0.00	0.0%
1:45 PM	8,371.30	2092.83	27.5%	0.00	0.00	0.0%	0.00	0.00	0.0%
2:00 PM	8,967.92	2241.98	29.5%	0.00	0.00	0.0%	0.00	0.00	0.0%
2:15 PM	9,584.58	2396.15	31.5%	0.00	0.00	0.0%	0.00	0.00	0.0%
2:30 PM	10,288.14	2572.04	33.8%	0.00	0.00	0.0%	0.00	0.00	0.0%
2:45 PM	11,201.28	2800.32	36.8%	0.00	0.00	0.0%	0.00	0.00	0.0%
3:00 PM	12,120.94	3030.23	39.9%	0.00	0.00	0.0%	0.00	0.00	0.0%
3:15 PM	13,078.74	3269.69	43.0%	0.00	0.00	0.0%	0.00	0.00	0.0%
3:30 PM	13,867.96	3466.99	45.6%	0.00	0.00	0.0%	0.00	0.00	0.0%
3:45 PM	15,140.87	3785.22	49.8%	0.00	0.00	0.0%	0.00	0.00	0.0%
4:00 PM	30,388.70	4558.30	100.0%	0.00	0.00	0.0%	0.00	0.00	0.0%
4:03 PM	30,388.70	911.66	100.0%	0.00	0.00	0.0%	0.00	0.00	0.0%

GRATTAN ELEMENTARY

NOVEMBER 15

Analysis Hours: 7:51 AM-3:57 PM (PST)

JANUARY 25 SIMILAR

Analysis Time	CURRENT SHADOW			NEW SHADOW FROM CPHP			NOT USED		
	Area (sf)	Area/Time (sfh)	Coverage	Area (sf)	Area/Time (sfh)	Coverage	Area (sf)	Area/Time (sfh)	Coverage
7:51 AM	24,526.94	1962.16	80.7%	0.00	0.00	0.0%	0.00	0.00	0.0%
8:00 AM	23,034.67	4606.93	75.8%	0.00	0.00	0.0%	0.00	0.00	0.0%
8:15 AM	20,288.59	5072.15	66.7%	0.00	0.00	0.0%	0.00	0.00	0.0%
8:30 AM	17,619.88	4404.97	58.0%	0.00	0.00	0.0%	0.00	0.00	0.0%
8:45 AM	15,271.94	3817.99	50.2%	0.00	0.00	0.0%	0.00	0.00	0.0%
9:00 AM	13,262.69	3315.67	43.6%	0.00	0.00	0.0%	0.00	0.00	0.0%
9:15 AM	11,703.33	2925.83	38.5%	0.00	0.00	0.0%	0.00	0.00	0.0%
9:30 AM	10,200.71	2550.18	33.6%	0.00	0.00	0.0%	0.00	0.00	0.0%
9:45 AM	8,957.44	2239.36	29.5%	0.00	0.00	0.0%	0.00	0.00	0.0%
10:00 AM	7,854.39	1963.60	25.8%	0.00	0.00	0.0%	0.00	0.00	0.0%
10:15 AM	7,000.50	1750.13	23.0%	0.00	0.00	0.0%	0.00	0.00	0.0%
10:30 AM	6,164.12	1541.03	20.3%	0.00	0.00	0.0%	0.00	0.00	0.0%
10:45 AM	5,502.61	1375.65	18.1%	0.00	0.00	0.0%	0.00	0.00	0.0%
11:00 AM	4,924.90	1231.23	16.2%	0.00	0.00	0.0%	0.00	0.00	0.0%
11:15 AM	4,573.91	1143.48	15.0%	0.00	0.00	0.0%	0.00	0.00	0.0%
11:30 AM	4,650.30	1162.58	15.3%	0.00	0.00	0.0%	0.00	0.00	0.0%
11:45 AM	4,933.13	1233.28	16.2%	0.00	0.00	0.0%	0.00	0.00	0.0%
12:00 PM	5,276.57	1319.14	17.4%	0.00	0.00	0.0%	0.00	0.00	0.0%
12:15 PM	5,689.89	1422.47	18.7%	0.00	0.00	0.0%	0.00	0.00	0.0%
12:30 PM	6,084.39	1521.10	20.0%	0.00	0.00	0.0%	0.00	0.00	0.0%
12:45 PM	6,546.87	1636.72	21.5%	0.00	0.00	0.0%	0.00	0.00	0.0%
1:00 PM	7,009.64	1752.41	23.1%	0.00	0.00	0.0%	0.00	0.00	0.0%
1:15 PM	7,566.81	1891.70	24.9%	0.00	0.00	0.0%	0.00	0.00	0.0%
1:30 PM	8,124.17	2031.04	26.7%	0.00	0.00	0.0%	0.00	0.00	0.0%
1:45 PM	8,791.72	2197.93	28.9%	0.00	0.00	0.0%	0.00	0.00	0.0%
2:00 PM	9,442.62	2360.66	31.1%	0.00	0.00	0.0%	0.00	0.00	0.0%
2:15 PM	10,052.30	2513.07	33.1%	0.00	0.00	0.0%	0.00	0.00	0.0%
2:30 PM	10,806.53	2701.63	35.6%	0.00	0.00	0.0%	0.00	0.00	0.0%
2:45 PM	11,761.20	2940.30	38.7%	0.00	0.00	0.0%	0.00	0.00	0.0%
3:00 PM	12,774.55	3193.64	42.0%	0.00	0.00	0.0%	0.00	0.00	0.0%
3:15 PM	13,792.14	3448.04	45.4%	0.00	0.00	0.0%	0.00	0.00	0.0%
3:30 PM	14,581.91	3645.48	48.0%	0.00	0.00	0.0%	0.00	0.00	0.0%
3:45 PM	16,349.34	3760.35	53.8%	0.00	0.00	0.0%	0.00	0.00	0.0%
3:57 PM	30,388.70	3342.76	100.0%	0.00	0.00	0.0%	0.00	0.00	0.0%

GRATTAN ELEMENTARY

NOVEMBER 22

Analysis Hours: 7:57 AM-3:54 PM (PST)

JANUARY 18 SIMILAR

Analysis Time	CURRENT SHADOW			NEW SHADOW FROM CPHP			NOT USED		
	Area (sf)	Area/Time (sfh)	Coverage	Area (sf)	Area/Time (sfh)	Coverage	Area (sf)	Area/Time (sfh)	Coverage
7:57 AM	25,219.52	504.39	83.0%	0.00	0.00	0.0%	0.00	0.00	0.0%
8:00 AM	24,828.58	3724.29	81.7%	0.00	0.00	0.0%	0.00	0.00	0.0%
8:15 AM	22,105.59	5526.40	72.7%	0.00	0.00	0.0%	0.00	0.00	0.0%
8:30 AM	19,390.05	4847.51	63.8%	0.00	0.00	0.0%	0.00	0.00	0.0%
8:45 AM	17,059.03	4264.76	56.1%	0.00	0.00	0.0%	0.00	0.00	0.0%
9:00 AM	14,843.88	3710.97	48.8%	0.00	0.00	0.0%	0.00	0.00	0.0%
9:15 AM	13,077.07	3269.27	43.0%	0.00	0.00	0.0%	0.00	0.00	0.0%
9:30 AM	11,371.23	2842.81	37.4%	0.00	0.00	0.0%	0.00	0.00	0.0%
9:45 AM	10,009.98	2502.49	32.9%	0.00	0.00	0.0%	0.00	0.00	0.0%
10:00 AM	8,754.39	2188.60	28.8%	0.00	0.00	0.0%	0.00	0.00	0.0%
10:15 AM	7,769.50	1942.37	25.6%	0.00	0.00	0.0%	0.00	0.00	0.0%
10:30 AM	6,806.49	1701.62	22.4%	0.00	0.00	0.0%	0.00	0.00	0.0%
10:45 AM	6,035.26	1508.82	19.9%	0.00	0.00	0.0%	0.00	0.00	0.0%
11:00 AM	5,351.61	1337.90	17.6%	0.00	0.00	0.0%	0.00	0.00	0.0%
11:15 AM	4,915.49	1228.87	16.2%	0.00	0.00	0.0%	0.00	0.00	0.0%
11:30 AM	4,930.57	1232.64	16.2%	0.00	0.00	0.0%	0.00	0.00	0.0%
11:45 AM	5,218.35	1304.59	17.2%	0.00	0.00	0.0%	0.00	0.00	0.0%
12:00 PM	5,547.41	1386.85	18.2%	0.00	0.00	0.0%	0.00	0.00	0.0%
12:15 PM	5,975.90	1493.98	19.7%	0.00	0.00	0.0%	0.00	0.00	0.0%
12:30 PM	6,372.90	1593.23	21.0%	0.00	0.00	0.0%	0.00	0.00	0.0%
12:45 PM	6,865.73	1716.43	22.6%	0.00	0.00	0.0%	0.00	0.00	0.0%
1:00 PM	7,350.41	1837.60	24.2%	0.00	0.00	0.0%	0.00	0.00	0.0%
1:15 PM	7,954.54	1988.63	26.2%	0.00	0.00	0.0%	0.00	0.00	0.0%
1:30 PM	8,527.95	2131.99	28.1%	0.00	0.00	0.0%	0.00	0.00	0.0%
1:45 PM	9,243.14	2310.79	30.4%	0.00	0.00	0.0%	0.00	0.00	0.0%
2:00 PM	9,911.28	2477.82	32.6%	0.00	0.00	0.0%	0.00	0.00	0.0%
2:15 PM	10,506.98	2626.75	34.6%	0.00	0.00	0.0%	0.00	0.00	0.0%
2:30 PM	11,233.23	2808.31	37.0%	0.00	0.00	0.0%	0.00	0.00	0.0%
2:45 PM	12,184.39	3046.10	40.1%	0.00	0.00	0.0%	0.00	0.00	0.0%
3:00 PM	13,345.64	3336.41	43.9%	0.00	0.00	0.0%	0.00	0.00	0.0%
3:15 PM	14,507.75	3626.94	47.7%	0.00	0.00	0.0%	0.00	0.00	0.0%
3:30 PM	15,550.52	3887.63	51.2%	0.00	0.00	0.0%	0.00	0.00	0.0%
3:45 PM	18,790.94	3758.19	61.8%	0.00	0.00	0.0%	0.00	0.00	0.0%
3:54 PM	30,388.69	2431.10	100.0%	0.00	0.00	0.0%	0.00	0.00	0.0%

NOVEMBER 29

Analysis Hours: 8:04 AM-3:51 PM (PST)

JANUARY 11 SIMILAR

Analysis Time	CURRENT SHADOW			NEW SHADOW FROM CPHP			NOT USED		
	Area (sf)	Area/Time (sfh)	Coverage	Area (sf)	Area/Time (sfh)	Coverage	Area (sf)	Area/Time (sfh)	Coverage
8:04 AM	25,879.89	2329.19	85.1%	0.00	0.00	0.0%	0.00	0.00	0.0%
8:15 AM	23,808.27	4999.74	78.3%	0.00	0.00	0.0%	0.00	0.00	0.0%
8:30 AM	21,003.09	5250.77	69.1%	0.00	0.00	0.0%	0.00	0.00	0.0%
8:45 AM	18,677.32	4669.33	61.4%	0.00	0.00	0.0%	0.00	0.00	0.0%
9:00 AM	16,343.31	4085.83	53.8%	0.00	0.00	0.0%	0.00	0.00	0.0%
9:15 AM	14,516.37	3629.09	47.8%	0.00	0.00	0.0%	0.00	0.00	0.0%
9:30 AM	12,665.00	3166.25	41.7%	0.00	0.00	0.0%	0.00	0.00	0.0%
9:45 AM	11,051.10	2762.78	36.4%	0.00	0.00	0.0%	0.00	0.00	0.0%
10:00 AM	9,616.29	2404.07	31.6%	0.00	0.00	0.0%	0.00	0.00	0.0%
10:15 AM	8,525.61	2131.40	28.0%	0.00	0.00	0.0%	0.00	0.00	0.0%
10:30 AM	7,482.02	1870.50	24.6%	0.00	0.00	0.0%	0.00	0.00	0.0%
10:45 AM	6,608.95	1652.24	21.7%	0.00	0.00	0.0%	0.00	0.00	0.0%
11:00 AM	5,831.23	1457.81	19.2%	0.00	0.00	0.0%	0.00	0.00	0.0%
11:15 AM	5,314.90	1328.73	17.5%	0.00	0.00	0.0%	0.00	0.00	0.0%
11:30 AM	5,253.83	1313.46	17.3%	0.00	0.00	0.0%	0.00	0.00	0.0%
11:45 AM	5,518.14	1379.53	18.2%	0.00	0.00	0.0%	0.00	0.00	0.0%
12:00 PM	5,785.86	1446.46	19.0%	0.00	0.00	0.0%	0.00	0.00	0.0%
12:15 PM	6,257.12	1564.28	20.6%	0.00	0.00	0.0%	0.00	0.00	0.0%
12:30 PM	6,676.12	1669.03	22.0%	0.00	0.00	0.0%	0.00	0.00	0.0%
12:45 PM	7,199.13	1799.78	23.7%	0.00	0.00	0.0%	0.00	0.00	0.0%
1:00 PM	7,701.04	1925.26	25.3%	0.00	0.00	0.0%	0.00	0.00	0.0%
1:15 PM	8,337.13	2084.28	27.4%	0.00	0.00	0.0%	0.00	0.00	0.0%
1:30 PM	8,915.00	2228.75	29.3%	0.00	0.00	0.0%	0.00	0.00	0.0%
1:45 PM	9,641.81	2410.45	31.7%	0.00	0.00	0.0%	0.00	0.00	0.0%
2:00 PM	10,288.99	2572.25	33.8%	0.00	0.00	0.0%	0.00	0.00	0.0%
2:15 PM	10,865.82	2716.46	35.7%	0.00	0.00	0.0%	0.00	0.00	0.0%
2:30 PM	11,535.01	2883.75	37.9%	0.00	0.00	0.0%	0.00	0.00	0.0%
2:45 PM	12,600.39	3150.10	41.5%	0.00	0.00	0.0%	0.00	0.00	0.0%
3:00 PM	13,945.14	3486.29	45.9%	0.00	0.00	0.0%	0.00	0.00	0.0%
3:15 PM	15,214.92	3803.73	50.1%	0.00	0.00	0.0%	0.00	0.00	0.0%
3:30 PM	16,668.15	4167.04	54.8%	0.00	0.00	0.0%	0.00	0.00	0.0%
3:45 PM	30,388.70	5469.97	100.0%	0.00	0.00	0.0%	0.00	0.00	0.0%
3:51 PM	30,388.70	1519.43	100.0%	0.00	0.00	0.0%	0.00	0.00	0.0%

GRATTAN ELEMENTARY

DECEMBER 6

Analysis Hours: 8:10 AM-3:51 PM (PST)

JANUARY 4 SIMILAR

Analysis Time	CURRENT SHADOW			NEW SHADOW FROM CPHP			NOT USED		
	Area (sf)	Area/Time (sfh)	Coverage	Area (sf)	Area/Time (sfh)	Coverage	Area (sf)	Area/Time (sfh)	Coverage
8:10 AM	26,507.72	1060.31	87.2%	0.00	0.00	0.0%	0.00	0.00	0.0%
8:15 AM	25,367.57	4312.49	83.5%	0.00	0.00	0.0%	0.00	0.00	0.0%
8:30 AM	22,456.40	5614.10	73.9%	0.00	0.00	0.0%	0.00	0.00	0.0%
8:45 AM	19,999.29	4999.82	65.8%	0.00	0.00	0.0%	0.00	0.00	0.0%
9:00 AM	17,629.50	4407.38	58.0%	0.00	0.00	0.0%	0.00	0.00	0.0%
9:15 AM	15,783.94	3945.98	51.9%	0.00	0.00	0.0%	0.00	0.00	0.0%
9:30 AM	13,911.74	3477.94	45.8%	0.00	0.00	0.0%	0.00	0.00	0.0%
9:45 AM	12,198.89	3049.72	40.1%	0.00	0.00	0.0%	0.00	0.00	0.0%
10:00 AM	10,474.46	2618.61	34.5%	0.00	0.00	0.0%	0.00	0.00	0.0%
10:15 AM	9,217.41	2304.35	30.3%	0.00	0.00	0.0%	0.00	0.00	0.0%
10:30 AM	8,086.19	2021.55	26.6%	0.00	0.00	0.0%	0.00	0.00	0.0%
10:45 AM	7,160.25	1790.06	23.6%	0.00	0.00	0.0%	0.00	0.00	0.0%
11:00 AM	6,298.23	1574.56	20.7%	0.00	0.00	0.0%	0.00	0.00	0.0%
11:15 AM	5,686.46	1421.62	18.7%	0.00	0.00	0.0%	0.00	0.00	0.0%
11:30 AM	5,517.64	1379.41	18.2%	0.00	0.00	0.0%	0.00	0.00	0.0%
11:45 AM	5,807.23	1451.81	19.1%	0.00	0.00	0.0%	0.00	0.00	0.0%
12:00 PM	6,092.62	1523.16	20.0%	0.00	0.00	0.0%	0.00	0.00	0.0%
12:15 PM	6,528.48	1632.12	21.5%	0.00	0.00	0.0%	0.00	0.00	0.0%
12:30 PM	6,915.76	1728.94	22.8%	0.00	0.00	0.0%	0.00	0.00	0.0%
12:45 PM	7,445.17	1861.29	24.5%	0.00	0.00	0.0%	0.00	0.00	0.0%
1:00 PM	7,956.57	1989.14	26.2%	0.00	0.00	0.0%	0.00	0.00	0.0%
1:15 PM	8,599.23	2149.81	28.3%	0.00	0.00	0.0%	0.00	0.00	0.0%
1:30 PM	9,172.57	2293.14	30.2%	0.00	0.00	0.0%	0.00	0.00	0.0%
1:45 PM	9,901.08	2475.27	32.6%	0.00	0.00	0.0%	0.00	0.00	0.0%
2:00 PM	10,542.75	2635.69	34.7%	0.00	0.00	0.0%	0.00	0.00	0.0%
2:15 PM	11,110.03	2777.51	36.5%	0.00	0.00	0.0%	0.00	0.00	0.0%
2:30 PM	11,784.26	2946.07	38.8%	0.00	0.00	0.0%	0.00	0.00	0.0%
2:45 PM	12,994.62	3248.65	42.7%	0.00	0.00	0.0%	0.00	0.00	0.0%
3:00 PM	14,328.37	3582.09	47.1%	0.00	0.00	0.0%	0.00	0.00	0.0%
3:15 PM	15,858.75	3964.69	52.2%	0.00	0.00	0.0%	0.00	0.00	0.0%
3:30 PM	21,176.05	5294.01	69.7%	0.00	0.00	0.0%	0.00	0.00	0.0%
3:45 PM	30,388.70	5166.08	100.0%	0.00	0.00	0.0%	0.00	0.00	0.0%
3:51 PM	30,388.70	1519.43	100.0%	0.00	0.00	0.0%	0.00	0.00	0.0%

DECEMBER 13

Analysis Hours: 8:15 AM-3:52 PM (PST)

DECEMBER 28 SIMILAR

Analysis Time	CURRENT SHADOW			NEW SHADOW FROM CPHP			NOT USED		
	Area (sf)	Area/Time (sfh)	Coverage	Area (sf)	Area/Time (sfh)	Coverage	Area (sf)	Area/Time (sfh)	Coverage
8:15 AM	26,833.69	3220.04	88.3%	0.00	0.00	0.0%	0.00	0.00	0.0%
8:30 AM	23,704.44	5926.11	78.0%	0.00	0.00	0.0%	0.00	0.00	0.0%
8:45 AM	21,056.58	5264.15	69.3%	0.00	0.00	0.0%	0.00	0.00	0.0%
9:00 AM	18,671.26	4667.82	61.4%	0.00	0.00	0.0%	0.00	0.00	0.0%
9:15 AM	16,722.91	4180.73	55.0%	0.00	0.00	0.0%	0.00	0.00	0.0%
9:30 AM	14,902.85	3725.71	49.0%	0.00	0.00	0.0%	0.00	0.00	0.0%
9:45 AM	13,181.71	3295.43	43.4%	0.00	0.00	0.0%	0.00	0.00	0.0%
10:00 AM	11,307.80	2826.95	37.2%	0.00	0.00	0.0%	0.00	0.00	0.0%
10:15 AM	9,865.45	2466.36	32.5%	0.00	0.00	0.0%	0.00	0.00	0.0%
10:30 AM	8,600.70	2150.17	28.3%	0.00	0.00	0.0%	0.00	0.00	0.0%
10:45 AM	7,617.20	1904.30	25.1%	0.00	0.00	0.0%	0.00	0.00	0.0%
11:00 AM	6,693.26	1673.32	22.0%	0.00	0.00	0.0%	0.00	0.00	0.0%
11:15 AM	5,998.78	1499.69	19.7%	0.00	0.00	0.0%	0.00	0.00	0.0%
11:30 AM	5,690.89	1422.72	18.7%	0.00	0.00	0.0%	0.00	0.00	0.0%
11:45 AM	5,951.02	1487.75	19.6%	0.00	0.00	0.0%	0.00	0.00	0.0%
12:00 PM	6,194.68	1548.67	20.4%	0.00	0.00	0.0%	0.00	0.00	0.0%
12:15 PM	6,639.69	1659.92	21.8%	0.00	0.00	0.0%	0.00	0.00	0.0%
12:30 PM	7,030.40	1757.60	23.1%	0.00	0.00	0.0%	0.00	0.00	0.0%
12:45 PM	7,556.44	1889.11	24.9%	0.00	0.00	0.0%	0.00	0.00	0.0%
1:00 PM	8,062.83	2015.71	26.5%	0.00	0.00	0.0%	0.00	0.00	0.0%
1:15 PM	8,705.52	2176.38	28.6%	0.00	0.00	0.0%	0.00	0.00	0.0%
1:30 PM	9,278.07	2319.52	30.5%	0.00	0.00	0.0%	0.00	0.00	0.0%
1:45 PM	10,000.83	2500.21	32.9%	0.00	0.00	0.0%	0.00	0.00	0.0%
2:00 PM	10,656.18	2664.04	35.1%	0.00	0.00	0.0%	0.00	0.00	0.0%
2:15 PM	11,242.82	2810.70	37.0%	0.00	0.00	0.0%	0.00	0.00	0.0%
2:30 PM	11,964.36	2991.09	39.4%	0.00	0.00	0.0%	0.00	0.00	0.0%
2:45 PM	13,142.50	3285.63	43.2%	0.00	0.00	0.0%	0.00	0.00	0.0%
3:00 PM	14,474.66	3618.67	47.6%	0.00	0.00	0.0%	0.00	0.00	0.0%
3:15 PM	16,137.74	4034.44	53.1%	0.00	0.00	0.0%	0.00	0.00	0.0%
3:30 PM	25,598.33	6399.58	84.2%	0.00	0.00	0.0%	0.00	0.00	0.0%
3:45 PM	30,388.70	5469.97	100.0%	0.00	0.00	0.0%	0.00	0.00	0.0%
3:52 PM	30,388.70	1823.32	100.0%	0.00	0.00	0.0%	0.00	0.00	0.0%

GRATTAN ELEMENTARY

DECEMBER 20

Analysis Hours: 8:19 AM-3:54 PM (PST)

WINTER SOLSTICE
DECEMBER 21 SIMILAR

Analysis Time	CURRENT SHADOW			NEW SHADOW FROM CPHP			NOT USED		
	Area (sf)	Area/Time (sfh)	Coverage	Area (sf)	Area/Time (sfh)	Coverage	Area (sf)	Area/Time (sfh)	Coverage
8:19 AM	26,945.21	2155.62	88.6%	0.00	0.00	0.0%	0.00	0.00	0.0%
8:30 AM	24,622.78	5170.78	81.0%	0.00	0.00	0.0%	0.00	0.00	0.0%
8:45 AM	21,843.69	5460.92	71.9%	0.00	0.00	0.0%	0.00	0.00	0.0%
9:00 AM	19,415.89	4853.97	63.9%	0.00	0.00	0.0%	0.00	0.00	0.0%
9:15 AM	17,332.12	4333.03	57.0%	0.00	0.00	0.0%	0.00	0.00	0.0%
9:30 AM	15,515.87	3878.97	51.0%	0.00	0.00	0.0%	0.00	0.00	0.0%
9:45 AM	13,832.84	3458.21	45.5%	0.00	0.00	0.0%	0.00	0.00	0.0%
10:00 AM	11,906.80	2976.70	39.2%	0.00	0.00	0.0%	0.00	0.00	0.0%
10:15 AM	10,357.84	2589.46	34.1%	0.00	0.00	0.0%	0.00	0.00	0.0%
10:30 AM	8,985.43	2246.36	29.6%	0.00	0.00	0.0%	0.00	0.00	0.0%
10:45 AM	7,946.87	1986.72	26.1%	0.00	0.00	0.0%	0.00	0.00	0.0%
11:00 AM	6,966.48	1741.62	22.9%	0.00	0.00	0.0%	0.00	0.00	0.0%
11:15 AM	6,228.30	1557.08	20.5%	0.00	0.00	0.0%	0.00	0.00	0.0%
11:30 AM	5,779.23	1444.81	19.0%	0.00	0.00	0.0%	0.00	0.00	0.0%
11:45 AM	5,982.77	1495.69	19.7%	0.00	0.00	0.0%	0.00	0.00	0.0%
12:00 PM	6,193.11	1548.28	20.4%	0.00	0.00	0.0%	0.00	0.00	0.0%
12:15 PM	6,626.37	1656.59	21.8%	0.00	0.00	0.0%	0.00	0.00	0.0%
12:30 PM	7,011.16	1752.79	23.1%	0.00	0.00	0.0%	0.00	0.00	0.0%
12:45 PM	7,527.13	1881.78	24.8%	0.00	0.00	0.0%	0.00	0.00	0.0%
1:00 PM	8,022.22	2005.55	26.4%	0.00	0.00	0.0%	0.00	0.00	0.0%
1:15 PM	8,662.65	2165.66	28.5%	0.00	0.00	0.0%	0.00	0.00	0.0%
1:30 PM	9,227.68	2306.92	30.4%	0.00	0.00	0.0%	0.00	0.00	0.0%
1:45 PM	9,937.52	2484.38	32.7%	0.00	0.00	0.0%	0.00	0.00	0.0%
2:00 PM	10,610.24	2652.56	34.9%	0.00	0.00	0.0%	0.00	0.00	0.0%
2:15 PM	11,220.41	2805.10	36.9%	0.00	0.00	0.0%	0.00	0.00	0.0%
2:30 PM	11,923.11	2980.78	39.2%	0.00	0.00	0.0%	0.00	0.00	0.0%
2:45 PM	13,024.82	3256.20	42.8%	0.00	0.00	0.0%	0.00	0.00	0.0%
3:00 PM	14,334.88	3583.72	47.2%	0.00	0.00	0.0%	0.00	0.00	0.0%
3:15 PM	16,027.70	4006.92	52.7%	0.00	0.00	0.0%	0.00	0.00	0.0%
3:30 PM	20,842.95	5210.74	68.6%	0.00	0.00	0.0%	0.00	0.00	0.0%
3:45 PM	30,388.70	6381.63	100.0%	0.00	0.00	0.0%	0.00	0.00	0.0%
3:54 PM	30,388.70	2431.10	100.0%	0.00	0.00	0.0%	0.00	0.00	0.0%

THEORETICAL ANNUAL AVAILABLE SUNLIGHT (TAAS)	GRATTAN ELEMENTARY
Area of Grattan Elementary	0.70 acres (30,398 sf)
Hours of annual available sunlight	3721.4 hrs
TAAS for Grattan Elementary	113,121,457 sfh

EXISTING (CURRENT) LEVELS OF SHADOW	GRATTAN ELEMENTARY
Existing annual total shading on park (sfh)	31,685,678 sfh
Existing shading as percentage of TAAS	28.01%

NEW SHADOW CAST BY THE PROPOSED UCSF PARNASSUS PROJECT	GRATTAN ELEMENTARY
Additional annual shading on Grattan Elementary from Project	72,263 sfh
Additional annual shading from Project as percentage of TAAS	0.06%
Combined total annual shading existing + Project (sfh)	31,757,941 sfh
Combined total annual shading from existing + Project as percentage of TAAS	28.07%
Number of days when new shading from Project would occur	56-68 days annually
Dates when new shadow from Project would be cast on Grattan Elementary	Between 3/23 - 4/25 & 8/17 - 9/19
Annual range in duration of new Project shadow (duration variance +/- 6 min.)	Zero to approx. 20 min
Range in area of new Project shadow (sf)	Zero to 11,866 sf
Average daily duration of new Project shadow (when present)	Approx. 15 min.
MAXIMUM NEW SHADING BY THE PROPOSED PROJECT	GRATTAN ELEMENTARY
Dates of maximum new shading from proposed Project (max sfh)	Apr 5 & Sep 6
Total new shading on date(s) of maximum shading (sfh)	1,661.22 sfh
Percentage new shadow on date(s) of maximum shading	0.51%
Date and duration of longest duration of new shading (duration variance +/- 6 min.)	Approx. 20 min on Aug 30 & Apr 12
Date and time of largest area of new Project shadow	11,866 sf on Sep 6/Apr 5 at 6:31 PM
Percentage of Grattan Elementary covered by largest new shadow	39.04%

THEORETICAL ANNUAL AVAILABLE SUNLIGHT (TAAS) CALCULATION	INDEPENDENCE HIGH SCHOOL
Total plan area of Independence High School	0.46 acres (20,211 sf)
Total hours of annual sunlight from 1-hr after sunrise through 1-hr before sunset	3721.4 hrs
Theoretical Annual Available Sunlight (plan area x hours of annual sunlight)	75,213,781 sfh

EXISTING SHADOW CONDITIONS SUMMARY	INDEPENDENCE HIGH SCHOOL
Total annual existing shadow load (existing shadow sfh ÷ TAAS sfh)	27.51%
Total annual existing shadow in square-foot-hours (sfh)	20,691,122 sfh
Range in existing shadow area coverage throughout the year	Between 0% - 100%
Time of year / time of day most affected by existing shadow	Fall / Early Morning (before 8:00 AM)

UCSF PARNASSUS NET NEW SHADOW SCENARIO SUMMARY	INDEPENDENCE HIGH SCHOOL
Annual net new project-only shadow load / Total existing + project shadow load	0.10% / 27.61%
Annual net new sfh project shadow / Total existing + project sfh	71,604 sfh / 20,762,727 sfh
Number of days annually when new shading from project would occur	Up to 152 days a year
Dates when net new shadow from project would be cast annually	2/9 - 4/25 & 8/17 - 10/31
Date(s) with most annual sfh net new project shadow (shadow load / net new sfh)	October 11 & March 1
Time of year / time of day most affected by project net new shadow overall	Winter / Early Morning (before 8:00 AM)
Date(s) with largest shadow area from the project (area and time shadow occurs)	Aug 30/Apr 12 (6,002 sf @ 7:37 AM)
Range in project net new shadow percentage coverage (area range)	Between 0% - 30% (0 - 6,002 sf)
Average project net new shadow coverage on affected dates (shadow area)	16.08% (3,251 sf)
Date(s) with the longest duration of net new shadow (duration)	Oct 4/Mar 8 (28 min +/- 7 min)
Range in daily project net new shadow duration (margin of error)	Between zero minutes up to 28 min (+/- 7 min)
Average daily project net new shadow duration on affected dates	15.2 minutes

PROJECT: UCSF Parnassus
OPEN SPACE: Independence High School

JUNE 21

Summer solstice
Analysis hours: 6:46 AM-7:36 PM (PDT)

Analysis Time	EXISTING SHADOW			UCSF PARNASSUS NET NEW SHADOW		
	Shadow Area (sf)	Area/Time (sfh)	Coverage	Shadow Area (sf)	Area/Time (sfh)	Coverage
6:46 AM	13,854.20	1,523.96	68.7%	0.00	0.00	0.0%
7:00 AM	10,071.85	2,316.53	49.9%	0.00	0.00	0.0%
7:15 AM	6,795.22	1,698.81	33.7%	0.00	0.00	0.0%
7:30 AM	4,384.73	1,096.18	21.7%	0.00	0.00	0.0%
7:45 AM	2,556.56	639.14	12.7%	0.00	0.00	0.0%
8:00 AM	1,211.76	302.94	6.0%	0.00	0.00	0.0%
8:15 AM	593.85	148.46	2.9%	0.00	0.00	0.0%
8:30 AM	298.08	74.52	1.5%	0.00	0.00	0.0%
8:45 AM	133.40	33.35	0.7%	0.00	0.00	0.0%
9:00 AM	20.49	5.12	0.1%	0.00	0.00	0.0%
9:15 AM	57.36	14.34	0.3%	0.00	0.00	0.0%
9:30 AM	128.08	32.02	0.6%	0.00	0.00	0.0%
9:45 AM	189.15	47.29	0.9%	0.00	0.00	0.0%
10:00 AM	235.03	58.76	1.2%	0.00	0.00	0.0%
10:15 AM	276.99	69.25	1.4%	0.00	0.00	0.0%
10:30 AM	305.81	76.45	1.5%	0.00	0.00	0.0%
10:45 AM	334.96	83.74	1.7%	0.00	0.00	0.0%
11:00 AM	351.44	87.86	1.7%	0.00	0.00	0.0%
11:15 AM	371.89	92.97	1.8%	0.00	0.00	0.0%
11:30 AM	378.52	94.63	1.9%	0.00	0.00	0.0%
11:45 AM	392.83	98.21	1.9%	0.00	0.00	0.0%
12:00 PM	390.92	97.73	1.9%	0.00	0.00	0.0%
12:15 PM	401.09	100.27	2.0%	0.00	0.00	0.0%
12:30 PM	391.40	97.85	1.9%	0.00	0.00	0.0%
12:45 PM	397.33	99.33	2.0%	0.00	0.00	0.0%
1:00 PM	381.45	95.36	1.9%	0.00	0.00	0.0%
1:15 PM	388.68	97.17	1.9%	0.00	0.00	0.0%
1:30 PM	576.42	144.10	2.9%	0.00	0.00	0.0%
1:45 PM	789.05	197.26	3.9%	0.00	0.00	0.0%
2:00 PM	1,020.55	255.14	5.1%	0.00	0.00	0.0%
2:15 PM	1,417.86	354.47	7.0%	0.00	0.00	0.0%
2:30 PM	1,815.45	453.86	9.0%	0.00	0.00	0.0%
2:45 PM	2,232.32	558.08	11.1%	0.00	0.00	0.0%
3:00 PM	2,638.99	659.75	13.1%	0.00	0.00	0.0%
3:15 PM	3,070.13	767.53	15.2%	0.00	0.00	0.0%
3:30 PM	3,503.25	875.81	17.4%	0.00	0.00	0.0%
3:45 PM	3,965.98	991.49	19.7%	0.00	0.00	0.0%
4:00 PM	4,438.52	1,109.63	22.0%	0.00	0.00	0.0%
4:15 PM	4,946.85	1,236.71	24.5%	0.00	0.00	0.0%
4:30 PM	5,475.54	1,368.89	27.1%	0.00	0.00	0.0%
4:45 PM	6,195.16	1,548.79	30.7%	0.00	0.00	0.0%
5:00 PM	7,095.81	1,773.95	35.2%	0.00	0.00	0.0%
5:15 PM	8,112.87	2,028.22	40.2%	0.00	0.00	0.0%
5:30 PM	9,237.11	2,309.28	45.8%	0.00	0.00	0.0%
5:45 PM	10,273.13	2,568.28	50.9%	0.00	0.00	0.0%
6:00 PM	11,417.38	2,854.35	56.6%	0.00	0.00	0.0%
6:15 PM	12,688.70	3,172.18	62.9%	0.00	0.00	0.0%
6:30 PM	14,137.58	3,534.40	70.1%	0.00	0.00	0.0%
6:45 PM	15,730.06	3,932.52	78.0%	0.00	0.00	0.0%
7:00 PM	16,268.00	4,067.00	80.6%	0.00	0.00	0.0%
7:15 PM	15,992.24	4,797.67	79.3%	0.00	0.00	0.0%
7:36 PM	15,595.67	2,807.22	77.3%	0.00	0.00	0.0%

PROJECT: UCSF Parnassus
OPEN SPACE: Independence High School

JUNE 28

Mirror date: June 14
Analysis hours: 6:48 AM-7:36 PM (PDT)

Analysis Time	EXISTING SHADOW			UCSF PARNASSUS NET NEW SHADOW		
	Shadow Area (sf)	Area/Time (sfh)	Coverage	Shadow Area (sf)	Area/Time (sfh)	Coverage
6:48 AM	13,845.17	1,384.52	68.6%	0.00	0.00	0.0%
7:00 AM	10,589.29	2,329.64	52.5%	0.00	0.00	0.0%
7:15 AM	7,183.31	1,795.83	35.6%	0.00	0.00	0.0%
7:30 AM	4,655.73	1,163.93	23.1%	0.00	0.00	0.0%
7:45 AM	2,771.25	692.81	13.7%	0.00	0.00	0.0%
8:00 AM	1,316.01	329.00	6.5%	0.00	0.00	0.0%
8:15 AM	636.03	159.01	3.2%	0.00	0.00	0.0%
8:30 AM	309.49	77.37	1.5%	0.00	0.00	0.0%
8:45 AM	138.93	34.73	0.7%	0.00	0.00	0.0%
9:00 AM	22.88	5.72	0.1%	0.00	0.00	0.0%
9:15 AM	56.41	14.10	0.3%	0.00	0.00	0.0%
9:30 AM	128.28	32.07	0.6%	0.00	0.00	0.0%
9:45 AM	190.28	47.57	0.9%	0.00	0.00	0.0%
10:00 AM	236.90	59.23	1.2%	0.00	0.00	0.0%
10:15 AM	279.38	69.84	1.4%	0.00	0.00	0.0%
10:30 AM	308.73	77.18	1.5%	0.00	0.00	0.0%
10:45 AM	338.25	84.56	1.7%	0.00	0.00	0.0%
11:00 AM	355.06	88.77	1.8%	0.00	0.00	0.0%
11:15 AM	375.69	93.92	1.9%	0.00	0.00	0.0%
11:30 AM	382.58	95.64	1.9%	0.00	0.00	0.0%
11:45 AM	397.19	99.30	2.0%	0.00	0.00	0.0%
12:00 PM	395.44	98.86	2.0%	0.00	0.00	0.0%
12:15 PM	405.67	101.42	2.0%	0.00	0.00	0.0%
12:30 PM	396.33	99.08	2.0%	0.00	0.00	0.0%
12:45 PM	402.22	100.56	2.0%	0.00	0.00	0.0%
1:00 PM	386.55	96.64	1.9%	0.00	0.00	0.0%
1:15 PM	392.03	98.01	1.9%	0.00	0.00	0.0%
1:30 PM	561.04	140.26	2.8%	0.00	0.00	0.0%
1:45 PM	774.33	193.58	3.8%	0.00	0.00	0.0%
2:00 PM	989.40	247.35	4.9%	0.00	0.00	0.0%
2:15 PM	1,387.22	346.80	6.9%	0.00	0.00	0.0%
2:30 PM	1,783.99	446.00	8.8%	0.00	0.00	0.0%
2:45 PM	2,200.59	550.15	10.9%	0.00	0.00	0.0%
3:00 PM	2,611.18	652.80	12.9%	0.00	0.00	0.0%
3:15 PM	3,042.60	760.65	15.1%	0.00	0.00	0.0%
3:30 PM	3,475.47	868.87	17.2%	0.00	0.00	0.0%
3:45 PM	3,938.17	984.54	19.5%	0.00	0.00	0.0%
4:00 PM	4,410.42	1,102.60	21.9%	0.00	0.00	0.0%
4:15 PM	4,918.46	1,229.61	24.4%	0.00	0.00	0.0%
4:30 PM	5,446.49	1,361.62	27.0%	0.00	0.00	0.0%
4:45 PM	6,122.10	1,530.53	30.3%	0.00	0.00	0.0%
5:00 PM	7,015.14	1,753.78	34.8%	0.00	0.00	0.0%
5:15 PM	8,023.17	2,005.79	39.8%	0.00	0.00	0.0%
5:30 PM	9,172.92	2,293.23	45.5%	0.00	0.00	0.0%
5:45 PM	10,206.41	2,551.60	50.6%	0.00	0.00	0.0%
6:00 PM	11,347.81	2,836.95	56.3%	0.00	0.00	0.0%
6:15 PM	12,616.42	3,154.10	62.5%	0.00	0.00	0.0%
6:30 PM	14,055.31	3,513.83	69.7%	0.00	0.00	0.0%
6:45 PM	15,681.33	3,920.33	77.7%	0.00	0.00	0.0%
7:00 PM	16,312.88	4,078.22	80.9%	0.00	0.00	0.0%
7:15 PM	16,036.17	4,810.85	79.5%	0.00	0.00	0.0%
7:36 PM	15,626.20	2,812.72	77.5%	0.00	0.00	0.0%

PROJECT: UCSF Parnassus
OPEN SPACE: Independence High School

JULY 5

Mirror date: June 7
Analysis hours: 6:52 AM-7:36 PM (PDT)

Analysis Time	EXISTING SHADOW			UCSF PARNASSUS NET NEW SHADOW		
	Shadow Area (sf)	Area/Time (sfh)	Coverage	Shadow Area (sf)	Area/Time (sfh)	Coverage
6:52 AM	13,801.47	828.09	68.4%	0.00	0.00	0.0%
7:00 AM	11,403.71	2,166.70	56.5%	0.00	0.00	0.0%
7:15 AM	7,771.59	1,942.90	38.5%	0.00	0.00	0.0%
7:30 AM	5,051.50	1,262.88	25.0%	0.00	0.00	0.0%
7:45 AM	3,077.88	769.47	15.3%	0.00	0.00	0.0%
8:00 AM	1,497.23	374.31	7.4%	0.00	0.00	0.0%
8:15 AM	680.37	170.09	3.4%	0.00	0.00	0.0%
8:30 AM	301.22	75.30	1.5%	0.00	0.00	0.0%
8:45 AM	124.32	31.08	0.6%	0.00	0.00	0.0%
9:00 AM	18.16	4.54	0.1%	0.00	0.00	0.0%
9:15 AM	71.20	17.80	0.4%	0.00	0.00	0.0%
9:30 AM	143.95	35.99	0.7%	0.00	0.00	0.0%
9:45 AM	206.19	51.55	1.0%	0.00	0.00	0.0%
10:00 AM	252.80	63.20	1.3%	0.00	0.00	0.0%
10:15 AM	295.28	73.82	1.5%	0.00	0.00	0.0%
10:30 AM	324.51	81.13	1.6%	0.00	0.00	0.0%
10:45 AM	353.88	88.47	1.8%	0.00	0.00	0.0%
11:00 AM	370.53	92.63	1.8%	0.00	0.00	0.0%
11:15 AM	391.06	97.77	1.9%	0.00	0.00	0.0%
11:30 AM	397.75	99.44	2.0%	0.00	0.00	0.0%
11:45 AM	412.18	103.05	2.0%	0.00	0.00	0.0%
12:00 PM	410.39	102.60	2.0%	0.00	0.00	0.0%
12:15 PM	420.31	105.08	2.1%	0.00	0.00	0.0%
12:30 PM	411.00	102.75	2.0%	0.00	0.00	0.0%
12:45 PM	416.70	104.18	2.1%	0.00	0.00	0.0%
1:00 PM	401.22	100.31	2.0%	0.00	0.00	0.0%
1:15 PM	405.63	101.41	2.0%	0.00	0.00	0.0%
1:30 PM	559.83	139.96	2.8%	0.00	0.00	0.0%
1:45 PM	774.49	193.62	3.8%	0.00	0.00	0.0%
2:00 PM	980.06	245.02	4.9%	0.00	0.00	0.0%
2:15 PM	1,379.56	344.89	6.8%	0.00	0.00	0.0%
2:30 PM	1,776.78	444.19	8.8%	0.00	0.00	0.0%
2:45 PM	2,193.93	548.48	10.9%	0.00	0.00	0.0%
3:00 PM	2,618.11	654.53	13.0%	0.00	0.00	0.0%
3:15 PM	3,052.87	763.22	15.1%	0.00	0.00	0.0%
3:30 PM	3,489.33	872.33	17.3%	0.00	0.00	0.0%
3:45 PM	3,955.76	988.94	19.6%	0.00	0.00	0.0%
4:00 PM	4,432.10	1,108.03	22.0%	0.00	0.00	0.0%
4:15 PM	4,944.86	1,236.22	24.5%	0.00	0.00	0.0%
4:30 PM	5,477.94	1,369.49	27.2%	0.00	0.00	0.0%
4:45 PM	6,087.57	1,521.89	30.2%	0.00	0.00	0.0%
5:00 PM	6,976.39	1,744.10	34.6%	0.00	0.00	0.0%
5:15 PM	7,985.02	1,996.26	39.6%	0.00	0.00	0.0%
5:30 PM	9,148.45	2,287.11	45.3%	0.00	0.00	0.0%
5:45 PM	10,241.22	2,560.31	50.8%	0.00	0.00	0.0%
6:00 PM	11,398.93	2,849.73	56.5%	0.00	0.00	0.0%
6:15 PM	12,688.06	3,172.02	62.9%	0.00	0.00	0.0%
6:30 PM	14,158.84	3,539.71	70.2%	0.00	0.00	0.0%
6:45 PM	15,792.91	3,948.23	78.3%	0.00	0.00	0.0%
7:00 PM	16,392.39	4,098.10	81.3%	0.00	0.00	0.0%
7:15 PM	16,116.91	4,835.07	79.9%	0.00	0.00	0.0%
7:36 PM	15,721.01	2,829.78	77.9%	0.00	0.00	0.0%

PROJECT: UCSF Parnassus
OPEN SPACE: Independence High School

JULY 12

Mirror date: May 31
Analysis hours: 6:56 AM-7:33 PM (PDT)

Analysis Time	EXISTING SHADOW			UCSF PARNASSUS NET NEW SHADOW		
	Shadow Area (sf)	Area/Time (sfh)	Coverage	Shadow Area (sf)	Area/Time (sfh)	Coverage
6:56 AM	13,715.81	411.47	68.0%	0.00	0.00	0.0%
7:00 AM	12,561.91	1,884.29	62.3%	0.00	0.00	0.0%
7:15 AM	8,592.05	2,148.01	42.6%	0.00	0.00	0.0%
7:30 AM	5,599.59	1,399.90	27.8%	0.00	0.00	0.0%
7:45 AM	3,487.26	871.82	17.3%	0.00	0.00	0.0%
8:00 AM	1,792.78	448.19	8.9%	0.00	0.00	0.0%
8:15 AM	753.81	188.45	3.7%	0.00	0.00	0.0%
8:30 AM	274.51	68.63	1.4%	0.00	0.00	0.0%
8:45 AM	89.26	22.31	0.4%	0.00	0.00	0.0%
9:00 AM	23.91	5.98	0.1%	0.00	0.00	0.0%
9:15 AM	103.55	25.89	0.5%	0.00	0.00	0.0%
9:30 AM	175.69	43.92	0.9%	0.00	0.00	0.0%
9:45 AM	237.49	59.37	1.2%	0.00	0.00	0.0%
10:00 AM	283.24	70.81	1.4%	0.00	0.00	0.0%
10:15 AM	325.10	81.27	1.6%	0.00	0.00	0.0%
10:30 AM	353.48	88.37	1.8%	0.00	0.00	0.0%
10:45 AM	382.24	95.56	1.9%	0.00	0.00	0.0%
11:00 AM	398.08	99.52	2.0%	0.00	0.00	0.0%
11:15 AM	418.04	104.51	2.1%	0.00	0.00	0.0%
11:30 AM	424.10	106.03	2.1%	0.00	0.00	0.0%
11:45 AM	437.98	109.49	2.2%	0.00	0.00	0.0%
12:00 PM	435.83	108.96	2.2%	0.00	0.00	0.0%
12:15 PM	445.14	111.28	2.2%	0.00	0.00	0.0%
12:30 PM	435.64	108.91	2.2%	0.00	0.00	0.0%
12:45 PM	440.73	110.18	2.2%	0.00	0.00	0.0%
1:00 PM	425.28	106.32	2.1%	0.00	0.00	0.0%
1:15 PM	428.58	107.14	2.1%	0.00	0.00	0.0%
1:30 PM	572.89	143.22	2.8%	0.00	0.00	0.0%
1:45 PM	790.10	197.52	3.9%	0.00	0.00	0.0%
2:00 PM	996.89	249.22	4.9%	0.00	0.00	0.0%
2:15 PM	1,394.95	348.74	6.9%	0.00	0.00	0.0%
2:30 PM	1,794.22	448.56	8.9%	0.00	0.00	0.0%
2:45 PM	2,213.65	553.41	11.0%	0.00	0.00	0.0%
3:00 PM	2,646.35	661.59	13.1%	0.00	0.00	0.0%
3:15 PM	3,101.33	775.33	15.4%	0.00	0.00	0.0%
3:30 PM	3,544.94	886.23	17.6%	0.00	0.00	0.0%
3:45 PM	4,019.49	1,004.87	19.9%	0.00	0.00	0.0%
4:00 PM	4,504.51	1,126.13	22.3%	0.00	0.00	0.0%
4:15 PM	5,027.56	1,256.89	24.9%	0.00	0.00	0.0%
4:30 PM	5,571.56	1,392.89	27.6%	0.00	0.00	0.0%
4:45 PM	6,163.73	1,540.93	30.6%	0.00	0.00	0.0%
5:00 PM	6,981.38	1,745.34	34.6%	0.00	0.00	0.0%
5:15 PM	7,999.60	1,999.90	39.7%	0.00	0.00	0.0%
5:30 PM	9,177.50	2,294.38	45.5%	0.00	0.00	0.0%
5:45 PM	10,380.34	2,595.09	51.5%	0.00	0.00	0.0%
6:00 PM	11,573.68	2,893.42	57.4%	0.00	0.00	0.0%
6:15 PM	12,908.68	3,227.17	64.0%	0.00	0.00	0.0%
6:30 PM	14,459.43	3,614.86	71.7%	0.00	0.00	0.0%
6:45 PM	16,065.60	4,016.40	79.6%	0.00	0.00	0.0%
7:00 PM	16,504.07	4,126.02	81.8%	0.00	0.00	0.0%
7:15 PM	16,227.39	4,543.67	80.4%	0.00	0.00	0.0%
7:33 PM	15,876.16	2,381.42	78.7%	0.00	0.00	0.0%

PROJECT: UCSF Parnassus
OPEN SPACE: Independence High School

JULY 19

Mirror date: May 24
Analysis hours: 7:01 AM-7:30 PM (PDT)

Analysis Time	EXISTING SHADOW			UCSF PARNASSUS NET NEW SHADOW		
	Shadow Area (sf)	Area/Time (sfh)	Coverage	Shadow Area (sf)	Area/Time (sfh)	Coverage
7:01 AM	13,660.73	1,775.89	67.7%	0.00	0.00	0.0%
7:16 AM	9,347.08	2,243.30	46.3%	0.00	0.00	0.0%
7:30 AM	6,326.86	1,518.45	31.4%	0.00	0.00	0.0%
7:45 AM	3,986.65	996.66	19.8%	0.00	0.00	0.0%
8:00 AM	2,175.99	544.00	10.8%	0.00	0.00	0.0%
8:15 AM	861.08	215.27	4.3%	0.00	0.00	0.0%
8:30 AM	246.19	61.55	1.2%	0.00	0.00	0.0%
8:45 AM	36.16	9.04	0.2%	0.00	0.00	0.0%
9:00 AM	62.64	15.66	0.3%	0.00	0.00	0.0%
9:15 AM	155.17	38.79	0.8%	0.00	0.00	0.0%
9:30 AM	225.32	56.33	1.1%	0.00	0.00	0.0%
9:45 AM	285.34	71.34	1.4%	0.00	0.00	0.0%
10:00 AM	329.22	82.30	1.6%	0.00	0.00	0.0%
10:15 AM	369.62	92.40	1.8%	0.00	0.00	0.0%
10:30 AM	396.15	99.04	2.0%	0.00	0.00	0.0%
10:45 AM	423.69	105.92	2.1%	0.00	0.00	0.0%
11:00 AM	438.07	109.52	2.2%	0.00	0.00	0.0%
11:15 AM	457.00	114.25	2.3%	0.00	0.00	0.0%
11:30 AM	461.95	115.49	2.3%	0.00	0.00	0.0%
11:45 AM	474.85	118.71	2.4%	0.00	0.00	0.0%
12:00 PM	471.82	117.95	2.3%	0.00	0.00	0.0%
12:15 PM	480.11	120.03	2.4%	0.00	0.00	0.0%
12:30 PM	470.18	117.55	2.3%	0.00	0.00	0.0%
12:45 PM	474.22	118.55	2.4%	0.00	0.00	0.0%
1:00 PM	458.63	114.66	2.3%	0.00	0.00	0.0%
1:15 PM	461.02	115.26	2.3%	0.00	0.00	0.0%
1:30 PM	603.28	150.82	3.0%	0.00	0.00	0.0%
1:45 PM	823.93	205.98	4.1%	0.00	0.00	0.0%
2:00 PM	1,034.55	258.64	5.1%	0.00	0.00	0.0%
2:15 PM	1,439.38	359.84	7.1%	0.00	0.00	0.0%
2:30 PM	1,842.17	460.54	9.1%	0.00	0.00	0.0%
2:45 PM	2,265.49	566.37	11.2%	0.00	0.00	0.0%
3:00 PM	2,702.98	675.74	13.4%	0.00	0.00	0.0%
3:15 PM	3,167.69	791.92	15.7%	0.00	0.00	0.0%
3:30 PM	3,649.31	912.33	18.1%	0.00	0.00	0.0%
3:45 PM	4,136.87	1,034.22	20.5%	0.00	0.00	0.0%
4:00 PM	4,635.28	1,158.82	23.0%	0.00	0.00	0.0%
4:15 PM	5,174.66	1,293.66	25.7%	0.00	0.00	0.0%
4:30 PM	5,736.24	1,434.06	28.4%	0.00	0.00	0.0%
4:45 PM	6,350.19	1,587.55	31.5%	0.00	0.00	0.0%
5:00 PM	7,045.06	1,761.27	34.9%	0.00	0.00	0.0%
5:15 PM	8,081.30	2,020.32	40.1%	0.00	0.00	0.0%
5:30 PM	9,289.33	2,322.33	46.0%	0.00	0.00	0.0%
5:45 PM	10,644.12	2,661.03	52.8%	0.00	0.00	0.0%
6:00 PM	11,898.10	2,974.53	59.0%	0.00	0.00	0.0%
6:15 PM	13,313.04	3,328.26	66.0%	0.00	0.00	0.0%
6:30 PM	14,999.33	3,749.83	74.4%	0.00	0.00	0.0%
6:45 PM	16,541.82	4,135.45	82.0%	0.00	0.00	0.0%
7:00 PM	16,641.29	4,160.32	82.5%	0.00	0.00	0.0%
7:15 PM	16,366.22	4,091.55	81.1%	0.00	0.00	0.0%
7:30 PM	16,083.61	2,090.87	79.7%	0.00	0.00	0.0%

PROJECT: UCSF Parnassus
OPEN SPACE: Independence High School

JULY 26

Mirror date: May 17
Analysis hours: 7:07 AM-7:25 PM (PDT)

Analysis Time	EXISTING SHADOW			UCSF PARNASSUS NET NEW SHADOW		
	Shadow Area (sf)	Area/Time (sfh)	Coverage	Shadow Area (sf)	Area/Time (sfh)	Coverage
7:07 AM	13,613.87	816.83	67.5%	0.00	0.00	0.0%
7:15 AM	11,134.84	2,115.62	55.2%	0.00	0.00	0.0%
7:30 AM	7,277.11	1,819.28	36.1%	0.00	0.00	0.0%
7:45 AM	4,611.24	1,152.81	22.9%	0.00	0.00	0.0%
8:00 AM	2,646.73	661.68	13.1%	0.00	0.00	0.0%
8:15 AM	1,039.03	259.76	5.2%	0.00	0.00	0.0%
8:30 AM	241.89	60.47	1.2%	0.00	0.00	0.0%
8:45 AM	39.44	9.86	0.2%	0.00	0.00	0.0%
9:00 AM	136.92	34.23	0.7%	0.00	0.00	0.0%
9:15 AM	226.58	56.65	1.1%	0.00	0.00	0.0%
9:30 AM	293.19	73.30	1.5%	0.00	0.00	0.0%
9:45 AM	350.40	87.60	1.7%	0.00	0.00	0.0%
10:00 AM	391.04	97.76	1.9%	0.00	0.00	0.0%
10:15 AM	428.92	107.23	2.1%	0.00	0.00	0.0%
10:30 AM	452.93	113.23	2.2%	0.00	0.00	0.0%
10:45 AM	478.47	119.62	2.4%	0.00	0.00	0.0%
11:00 AM	490.60	122.65	2.4%	0.00	0.00	0.0%
11:15 AM	507.98	126.99	2.5%	0.00	0.00	0.0%
11:30 AM	511.10	127.77	2.5%	0.00	0.00	0.0%
11:45 AM	522.61	130.65	2.6%	0.00	0.00	0.0%
12:00 PM	518.24	129.56	2.6%	0.00	0.00	0.0%
12:15 PM	525.26	131.32	2.6%	0.00	0.00	0.0%
12:30 PM	514.48	128.62	2.6%	0.00	0.00	0.0%
12:45 PM	517.33	129.33	2.6%	0.00	0.00	0.0%
1:00 PM	501.33	125.33	2.5%	0.00	0.00	0.0%
1:15 PM	502.81	125.70	2.5%	0.00	0.00	0.0%
1:30 PM	649.55	162.39	3.2%	0.00	0.00	0.0%
1:45 PM	874.78	218.70	4.3%	0.00	0.00	0.0%
2:00 PM	1,099.33	274.83	5.4%	0.00	0.00	0.0%
2:15 PM	1,509.75	377.44	7.5%	0.00	0.00	0.0%
2:30 PM	1,917.19	479.30	9.5%	0.00	0.00	0.0%
2:45 PM	2,346.11	586.53	11.6%	0.00	0.00	0.0%
3:00 PM	2,790.31	697.58	13.8%	0.00	0.00	0.0%
3:15 PM	3,262.50	815.63	16.2%	0.00	0.00	0.0%
3:30 PM	3,758.42	939.61	18.6%	0.00	0.00	0.0%
3:45 PM	4,294.44	1,073.61	21.3%	0.00	0.00	0.0%
4:00 PM	4,823.11	1,205.78	23.9%	0.00	0.00	0.0%
4:15 PM	5,384.76	1,346.19	26.7%	0.00	0.00	0.0%
4:30 PM	5,971.28	1,492.82	29.6%	0.00	0.00	0.0%
4:45 PM	6,615.30	1,653.82	32.8%	0.00	0.00	0.0%
5:00 PM	7,305.09	1,826.27	36.2%	0.00	0.00	0.0%
5:15 PM	8,225.22	2,056.31	40.8%	0.00	0.00	0.0%
5:30 PM	9,477.31	2,369.33	47.0%	0.00	0.00	0.0%
5:45 PM	10,945.13	2,736.28	54.3%	0.00	0.00	0.0%
6:00 PM	12,378.79	3,094.70	61.4%	0.00	0.00	0.0%
6:15 PM	13,913.85	3,478.46	69.0%	0.00	0.00	0.0%
6:30 PM	15,801.22	3,950.30	78.3%	0.00	0.00	0.0%
6:45 PM	17,039.57	4,259.89	84.5%	0.00	0.00	0.0%
7:00 PM	16,802.65	4,200.66	83.3%	0.00	0.00	0.0%
7:15 PM	16,530.54	3,471.41	81.9%	0.00	0.00	0.0%
7:25 PM	16,341.68	1,470.75	81.0%	0.00	0.00	0.0%

PROJECT: UCSF Parnassus
OPEN SPACE: Independence High School

AUGUST 2

Mirror date: May 10
Analysis hours: 7:12 AM-7:18 PM (PDT)

Analysis Time	EXISTING SHADOW			UCSF PARNASSUS NET NEW SHADOW		
	Shadow Area (sf)	Area/Time (sfh)	Coverage	Shadow Area (sf)	Area/Time (sfh)	Coverage
7:12 AM	13,593.18	271.86	67.4%	0.00	0.00	0.0%
7:15 AM	12,784.64	1,917.70	63.4%	0.00	0.00	0.0%
7:30 AM	8,467.35	2,116.84	42.0%	0.00	0.00	0.0%
7:45 AM	5,371.22	1,342.81	26.6%	0.00	0.00	0.0%
8:00 AM	3,167.42	791.86	15.7%	0.00	0.00	0.0%
8:15 AM	1,376.83	344.21	6.8%	0.00	0.00	0.0%
8:30 AM	331.32	82.83	1.6%	0.00	0.00	0.0%
8:45 AM	151.72	37.93	0.8%	0.00	0.00	0.0%
9:00 AM	237.44	59.36	1.2%	0.00	0.00	0.0%
9:15 AM	320.60	80.15	1.6%	0.00	0.00	0.0%
9:30 AM	381.54	95.39	1.9%	0.00	0.00	0.0%
9:45 AM	434.04	108.51	2.2%	0.00	0.00	0.0%
10:00 AM	470.03	117.51	2.3%	0.00	0.00	0.0%
10:15 AM	504.10	126.02	2.5%	0.00	0.00	0.0%
10:30 AM	524.28	131.07	2.6%	0.00	0.00	0.0%
10:45 AM	546.93	136.73	2.7%	0.00	0.00	0.0%
11:00 AM	556.06	139.01	2.8%	0.00	0.00	0.0%
11:15 AM	571.09	142.77	2.8%	0.00	0.00	0.0%
11:30 AM	571.81	142.95	2.8%	0.00	0.00	0.0%
11:45 AM	581.45	145.36	2.9%	0.00	0.00	0.0%
12:00 PM	575.22	143.81	2.9%	0.00	0.00	0.0%
12:15 PM	580.53	145.13	2.9%	0.00	0.00	0.0%
12:30 PM	568.59	142.15	2.8%	0.00	0.00	0.0%
12:45 PM	569.69	142.42	2.8%	0.00	0.00	0.0%
1:00 PM	553.01	138.25	2.7%	0.00	0.00	0.0%
1:15 PM	554.08	138.52	2.7%	0.00	0.00	0.0%
1:30 PM	715.74	178.94	3.5%	0.00	0.00	0.0%
1:45 PM	946.71	236.68	4.7%	0.00	0.00	0.0%
2:00 PM	1,196.83	299.21	5.9%	0.00	0.00	0.0%
2:15 PM	1,612.38	403.09	8.0%	0.00	0.00	0.0%
2:30 PM	2,026.18	506.55	10.0%	0.00	0.00	0.0%
2:45 PM	2,462.98	615.74	12.2%	0.00	0.00	0.0%
3:00 PM	2,915.98	728.99	14.5%	0.00	0.00	0.0%
3:15 PM	3,398.77	849.69	16.8%	0.00	0.00	0.0%
3:30 PM	3,906.94	976.74	19.4%	0.00	0.00	0.0%
3:45 PM	4,457.54	1,114.39	22.1%	0.00	0.00	0.0%
4:00 PM	5,049.36	1,262.34	25.0%	0.00	0.00	0.0%
4:15 PM	5,672.60	1,418.15	28.1%	0.00	0.00	0.0%
4:30 PM	6,292.29	1,573.07	31.2%	0.00	0.00	0.0%
4:45 PM	6,977.81	1,744.45	34.6%	0.00	0.00	0.0%
5:00 PM	7,714.33	1,928.58	38.2%	0.00	0.00	0.0%
5:15 PM	8,539.67	2,134.92	42.3%	0.00	0.00	0.0%
5:30 PM	9,769.48	2,442.37	48.4%	0.00	0.00	0.0%
5:45 PM	11,327.74	2,831.93	56.2%	0.00	0.00	0.0%
6:00 PM	13,069.74	3,267.43	64.8%	0.00	0.00	0.0%
6:15 PM	14,807.39	3,701.85	73.4%	0.00	0.00	0.0%
6:30 PM	16,732.30	4,183.07	82.9%	0.00	0.00	0.0%
6:45 PM	17,244.08	4,311.02	85.5%	0.00	0.00	0.0%
7:00 PM	16,979.25	4,244.81	84.2%	0.00	0.00	0.0%
7:15 PM	16,706.17	2,505.93	82.8%	0.00	0.00	0.0%
7:18 PM	16,639.71	499.19	82.5%	0.00	0.00	0.0%

PROJECT: UCSF Parnassus
OPEN SPACE: Independence High School

AUGUST 9

Mirror date: May 3
Analysis hours: 7:19 AM-7:10 PM (PDT)

Analysis Time	EXISTING SHADOW			UCSF PARNASSUS NET NEW SHADOW		
	Shadow Area (sf)	Area/Time (sfh)	Coverage	Shadow Area (sf)	Area/Time (sfh)	Coverage
7:19 AM	13,535.11	1,218.16	67.1%	0.00	0.00	0.0%
7:30 AM	10,006.74	2,101.41	49.6%	0.00	0.00	0.0%
7:45 AM	6,381.35	1,595.34	31.6%	0.00	0.00	0.0%
8:00 AM	3,781.42	945.36	18.7%	0.00	0.00	0.0%
8:15 AM	1,834.55	458.64	9.1%	0.00	0.00	0.0%
8:30 AM	726.26	181.56	3.6%	0.00	0.00	0.0%
8:45 AM	360.08	90.02	1.8%	0.00	0.00	0.0%
9:00 AM	367.79	91.95	1.8%	0.00	0.00	0.0%
9:15 AM	438.27	109.57	2.2%	0.00	0.00	0.0%
9:30 AM	490.98	122.74	2.4%	0.00	0.00	0.0%
9:45 AM	536.76	134.19	2.7%	0.00	0.00	0.0%
10:00 AM	566.26	141.56	2.8%	0.00	0.00	0.0%
10:15 AM	595.31	148.83	3.0%	0.00	0.00	0.0%
10:30 AM	610.45	152.61	3.0%	0.00	0.00	0.0%
10:45 AM	629.21	157.30	3.1%	0.00	0.00	0.0%
11:00 AM	634.39	158.60	3.1%	0.00	0.00	0.0%
11:15 AM	646.37	161.59	3.2%	0.00	0.00	0.0%
11:30 AM	643.94	160.98	3.2%	0.00	0.00	0.0%
11:45 AM	651.07	162.77	3.2%	0.00	0.00	0.0%
12:00 PM	642.61	160.65	3.2%	0.00	0.00	0.0%
12:15 PM	645.69	161.42	3.2%	0.00	0.00	0.0%
12:30 PM	632.10	158.03	3.1%	0.00	0.00	0.0%
12:45 PM	631.41	157.85	3.1%	0.00	0.00	0.0%
1:00 PM	613.74	153.44	3.0%	0.00	0.00	0.0%
1:15 PM	615.08	153.77	3.0%	0.00	0.00	0.0%
1:30 PM	800.33	200.08	4.0%	0.00	0.00	0.0%
1:45 PM	1,038.31	259.58	5.1%	0.00	0.00	0.0%
2:00 PM	1,322.92	330.73	6.6%	0.00	0.00	0.0%
2:15 PM	1,743.92	435.98	8.6%	0.00	0.00	0.0%
2:30 PM	2,165.65	541.41	10.7%	0.00	0.00	0.0%
2:45 PM	2,612.26	653.07	12.9%	0.00	0.00	0.0%
3:00 PM	3,076.32	769.08	15.2%	0.00	0.00	0.0%
3:15 PM	3,572.06	893.02	17.7%	0.00	0.00	0.0%
3:30 PM	4,095.64	1,023.91	20.3%	0.00	0.00	0.0%
3:45 PM	4,664.83	1,166.21	23.1%	0.00	0.00	0.0%
4:00 PM	5,278.80	1,319.70	26.2%	0.00	0.00	0.0%
4:15 PM	5,959.03	1,489.76	29.5%	0.00	0.00	0.0%
4:30 PM	6,702.58	1,675.65	33.2%	0.00	0.00	0.0%
4:45 PM	7,441.88	1,860.47	36.9%	0.00	0.00	0.0%
5:00 PM	8,240.49	2,060.12	40.8%	0.00	0.00	0.0%
5:15 PM	9,143.15	2,285.79	45.3%	0.00	0.00	0.0%
5:30 PM	10,182.15	2,545.54	50.5%	0.00	0.00	0.0%
5:45 PM	11,843.72	2,960.93	58.7%	0.00	0.00	0.0%
6:00 PM	13,916.47	3,479.12	69.0%	0.00	0.00	0.0%
6:15 PM	16,087.33	4,021.83	79.7%	0.00	0.00	0.0%
6:30 PM	17,670.67	4,417.67	87.6%	0.00	0.00	0.0%
6:45 PM	17,433.45	5,927.37	86.4%	0.00	0.00	0.0%
7:10 PM	16,970.40	3,563.78	84.1%	0.00	0.00	0.0%

PROJECT: UCSF Parnassus
OPEN SPACE: Independence High School

AUGUST 16

Mirror date: April 26
Analysis hours: 7:25 AM-7:02 PM (PDT)

Analysis Time	EXISTING SHADOW			UCSF PARNASSUS NET NEW SHADOW		
	Shadow Area (sf)	Area/Time (sfh)	Coverage	Shadow Area (sf)	Area/Time (sfh)	Coverage
7:25 AM	13,635.40	545.42	67.6%	0.00	0.00	0.0%
7:30 AM	12,031.06	2,045.28	59.6%	0.00	0.00	0.0%
7:45 AM	7,669.76	1,917.44	38.0%	0.00	0.00	0.0%
8:00 AM	4,569.39	1,142.35	22.7%	0.00	0.00	0.0%
8:15 AM	2,725.10	681.27	13.5%	0.00	0.00	0.0%
8:30 AM	1,367.26	341.81	6.8%	0.00	0.00	0.0%
8:45 AM	697.53	174.38	3.5%	0.00	0.00	0.0%
9:00 AM	534.64	133.66	2.7%	0.00	0.00	0.0%
9:15 AM	581.13	145.28	2.9%	0.00	0.00	0.0%
9:30 AM	622.53	155.63	3.1%	0.00	0.00	0.0%
9:45 AM	659.23	164.81	3.3%	0.00	0.00	0.0%
10:00 AM	680.34	170.09	3.4%	0.00	0.00	0.0%
10:15 AM	702.85	175.71	3.5%	0.00	0.00	0.0%
10:30 AM	711.48	177.87	3.5%	0.00	0.00	0.0%
10:45 AM	725.35	181.34	3.6%	0.00	0.00	0.0%
11:00 AM	725.65	181.41	3.6%	0.00	0.00	0.0%
11:15 AM	733.76	183.44	3.6%	0.00	0.00	0.0%
11:30 AM	727.63	181.91	3.6%	0.00	0.00	0.0%
11:45 AM	731.79	182.95	3.6%	0.00	0.00	0.0%
12:00 PM	720.44	180.11	3.6%	0.00	0.00	0.0%
12:15 PM	720.92	180.23	3.6%	0.00	0.00	0.0%
12:30 PM	705.32	176.33	3.5%	0.00	0.00	0.0%
12:45 PM	702.56	175.64	3.5%	0.00	0.00	0.0%
1:00 PM	683.40	170.85	3.4%	0.00	0.00	0.0%
1:15 PM	688.03	172.01	3.4%	0.00	0.00	0.0%
1:30 PM	902.42	225.61	4.5%	0.00	0.00	0.0%
1:45 PM	1,148.65	287.16	5.7%	0.00	0.00	0.0%
2:00 PM	1,474.75	368.69	7.3%	0.00	0.00	0.0%
2:15 PM	1,901.19	475.30	9.4%	0.00	0.00	0.0%
2:30 PM	2,332.46	583.11	11.6%	0.00	0.00	0.0%
2:45 PM	2,790.48	697.62	13.8%	0.00	0.00	0.0%
3:00 PM	3,267.72	816.93	16.2%	0.00	0.00	0.0%
3:15 PM	3,779.09	944.77	18.7%	0.00	0.00	0.0%
3:30 PM	4,321.20	1,080.30	21.4%	0.00	0.00	0.0%
3:45 PM	4,912.49	1,228.12	24.4%	0.00	0.00	0.0%
4:00 PM	5,553.30	1,388.32	27.5%	0.00	0.00	0.0%
4:15 PM	6,266.62	1,566.65	31.1%	0.00	0.00	0.0%
4:30 PM	7,059.77	1,764.94	35.0%	0.00	0.00	0.0%
4:45 PM	7,967.06	1,991.77	39.5%	0.00	0.00	0.0%
5:00 PM	8,895.99	2,224.00	44.1%	0.00	0.00	0.0%
5:15 PM	9,900.66	2,475.16	49.1%	0.00	0.00	0.0%
5:30 PM	11,028.38	2,757.09	54.7%	0.00	0.00	0.0%
5:45 PM	12,511.16	3,127.79	62.0%	0.00	0.00	0.0%
6:00 PM	14,854.22	3,713.56	73.6%	0.00	0.00	0.0%
6:15 PM	17,488.30	4,372.07	86.7%	0.00	0.00	0.0%
6:30 PM	17,983.17	4,495.79	89.1%	0.00	0.00	0.0%
6:45 PM	17,637.65	4,762.17	87.4%	0.00	0.00	0.0%
7:02 PM	17,327.19	2,425.81	85.9%	0.00	0.00	0.0%

PROJECT: UCSF Parnassus
OPEN SPACE: Independence High School

AUGUST 23

Mirror date: April 19
Analysis hours: 7:31 AM-6:52 PM (PDT)

Analysis Time	EXISTING SHADOW			UCSF PARNASSUS NET NEW SHADOW		
	Shadow Area (sf)	Area/Time (sfh)	Coverage	Shadow Area (sf)	Area/Time (sfh)	Coverage
7:31 AM	13,852.44	1,523.77	68.7%	1,020.42	112.25	5.1%
7:45 AM	9,287.18	2,136.05	46.0%	0.00	0.00	0.0%
8:00 AM	5,937.60	1,484.40	29.4%	0.00	0.00	0.0%
8:15 AM	3,864.09	966.02	19.2%	0.00	0.00	0.0%
8:30 AM	2,238.06	559.51	11.1%	0.00	0.00	0.0%
8:45 AM	1,202.26	300.56	6.0%	0.00	0.00	0.0%
9:00 AM	770.07	192.52	3.8%	0.00	0.00	0.0%
9:15 AM	754.12	188.53	3.7%	0.00	0.00	0.0%
9:30 AM	778.29	194.57	3.9%	0.00	0.00	0.0%
9:45 AM	803.24	200.81	4.0%	0.00	0.00	0.0%
10:00 AM	813.44	203.36	4.0%	0.00	0.00	0.0%
10:15 AM	827.51	206.88	4.1%	0.00	0.00	0.0%
10:30 AM	828.10	207.03	4.1%	0.00	0.00	0.0%
10:45 AM	835.59	208.90	4.1%	0.00	0.00	0.0%
11:00 AM	829.67	207.42	4.1%	0.00	0.00	0.0%
11:15 AM	832.78	208.19	4.1%	0.00	0.00	0.0%
11:30 AM	822.06	205.51	4.1%	0.00	0.00	0.0%
11:45 AM	822.22	205.56	4.1%	0.00	0.00	0.0%
12:00 PM	807.60	201.90	4.0%	0.00	0.00	0.0%
12:15 PM	805.03	201.26	4.0%	0.00	0.00	0.0%
12:30 PM	787.24	196.81	3.9%	0.00	0.00	0.0%
12:45 PM	781.83	195.46	3.9%	0.00	0.00	0.0%
1:00 PM	761.22	190.30	3.8%	0.00	0.00	0.0%
1:15 PM	797.71	199.43	4.0%	0.00	0.00	0.0%
1:30 PM	1,027.55	256.89	5.1%	0.00	0.00	0.0%
1:45 PM	1,283.49	320.87	6.4%	0.00	0.00	0.0%
2:00 PM	1,662.24	415.56	8.2%	0.00	0.00	0.0%
2:15 PM	2,093.10	523.28	10.4%	0.00	0.00	0.0%
2:30 PM	2,536.05	634.01	12.6%	0.00	0.00	0.0%
2:45 PM	3,007.98	751.99	14.9%	0.00	0.00	0.0%
3:00 PM	3,500.91	875.23	17.4%	0.00	0.00	0.0%
3:15 PM	4,031.47	1,007.87	20.0%	0.00	0.00	0.0%
3:30 PM	4,595.90	1,148.98	22.8%	0.00	0.00	0.0%
3:45 PM	5,215.40	1,303.85	25.9%	0.00	0.00	0.0%
4:00 PM	5,888.88	1,472.22	29.2%	0.00	0.00	0.0%
4:15 PM	6,643.73	1,660.93	32.9%	0.00	0.00	0.0%
4:30 PM	7,488.33	1,872.08	37.1%	0.00	0.00	0.0%
4:45 PM	8,461.83	2,115.46	41.9%	0.00	0.00	0.0%
5:00 PM	9,589.40	2,397.35	47.5%	0.00	0.00	0.0%
5:15 PM	10,870.37	2,717.59	53.9%	0.00	0.00	0.0%
5:30 PM	12,165.49	3,041.37	60.3%	0.00	0.00	0.0%
5:45 PM	13,748.78	3,437.19	68.2%	0.00	0.00	0.0%
6:00 PM	16,252.42	4,063.11	80.6%	0.00	0.00	0.0%
6:15 PM	18,262.68	4,565.67	90.5%	0.00	0.00	0.0%
6:30 PM	18,609.46	4,652.36	92.2%	0.00	0.00	0.0%
6:45 PM	18,100.13	3,439.02	89.7%	0.00	0.00	0.0%
6:52 PM	17,719.28	1,063.16	87.8%	0.00	0.00	0.0%

PROJECT: UCSF Parnassus
OPEN SPACE: Independence High School

AUGUST 30

Mirror date: April 12
Analysis hours: 7:37 AM-6:42 PM (PDT)

Analysis Time	EXISTING SHADOW			UCSF PARNASSUS NET NEW SHADOW		
	Shadow Area (sf)	Area/Time (sfh)	Coverage	Shadow Area (sf)	Area/Time (sfh)	Coverage
7:37 AM	14,170.92	850.26	70.2%	6,002.20	360.13	29.8%
7:45 AM	11,643.53	2,212.27	57.7%	1,491.19	283.33	7.4%
8:00 AM	7,731.77	1,932.94	38.3%	0.00	0.00	0.0%
8:15 AM	5,167.05	1,291.76	25.6%	0.00	0.00	0.0%
8:30 AM	3,320.76	830.19	16.5%	0.00	0.00	0.0%
8:45 AM	1,886.81	471.70	9.4%	0.00	0.00	0.0%
9:00 AM	1,145.76	286.44	5.7%	0.00	0.00	0.0%
9:15 AM	965.99	241.50	4.8%	0.00	0.00	0.0%
9:30 AM	959.23	239.81	4.8%	0.00	0.00	0.0%
9:45 AM	968.57	242.14	4.8%	0.00	0.00	0.0%
10:00 AM	964.70	241.18	4.8%	0.00	0.00	0.0%
10:15 AM	967.81	241.95	4.8%	0.00	0.00	0.0%
10:30 AM	958.42	239.61	4.8%	0.00	0.00	0.0%
10:45 AM	958.13	239.53	4.7%	0.00	0.00	0.0%
11:00 AM	945.09	236.27	4.7%	0.00	0.00	0.0%
11:15 AM	942.51	235.63	4.7%	0.00	0.00	0.0%
11:30 AM	926.67	231.67	4.6%	0.00	0.00	0.0%
11:45 AM	922.53	230.63	4.6%	0.00	0.00	0.0%
12:00 PM	904.29	226.07	4.5%	0.00	0.00	0.0%
12:15 PM	898.35	224.59	4.5%	0.00	0.00	0.0%
12:30 PM	877.89	219.47	4.4%	0.00	0.00	0.0%
12:45 PM	869.96	217.49	4.3%	0.00	0.00	0.0%
1:00 PM	847.37	211.84	4.2%	0.00	0.00	0.0%
1:15 PM	926.64	231.66	4.6%	0.00	0.00	0.0%
1:30 PM	1,170.92	292.73	5.8%	0.00	0.00	0.0%
1:45 PM	1,438.04	359.51	7.1%	0.00	0.00	0.0%
2:00 PM	1,868.63	467.16	9.3%	0.00	0.00	0.0%
2:15 PM	2,309.03	577.26	11.4%	0.00	0.00	0.0%
2:30 PM	2,765.28	691.32	13.7%	0.00	0.00	0.0%
2:45 PM	3,253.07	813.27	16.1%	0.00	0.00	0.0%
3:00 PM	3,764.00	941.00	18.7%	0.00	0.00	0.0%
3:15 PM	4,316.96	1,079.24	21.4%	0.00	0.00	0.0%
3:30 PM	4,907.26	1,226.82	24.3%	0.00	0.00	0.0%
3:45 PM	5,558.51	1,389.63	27.6%	0.00	0.00	0.0%
4:00 PM	6,271.18	1,567.80	31.1%	0.00	0.00	0.0%
4:15 PM	7,074.90	1,768.72	35.1%	0.00	0.00	0.0%
4:30 PM	7,980.98	1,995.24	39.6%	0.00	0.00	0.0%
4:45 PM	9,033.88	2,258.47	44.8%	0.00	0.00	0.0%
5:00 PM	10,266.08	2,566.52	50.9%	0.00	0.00	0.0%
5:15 PM	11,759.25	2,939.81	58.3%	0.00	0.00	0.0%
5:30 PM	13,629.35	3,407.34	67.6%	0.00	0.00	0.0%
5:45 PM	15,705.72	3,926.43	77.9%	0.00	0.00	0.0%
6:00 PM	17,579.28	4,394.82	87.1%	0.00	0.00	0.0%
6:15 PM	17,856.39	4,464.10	88.5%	0.00	0.00	0.0%
6:30 PM	19,138.31	4,401.81	94.9%	0.00	0.00	0.0%
6:42 PM	19,395.07	2,133.46	96.1%	0.00	0.00	0.0%

PROJECT: UCSF Parnassus
OPEN SPACE: Independence High School

SEPTEMBER 6

Mirror date: April 5
Analysis hours: 7:44 AM-6:31 PM (PDT)

Analysis Time	EXISTING SHADOW			UCSF PARNASSUS NET NEW SHADOW		
	Shadow Area (sf)	Area/Time (sfh)	Coverage	Shadow Area (sf)	Area/Time (sfh)	Coverage
7:44 AM	16,296.06	2,118.49	80.8%	3,877.06	504.02	19.2%
8:00 AM	9,844.72	2,461.18	48.8%	0.00	0.00	0.0%
8:15 AM	6,712.95	1,678.24	33.3%	0.00	0.00	0.0%
8:30 AM	4,595.19	1,148.80	22.8%	0.00	0.00	0.0%
8:45 AM	2,797.02	699.26	13.9%	0.00	0.00	0.0%
9:00 AM	1,660.94	415.24	8.2%	0.00	0.00	0.0%
9:15 AM	1,219.34	304.84	6.0%	0.00	0.00	0.0%
9:30 AM	1,163.02	290.76	5.8%	0.00	0.00	0.0%
9:45 AM	1,152.13	288.03	5.7%	0.00	0.00	0.0%
10:00 AM	1,131.85	282.96	5.6%	0.00	0.00	0.0%
10:15 AM	1,122.16	280.54	5.6%	0.00	0.00	0.0%
10:30 AM	1,101.65	275.41	5.5%	0.00	0.00	0.0%
10:45 AM	1,092.43	273.11	5.4%	0.00	0.00	0.0%
11:00 AM	1,071.52	267.88	5.3%	0.00	0.00	0.0%
11:15 AM	1,062.65	265.66	5.3%	0.00	0.00	0.0%
11:30 AM	1,041.12	260.28	5.2%	0.00	0.00	0.0%
11:45 AM	1,032.25	258.06	5.1%	0.00	0.00	0.0%
12:00 PM	1,010.09	252.52	5.0%	0.00	0.00	0.0%
12:15 PM	1,000.73	250.18	5.0%	0.00	0.00	0.0%
12:30 PM	977.41	244.35	4.8%	0.00	0.00	0.0%
12:45 PM	966.60	241.65	4.8%	0.00	0.00	0.0%
1:00 PM	942.15	235.54	4.7%	0.00	0.00	0.0%
1:15 PM	1,074.68	268.67	5.3%	0.00	0.00	0.0%
1:30 PM	1,333.16	333.29	6.6%	0.00	0.00	0.0%
1:45 PM	1,655.42	413.86	8.2%	0.00	0.00	0.0%
2:00 PM	2,094.86	523.72	10.4%	0.00	0.00	0.0%
2:15 PM	2,548.83	637.21	12.6%	0.00	0.00	0.0%
2:30 PM	3,019.60	754.90	15.0%	0.00	0.00	0.0%
2:45 PM	3,525.25	881.31	17.5%	0.00	0.00	0.0%
3:00 PM	4,056.70	1,014.18	20.1%	0.00	0.00	0.0%
3:15 PM	4,634.54	1,158.64	23.0%	0.00	0.00	0.0%
3:30 PM	5,254.97	1,313.74	26.0%	0.00	0.00	0.0%
3:45 PM	5,943.48	1,485.87	29.5%	0.00	0.00	0.0%
4:00 PM	6,700.68	1,675.17	33.2%	0.00	0.00	0.0%
4:15 PM	7,561.14	1,890.28	37.5%	0.00	0.00	0.0%
4:30 PM	8,539.03	2,134.76	42.3%	0.00	0.00	0.0%
4:45 PM	9,687.15	2,421.79	48.0%	0.00	0.00	0.0%
5:00 PM	11,082.40	2,770.60	54.9%	0.00	0.00	0.0%
5:15 PM	12,816.15	3,204.04	63.5%	0.00	0.00	0.0%
5:30 PM	15,059.40	3,764.85	74.7%	0.00	0.00	0.0%
5:45 PM	17,975.95	4,493.99	89.1%	0.00	0.00	0.0%
6:00 PM	18,272.38	4,568.10	90.6%	0.00	0.00	0.0%
6:15 PM	17,569.31	4,743.71	87.1%	0.00	0.00	0.0%
6:31 PM	18,656.28	2,611.88	92.5%	0.00	0.00	0.0%

PROJECT: UCSF Parnassus
OPEN SPACE: Independence High School

SEPTEMBER 13

Mirror date: March 29
Analysis hours: 7:50 AM-6:21 PM (PDT)

Analysis Time	EXISTING SHADOW			UCSF PARNASSUS NET NEW SHADOW		
	Shadow Area (sf)	Area/Time (sfh)	Coverage	Shadow Area (sf)	Area/Time (sfh)	Coverage
7:50 AM	19,648.60	1,571.89	97.4%	7.90	0.63	0.0%
8:00 AM	12,276.06	2,577.97	60.9%	0.00	0.00	0.0%
8:15 AM	8,530.01	2,132.50	42.3%	0.00	0.00	0.0%
8:30 AM	5,969.99	1,492.50	29.6%	0.00	0.00	0.0%
8:45 AM	3,933.38	983.34	19.5%	0.00	0.00	0.0%
9:00 AM	2,356.40	589.10	11.7%	0.00	0.00	0.0%
9:15 AM	1,559.96	389.99	7.7%	0.00	0.00	0.0%
9:30 AM	1,407.54	351.89	7.0%	0.00	0.00	0.0%
9:45 AM	1,367.40	341.85	6.8%	0.00	0.00	0.0%
10:00 AM	1,322.08	330.52	6.6%	0.00	0.00	0.0%
10:15 AM	1,295.01	323.75	6.4%	0.00	0.00	0.0%
10:30 AM	1,258.66	314.66	6.2%	0.00	0.00	0.0%
10:45 AM	1,237.93	309.48	6.1%	0.00	0.00	0.0%
11:00 AM	1,208.50	302.13	6.0%	0.00	0.00	0.0%
11:15 AM	1,192.72	298.18	5.9%	0.00	0.00	0.0%
11:30 AM	1,165.15	291.29	5.8%	0.00	0.00	0.0%
11:45 AM	1,151.26	287.82	5.7%	0.00	0.00	0.0%
12:00 PM	1,124.63	281.16	5.6%	0.00	0.00	0.0%
12:15 PM	1,111.64	277.91	5.5%	0.00	0.00	0.0%
12:30 PM	1,085.51	271.38	5.4%	0.00	0.00	0.0%
12:45 PM	1,072.32	268.08	5.3%	0.00	0.00	0.0%
1:00 PM	1,048.31	262.08	5.2%	0.00	0.00	0.0%
1:15 PM	1,241.71	310.43	6.2%	0.00	0.00	0.0%
1:30 PM	1,515.37	378.84	7.5%	0.00	0.00	0.0%
1:45 PM	1,901.44	475.36	9.4%	0.00	0.00	0.0%
2:00 PM	2,342.46	585.61	11.6%	0.00	0.00	0.0%
2:15 PM	2,811.36	702.84	13.9%	0.00	0.00	0.0%
2:30 PM	3,298.16	824.54	16.3%	0.00	0.00	0.0%
2:45 PM	3,823.82	955.95	19.0%	0.00	0.00	0.0%
3:00 PM	4,378.27	1,094.57	21.7%	0.00	0.00	0.0%
3:15 PM	4,984.45	1,246.11	24.7%	0.00	0.00	0.0%
3:30 PM	5,638.35	1,409.59	27.9%	0.00	0.00	0.0%
3:45 PM	6,368.56	1,592.14	31.6%	0.00	0.00	0.0%
4:00 PM	7,176.80	1,794.20	35.6%	0.00	0.00	0.0%
4:15 PM	8,103.15	2,025.79	40.2%	0.00	0.00	0.0%
4:30 PM	9,164.35	2,291.09	45.4%	0.00	0.00	0.0%
4:45 PM	10,452.32	2,613.08	51.8%	0.00	0.00	0.0%
5:00 PM	12,059.34	3,014.84	59.8%	0.00	0.00	0.0%
5:15 PM	14,096.27	3,524.07	69.9%	0.00	0.00	0.0%
5:30 PM	16,942.75	4,235.69	84.0%	0.00	0.00	0.0%
5:45 PM	18,641.43	4,660.36	92.4%	0.00	0.00	0.0%
6:00 PM	18,964.73	4,741.18	94.0%	0.00	0.00	0.0%
6:15 PM	18,499.97	3,330.00	91.7%	0.00	0.00	0.0%
6:21 PM	18,157.91	907.90	90.0%	0.00	0.00	0.0%

PROJECT: UCSF Parnassus
OPEN SPACE: Independence High School

SEPTEMBER 20

Fall equinox (Spring equinox on March 22 similar)
Analysis hours: 7:57 AM-6:09 PM (PDT)

Analysis Time	EXISTING SHADOW			UCSF PARNASSUS NET NEW SHADOW		
	Shadow Area (sf)	Area/Time (sfh)	Coverage	Shadow Area (sf)	Area/Time (sfh)	Coverage
7:57 AM	16,634.77	332.70	82.5%	1,123.56	22.47	5.6%
8:00 AM	15,402.26	2,310.34	76.4%	860.72	129.11	4.3%
8:15 AM	10,636.28	2,659.07	52.7%	0.00	0.00	0.0%
8:30 AM	7,522.13	1,880.53	37.3%	0.00	0.00	0.0%
8:45 AM	5,277.34	1,319.34	26.2%	0.00	0.00	0.0%
9:00 AM	3,256.42	814.10	16.1%	0.00	0.00	0.0%
9:15 AM	2,098.58	524.64	10.4%	0.00	0.00	0.0%
9:30 AM	1,725.72	431.43	8.6%	0.00	0.00	0.0%
9:45 AM	1,633.98	408.49	8.1%	0.00	0.00	0.0%
10:00 AM	1,551.07	387.77	7.7%	0.00	0.00	0.0%
10:15 AM	1,494.32	373.58	7.4%	0.00	0.00	0.0%
10:30 AM	1,433.17	358.29	7.1%	0.00	0.00	0.0%
10:45 AM	1,395.93	348.98	6.9%	0.00	0.00	0.0%
11:00 AM	1,355.65	338.91	6.7%	0.00	0.00	0.0%
11:15 AM	1,332.57	333.14	6.6%	0.00	0.00	0.0%
11:30 AM	1,298.34	324.59	6.4%	0.00	0.00	0.0%
11:45 AM	1,279.20	319.80	6.3%	0.00	0.00	0.0%
12:00 PM	1,247.90	311.97	6.2%	0.00	0.00	0.0%
12:15 PM	1,231.06	307.76	6.1%	0.00	0.00	0.0%
12:30 PM	1,201.66	300.41	6.0%	0.00	0.00	0.0%
12:45 PM	1,186.03	296.51	5.9%	0.00	0.00	0.0%
1:00 PM	1,171.86	292.97	5.8%	0.00	0.00	0.0%
1:15 PM	1,430.13	357.53	7.1%	0.00	0.00	0.0%
1:30 PM	1,717.57	429.39	8.5%	0.00	0.00	0.0%
1:45 PM	2,160.89	540.22	10.7%	0.00	0.00	0.0%
2:00 PM	2,607.29	651.82	12.9%	0.00	0.00	0.0%
2:15 PM	3,092.27	773.07	15.3%	0.00	0.00	0.0%
2:30 PM	3,596.21	899.05	17.8%	0.00	0.00	0.0%
2:45 PM	4,143.70	1,035.93	20.5%	0.00	0.00	0.0%
3:00 PM	4,722.49	1,180.62	23.4%	0.00	0.00	0.0%
3:15 PM	5,360.81	1,340.20	26.6%	0.00	0.00	0.0%
3:30 PM	6,051.90	1,512.98	30.0%	0.00	0.00	0.0%
3:45 PM	6,828.22	1,707.06	33.8%	0.00	0.00	0.0%
4:00 PM	7,693.87	1,923.47	38.1%	0.00	0.00	0.0%
4:15 PM	8,694.19	2,173.55	43.1%	0.00	0.00	0.0%
4:30 PM	9,850.52	2,462.63	48.8%	0.00	0.00	0.0%
4:45 PM	11,315.50	2,828.88	56.1%	0.00	0.00	0.0%
5:00 PM	13,175.47	3,293.87	65.3%	0.00	0.00	0.0%
5:15 PM	15,635.04	3,908.76	77.5%	0.00	0.00	0.0%
5:30 PM	18,131.00	4,532.75	89.9%	0.00	0.00	0.0%
5:45 PM	18,891.33	4,722.83	93.6%	0.00	0.00	0.0%
6:00 PM	19,638.74	4,124.14	97.4%	0.00	0.00	0.0%
6:09 PM	19,846.66	1,587.73	98.4%	0.00	0.00	0.0%

PROJECT: UCSF Parnassus
OPEN SPACE: Independence High School

SEPTEMBER 27

Mirror date: March 15
Analysis hours: 8:03 AM-5:58 PM (PDT)

Analysis Time	EXISTING SHADOW			UCSF PARNASSUS NET NEW SHADOW		
	Shadow Area (sf)	Area/Time (sfh)	Coverage	Shadow Area (sf)	Area/Time (sfh)	Coverage
8:03 AM	20,173.13	2,017.31	100.0%	0.00	0.00	0.0%
8:15 AM	13,254.00	2,915.88	65.7%	2,718.81	598.14	13.5%
8:30 AM	9,248.60	2,312.15	45.8%	0.00	0.00	0.0%
8:45 AM	6,690.46	1,672.61	33.2%	0.00	0.00	0.0%
9:00 AM	4,432.70	1,108.18	22.0%	0.00	0.00	0.0%
9:15 AM	2,797.13	699.28	13.9%	0.00	0.00	0.0%
9:30 AM	2,101.66	525.41	10.4%	0.00	0.00	0.0%
9:45 AM	1,934.72	483.68	9.6%	0.00	0.00	0.0%
10:00 AM	1,805.06	451.27	8.9%	0.00	0.00	0.0%
10:15 AM	1,713.56	428.39	8.5%	0.00	0.00	0.0%
10:30 AM	1,625.07	406.27	8.1%	0.00	0.00	0.0%
10:45 AM	1,568.90	392.22	7.8%	0.00	0.00	0.0%
11:00 AM	1,513.83	378.46	7.5%	0.00	0.00	0.0%
11:15 AM	1,482.73	370.68	7.4%	0.00	0.00	0.0%
11:30 AM	1,441.35	360.34	7.1%	0.00	0.00	0.0%
11:45 AM	1,416.54	354.14	7.0%	0.00	0.00	0.0%
12:00 PM	1,380.17	345.04	6.8%	0.00	0.00	0.0%
12:15 PM	1,359.55	339.89	6.7%	0.00	0.00	0.0%
12:30 PM	1,326.57	331.64	6.6%	0.00	0.00	0.0%
12:45 PM	1,311.70	327.93	6.5%	0.00	0.00	0.0%
1:00 PM	1,353.52	338.38	6.7%	0.00	0.00	0.0%
1:15 PM	1,648.53	412.13	8.2%	0.00	0.00	0.0%
1:30 PM	1,960.97	490.24	9.7%	0.00	0.00	0.0%
1:45 PM	2,427.67	606.92	12.0%	0.00	0.00	0.0%
2:00 PM	2,887.10	721.77	14.3%	0.00	0.00	0.0%
2:15 PM	3,387.81	846.95	16.8%	0.00	0.00	0.0%
2:30 PM	3,911.00	977.75	19.4%	0.00	0.00	0.0%
2:45 PM	4,480.72	1,120.18	22.2%	0.00	0.00	0.0%
3:00 PM	5,086.03	1,271.51	25.2%	0.00	0.00	0.0%
3:15 PM	5,756.63	1,439.16	28.5%	0.00	0.00	0.0%
3:30 PM	6,487.68	1,621.92	32.2%	0.00	0.00	0.0%
3:45 PM	7,313.81	1,828.45	36.3%	0.00	0.00	0.0%
4:00 PM	8,240.55	2,060.14	40.8%	0.00	0.00	0.0%
4:15 PM	9,321.02	2,330.26	46.2%	0.00	0.00	0.0%
4:30 PM	10,593.50	2,648.38	52.5%	0.00	0.00	0.0%
4:45 PM	12,254.16	3,063.54	60.7%	0.00	0.00	0.0%
5:00 PM	14,421.37	3,605.34	71.5%	0.00	0.00	0.0%
5:15 PM	17,419.17	4,354.79	86.3%	0.00	0.00	0.0%
5:30 PM	18,225.19	4,556.30	90.3%	0.00	0.00	0.0%
5:45 PM	19,287.59	4,436.15	95.6%	0.00	0.00	0.0%
5:58 PM	20,173.13	2,219.04	100.0%	0.00	0.00	0.0%

PROJECT: UCSF Parnassus
OPEN SPACE: Independence High School

OCTOBER 4

Mirror date: March 8
Analysis hours: 8:09 AM-5:47 PM (PDT)

Analysis Time	EXISTING SHADOW			UCSF PARNASSUS NET NEW SHADOW		
	Shadow Area (sf)	Area/Time (sfh)	Coverage	Shadow Area (sf)	Area/Time (sfh)	Coverage
8:09 AM	20,141.32	805.65	99.8%	31.80	1.27	0.2%
8:15 AM	18,323.17	3,114.94	90.8%	1,849.96	314.49	9.2%
8:30 AM	11,235.13	2,808.78	55.7%	2,695.66	673.91	13.4%
8:45 AM	8,215.88	2,053.97	40.7%	0.00	0.00	0.0%
9:00 AM	5,848.74	1,462.18	29.0%	0.00	0.00	0.0%
9:15 AM	3,717.99	929.50	18.4%	0.00	0.00	0.0%
9:30 AM	2,574.36	643.59	12.8%	0.00	0.00	0.0%
9:45 AM	2,280.25	570.06	11.3%	0.00	0.00	0.0%
10:00 AM	2,093.30	523.32	10.4%	0.00	0.00	0.0%
10:15 AM	1,959.54	489.89	9.7%	0.00	0.00	0.0%
10:30 AM	1,836.90	459.23	9.1%	0.00	0.00	0.0%
10:45 AM	1,758.36	439.59	8.7%	0.00	0.00	0.0%
11:00 AM	1,684.86	421.22	8.4%	0.00	0.00	0.0%
11:15 AM	1,643.81	410.95	8.1%	0.00	0.00	0.0%
11:30 AM	1,594.47	398.62	7.9%	0.00	0.00	0.0%
11:45 AM	1,563.74	390.94	7.8%	0.00	0.00	0.0%
12:00 PM	1,521.91	380.48	7.5%	0.00	0.00	0.0%
12:15 PM	1,497.35	374.34	7.4%	0.00	0.00	0.0%
12:30 PM	1,460.53	365.13	7.2%	0.00	0.00	0.0%
12:45 PM	1,449.06	362.26	7.2%	0.00	0.00	0.0%
1:00 PM	1,511.48	377.87	7.5%	0.00	0.00	0.0%
1:15 PM	1,853.60	463.40	9.2%	0.00	0.00	0.0%
1:30 PM	2,238.95	559.74	11.1%	0.00	0.00	0.0%
1:45 PM	2,704.49	676.12	13.4%	0.00	0.00	0.0%
2:00 PM	3,178.19	794.55	15.8%	0.00	0.00	0.0%
2:15 PM	3,697.74	924.43	18.3%	0.00	0.00	0.0%
2:30 PM	4,239.63	1,059.91	21.0%	0.00	0.00	0.0%
2:45 PM	4,835.44	1,208.86	24.0%	0.00	0.00	0.0%
3:00 PM	5,469.69	1,367.42	27.1%	0.00	0.00	0.0%
3:15 PM	6,179.53	1,544.88	30.6%	0.00	0.00	0.0%
3:30 PM	6,954.47	1,738.62	34.5%	0.00	0.00	0.0%
3:45 PM	7,840.82	1,960.20	38.9%	0.00	0.00	0.0%
4:00 PM	8,836.81	2,209.20	43.8%	0.00	0.00	0.0%
4:15 PM	10,028.67	2,507.17	49.7%	0.00	0.00	0.0%
4:30 PM	11,465.96	2,866.49	56.8%	0.00	0.00	0.0%
4:45 PM	13,402.28	3,350.57	66.4%	0.00	0.00	0.0%
5:00 PM	16,334.10	4,083.53	81.0%	0.00	0.00	0.0%
5:15 PM	17,591.44	4,397.86	87.2%	0.00	0.00	0.0%
5:30 PM	18,584.27	5,017.75	92.1%	0.00	0.00	0.0%
5:47 PM	19,978.83	2,797.04	99.0%	0.00	0.00	0.0%

PROJECT: UCSF Parnassus
OPEN SPACE: Independence High School

OCTOBER 11

Mirror date: March 1
Analysis hours: 8:16 AM-5:37 PM (PDT)

Analysis Time	EXISTING SHADOW			UCSF PARNASSUS NET NEW SHADOW		
	Shadow Area (sf)	Area/Time (sfh)	Coverage	Shadow Area (sf)	Area/Time (sfh)	Coverage
8:16 AM	20,066.42	2,407.97	99.5%	106.70	12.80	0.5%
8:30 AM	13,497.72	3,239.45	66.9%	5,480.28	1,315.27	27.2%
8:45 AM	10,023.99	2,506.00	49.7%	0.00	0.00	0.0%
9:00 AM	7,365.45	1,841.36	36.5%	0.00	0.00	0.0%
9:15 AM	4,954.86	1,238.72	24.6%	0.00	0.00	0.0%
9:30 AM	3,252.21	813.05	16.1%	0.00	0.00	0.0%
9:45 AM	2,678.19	669.55	13.3%	0.00	0.00	0.0%
10:00 AM	2,420.06	605.01	12.0%	0.00	0.00	0.0%
10:15 AM	2,235.78	558.94	11.1%	0.00	0.00	0.0%
10:30 AM	2,070.81	517.70	10.3%	0.00	0.00	0.0%
10:45 AM	1,965.51	491.38	9.7%	0.00	0.00	0.0%
11:00 AM	1,871.89	467.97	9.3%	0.00	0.00	0.0%
11:15 AM	1,817.48	454.37	9.0%	0.00	0.00	0.0%
11:30 AM	1,757.92	439.48	8.7%	0.00	0.00	0.0%
11:45 AM	1,720.75	430.19	8.5%	0.00	0.00	0.0%
12:00 PM	1,672.91	418.23	8.3%	0.00	0.00	0.0%
12:15 PM	1,644.06	411.02	8.1%	0.00	0.00	0.0%
12:30 PM	1,603.41	400.85	7.9%	0.00	0.00	0.0%
12:45 PM	1,598.43	399.61	7.9%	0.00	0.00	0.0%
1:00 PM	1,754.01	438.50	8.7%	0.00	0.00	0.0%
1:15 PM	2,107.95	526.99	10.4%	0.00	0.00	0.0%
1:30 PM	2,519.49	629.87	12.5%	0.00	0.00	0.0%
1:45 PM	2,990.90	747.73	14.8%	0.00	0.00	0.0%
2:00 PM	3,480.39	870.10	17.3%	0.00	0.00	0.0%
2:15 PM	4,020.59	1,005.15	19.9%	0.00	0.00	0.0%
2:30 PM	4,585.61	1,146.40	22.7%	0.00	0.00	0.0%
2:45 PM	5,213.12	1,303.28	25.8%	0.00	0.00	0.0%
3:00 PM	5,881.22	1,470.31	29.2%	0.00	0.00	0.0%
3:15 PM	6,632.24	1,658.06	32.9%	0.00	0.00	0.0%
3:30 PM	7,452.79	1,863.20	36.9%	0.00	0.00	0.0%
3:45 PM	8,394.42	2,098.61	41.6%	0.00	0.00	0.0%
4:00 PM	9,481.21	2,370.30	47.0%	0.00	0.00	0.0%
4:15 PM	10,843.03	2,710.76	53.7%	0.00	0.00	0.0%
4:30 PM	12,517.57	3,129.39	62.1%	0.00	0.00	0.0%
4:45 PM	14,896.22	3,724.05	73.8%	0.00	0.00	0.0%
5:00 PM	16,939.93	4,234.98	84.0%	0.00	0.00	0.0%
5:15 PM	18,079.72	4,519.93	89.6%	0.00	0.00	0.0%
5:30 PM	19,484.49	3,702.05	96.6%	0.00	0.00	0.0%
5:37 PM	19,995.57	1,199.73	99.1%	0.00	0.00	0.0%

PROJECT: UCSF Parnassus
OPEN SPACE: Independence High School

OCTOBER 18

Mirror date: February 22
Analysis hours: 8:22 AM-5:27 PM (PDT)

Analysis Time	EXISTING SHADOW			UCSF PARNASSUS NET NEW SHADOW		
	Shadow Area (sf)	Area/Time (sfh)	Coverage	Shadow Area (sf)	Area/Time (sfh)	Coverage
8:22 AM	20,173.13	1,210.39	100.0%	0.00	0.00	0.0%
8:30 AM	17,253.17	3,105.57	85.5%	2,919.95	525.59	14.5%
8:45 AM	12,057.59	3,014.40	59.8%	955.68	238.92	4.7%
9:00 AM	9,020.64	2,255.16	44.7%	0.00	0.00	0.0%
9:15 AM	6,571.35	1,642.84	32.6%	0.00	0.00	0.0%
9:30 AM	4,256.27	1,064.07	21.1%	0.00	0.00	0.0%
9:45 AM	3,195.18	798.80	15.8%	0.00	0.00	0.0%
10:00 AM	2,792.23	698.06	13.8%	0.00	0.00	0.0%
10:15 AM	2,546.10	636.52	12.6%	0.00	0.00	0.0%
10:30 AM	2,330.09	582.52	11.6%	0.00	0.00	0.0%
10:45 AM	2,191.47	547.87	10.9%	0.00	0.00	0.0%
11:00 AM	2,075.13	518.78	10.3%	0.00	0.00	0.0%
11:15 AM	2,005.94	501.49	9.9%	0.00	0.00	0.0%
11:30 AM	1,931.82	482.95	9.6%	0.00	0.00	0.0%
11:45 AM	1,886.79	471.70	9.4%	0.00	0.00	0.0%
12:00 PM	1,832.53	458.13	9.1%	0.00	0.00	0.0%
12:15 PM	1,799.19	449.80	8.9%	0.00	0.00	0.0%
12:30 PM	1,754.40	438.60	8.7%	0.00	0.00	0.0%
12:45 PM	1,757.49	439.37	8.7%	0.00	0.00	0.0%
1:00 PM	1,980.87	495.22	9.8%	0.00	0.00	0.0%
1:15 PM	2,352.82	588.20	11.7%	0.00	0.00	0.0%
1:30 PM	2,793.92	698.48	13.8%	0.00	0.00	0.0%
1:45 PM	3,282.34	820.59	16.3%	0.00	0.00	0.0%
2:00 PM	3,789.10	947.27	18.8%	0.00	0.00	0.0%
2:15 PM	4,354.24	1,088.56	21.6%	0.00	0.00	0.0%
2:30 PM	4,943.78	1,235.95	24.5%	0.00	0.00	0.0%
2:45 PM	5,597.70	1,399.43	27.7%	0.00	0.00	0.0%
3:00 PM	6,293.33	1,573.33	31.2%	0.00	0.00	0.0%
3:15 PM	7,079.52	1,769.88	35.1%	0.00	0.00	0.0%
3:30 PM	7,940.98	1,985.24	39.4%	0.00	0.00	0.0%
3:45 PM	8,936.89	2,234.22	44.3%	0.00	0.00	0.0%
4:00 PM	10,157.01	2,539.25	50.3%	0.00	0.00	0.0%
4:15 PM	11,703.86	2,925.97	58.0%	0.00	0.00	0.0%
4:30 PM	13,660.28	3,415.07	67.7%	0.00	0.00	0.0%
4:45 PM	16,149.78	4,037.45	80.1%	0.00	0.00	0.0%
5:00 PM	17,273.78	4,318.44	85.6%	0.00	0.00	0.0%
5:15 PM	18,681.50	4,109.93	92.6%	0.00	0.00	0.0%
5:27 PM	20,062.58	2,006.26	99.5%	0.00	0.00	0.0%

PROJECT: UCSF Parnassus
OPEN SPACE: Independence High School

OCTOBER 25

Mirror date: February 15
Analysis hours: 7:30 AM-4:18 PM (PST)

Analysis Time	EXISTING SHADOW			UCSF PARNASSUS NET NEW SHADOW		
	Shadow Area (sf)	Area/Time (sfh)	Coverage	Shadow Area (sf)	Area/Time (sfh)	Coverage
7:30 AM	20,173.13	2,622.51	100.0%	0.00	0.00	0.0%
7:45 AM	14,346.44	3,586.61	71.1%	844.53	211.13	4.2%
8:00 AM	10,889.66	2,722.41	54.0%	0.00	0.00	0.0%
8:15 AM	8,277.54	2,069.39	41.0%	0.00	0.00	0.0%
8:30 AM	5,680.45	1,420.11	28.2%	0.00	0.00	0.0%
8:45 AM	3,955.99	989.00	19.6%	0.00	0.00	0.0%
9:00 AM	3,308.56	827.14	16.4%	0.00	0.00	0.0%
9:15 AM	2,953.11	738.28	14.6%	0.00	0.00	0.0%
9:30 AM	2,644.68	661.17	13.1%	0.00	0.00	0.0%
9:45 AM	2,444.85	611.21	12.1%	0.00	0.00	0.0%
10:00 AM	2,293.45	573.36	11.4%	0.00	0.00	0.0%
10:15 AM	2,209.15	552.29	11.0%	0.00	0.00	0.0%
10:30 AM	2,121.40	530.35	10.5%	0.00	0.00	0.0%
10:45 AM	2,066.80	516.70	10.2%	0.00	0.00	0.0%
11:00 AM	2,003.78	500.94	9.9%	0.00	0.00	0.0%
11:15 AM	1,965.28	491.32	9.7%	0.00	0.00	0.0%
11:30 AM	1,914.83	478.71	9.5%	0.00	0.00	0.0%
11:45 AM	1,928.58	482.14	9.6%	0.00	0.00	0.0%
12:00 PM	2,212.78	553.20	11.0%	0.00	0.00	0.0%
12:15 PM	2,609.67	652.42	12.9%	0.00	0.00	0.0%
12:30 PM	3,064.28	766.07	15.2%	0.00	0.00	0.0%
12:45 PM	3,570.35	892.59	17.7%	0.00	0.00	0.0%
1:00 PM	4,095.65	1,023.91	20.3%	0.00	0.00	0.0%
1:15 PM	4,680.08	1,170.02	23.2%	0.00	0.00	0.0%
1:30 PM	5,285.99	1,321.50	26.2%	0.00	0.00	0.0%
1:45 PM	5,961.49	1,490.37	29.6%	0.00	0.00	0.0%
2:00 PM	6,681.36	1,670.34	33.1%	0.00	0.00	0.0%
2:15 PM	7,498.08	1,874.52	37.2%	0.00	0.00	0.0%
2:30 PM	8,394.11	2,098.53	41.6%	0.00	0.00	0.0%
2:45 PM	9,435.09	2,358.77	46.8%	0.00	0.00	0.0%
3:00 PM	10,776.88	2,694.22	53.4%	0.00	0.00	0.0%
3:15 PM	12,498.19	3,124.55	62.0%	0.00	0.00	0.0%
3:30 PM	15,072.55	3,768.14	74.7%	0.00	0.00	0.0%
3:45 PM	16,585.01	4,146.25	82.2%	0.00	0.00	0.0%
4:00 PM	18,083.83	4,520.96	89.6%	0.00	0.00	0.0%
4:15 PM	19,948.74	2,992.31	98.9%	0.00	0.00	0.0%
4:18 PM	20,121.26	603.64	99.7%	0.00	0.00	0.0%

PROJECT: UCSF Parnassus
OPEN SPACE: Independence High School

NOVEMBER 1

Mirror date: February 8
Analysis hours: 7:36 AM-4:10 PM (PST)

Analysis Time	EXISTING SHADOW			UCSF PARNASSUS NET NEW SHADOW		
	Shadow Area (sf)	Area/Time (sfh)	Coverage	Shadow Area (sf)	Area/Time (sfh)	Coverage
7:36 AM	20,173.13	1,412.12	100.0%	0.00	0.00	0.0%
7:45 AM	20,173.13	3,832.89	100.0%	0.00	0.00	0.0%
8:00 AM	12,995.63	3,248.91	64.4%	0.00	0.00	0.0%
8:15 AM	10,086.91	2,521.73	50.0%	0.00	0.00	0.0%
8:30 AM	7,368.20	1,842.05	36.5%	0.00	0.00	0.0%
8:45 AM	5,007.20	1,251.80	24.8%	0.00	0.00	0.0%
9:00 AM	3,908.56	977.14	19.4%	0.00	0.00	0.0%
9:15 AM	3,435.34	858.84	17.0%	0.00	0.00	0.0%
9:30 AM	3,031.76	757.94	15.0%	0.00	0.00	0.0%
9:45 AM	2,765.46	691.36	13.7%	0.00	0.00	0.0%
10:00 AM	2,553.40	638.35	12.7%	0.00	0.00	0.0%
10:15 AM	2,427.13	606.78	12.0%	0.00	0.00	0.0%
10:30 AM	2,319.22	579.80	11.5%	0.00	0.00	0.0%
10:45 AM	2,255.09	563.77	11.2%	0.00	0.00	0.0%
11:00 AM	2,183.90	545.97	10.8%	0.00	0.00	0.0%
11:15 AM	2,139.99	535.00	10.6%	0.00	0.00	0.0%
11:30 AM	2,088.84	522.21	10.4%	0.00	0.00	0.0%
11:45 AM	2,110.02	527.51	10.5%	0.00	0.00	0.0%
12:00 PM	2,445.28	611.32	12.1%	0.00	0.00	0.0%
12:15 PM	2,868.67	717.17	14.2%	0.00	0.00	0.0%
12:30 PM	3,326.10	831.52	16.5%	0.00	0.00	0.0%
12:45 PM	3,848.22	962.06	19.1%	0.00	0.00	0.0%
1:00 PM	4,385.12	1,096.28	21.7%	0.00	0.00	0.0%
1:15 PM	4,981.04	1,245.26	24.7%	0.00	0.00	0.0%
1:30 PM	5,599.61	1,399.90	27.8%	0.00	0.00	0.0%
1:45 PM	6,292.51	1,573.13	31.2%	0.00	0.00	0.0%
2:00 PM	7,031.42	1,757.85	34.9%	0.00	0.00	0.0%
2:15 PM	7,871.17	1,967.79	39.0%	0.00	0.00	0.0%
2:30 PM	8,791.70	2,197.93	43.6%	0.00	0.00	0.0%
2:45 PM	9,900.57	2,475.14	49.1%	0.00	0.00	0.0%
3:00 PM	11,401.95	2,850.49	56.5%	0.00	0.00	0.0%
3:15 PM	13,485.34	3,371.34	66.8%	0.00	0.00	0.0%
3:30 PM	15,679.15	3,919.79	77.7%	0.00	0.00	0.0%
3:45 PM	17,185.12	4,296.28	85.2%	0.00	0.00	0.0%
4:00 PM	19,185.01	4,028.85	95.1%	0.00	0.00	0.0%
4:10 PM	20,170.08	1,815.31	100.0%	0.00	0.00	0.0%

PROJECT: UCSF Parnassus
OPEN SPACE: Independence High School

NOVEMBER 8

Mirror date: February 1
Analysis hours: 7:43 AM-4:03 PM (PST)

Analysis Time	EXISTING SHADOW			UCSF PARNASSUS NET NEW SHADOW		
	Shadow Area (sf)	Area/Time (sfh)	Coverage	Shadow Area (sf)	Area/Time (sfh)	Coverage
7:43 AM	20,173.12	201.73	100.0%	0.00	0.00	0.0%
7:45 AM	20,173.13	2,622.51	100.0%	0.00	0.00	0.0%
8:00 AM	20,173.13	5,043.28	100.0%	0.00	0.00	0.0%
8:15 AM	11,997.06	2,999.27	59.5%	0.00	0.00	0.0%
8:30 AM	9,184.24	2,296.06	45.5%	0.00	0.00	0.0%
8:45 AM	6,613.19	1,653.30	32.8%	0.00	0.00	0.0%
9:00 AM	4,670.56	1,167.64	23.2%	0.00	0.00	0.0%
9:15 AM	3,991.70	997.93	19.8%	0.00	0.00	0.0%
9:30 AM	3,484.92	871.23	17.3%	0.00	0.00	0.0%
9:45 AM	3,129.27	782.32	15.5%	0.00	0.00	0.0%
10:00 AM	2,846.87	711.72	14.1%	0.00	0.00	0.0%
10:15 AM	2,670.31	667.58	13.2%	0.00	0.00	0.0%
10:30 AM	2,530.01	632.50	12.5%	0.00	0.00	0.0%
10:45 AM	2,447.17	611.79	12.1%	0.00	0.00	0.0%
11:00 AM	2,366.85	591.71	11.7%	0.00	0.00	0.0%
11:15 AM	2,316.92	579.23	11.5%	0.00	0.00	0.0%
11:30 AM	2,263.39	565.85	11.2%	0.00	0.00	0.0%
11:45 AM	2,289.00	572.25	11.3%	0.00	0.00	0.0%
12:00 PM	2,662.33	665.58	13.2%	0.00	0.00	0.0%
12:15 PM	3,104.27	776.07	15.4%	0.00	0.00	0.0%
12:30 PM	3,564.95	891.24	17.7%	0.00	0.00	0.0%
12:45 PM	4,097.74	1,024.43	20.3%	0.00	0.00	0.0%
1:00 PM	4,640.05	1,160.01	23.0%	0.00	0.00	0.0%
1:15 PM	5,243.15	1,310.79	26.0%	0.00	0.00	0.0%
1:30 PM	5,869.74	1,467.43	29.1%	0.00	0.00	0.0%
1:45 PM	6,574.20	1,643.55	32.6%	0.00	0.00	0.0%
2:00 PM	7,324.92	1,831.23	36.3%	0.00	0.00	0.0%
2:15 PM	8,177.93	2,044.48	40.5%	0.00	0.00	0.0%
2:30 PM	9,146.20	2,286.55	45.3%	0.00	0.00	0.0%
2:45 PM	10,377.08	2,594.27	51.4%	0.00	0.00	0.0%
3:00 PM	11,989.35	2,997.34	59.4%	0.00	0.00	0.0%
3:15 PM	14,426.76	3,606.69	71.5%	0.00	0.00	0.0%
3:30 PM	15,935.06	3,983.76	79.0%	0.00	0.00	0.0%
3:45 PM	17,816.75	4,454.19	88.3%	0.00	0.00	0.0%
4:00 PM	20,154.10	3,023.11	99.9%	0.00	0.00	0.0%
4:03 PM	20,173.12	605.19	100.0%	0.00	0.00	0.0%

PROJECT: UCSF Parnassus
OPEN SPACE: Independence High School

NOVEMBER 15

Mirror date: January 25
Analysis hours: 7:51 AM-3:57 PM (PST)

Analysis Time	EXISTING SHADOW			UCSF PARNASSUS NET NEW SHADOW		
	Shadow Area (sf)	Area/Time (sfh)	Coverage	Shadow Area (sf)	Area/Time (sfh)	Coverage
7:51 AM	20,173.13	1,613.85	100.0%	0.00	0.00	0.0%
8:00 AM	20,173.13	4,034.63	100.0%	0.00	0.00	0.0%
8:15 AM	18,455.58	4,613.90	91.5%	0.00	0.00	0.0%
8:30 AM	10,959.72	2,739.93	54.3%	0.00	0.00	0.0%
8:45 AM	8,361.61	2,090.40	41.4%	0.00	0.00	0.0%
9:00 AM	5,766.62	1,441.65	28.6%	0.00	0.00	0.0%
9:15 AM	4,637.27	1,159.32	23.0%	0.00	0.00	0.0%
9:30 AM	3,999.77	999.94	19.8%	0.00	0.00	0.0%
9:45 AM	3,542.76	885.69	17.6%	0.00	0.00	0.0%
10:00 AM	3,178.41	794.60	15.8%	0.00	0.00	0.0%
10:15 AM	2,949.67	737.42	14.6%	0.00	0.00	0.0%
10:30 AM	2,760.31	690.08	13.7%	0.00	0.00	0.0%
10:45 AM	2,647.49	661.87	13.1%	0.00	0.00	0.0%
11:00 AM	2,549.03	637.26	12.6%	0.00	0.00	0.0%
11:15 AM	2,491.20	622.80	12.3%	0.00	0.00	0.0%
11:30 AM	2,432.12	608.03	12.1%	0.00	0.00	0.0%
11:45 AM	2,458.67	614.67	12.2%	0.00	0.00	0.0%
12:00 PM	2,852.23	713.06	14.1%	0.00	0.00	0.0%
12:15 PM	3,309.32	827.33	16.4%	0.00	0.00	0.0%
12:30 PM	3,772.85	943.21	18.7%	0.00	0.00	0.0%
12:45 PM	4,308.99	1,077.25	21.4%	0.00	0.00	0.0%
1:00 PM	4,852.85	1,213.21	24.1%	0.00	0.00	0.0%
1:15 PM	5,460.72	1,365.18	27.1%	0.00	0.00	0.0%
1:30 PM	6,091.32	1,522.83	30.2%	0.00	0.00	0.0%
1:45 PM	6,802.06	1,700.52	33.7%	0.00	0.00	0.0%
2:00 PM	7,555.35	1,888.84	37.5%	0.00	0.00	0.0%
2:15 PM	8,409.22	2,102.31	41.7%	0.00	0.00	0.0%
2:30 PM	9,435.08	2,358.77	46.8%	0.00	0.00	0.0%
2:45 PM	10,749.88	2,687.47	53.3%	0.00	0.00	0.0%
3:00 PM	12,425.39	3,106.35	61.6%	0.00	0.00	0.0%
3:15 PM	14,553.94	3,638.48	72.1%	0.00	0.00	0.0%
3:30 PM	16,165.65	4,041.41	80.1%	0.00	0.00	0.0%
3:45 PM	18,537.72	4,263.67	91.9%	0.00	0.00	0.0%
3:57 PM	20,136.49	2,215.01	99.8%	0.00	0.00	0.0%

PROJECT: UCSF Parnassus
OPEN SPACE: Independence High School

NOVEMBER 22

Mirror date: January 18
Analysis hours: 7:57 AM-3:54 PM (PST)

Analysis Time	EXISTING SHADOW			UCSF PARNASSUS NET NEW SHADOW		
	Shadow Area (sf)	Area/Time (sfh)	Coverage	Shadow Area (sf)	Area/Time (sfh)	Coverage
7:57 AM	20,173.13	403.46	100.0%	0.00	0.00	0.0%
8:00 AM	20,173.13	3,025.97	100.0%	0.00	0.00	0.0%
8:15 AM	20,173.13	5,043.28	100.0%	0.00	0.00	0.0%
8:30 AM	12,726.32	3,181.58	63.1%	0.00	0.00	0.0%
8:45 AM	10,033.72	2,508.43	49.7%	0.00	0.00	0.0%
9:00 AM	7,239.38	1,809.85	35.9%	0.00	0.00	0.0%
9:15 AM	5,333.41	1,333.35	26.4%	0.00	0.00	0.0%
9:30 AM	4,546.42	1,136.61	22.5%	0.00	0.00	0.0%
9:45 AM	4,007.47	1,001.87	19.9%	0.00	0.00	0.0%
10:00 AM	3,550.01	887.50	17.6%	0.00	0.00	0.0%
10:15 AM	3,247.24	811.81	16.1%	0.00	0.00	0.0%
10:30 AM	2,998.12	749.53	14.9%	0.00	0.00	0.0%
10:45 AM	2,857.53	714.38	14.2%	0.00	0.00	0.0%
11:00 AM	2,745.15	686.29	13.6%	0.00	0.00	0.0%
11:15 AM	2,677.18	669.30	13.3%	0.00	0.00	0.0%
11:30 AM	2,602.55	650.64	12.9%	0.00	0.00	0.0%
11:45 AM	2,623.85	655.96	13.0%	0.00	0.00	0.0%
12:00 PM	3,008.63	752.16	14.9%	0.00	0.00	0.0%
12:15 PM	3,483.28	870.82	17.3%	0.00	0.00	0.0%
12:30 PM	3,945.75	986.44	19.6%	0.00	0.00	0.0%
12:45 PM	4,483.44	1,120.86	22.2%	0.00	0.00	0.0%
1:00 PM	5,025.01	1,256.25	24.9%	0.00	0.00	0.0%
1:15 PM	5,632.47	1,408.12	27.9%	0.00	0.00	0.0%
1:30 PM	6,256.41	1,564.10	31.0%	0.00	0.00	0.0%
1:45 PM	6,961.70	1,740.43	34.5%	0.00	0.00	0.0%
2:00 PM	7,707.52	1,926.88	38.2%	0.00	0.00	0.0%
2:15 PM	8,550.51	2,137.63	42.4%	0.00	0.00	0.0%
2:30 PM	9,598.33	2,399.58	47.6%	0.00	0.00	0.0%
2:45 PM	10,955.89	2,738.97	54.3%	0.00	0.00	0.0%
3:00 PM	12,744.82	3,186.20	63.2%	0.00	0.00	0.0%
3:15 PM	14,551.53	3,637.88	72.1%	0.00	0.00	0.0%
3:30 PM	16,384.03	4,096.01	81.2%	0.00	0.00	0.0%
3:45 PM	19,187.30	3,837.46	95.1%	0.00	0.00	0.0%
3:54 PM	20,108.07	1,608.65	99.7%	0.00	0.00	0.0%

PROJECT: UCSF Parnassus
OPEN SPACE: Independence High School

NOVEMBER 29

Mirror date: January 11
Analysis hours: 8:04 AM-3:51 PM (PST)

Analysis Time	EXISTING SHADOW			UCSF PARNASSUS NET NEW SHADOW		
	Shadow Area (sf)	Area/Time (sfh)	Coverage	Shadow Area (sf)	Area/Time (sfh)	Coverage
8:04 AM	20,173.12	1,815.58	100.0%	0.00	0.00	0.0%
8:15 AM	20,173.13	4,236.36	100.0%	0.00	0.00	0.0%
8:30 AM	20,173.12	5,043.28	100.0%	0.00	0.00	0.0%
8:45 AM	11,654.71	2,913.68	57.8%	0.00	0.00	0.0%
9:00 AM	8,845.29	2,211.32	43.8%	0.00	0.00	0.0%
9:15 AM	6,347.97	1,586.99	31.5%	0.00	0.00	0.0%
9:30 AM	5,085.45	1,271.36	25.2%	0.00	0.00	0.0%
9:45 AM	4,456.63	1,114.16	22.1%	0.00	0.00	0.0%
10:00 AM	3,919.37	979.84	19.4%	0.00	0.00	0.0%
10:15 AM	3,560.92	890.23	17.7%	0.00	0.00	0.0%
10:30 AM	3,246.61	811.65	16.1%	0.00	0.00	0.0%
10:45 AM	3,055.47	763.87	15.1%	0.00	0.00	0.0%
11:00 AM	2,923.14	730.78	14.5%	0.00	0.00	0.0%
11:15 AM	2,845.58	711.39	14.1%	0.00	0.00	0.0%
11:30 AM	2,757.66	689.41	13.7%	0.00	0.00	0.0%
11:45 AM	2,774.86	693.72	13.8%	0.00	0.00	0.0%
12:00 PM	3,046.64	761.66	15.1%	0.00	0.00	0.0%
12:15 PM	3,587.35	896.84	17.8%	0.00	0.00	0.0%
12:30 PM	4,074.04	1,018.51	20.2%	0.00	0.00	0.0%
12:45 PM	4,606.87	1,151.72	22.8%	0.00	0.00	0.0%
1:00 PM	5,140.35	1,285.09	25.5%	0.00	0.00	0.0%
1:15 PM	5,741.15	1,435.29	28.5%	0.00	0.00	0.0%
1:30 PM	6,354.95	1,588.74	31.5%	0.00	0.00	0.0%
1:45 PM	7,049.01	1,762.25	34.9%	0.00	0.00	0.0%
2:00 PM	7,782.04	1,945.51	38.6%	0.00	0.00	0.0%
2:15 PM	8,605.42	2,151.35	42.7%	0.00	0.00	0.0%
2:30 PM	9,635.29	2,408.82	47.8%	0.00	0.00	0.0%
2:45 PM	11,030.17	2,757.54	54.7%	0.00	0.00	0.0%
3:00 PM	12,785.40	3,196.35	63.4%	0.00	0.00	0.0%
3:15 PM	14,486.82	3,621.70	71.8%	0.00	0.00	0.0%
3:30 PM	16,492.23	4,123.06	81.8%	0.00	0.00	0.0%
3:45 PM	19,489.06	3,508.03	96.6%	0.00	0.00	0.0%
3:51 PM	20,090.99	1,004.55	99.6%	0.00	0.00	0.0%

PROJECT: UCSF Parnassus
OPEN SPACE: Independence High School

DECEMBER 6

Mirror date: January 4
Analysis hours: 8:10 AM-3:51 PM (PST)

Analysis Time	EXISTING SHADOW			UCSF PARNASSUS NET NEW SHADOW		
	Shadow Area (sf)	Area/Time (sfh)	Coverage	Shadow Area (sf)	Area/Time (sfh)	Coverage
8:10 AM	20,173.13	806.93	100.0%	0.00	0.00	0.0%
8:15 AM	20,173.13	3,429.43	100.0%	0.00	0.00	0.0%
8:30 AM	20,173.13	5,043.28	100.0%	0.00	0.00	0.0%
8:45 AM	15,073.74	3,768.43	74.7%	0.00	0.00	0.0%
9:00 AM	10,211.72	2,552.93	50.6%	0.00	0.00	0.0%
9:15 AM	7,555.17	1,888.79	37.5%	0.00	0.00	0.0%
9:30 AM	5,660.63	1,415.16	28.1%	0.00	0.00	0.0%
9:45 AM	4,865.81	1,216.45	24.1%	0.00	0.00	0.0%
10:00 AM	4,258.94	1,064.73	21.1%	0.00	0.00	0.0%
10:15 AM	3,842.81	960.70	19.0%	0.00	0.00	0.0%
10:30 AM	3,476.12	869.03	17.2%	0.00	0.00	0.0%
10:45 AM	3,234.40	808.60	16.0%	0.00	0.00	0.0%
11:00 AM	3,072.62	768.15	15.2%	0.00	0.00	0.0%
11:15 AM	2,985.04	746.26	14.8%	0.00	0.00	0.0%
11:30 AM	2,889.49	722.37	14.3%	0.00	0.00	0.0%
11:45 AM	2,897.93	724.48	14.4%	0.00	0.00	0.0%
12:00 PM	3,188.86	797.22	15.8%	0.00	0.00	0.0%
12:15 PM	3,698.86	924.72	18.3%	0.00	0.00	0.0%
12:30 PM	4,140.16	1,035.04	20.5%	0.00	0.00	0.0%
12:45 PM	4,666.01	1,166.50	23.1%	0.00	0.00	0.0%
1:00 PM	5,190.44	1,297.61	25.7%	0.00	0.00	0.0%
1:15 PM	5,782.29	1,445.57	28.7%	0.00	0.00	0.0%
1:30 PM	6,384.44	1,596.11	31.6%	0.00	0.00	0.0%
1:45 PM	7,064.12	1,766.03	35.0%	0.00	0.00	0.0%
2:00 PM	7,781.04	1,945.26	38.6%	0.00	0.00	0.0%
2:15 PM	8,585.16	2,146.29	42.6%	0.00	0.00	0.0%
2:30 PM	9,579.09	2,394.77	47.5%	0.00	0.00	0.0%
2:45 PM	10,918.81	2,729.70	54.1%	0.00	0.00	0.0%
3:00 PM	12,643.67	3,160.92	62.7%	0.00	0.00	0.0%
3:15 PM	14,332.12	3,583.03	71.0%	0.00	0.00	0.0%
3:30 PM	16,478.88	4,119.72	81.7%	0.00	0.00	0.0%
3:45 PM	19,491.42	3,313.54	96.6%	0.00	0.00	0.0%
3:51 PM	20,093.56	1,004.68	99.6%	0.00	0.00	0.0%

PROJECT: UCSF Parnassus
OPEN SPACE: Independence High School

DECEMBER 13

Mirror date: December 28
Analysis hours: 8:15 AM-3:52 PM (PST)

Analysis Time	EXISTING SHADOW			UCSF PARNASSUS NET NEW SHADOW		
	Shadow Area (sf)	Area/Time (sfh)	Coverage	Shadow Area (sf)	Area/Time (sfh)	Coverage
8:15 AM	20,173.12	2,420.77	100.0%	0.00	0.00	0.0%
8:30 AM	20,173.13	5,043.28	100.0%	0.00	0.00	0.0%
8:45 AM	20,173.13	5,043.28	100.0%	0.00	0.00	0.0%
9:00 AM	11,420.26	2,855.06	56.6%	0.00	0.00	0.0%
9:15 AM	8,754.90	2,188.73	43.4%	0.00	0.00	0.0%
9:30 AM	6,224.27	1,556.07	30.9%	0.00	0.00	0.0%
9:45 AM	5,258.47	1,314.62	26.1%	0.00	0.00	0.0%
10:00 AM	4,548.39	1,137.10	22.5%	0.00	0.00	0.0%
10:15 AM	4,076.08	1,019.02	20.2%	0.00	0.00	0.0%
10:30 AM	3,668.25	917.06	18.2%	0.00	0.00	0.0%
10:45 AM	3,382.22	845.56	16.8%	0.00	0.00	0.0%
11:00 AM	3,187.40	796.85	15.8%	0.00	0.00	0.0%
11:15 AM	3,087.42	771.85	15.3%	0.00	0.00	0.0%
11:30 AM	2,983.80	745.95	14.8%	0.00	0.00	0.0%
11:45 AM	2,974.18	743.55	14.7%	0.00	0.00	0.0%
12:00 PM	3,141.03	785.26	15.6%	0.00	0.00	0.0%
12:15 PM	3,698.14	924.53	18.3%	0.00	0.00	0.0%
12:30 PM	4,137.22	1,034.31	20.5%	0.00	0.00	0.0%
12:45 PM	4,655.82	1,163.95	23.1%	0.00	0.00	0.0%
1:00 PM	5,170.44	1,292.61	25.6%	0.00	0.00	0.0%
1:15 PM	5,753.07	1,438.27	28.5%	0.00	0.00	0.0%
1:30 PM	6,343.38	1,585.84	31.4%	0.00	0.00	0.0%
1:45 PM	7,007.56	1,751.89	34.7%	0.00	0.00	0.0%
2:00 PM	7,708.38	1,927.09	38.2%	0.00	0.00	0.0%
2:15 PM	8,499.38	2,124.85	42.1%	0.00	0.00	0.0%
2:30 PM	9,424.34	2,356.09	46.7%	0.00	0.00	0.0%
2:45 PM	10,697.71	2,674.43	53.0%	0.00	0.00	0.0%
3:00 PM	12,354.67	3,088.67	61.2%	0.00	0.00	0.0%
3:15 PM	14,073.42	3,518.35	69.8%	0.00	0.00	0.0%
3:30 PM	16,236.28	4,059.07	80.5%	0.00	0.00	0.0%
3:45 PM	19,274.89	3,469.48	95.5%	0.00	0.00	0.0%
3:52 PM	20,110.39	1,206.62	99.7%	0.00	0.00	0.0%

PROJECT: UCSF Parnassus
OPEN SPACE: Independence High School

DECEMBER 20

Winter solstice (December 21 similar)
Analysis hours: 8:19 AM-3:54 PM (PST)

Analysis Time	EXISTING SHADOW			UCSF PARNASSUS NET NEW SHADOW		
	Shadow Area (sf)	Area/Time (sfh)	Coverage	Shadow Area (sf)	Area/Time (sfh)	Coverage
8:19 AM	20,173.13	1,613.85	100.0%	0.00	0.00	0.0%
8:30 AM	20,173.12	4,236.35	100.0%	0.00	0.00	0.0%
8:45 AM	20,173.13	5,043.28	100.0%	0.00	0.00	0.0%
9:00 AM	12,279.51	3,069.88	60.9%	0.00	0.00	0.0%
9:15 AM	9,614.69	2,403.67	47.7%	0.00	0.00	0.0%
9:30 AM	6,824.44	1,706.11	33.8%	0.00	0.00	0.0%
9:45 AM	5,552.03	1,388.01	27.5%	0.00	0.00	0.0%
10:00 AM	4,748.72	1,187.18	23.5%	0.00	0.00	0.0%
10:15 AM	4,236.83	1,059.21	21.0%	0.00	0.00	0.0%
10:30 AM	3,797.85	949.46	18.8%	0.00	0.00	0.0%
10:45 AM	3,487.03	871.76	17.3%	0.00	0.00	0.0%
11:00 AM	3,256.19	814.05	16.1%	0.00	0.00	0.0%
11:15 AM	3,143.10	785.77	15.6%	0.00	0.00	0.0%
11:30 AM	3,032.83	758.21	15.0%	0.00	0.00	0.0%
11:45 AM	3,003.59	750.90	14.9%	0.00	0.00	0.0%
12:00 PM	3,064.65	766.16	15.2%	0.00	0.00	0.0%
12:15 PM	3,634.09	908.52	18.0%	0.00	0.00	0.0%
12:30 PM	4,068.13	1,017.03	20.2%	0.00	0.00	0.0%
12:45 PM	4,579.26	1,144.82	22.7%	0.00	0.00	0.0%
1:00 PM	5,085.60	1,271.40	25.2%	0.00	0.00	0.0%
1:15 PM	5,659.63	1,414.91	28.1%	0.00	0.00	0.0%
1:30 PM	6,239.94	1,559.98	30.9%	0.00	0.00	0.0%
1:45 PM	6,890.60	1,722.65	34.2%	0.00	0.00	0.0%
2:00 PM	7,576.72	1,894.18	37.6%	0.00	0.00	0.0%
2:15 PM	8,352.70	2,088.18	41.4%	0.00	0.00	0.0%
2:30 PM	9,214.28	2,303.57	45.7%	0.00	0.00	0.0%
2:45 PM	10,412.58	2,603.15	51.6%	0.00	0.00	0.0%
3:00 PM	11,971.72	2,992.93	59.3%	0.00	0.00	0.0%
3:15 PM	13,733.31	3,433.33	68.1%	0.00	0.00	0.0%
3:30 PM	15,761.67	3,940.42	78.1%	0.00	0.00	0.0%
3:45 PM	18,778.51	3,943.49	93.1%	0.00	0.00	0.0%
3:54 PM	20,118.99	1,609.52	99.7%	0.00	0.00	0.0%

Appendix SNA
Space Needs Assessment

UCSF COMPREHENSIVE PARNASSUS HEIGHTS PLAN (CPHP)
SPACE NEEDS ASSESSMENT REPORT

1.0 Introduction

As one of the country's leading health sciences campuses and UC's only campus focused exclusively on health sciences, UCSF's mission is to deliver instruction, conduct research, and provide clinical care, and all three elements of its mission are inter-dependent and inextricably linked.

UCSF's education enterprise includes the five professional degree programs (dentistry, medicine, nursing, pharmacy, and physical therapy), as well as interdisciplinary graduate programs and numerous postdoctoral programs. About 80 percent of UCSF instruction occurs at the Parnassus Heights campus site, with the balance at Mount Zion and Mission Bay. As noted in the 2014 Long Range Development Plan (LRDP), didactic instruction is expected to remain primarily at Parnassus Heights, and new instruction space is expected there, as well as at Mission Bay to support overall growth.

UCSF's research enterprise conducts research in biology, biochemistry, and other disciplines related to health and disease; carries out translational medicine studies in epidemiology, behavioral, and social sciences; studies health care policies; and provides training in each of these fields. With a health science focus, research benefits from adjacency to both the clinical and instructional facilities.

UCSF Health consists of the Medical Centers at Parnassus Heights, Mount Zion, and Mission Bay; UCSF Benioff Children's Hospitals in Oakland and San Francisco; patient care components of UCSF Helen Diller Family Comprehensive Cancer Center and UCSF Weill Institute for Neurosciences, including Langley Porter Psychiatric Hospital and Clinics; UCSF Benioff Children's Physicians; and the UCSF Faculty Practice.

The UCSF Medical Center is recognized as a world leader in health care. It consists of existing inpatient facilities at Parnassus Heights (Long and Moffitt Hospitals), three new specialty hospitals at Mission Bay, and outpatient clinics at these sites, at Mount Zion, and at numerous other locations throughout the City. As noted in the 2014 LRDP, new clinical space would be distributed among the Parnassus Heights, Mission Bay, and Mount Zion campus sites as appropriate to maintain or improve operational efficiency and enhance adjacencies with related research and instructional programs at those sites.

In addition to instructional, clinical and research space, other major LRDP space categories include (1) support space (includes subcategories of Academic Support, Academic and Campus Administration, Campus Community, and Logistics, and covers facilities like the central plants, EH&S, and other support facilities), (2) structured parking, and (3) housing for students, trainees and faculty. The 2014 LRDP plans for increases in these space categories in support of UCSF's primary mission and anticipated space need.

With regard to the Parnassus Heights campus site, the 2014 LRDP includes, among others, the following key objectives:

> A. Continue to promote excellence and leadership in health science education, maintaining the Parnassus Heights campus site as the central location for classroom instruction.
>
> B. Ensure that adequate space is provided to foster collaboration and to facilitate the interdependence and connectivity for operational efficiency and effectiveness of instruction, clinical, research and support uses in close physical proximity to each other.
>
> C. Ensure that Long Hospital and the New Hospital Addition have adequate clinical and administrative support and are aligned with education, research and specialized care programs and support that remain at the campus site.

The 2014 LRDP emphasizes investment in existing facilities and older sites, coupled with further development at the Mission Bay campus site.

Over the last 20 years, UCSF has made substantial investments in acquiring and developing its Mission Bay campus site and as of September 2019, the Mission Bay campus site totals approximately 3.25 million gsf of built space (excluding structure parking). Under the 2014 LRDP, Mission Bay is anticipated to grow to 5.14 million gsf by 2035. The LRDP assumes that Phase 2 of the Medical Center at Mission Bay would occur after 2035, beyond the 2014 LRDP planning horizon. The additional growth anticipated at Mission Bay was planned to support basic science research, as well as both inpatient and outpatient clinical care. Although the 2014 LRDP planned for a modest growth in clinical and research space at the Parnassus Heights campus site, UCSF has since determined that in order to ensure continued excellence of the University, stay competitive and remain a leading health science institution both nationally and internationally, similar investments must be made at Parnassus Heights campus site to keep pace with the investments made at the Mission Bay campus site.

In 2018, UCSF commenced a planning process to re-envision and revitalize the Parnassus Heights campus site. The purpose was to ensure the Parnassus Heights campus site was strongly positioned to advance the excellence of UCSF's clinical, educational, and research programs in direct support of the university's advancing health worldwide mission. UCSF's investment in Parnassus Heights has not kept pace with its aging and inadequate facilities, seismic needs, or changes in programmatic need, resulting in infrastructure, buildings, and interior spaces that require substantial renewal and investment. In addition, concerns regarding faculty and student recruitment and UCSF's ability to maintain the highest levels of patient care and research were identified. The Parnassus Heights planning process resulted in the development and publication of the Comprehensive Parnassus Heights Plan (CPHP), a long-term development framework with a planning horizon of 2050, for the revitalization of the Parnassus Heights physical environment.

The CPHP process was led by the Parnassus Master Planning (PMP) Steering Committee, comprising of faculty and senior administrators from across the campus and UCSF Health. PMP members helped define the programmatic strategy and vision for the Parnassus Heights campus site, including development of space needs, and oversaw the preparation of the CPHP.

The 2014 LRDP, which includes plans and strategies for growth at all of UCSF's major campus sites, was developed with a horizon year of 2035. UCSF will seek an amendment to the 2014 LRDP because implementation of the CPHP recommendations would require modification of the 2014 LRDP's Parnassus Heights development plan. If the LRDP amendment is approved, the CPHP would become the primary planning document for Parnassus Heights and would be used by UCSF to guide the development of the campus site for the next 30 years, to approximately year 2050.

Under the 1976 Regents' resolution, the Parnassus Heights campus site has a limit of 3.55 million gsf of developed space (commonly known as the "space ceiling"). Per the 2014 LRDP, the space ceiling amount excludes housing. Currently, Parnassus Heights is approximately 128,600 gsf, or about 3.6%%, above the space ceiling limit.

The purpose of this report is twofold:

- To summarize the projected space needs identified and recommended by the working groups and the PMP, and
- To note and validate any significant changes between the 2014 LRDP space need assumptions and projections for the Parnassus Heights campus site and the CPHP space need assumptions and projections.

2.0 The Comprehensive Parnassus Heights Plan

The PMP Steering Committee had oversight of four working groups focused on the topics of education space, research space, "digital hub" space for clinical informatics, and central research core space, also known as CoLabs. These working groups included campus researchers, faculty, staff, and clinicians, and each group produced a final report with recommendations for the Parnassus Heights campus site. These reports provide a high-level framework for future education and research platforms, as well as preferred programmatic, operational, and space needs. The recommendations from all four working groups are aligned on the need to better organize, co-locate, and improve the functionality of spaces, as well as provide new methods to share resources and facilities. The working group reports were reviewed, considered and accepted by the PMP. The CPHP working group reports are attached as Appendix A.

In addition to the four working groups, UCSF also convened the Parnassus Heights Community Working Group, comprising community leaders, neighbors, merchants, city representatives, and UCSF staff to engage the broader community in the Parnassus re-envisioning discussion and to identify potential improvements to enhance campus amenities and services to its adjoining neighbors and neighborhoods. The Community Working Group produced a Community Ideas report, which is attached as Appendix B. The CPHP incorporates and reflects many of the ideas captured in this report.

The research and analysis undertaken and completed by the four PMP working groups resulted in recommendations for additional growth of the Parnassus campus. Specifically, the space need recommendations identified by the PMP working groups were:

- Education Space Working Group: 80,000 gsf
- Research Space Working Group: 410,000 gsf
- Digital Hub Working Group: 40,000 gsf
- CoLabs Working Group: 22,000 gsf

The CPHP recommends that these space needs be met through a combination of repurposing and converting existing space, as well as through new construction after demolition. As such, the space needs identified by the working groups are not additive. Rather, only a portion of the future space needs would need to be met through the creation of net new space at Parnassus Heights. The recommendations from all four working groups are aligned on the need to better organize, co-locate, and improve the functionality of spaces, as well as provide new methods to share resources and facilities.

Since the adoption of the 2014 LRDP, UCSF has had significant inpatient volume growth driven by increases in high acuity/complex adult care (for example, cancer and neurosurgery). The growth of complex care demand is driving the need for additional beds. UCSF's catchment area has expanded over time, as the trends in health care have evolved, thus creating significant more demand for care at the Parnassus Heights campus site. Therefore, during the development of the CPHP, a parallel and coordinated effort to develop a master plan for the new hospital facility envisioned for Parnassus Heights in the 2014 LRDP was also commenced and continues to be the subject of detailed planning effort.

Investing in UCSF Health's future is critical to sustaining UCSF's public mission of providing top-quality care to all patients and supporting research and education. Moffitt Hospital was built in 1955 and physicians and staff are currently working in facilities that are outdated, inflexible, undersized, and clinically obsolete. Providing quality facilities is critical to retaining, as well as recruiting top-tier clinicians, staff, researchers and students. In addition, State seismic laws (SB 1953) require Moffitt Hospital to be structurally retrofitted or decommissioned as an inpatient facility by 2030.

Affordable, accessible housing options are critical to the successful recruitment of faculty and students, as well as long-term employee retention, especially in light of the critical housing shortage in San Francisco. Therefore, the CPHP plans for more housing on the Parnassus Heights campus site, compared to what was envisioned in the 2014 LRDP.

The CPHP also envisions an increase in the total amount of usable open space on campus. The most notable of these spaces include the Millberry Terrace, to be located atop the altered or new Millberry Union garage; an expansion of Saunders Court; and the Promenade, to be located to the west of Saunders Court and south of the existing UC Hall, which will be the site of a new Research and Academic Building. The CPHP also proposes additional pathways leading to the Mount Sutro Open Space Reserve, creating a potential “park to peak” connection through campus. Some of the increase in usable open space would be achieved by demolition of existing buildings.

The CPHP incorporates planning elements that seek to improve mobility and campus housing while creating significantly more open space and greater community access in a high-quality, cohesive, integrated health sciences campus that embraces smart urban planning principles.

As shown in Table 1 below, the total amount of building space at the Parnassus Heights campus site at CPHP buildout would be approximately 5.97 million gsf, which includes 915,300 gsf of housing that would be excluded from the space ceiling. To implement the CPHP, the space ceiling at Parnassus Heights would need to increase by 1.5 million gsf, from 3.55 million gsf to 5.05 million gsf. This change would require an amendment to the LRDP and approval by the Regents.

TABLE 1
SPACE PROPOSED UNDER THE CPHP

Type of Space	Existing (2019) Total gsf	Total GSF under the CPHP Horizon 2050 Total gsf	Projected Net New Space Need Under the CPHP Total gsf
Instructional	290,300	290,300	0[a]
Research	709,800	1,018,700	308,900[b]
Clinical	1,030,800	1,872,700	841,900[cb]
Support			
Academic Support	193,800	193,800	0
Academic/Campus Admin	438,300	524,400	86,100
Campus Community	145,500	170,500	25,000
Logistics	107,400	150,900	43,500
Support Subtotal	885,000	1,039,600	154,600
Structured Parking	653,700	719,700	66,000
Vacant/Alteration	109,000	109,000	--
Housing	241,900	915,300	673,400
Total with Housing	**3,920,500**	**5,965,300**	**2,044,800**
Total without Housing	**3,678,600**	**5,050,000**	**1,371,400**

Notes:

a. The table shows no increase in instructional space because the additional instructional space (about 80,000 gsf) would be accommodated in renovated and repurposed existing spaces.

b. This is the net new space. Of the 472,000 gsf research space need identified (which includes 410,000 gsf of Research, 40,000 gsf Digital Hub and 22,000 gsf CoLabs), some of the need would be met through renovation of existing space or new construction after demolition.

c. Additional outpatient space needs would be met in existing space that is converted or renovated from other existing uses.

3.0 Need for Growth at Parnassus Heights

UCSF is a graduate-level university that is devoted exclusively to health sciences and is host to world-renowned science, from basic and quantitative biomedical sciences to translational and clinical research. Today, UCSF's public mission goes beyond San Francisco and delivers a substantial impact on a national and global level by innovating health care approaches for the world's most vulnerable populations, training the next generation of doctors, nurses, dentists, pharmacists, and scientists; supporting elementary and high school education; and translating scientific discoveries into better health for everyone. These three missions of clinical care, education, and research are inter-dependent and require balanced support to ensure continued excellence. With a health science focus, much of the research at UCSF benefits from adjacency to the clinical environment just as access to the most advanced research is important to support the clinicians. Similarly, the research and clinical environments provide critical training for students and learners at UCSF. The clinical, educational and research programs are inextricably linked. The physical environment supports UCSF's mission with outpatient and inpatient facilities, laboratory and other research spaces, classrooms and educational support spaces, academic offices, administrative and logistics spaces, community spaces, and housing for UCSF students, faculty, and their families.

Even with the development and growth of the Mission Bay campus, there is a long history of strong Parnassus Height research programs that must remain at Parnassus Heights and a robust research community is vital to the success of the academic medical center. It is critical to accommodate forecasted research and clinical growth at Parnassus Heights and include a new patient-centered hospital that is embedded with modern outpatient space, research space, and teaching space. The CPHP envisions an integrated Parnassus Heights campus site comprising world-class biomedical research, leading-edge patient care, and the highest standard of educational programs in life sciences and health professions. The New Hospital at Parnassus Heights (NHPH), which would provide adult tertiary and quaternary care and emergency care, needs to open in 2030. The patient care services provided at the NHPH will require the alignment and ongoing support and proximity of the research enterprise at Parnassus Heights and a vibrant UCSF campus of the future requires transformative new space for research and discovery. The CPHP provides this support with opportunities for renovation and creation of space for basic, translational, and clinical research.

Through an assessment of research programs and infrastructure at Parnassus Heights, the Research Space Working Group (RSWG) found that UCSF Parnassus Heights is home to numerous highly regarded biomedical research programs that are outstanding across the spectrum. In contrast, the current research space and infrastructure at Parnassus Heights, in many cases, are sub-standard and inadequate. Close to 80% of existing research space at Parnassus Heights is in buildings well over 50 years old and much of this space does not meet standards for modern research space and is not compliant with current building codes. Modern research space requires larger open spaces that provide flexibility for new programs, space to connect to other research functions, larger floor-to-floor height to accommodate modern infrastructure, and the ability to foster programmatic research interactions in common or shared space. Because there is a shortage of core research resource space, such as co-located shared core labs that facilitate collaboration, and digital hub space for clinical informatics research, many research programs are fragmented, causing difficulty in collaboration, and there is no room to grow or expand existing research programs.

The RSWG further found that the lack of investment in the Parnassus Heights research space infrastructure threatens the competitiveness and viability of Parnassus Heights-based research. The RSWG concluded that in order to transform and meet the campus' future research program needs, an increase in research space is essential.

UCSF's research activities benefit from the frequent personal connections that foster collaborations in discovery. The current medical center at Parnassus Heights, comprising Moffitt and Long hospitals, has convenient connections on every floor to the research and learning facilities in the Medical Sciences Building and is located near the Health Sciences East and West research towers. Parnassus Heights research teams are made up of clinicians, learners, faculty, and staff who leverage the full assets of the campus and the proximity to one another to create a variety of working partnerships. To realize the potential of world-class Parnassus Heights-based research programs, such as ImmunoX, and pioneer new discoveries in important research areas, including aging, metabolomics, microbiome, and others, research space for growth is needed. In addition, research and clinical trials, including National Institutes of Health-funded studies and industry-sponsored studies, benefit from proximity to the hospital, while patients benefit from innovative clinical care that results from these trials.

The CPHP re-envisioning of the Parnassus Height campus is an opportunity to highlight the future hospital at Parnassus Heights where new technologies will be embedded and leading clinicians and scientists will be focused on translating discoveries into treatments and cures.

The 2014 LRDP projected that there would be a need for a new 308,000 gsf hospital addition at Parnassus Heights. The current clinical needs identified at Parnassus Heights, based on evolving information and trends, is greater than what was assumed in the 2014 LRDP. It is now projected that the new hospital would be 955,000 gsf (or approximately 841,900 gsf of net new space) and that Moffitt Hospital would be retrofitted, but would not provide inpatient beds and would be converted to hospital support and other non-acute care uses. There are several factors that resulted in the change in the clinical growth projections. The need for seismic upgrades and replacement of outdated facilities at the Parnassus Heights campus site trigger additional space need requirements in order to comply with current code requirements and industry best practices. Learning from our current public health crisis and pandemic (COVID-19), it is extremely critical for clinical facilities to have the ability and flexibility to increase our inpatient capacity to accommodate the additional clinical needs during these times. The additional need for clinical space at Parnassus Heights is discussed in greater detail below, in Section 5.0 Need for Clinical Space and the New Hospital at Parnassus Heights.

4.0 Need for Instructional Space at UCSF Parnassus Heights

All five professional degree programs are located at Parnassus Heights campus site and classroom instruction for them will continue to occur primarily at Parnassus Heights. The Education Space Working Group (ESWG) comprised a range of faculty and staff from across the academic enterprise that was charged with addressing the space needs of these educational programs. The ESWG engaged with education mission stakeholders, including students; conducted an inventory of current shared and departmental instructional spaces; and explored the role of clinical and research space on the Parnassus Heights campus site as it intersects with the education mission. The ESWG envisions Parnassus Heights as a vibrant community to support student life, well-being, and learning on campus with a reimagined holistic experience.

Many of the 2014 LRDP space needs assumptions for the future of instructional space were validated in the CPHP as teaching and learning trends anticipated in the 2014 LRDP continue. As determined in both processes, future instructional space at UCSF must be flexible and designed to evolve and change due to the influence of new technologies and pedagogies.

The 2014 LRDP assumed that there would be a shift away from traditional instructor-centered teaching toward student-centered learning and informal learning spaces, using team-based and project-based methods within virtual and workplace environments (e.g. clinical and community settings). Similar to the assumptions used by the Instruction Subcommittee and included in the 2014 LRDP, the ESWG assumed that teaching and learning would continue to evolve and change due to the influence of new technologies and that there would not be an overall reduction in instructional space at Parnassus Heights. Rather, different types of space would be needed to meet changing educational needs. The ESWG also envisions an innovative central education core to support active learning and inter-professional pedagogies, including the reconfiguration of existing education space.

This education core would integrate with clinical simulation space, updated modern classrooms, and lab space. The 2014 LRDP assumed instructional space would increase by about 25%, which would be met in existing repurposed space, with adjustments as needed to account for future learning needs.

As of September 2019, there is approximately 290,300 gsf of instructional space at Parnassus Heights. In order to accommodate the ESWG recommendations, the CPHP would provide approximately 80,000 gsf of additional instructional space. The majority of the identified space need would be accommodated in existing repurposed space. As such, there would be an increase of about 27% of instructional space from existing conditions, which is close to the 2014 LRDP projection for new instructional space.

Enrollment trends are only a small indicator and driver of space needs since enrollment trends and projections are unpredictable and it is customary that enrollment projections are limited to 10 years, therefore, much of the need for instructional space is not enrollment driven, but instead reflects research trends, research funding, and medical center growth. Both the 2014 LRDP and the current CPHP assumed very modest future enrollment growth, around 20%. Space identified in the CPHP would accommodate this estimated growth in enrollment. The anticipated instructional space needs (approximately 80,000 gsf) that were identified by the ESWG would be accommodated in existing repurposed and renovated spaces to meet the changing instructional needs.

5.0 Need for Clinical Space and the New Hospital at Parnassus Heights

UCSF Health has experienced significant growth in patient volumes in the last 10 years, which has increased pressure for expansion and growth in clinical facilities, including the Mission Bay expansion. The Smith Cardiovascular Research Building, which include clinical uses, opened in 2010, the Medical Center at Mission Bay opened in 2015, and the Bakar Precision Cancer Medicine Building opened in June 2019. Two more buildings that include clinical facilities, the Joan and Sanford I. Weill Neurosciences Building and the Wayne and Gladys Valley Center for Vision, are slated to open in 2020. In addition, just south of the Mission Bay campus site, in the Dogpatch neighborhood, the Child, Teen and Family Center and Department of Psychiatry Building is scheduled to open in 2021. This state-of-the-art facility will provide outpatient mental health services to Bay Area adults and children.

Need for Inpatient Clinical Space

The Helen Diller Medical Center (Medical Center) at Parnassus Heights which comprises Moffitt and Long Hospitals, provides highly specialized tertiary and quaternary adult care. As of September 2019, there was approximately 1,030,800 gsf of built clinical space and 475 inpatient beds at the Medical Center. The 2014 LRDP identified a New Hospital Addition as the only new clinical building proposed for the Parnassus Heights campus site during the 2014 LRDP planning period, driven predominantly by the need to comply by year 2030 with California's seismic requirements for hospitals.[1] UCSF determined that renovation of Moffitt Hospital to meet SB 1953 seismic standards and current code standards for inpatient use was not practical for several reasons. Moffitt Hospital was constructed in 1955 and the space in the hospital is outdated, undersized, inflexible and obsolete. Many of the existing hospital support functions in the hospital including the emergency room, surgery rooms, procedure rooms,

[1] Requirements of the State of California Alfred E. Alquist Hospital Facilities Seismic Safety Act of 1983.

patient rooms, the clinical lab, pharmacy, and sterile processing spaces are outdated and undersized to serve the current patient load. Floor to ceiling heights are not tall enough to accommodate contemporary equipment.

In 2014, UCSF proposed to comply with the state's requirements by decommissioning and replacing the inpatient facilities currently in Moffitt Hospital and constructing a new 308,000 gsf hospital addition that would be physically connected to Long Hospital, which complies with state seismic law, after demolishing the Langley Porter Psychiatric Institute (LPPI) building. Under the 2014 LRDP, a total of 439 inpatient beds would be provided in the New Hospital Addition and the existing Long Hospital by 2030. Detailed analysis of the clinical space needs at Parnassus Heights has continued to provide information to the hospital planning team. As a result of this continued analysis and to meet the projected patient demand, the New Hospital at Parnassus Heights (NHPH) will need to be larger than what was assumed in the 2014 LRDP.

According to UCSF Health, the Medical Center's inpatient census is at a record high and continues to experience unprecedented growth. Patient demand has exceed the projections made in the 2014 LRDP. The Medical Center at Parnassus Heights is already at capacity and has to turn away transfer patients who need complex care. The existing volume of inpatient admissions at UCSF Parnassus are understated due to capacity constraints preventing patient transfers and scheduling of surgical cases. In 2018, UCSF received over 5,500 requested medically necessary transfers, of which about 2,380 (or approximately 40%) were turned away due to lack of capacity. In 2019, over 3,000 patients were turned away (about 46%). It is anticipated that there will be a 14% increase in medically necessary transfers by 2030. Projected patient demand shows that UCSF must expand capacity. In addition, all of the scenarios below lead to safety, staffing, care quality, and patient satisfaction issues. For example, at the Parnassus hospitals:

- On average, more than five patients per night stay overnight in the Emergency Department (ED) while waiting for an inpatient bed, contributing to ED overcrowding, lack of privacy, delayed access to specialized care, and long wait times.
- Due to capacity constraints and lack of beds, more than two patients per weekday must stay overnight in the Post-Anesthesia Recovery Unit (PACU) following surgery, creating back-ups, delays, and cancellations for other scheduled surgeries.
- On average, four times each week the hospital is on "high capacity alert" as a result of too many patients in the ED, not enough critical care beds, and/or not enough acute care beds. This delays all clinically appropriate patient movement through the hospital.
- Shared rooms do not provide the privacy or space that patients and families need.

The complex tertiary and quaternary cases treated by UCSF specialists at Parnassus Heights are forecast to increase in number over the coming years and decades, due to the Bay Area's projected population growth, which includes an increase in the Medicare population due to an aging regional population. For example, complex cardiac surgery and neurosurgery cases are projected to increase by 30% in the next 10 years. These complex cases will require longer hospital stays and more hospital beds. The projected increases in population and complex cases will lead to a greater inpatient capacity deficit. These high acuity complex admissions will likely be concentrated at a small number of medical centers with the equipment and staff capable of caring for complex patients. These types of cases are critical to the research, education, and patient care mission delivered and provided by UCSF.

The Bay Area population has grown steadily over the last 10 years (around 1% per year) and growth is expected to continue at a similar pace moving forward, from an estimated 7.8 million in 2020 to 8.1

million by 2025.[2] Growth is also expected to be much greater in the older populations, with ages 65 and up growing almost 18% during this period, much faster than the younger age groups. National trends indicated there will be a 31% increase in the Medicare population over the next 10 years. In addition, there is an increase in the medical complexity of patients coming to the hospital as less complex cases are transitioned to outpatient settings. Higher medical complexity cases result in longer length of stay for each admission which drives the greater need for additional beds. Learning from the current pandemic (COVID-19), it is extremely critical for clinical facilities to be flexible and have the ability to increase inpatient capacity to accommodate the additional clinical needs, rather than reducing or canceling non-essential surgeries in order to reduce patient census, as has been done during the current pandemic. In addition, certain conditions and non-essential surgeries could turn critical if they go untreated for a prolonged period of time, putting additional strain on the healthcare system.

This projected growth in patient demand and the complex caseload, (e.g. neurosurgery, neurology, cardiac surgery, vascular surgery, diabetes, and cancer) will increase the total number of beds needed at the Medical Center. To accommodate the current rate of growth in specialty care areas, including the growth in referral and transfer requests from other healthcare providers, UCSF needs to plan for a larger new hospital at Parnassus Heights than what was contemplated in the 2014 LRDP.

Table 2 presents an overview of the existing Parnassus Heights hospital program, and the hospital programs envisioned under the 2014 LRDP and the proposed CPHP. As shown in Table 2, there are currently 325 inpatient beds at Long Hospital and 150 inpatient beds at Moffitt Hospital, for a total of 475 inpatient beds in a combined 754,000 gsf of building space. The 2014 LRDP envisioned a New Hospital Addition of about 308,000 gsf with 140 beds to replace the inpatient facilities that were in Moffitt Hospital; renovation and reuse of Moffitt Hospital for outpatient, support and other campus uses; and reduction in the inpatient beds at Long Hospital to 299 beds, for a total of approximately 439 inpatient beds at Parnassus Heights. At that time of preparation of the 2014 LRDP, the New Hospital Addition was based on replacing Moffitt Hospital to meet the clinical needs in response to SB 1953, with a minimal program that could be accommodated on the LPPI site.

However, for reasons set forth above, UCSF Health has determined that additional inpatient beds are necessary at the Parnassus Heights campus site and that under the CPHP, a total of 675 inpatient beds would be provided, an increase of 200 beds over existing conditions and 236 beds over the 2014 LRDP projections. Under the CPHP, the new NHPH would be 955,000 gsf (or approximately 841,900 gsf of net new space) and would provide 384 inpatient beds for a total bed count of 675 at Parnassus Heights when combined with the 291 inpatient beds in Long Hospital, compared to 439 total beds that were planned in the 2014 LRDP.

Table 2
Parnassus Heights Hospital Program

	Existing (2020)		**2014 LRDP Proposal**		**CPHP Proposal**	
	Beds	**GSF**	**Beds**	**GSF**	**Beds**	**GSF**
Moffitt Hospital	**150**	**385,800**	--	--	--	--
Long Hospital	**325**	**368,600**	299	368,600	291	368,600
Proposed New Hospital	--	--	140	308,000	384	955,000
Total	**475**	**754,400**	**439**	**676,600**	**675**	**1,323,600**

[2] Claritas Pop-Facts® 2020

Other factors informing the size of the NHPH include complying with applicable codes and regulations for new hospitals that require among other things taller floor-to-ceiling heights and additional space necessary to accommodate mechanical equipment and hospital support functions. The NHPH conceptual design also reflects considerations to further improve operational efficiency, including providing operating rooms and critical supporting functions on the same level.

Similar to the 2014 LRDP proposal, the current plan for the NHPH calls for the demolition of LPPI with construction to begin in mid-2023 and anticipated completion by about 2030. In addition to the construction of the NHPH for inpatient use, the Moffitt building would be retained and renovated for other hospital support and non-acute care uses.

The planning, design, and construction of a new, world-class hospital at Parnassus Heights will ensure that UCSF can continue to provide premier care to patients in the San Francisco Bay Area and beyond in the 21st century. The NHPH will also bolster UCSF's ability to provide high-quality, cost-effective health care. It will also allow UCSF Health to create a new optimal healing environment and to design a building based on "whole patient" need, with leading-edge diagnostic tests and therapies, incorporating privacy, views to nature (light and air), and the human connection. This will allow UCSF to connect the research discovery to patient healing and create a new hospital on par with the excellence and preeminence of UCSF's clinicians, scientists, staff, trainees, students and UCSF's mission.

Healthcare is continually evolving and changing. There are many factors and unknowns that continue to affect UCSF's clinical space needs projections, such as advances and changes in health care practices, rapid pace of scientific discovery, government regulation and mandates, impacts from other health care organizations located in UCSF's service area, the continued Bay Area population shifts, and the overall aging demographic. Ongoing changes in the local, regional, state and national healthcare landscape are being considered and factored in the planning of the NHPH.

In summary, based on observed and documented shortages in the availability of beds, especially ICU and acute care beds; an analysis of demographic trends that indicates that Parnassus Heights will need to serve not only a larger population but also a population that includes more elderly patients; an analysis of the demand/need for private rooms (vs. shared rooms/wards); and an analysis of trends in health care which show an increased need for tertiary and quaternary health care, UCSF has determined that a larger hospital is needed that not only replaces the 150 beds that are currently in Moffitt Hospital and the beds that would be reduced in Long Hospital once it is upgraded to current standards, but also provides an additional 200 beds, along with other necessary facilities that include additional operating rooms, additional ER bays and spaces, additional interventional labs, and ambulance bays.

The NHPH is planned to be located at the LPPI site so that it is adjacent to Long Hospital which would continue to provide 291 beds, and Moffitt Hospital which would be seismically retrofitted and renovated for clinical operations in support of both Long Hospital and the NHPH. This co-location of clinical uses would allow UCSF to operate more efficiently, allow the hospitals to share resources, and also minimize intra-campus travel for patients and staff. Further, the expanded clinical program at Parnassus Heights campus site would provide benefits to the research programs and critical training for students and learners, all of which would be enhanced by the adjacency of the three programs.

The projected clinical space need and increase in inpatient beds at Parnassus Heights would not change the 2014 LRDP assumptions related to the inpatient needs projected at Mission Bay. Under the 2014 LRDP, the Mission Bay campus site is expected to grow to 4.35 million gsf by 2035, excluding 786,100 gsf of housing and 1.39 million gsf in structured parking. The 2014 LRDP assumed that the additional beds planned under Phase 2 of the Medical Center at Mission Bay in the 793,500 gsf Phase 2 Hospital would occur after 2035, after the NHPH is completed and operational. Phase 2 of the Medical Center at

Mission Bay is planned to accommodate growth in women's, children's and/or cancer programs, and possibly a new service line. The additional space need in the NHPH would complement the services that currently exist at the Medical Center at Mission Bay.

Need for Outpatient Clinical Space

In the 2014 LRDP Space Needs Assessment Report, the projected outpatient growth through 2020 would be met in new outpatient buildings at Mission Bay with the construction and opening of several new buildings. For example, the new Precision Cancer Medical Center opened in 2019 and the Wayne and Gladys Center for Vision and the Joan and Sanford I. Weill Neurosciences Building are slated to open in 2020. The 2014 LRDP assumed that any future growth in outpatient space at Parnassus Heights would be met in existing facilities.

The 2014 LRDP projected a compound annual outpatient growth rate (CAGR) of 3% from 2010-2020, a 2% CAGR from 2020-2030, and a 1% CAGR for the final five years of the LRDP horizon (2030-2035). After the opening of the Mission Bay hospitals in 2015, there was a slight decline in outpatient visits to Parnassus Heights. This was expected with visits shifting to the Mission Bay campus site to support that campus' new hospitals and clinics. However, actual outpatient growth at Parnassus Heights campus site has outpaced 2014 LRDP projections. Since 2015, outpatient volume at Parnassus Heights has grown 6% annually, double the 2014 LRDP projections. Should this growth rate continue, alternative strategies to accommodate the additional outpatient growth will need to be developed.

Continuing the outpatient growth rate and assumption that was used in the 2014 LRDP for the final five years of the LRDP horizon, UCSF Health currently projects the same modest 1% growth per year at Parnassus Heights between 2030 and 2050. As with the 2014 LRDP, the CPHP does not plan for additional net new outpatient space. It is assumed that any outpatient space needs would be met in existing space that is converted or renovated from other existing uses.

The 2014 Space Needs Assessment assumed the anticipated clinical faculty office demand at Parnassus Heights could be met in existing facilities. However, under the new clinical growth projections, the additional faculty that are needed to support the growth associated with the New Hospital would generate additional clinical faculty office demand. This additional demand is accounted for in Campus Support Space, under the Academic and Campus Administrative category.

The net new clinical space in the CPHP totals 841,900 gsf. This reflects the relocation of some existing clinical uses and demolition of existing facilities, as well as the conversion and renovation of existing facilities to meet the projected net new clinical space need, including the New Hospital and outpatient surgery and imaging.

While there continue to be many uncertainties regarding the future healthcare landscape, the 2014 LRDP and the CPHP set forth the planning for physical facilities to provide flexibility to accommodate anticipated future demand and growth. It will be crucial to continually reassess clinical and other space needs over time and to make adjustments as needed, including through amendments to the 2014 LRDP as necessary.

6.0 Need for Research Space at UCSF Parnassus Heights

Three working groups (Research, Central Research Labs, and Digital Hub) were formed to determine the future research space needs at Parnassus Heights.

The Research Space Working Group (RSWG) conducted a review of Parnassus Heights research activities and areas of programmatic strength and reviewed assessments of research space conditions and utilization, as well as the quality and function of associated research infrastructure.

The RSWG vision for Parnassus Heights is an integrated campus comprising world-class health science research, leading-edge patient care, and the highest quality educational programs. The RSWG envisions a magnet science community at Parnassus Heights that supports a blend of basic, clinical, and translational research activities, each with a critical mass of faculty. Because the last 20 years of UCSF investments in research facilities have been focused at Mission Bay, the RSWG recommended a renewed focus on Parnassus Heights. Additionally, the expansion of the clinical enterprise at Parnassus Heights calls for additional research space to support the new hospital with top-tier basic, clinical, and translational research.

Of the total number of Principal Investigators (PIs) at Parnassus Heights, about 45% of PIs conduct Parnassus-based sponsored projects involving patient-facing research. Currently, there is a lack of designated clinical research space in patient care areas of the hospitals and clinics and properly designed clinical research space for patient cohorts, clinical trials and mechanism-oriented clinical research. This created suboptimal interactions and collaborations with UCSF Health.

Growth in research at Parnassus Heights cannot be accommodated in existing remodeled/renovated space. The RSWG recommends immediate expansion and transformation of the Parnassus Heights research facilities to address existing challenges and deficiencies in the current research space infrastructure and to allow future expansion. The new research space would address the current unmet need for research space and address the need for future growth.

The RSWG came to some of the same findings as the 2014 LRDP Research Subcommittee: Parnassus Heights is experiencing difficulty recruiting and retaining young faculty due to insufficient research space both in terms of quality and quantity, fragmented research programs and a shortage of Core resources. Currently, only 23% of researchers at Parnassus Heights are junior faculty. That is 1/3 fewer assistant professors than at Mission Bay. Nationally, benchmarks suggest research campuses have an even distribution between senior and junior faculty. In order to attract and retain junior faculty, ensure a healthy research enterprise and maintain a balance of junior, mid-level and senior faculty, the RSWG concluded that an investment in research space is urgently needed. The group found a real need and desire to create inspiring research space with program adjacencies and design elements that spur connectivity, community, and innovation to promote research and discovery. In terms of the research enterprise, the CPHP uses some new terminologies that were not used in the 2014 LRDP. The Central Research Labs (CoLabs) concept comprises co-located shared core labs that facilitate collaboration. The Digital Hub space is focused on clinical informatics and desktop research in four core areas: entrepreneurship and training, simulation and testing, collaboration and resources, and education/training.

The 2014 LRDP accounted for these types of space needs in general research spaces, enabling technology or research cores, and research support type spaces. The 2014 LRDP assumed that any growth in research space at Parnassus Heights would be accommodated in underutilized or renovated space. While research space would continue to grow at Mission Bay, the 2014 LRDP assumed that overall research space would decrease slightly to about 711,200 gsf at Parnassus Heights by 2035, the 2014 LRDP planning horizon. The research growth assumptions used in the 2014 LRDP were based on historic funding trends and assumed the following:

- For years 2012-2016: Research funding will not increase and demand for research space will not increase
- For years 2017 - 2021: Research space will increase with growth in research funding, however research space need will be accommodated in existing space

- For years 2022 - 2030: Research space needs will increase as research funding grows, requiring new research space. A 2.5% growth rate was used from 2022-2030
- For years 2031 - 2035: No additional funding growth was assumed since it would be too speculative to estimate beyond 2030

In 2014, research space at the Parnassus Heights campus site totaled 802,200 gsf. Currently, the existing research space at Parnassus Heights is approximately 709,800 gsf, which is slightly less than what was projected to occur by 2035 and less than the space that existed in 2014. The decrease in gsf is due to moves to Mission Bay after the opening of the hospitals in 2015 and renovations of existing buildings that are currently underway at Parnassus Heights. However, research funding – which leads to demand for research space – has far exceeded the 2014 LRDP projections over the last five years. Funding assumptions used in the 2014 LRDP were conservative. According to UCSF's Budget and Resource Management Office, UCSF's CAGR over the last 5 years is approximately 5% vs. 2.5% assumed in the 2014 LRDP. Both the 2014 LRDP and the current CPHP assumes a modest growth (about 2%) in PIs over the next 20 years (through 2035 for the LRDP and 2040 for the CPHP, no assumptions were made beyond 2040 for the CPHP). The RSWG recommends using current industry standards for Core (20% factor) and animal space (15% factor) to account for these types of research space needs in the CPHP. These standards are higher than what was used in the 2014 LRDP (10% factor for both Core and animal space).

Given the current research climate and new research assumptions, and based on recent actual growth rates as well as national trends, the three research working groups projected an additional research space need of approximately 472,000 gsf at Parnassus Heights.

Offices associated with research space need were included in the RSWG request, and that office space is accounted for in Campus Support space, under the category of Academic and Campus Administrative. Some of these research space needs would be met through renovation of existing space or new construction after demolition. Of the 472,000 gsf research space need that was identified, the projected net new research space need is estimated to be 308,900 gsf.

7.0 Need for Campus Support Space

In addition to Instruction, Clinical, and Research spaces, campus support space also needs to grow proportionally to provide the essential services and continued support for the growth of the Parnassus Heights campus site. Campus support functions consist of the following:

- Academic Support, which includes activities supporting the academic enterprise such as the library and animal care;
- Academic and Campus Administration, which includes all administrative activities at the department, school and campus level, including the deans' and directors' offices, conference rooms, and non-academic support activities such as police, personnel and accounting offices;
- Campus Community, which includes activities and amenities that are provided to the larger campus community, such as recreation, fitness, childcare, retail and food service; and
- Logistics, which includes activities devoted to the delivery of material and physical plant activities such as machine shops, service yards, laundry services, utilities, and storage.

As of September 2019, there is approximately 885,000 gsf of total built support space at Parnassus Heights. General growth factors were used for the 2014 LRDP to account for corresponding support uses that would be needed to support the future growth of the campus. Rather than using similar growth factors, Academic Support needs were incorporated in the research space need projections. For Academic and Campus Administration, Campus Community and Logistics space, a small amount of space would be needed to support the anticipated growth at Parnassus Heights. A modest amount of Campus Community and Logistics space is included to account for the proposed Irving Street Arrival Unified Lobby and the Service Corridor projects that are proposed under the CPHP. Under the full buildout of the CPHP, an estimated net new campus support space of about 154,600 gsf is projected.

8.0 Need for On-Campus Housing

Affordable, accessible housing options are critical to the successful recruitment of faculty and students, as well as long-term employee retention, especially in light of the critical housing shortage in San Francisco. Currently, across all UCSF sites, there are 1,248 units of faculty and student/trainee housing. In the summer of 2021, 71 additional units for faculty housing will be available at 2130 Post Street. Based on a Housing Study conducted in 2015, the estimated demand in 2025 for student/trainee housing would be about 2,030 units. Estimated demand for faculty housing would be 345 units, predominantly for incoming junior faculty. The estimated demand far exceeds what is currently available across UCSF campus sites.

The CPHP includes the development of new housing, both to address the needs of the Parnassus Heights community and to offset the pressures on San Francisco's existing housing inventory. UCSF also recognizes that the development of campus housing reduces commute trips by faculty, students and staff. The CPHP envisions densification of the existing Aldea housing complex site and explores long-term housing opportunity on the west side of the campus site, along a new Fourth Avenue extension. The densification of the Aldea housing complex and the total increase in campus housing is necessary to offset the increase in campus population and the non-residential growth of the CPHP.

The 2014 LRDP assumed that approximately 175,000 gsf of existing non-residential uses at Parnassus Heights would be converted to new housing by the LRDP planning horizon. Under the 2014 LRDP, about 329 units of housing would be proposed by the 2035 planning horizon. Upon full implementation of the 2014 LRDP, there would be a total of about 550 housing units on the Parnassus Heights campus site. Compared to the 2014 LRDP, the CPHP would provide less housing in the initial phase (by 2030) but overall, would provide up to about 760 net new units of housing by 2050, bringing the total amount of campus housing on the campus site to about 984 units, about 915,300 gsf of campus housing.

It is anticipated that the Aldea housing complex would continue to be prioritized for student families. Densification of the Aldea housing complex would occur in two phases. The first phase would occur by 2030 and would require the demolition of three existing aging structures in order to provide up to 142 net new units. Phase 2 with 190 net new units would occur at a later date. Upon completion of phase 2, a total of 332 net new units would be added to the Aldea housing complex for a total of 504 units. Based on the housing capacity study that was done as part of the CPHP, up to approximately 430 net new housing units could be accommodated in the West Side district on both sides of the newly proposed Fourth Avenue extension. Upon full implementation of the CPHP, approximately 762 additional units or about 673,400 gsf of net new housing, could be accommodated at the Parnassus Heights campus site. UCSF must increase its housing stock in order to support the campus's long-term housing objectives and accommodate some of the housing demand at Parnassus Heights that is generated with the proposed CPHP development. UCSF is committed to exploring creative ways to provide additional housing and housing options to help meet the needs of its students, faculty and workforce.

9.0 Total Projected Net New Space Need and Space Ceiling

The total amount of existing built space at the Parnassus Heights campus site in 2019 was 3,920,500 gsf, which includes 241,900 gsf of housing. Under the full implementation of the CPHP, the projected net new space needs by LRDP program category at Parnassus Heights are shown in Table 1 on page 4. This total projected space need forms the basis for the physical development of the Parnassus Heights campus site under the CPHP. While the majority of the projected space need would be met through new construction (2.9 million gsf) after demolition (about 875,000 gsf) of existing facilities, some of the projected space need would be accommodated through a combination of conversion and renovation of underutilized space within existing facilities in order to meet current priorities.

Currently, UCSF occupies a total of approximately 3.92 million gsf at Parnassus Heights. Taking into account efficiency gained through renovations and demolitions of existing space, UCSF's space at Parnassus Heights would increase by 2.04 million gsf under the proposed CPHP. With the full implementation of the CPHP, UCSF's total space at Parnassus Heights is estimated to be 5.97 million gsf.

A "space ceiling" limit of 3.55 million gsf currently exists at Parnassus Heights under the 1976 Regents' Resolution. Of the 5.97 million gsf at full development under the CPHP, approximately 915,300 gsf would be devoted to housing, which does not count towards the space ceiling. As shown in Table 1, excluding housing, the projected net new space need is approximately 1.37 million gsf. As of September 2019, and shown in Table 3 below, approximately 3.68 million gsf of space is subject to the space ceiling, which is approximately 128,600 gsf or about 3.6% above the 3.55 million gsf space ceiling limit. Including the future space need of 1.37 million gsf, the total amount of space subject to the space ceiling would be 5.05 million gsf. With the full implementation of the CPHP, the space ceiling overage prior to a proposed amendment to the 2014 LRDP would be about 1.5 million gsf or about 42% above the current 3.55 million gsf space ceiling limit.

TABLE 3
PARNASSUS HEIGHTS SPACE CEILING OVERAGE CALCULATION

	Total gsf	GSF Overage	Percentage Space Ceiling Overage
Space Ceiling	3,550,000		
2019 Existing Space	3,920,500		
Existing Housing	241,900		
2019 Space Subject to the Space Ceiling	3,678,600	128,600	3.6%
2019 Existing Space	3,920,500		
Projected Net New GSF under CPHP at full buildout (2050)	2,044,200		
Total Space under CPHP at full buildout	5,965,300		
Total Housing	915,300		
CPHP Space Subject to the Space Ceiling	**5,050,000**	**1,500,000**	**42%**

APPENDICES INCLUDE:

1. CPHP Research Space Working Group Report
2. CPHP CRL- CoLabs_Report1
3. CPHP CoLabs 2019 Report2
4. CPHP Digital Hub Working Group Report
5. CPHP Educational Space Working Group Report
6. Hospital Sizing 2020-06

UCSF
University of California
San Francisco

Research Space Working Group (RSWG)

December 20, 2018
PMP Steering Committee Meeting

Co Chairs
Tamara Alliston
John Fahy

Committee
Robert Blelloch
Jason Cyster
Andrei Goga
Julene Johnson
Thomas Lang
Janel Long-Boyle
Shaeri Mukherjee
Rushika Perera
Art Weiss
Carol Dawson-Rose
Christine Nguyen
Maria Dall'Era
Jeffrey Lotz

Lindsey Criswell

Support
Cara Fladd
Sharon Priest
Joy Glasier
Maryam Farshad

Research Space Working Group Charge

- **Research Space Working Group (RSWG)**: A representative committee reporting to campus leadership as part of the Comprehensive Parnassus Heights Plan project.
- **RSWG Charge**: To develop guiding principles for research space at Parnassus Heights.

How much research space does PH need?

What kind of research space does PH need?

Before we start...
PH research space planning in a 2018 context

- Development of the UCSF-MB campus nearing completion.
- Relative neglect of the UCSF-PH campus threatening its viability as a world class research campus.
- Groundswell of support from faculty and leadership to rejuvenate the PH campus.
- $500MM Diller gift for a new PH hospital.
- Comprehensive Parnassus Heights Plan (CPHP) - possibility for PH to be "re-born."

UCSF

UCSF Helen Diller Medical Center at PH

Mark Laret

“The new hospital …will be embedded within a campus that includes leading clinicians & scientists focused on translating discoveries into treatments & cures for conditions ranging from diabetes to neurological diseases to organ failure.”

UCSF Helen Diller Medical Center at PH

RSWG

Recognition of the unique opportunity to create an integrated campus at UCSF-PH comprising cutting edge patient care, world class biomedical research, & highest standard education programs in life sciences & health professions.

UCSF Mission

Advance health worldwide through ..

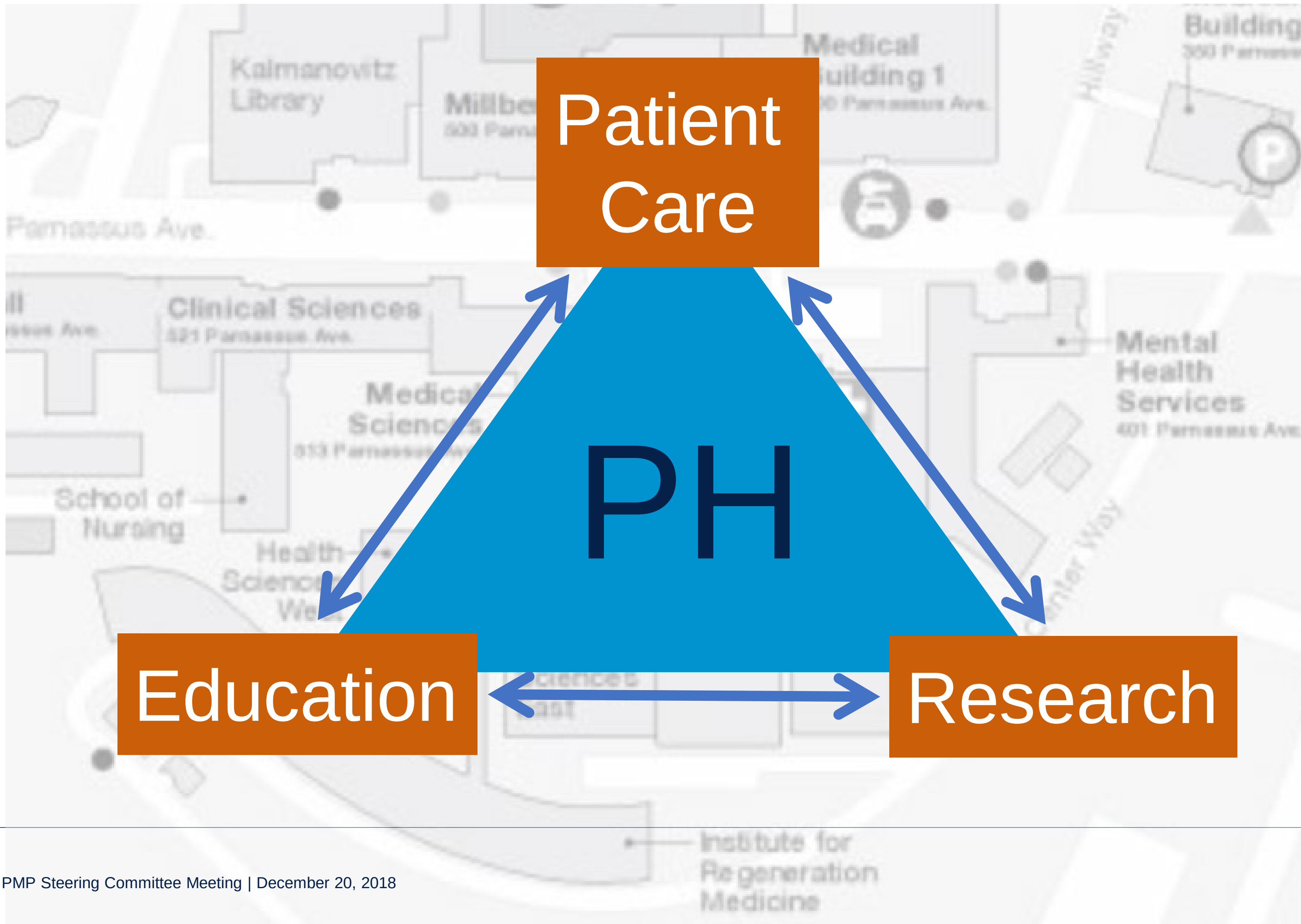
preeminent biomedical **research**

graduate-level **education** in the life sciences and health professions

and excellence in **patient care**.

RSWG and the CPHP process

The unique opportunity to create an integrated world-class UCSF campus at PH



Overview of RSWG Guiding Principles for the PH Research Enterprise

1. World-class biomedical research campus:

- a magnet science community
- architecture and design that inspires innovation & discovery

2. Blend of research activities - basic, clinical, translational:

- not dominated by any research category or program
- each research activity represented by a critical mass of faculty

3. Research activities that are integrated with one another and:

- UCSF Helen Diller Medical Center
- UCSF education programs

UCSF

RSWG - Main Recommendation

- Immediately expand and transform the Parnassus Heights research campus to meet the urgent needs of current and future research programs.

- Plan for an increase in research space from current 550,000 ASF to proposed 875,000 ASF.

Phase 1 (immediately):

(i) Build Parnassus Discovery Hall - 150,000 ASF.
(ii) Build Center for Innovative Medicine - 75,000 ASF.
(iii) Renovate HSIR-East, HSIR-West, and Medical Sciences.

RSWG - Main Recommendation

- Immediately expand and transform the Parnassus Heights research campus to meet the urgent needs of current and future research programs.

- Plan for an increase in research space from current 550,000 ASF to proposed 875,000 ASF.

Phase 1 (immediately):

(i) Build Parnassus Discovery Hall - 150,000 ASF.
(ii) Build Center for Innovative Medicine - 75,000 ASF.
(iii) Renovate HSIR-East, HSIR-West, and Medical Sciences.

Phase 2 (5-10 years)

New Research Building(s) – 100,000 ASF

Why should PH accommodate 875K of research space?

1. Overview of RSWG Process

2. Overview of Current PH Research Enterprise
   - Space
   - Investigators
   - Programs

3. Recommendations for space and other research needs

UCSF

RSWG - Overview of Process

1. Meetings

- RSWG: monthly, March – December 2018.
- RSWG Executive Team: weekly, March – December 2018

2. Sources of Information

- Research survey - Vice Chancellor of Research - Spring 2018
- Research space data - Campus Planning, Space Management
- Research funding data – Budget and Resource Management
- National research space ‘benchmarks’ – Perkins Eastman, Jacobs
- Grassroots and leadership – Stakeholder outreach and meetings

Overview of Current PH Research Enterprise – Research Space

How much research space is available at PH?

558,000 ASF [a] *currently* available

Completed	Building	Space (ASF)
1917	UC Hall	26,000
1941	Langley Porter (LPPI)	26,000
1954	Medical Science Building	117,000
1955	Millberry Union	9,000
1955	Moffitt Hospital	14,000
1956	Proctor Foundation	4,000
1964	HSIR East	130,000
1964	HSIR West	109,000
1964	LPPI Butler Building	1,000
1966	Surge	5,000
1972	ACC Building	10,000
1972	School of Nursing	19,000
1979	School of Dentistry	11,000
1982	Long Hospital	3,000
1986	Koret Vision Research	21,000
1991	Kalmanovitz Library	4,000
2005	PSB	8,000
2010	Dolby	41,000
	Total	**558,000**

- Total space at PH

  = 1,777,000 ASF

- 31% = research space

10 Buildings are more than 50 years old

(a) Research Space includes: academic office, dry lab, wet lab, wet lab support, & Medical Center academic space = broader characterization than for ICR (only considers academic office space assigned to PI with awards).

How much research space is available at PH?

558,000 ASF [a] *currently* available

Completed	Building	Space (ASF)
1917	UC Hall	26,000
1941	Langley Porter (LPPI)	26,000
1954	Medical Science Building	117,000
1955	Millberry Union	9,000
1955	Moffitt Hospital	14,000
1956	Proctor Foundation	4,000
1964	HSIR East	130,000
1964	HSIR West	109,000
1964	LPPI Butler Building	1,000
1966	Surge	5,000
1972	ACC Building	10,000
1972	School of Nursing	19,000
1979	School of Dentistry	11,000
1982	Long Hospital	3,000
1986	Koret Vision Research	21,000
1991	Kalmanovitz Library	4,000
2005	PSB	8,000
2010	Dolby	41,000
	Total	**558,000**

- Total space at PH

  = 1,777,000 ASF

- 31% = research space

10 Buildings are more than 50 years old

20 of 28 HSE/HSW floors remodeled

(a) Research Space includes: academic office, dry lab, wet lab, wet lab support, & Medical Center academic space = broader characterization than for ICR (only considers academic office space assigned to PI with awards).

How much research space is available at PH?

558,000 ASF [a] *currently* available

Completed	Building	Space (ASF)
1917	UC Hall	26,000
1941	Langley Porter (LPPI)	26,000
1954	Medical Science Building	117,000
1955	Millberry Union	9,000
1955	Moffitt Hospital	14,000
1956	Proctor Foundation	4,000
1964	HSIR East	130,000
1964	HSIR West	109,000
1964	LPPI Butler Building	1,000
1966	Surge	5,000
1972	ACC Building	10,000
1972	School of Nursing	19,000
1979	School of Dentistry	11,000
1982	Long Hospital	3,000
1986	Koret Vision Research	21,000
1991	Kalmanovitz Library	4,000
2005	PSB	8,000
2010	Dolby	41,000
	Total	**558,000**

- Total space at PH

  = 1,777,000 ASF

- 31% = research space

10 buildings are more than 50 years old

20 of 28 HSE/HSW floors remodeled

49,000 ASF research space in last 20 years

(a) Research Space includes: academic office, dry lab, wet lab, wet lab support, & Medical Center academic space = broader characterization than for ICR (only considers academic office space assigned to PI with awards).

How much research space is available at PH?

550,000 ASF [a] available when accounting for decanted buildings

Completed	Building	Current	2019-2030
1917	UC Hall	26,000	
1941	Langley Porter (LPPI)	26,000	
1954	MSB	117,000	117,000
1955	Millberry Union	9,000	9,000
1955	Moffitt Hospital	14,000	14,000
1956	Proctor Foundation	4,000	
1964	HSIR East	130,000	130,000
1964	HSIR West	109,000	109,000
1964	LPPI Butler Building	1,000	
1966	Surge	5,000	
1972	ACC Building	10,000	10,000
1972	School of Nursing	19,000	19,000
1979	School of Dentistry	11,000	11,000
1982	Long Hospital	3,000	3,000
1986	Koret Vision Research	21,000	
1991	Kalmanovitz Library	4,000	4,000
2005	PSB	8,000	8,000
2010	Dolby	41,000	41,000
2020	Clinical Sciences		75,000
	Total	**558,000**	**550,000**

6 buildings to be decanted

Clinical Sciences is re-opening in 2020

(a) Research Space includes: academic office, dry lab, wet lab, wet lab support, & Medical Center academic space = broader characterization than for ICR (only considers academic office space assigned to PI with awards).

How does PH compare to MB: ASF?

	Current	2019-2030
Parnassus Heights		
Total ASF	1,777,000	1,656,000
Research ASF	558,000	550,000
% Research ASF	31	33
% Growth in Research ASF		**-1%**
Mission Bay		
Total ASF	1,497,000	2,238,000
Research ASF	546,000	864,000
% Research ASF	36	39
% Growth in Research ASF		**58%**

How does PH compare to MB: Space Utilization?

1. A healthy research campus requires some underutilized space.

2. Old space drives PH space underutilization

   - 30% of HSE/HSW has not been remodeled.

3. Remodeled PH research space is hyper-utilized.

   - Current PH research is projected to require 600K ASF, but has 550K.

Parnassus Heights:	**55% Utilized**		
	% Utilization	Building	Completed
Most Utilized	87% 73%	HSE 15 Dolby	2010 2010
Least Utilized	49%	HSE	1964
Average	55%	HSW	1964
Mission Bay:	**70% Utilized**		
	% Utilization	Building	Completed
Most Utilized	83%	Byers	2005
Least Utilized	50% 65%	Smith CVRI Genentech	2010 2002
Average	72%	Cancer Center	2008

Remodeling old PH research space will not accommodate growth.

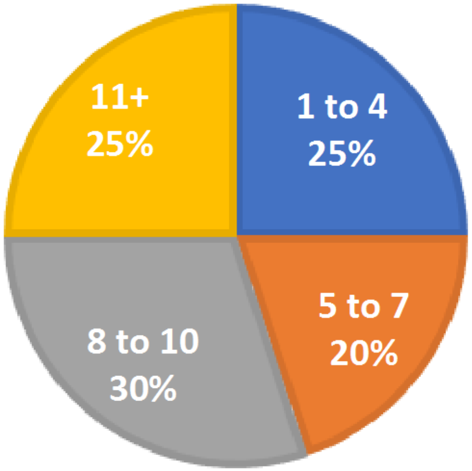
Overview of Current PH Research Enterprise – Investigators and Programs

Current PH Research Enterprise
PH Investigators

- Number of PH PIs[a]: 427 PIs (40% of UCSF PIs)
- Academic research benchmarks suggest even faculty rank distribution.
- 55% Senior Faculty: Full Professors are overrepresented at PH
- 23% Junior Faculty: 1/3 fewer Assistant Professors at PH than MB
- PH Group Size: 25% small, 50% medium, 25% large research groups

(a) PI: all PI's of Sponsored Research Projects.

Researchers per PH F



UCSF

Current PH Research Enterprise
PH Investigators – Robust Funding

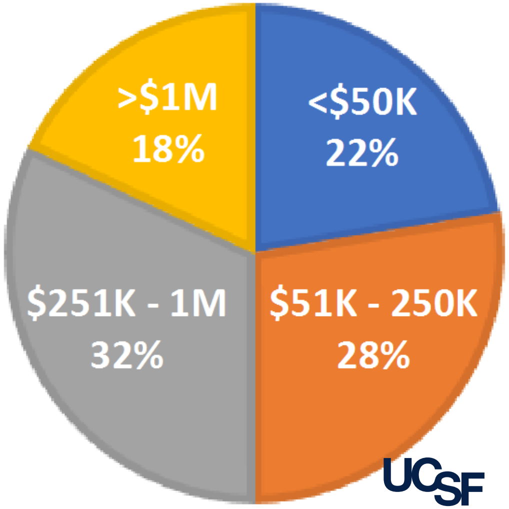
- Funding: $309 MM in annual research funding (direct & indirect, 2016)

- PH ICR/ASF is 14% lower than MB
  - PH ICR/ASF: $153
  - MB ICR/ASF: $177

- Modern space design affords a 15% efficiency

- Suggests that PH ICR/ASF is on par with MB

Direct Costs per PH P

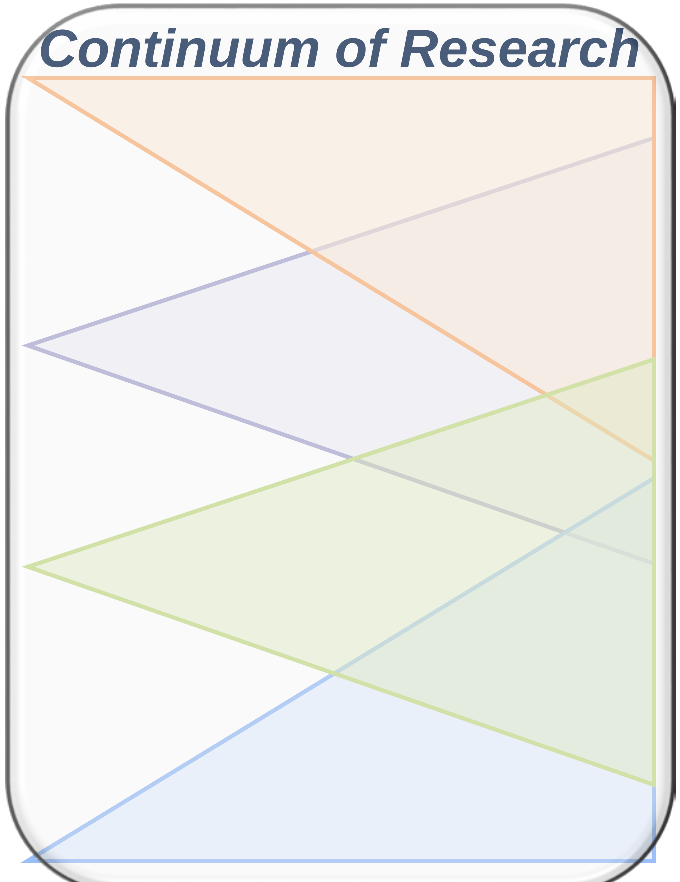


Current PH Research Enterprise
Types of Research and Research Space

Types of Research
(*2018 Research Survey data).

1. Basic (40%)
2. Translational (21%)
3. Clinical (27%)
4. Population (12%)
   Many PIs moving to MB (Block 33).
   Staying at PH: Tobacco Center, SOD, some SON.

Precision Medicine



Types of Research Space

	ASF/Researcher
1. Bench/Wet	200
Hybrid	150
2. Computational	100
Hybrid	150
3. Patient Facing	225
4. Hospital & Clinics	
5. Community	

Current PH Research Enterprise
Basic Science Program

History of Strong PH Research Programs

Longstanding Programs
Cancer
Diabetes
Liver Science
Lung Science

Research that 'stayed' at PH
Cell Biology (SOD)
Research in Clinical Depts
(OB/Gyn, Orthopaedics, etc.)

'Post-MB' PH Programs
Craniofacial
Dev & Stem Cell Biology
Human Genetics
Immunology
Microbial Pathogenesis

Present: Diverse mix of outstanding investigators

- High-impact fundamental & translational discoveries
- Many #1 programs and investigators
- Strong Centers and Programs (P30, T32 etc.)
- New initiatives that synergistically advance UCSF mission at PH (i.e. Aging)

Current PH Research Enterprise
Basic Science Program

Challenges:

- **Insufficient space** quality and quantity - no room to grow
- **Gridlock** to remodeling
- **Difficulty recruiting** faculty & trainees – '2nd tier campus'
- **Fragmented programs** – difficult to colocate collaborators
- **Shortage of core resources**

"Despite its international preeminence and extraordinary success by all objective measures including the highest levels of indirect costs per square foot at Parnassus, the center is bursting at the seams…"

- Matthias Hebrok, Diabetes Center

UCSF

Current PH Research Enterprise
- Clinical Research programs involving patient contact

- 239 faculty[a]
- 45% are female
- 190 are PIs on PH-based sponsored projects that involve patient-facing research.
- 226 clinical research coordinators.
- Diverse, successful & growing programs in multiple clinical departments across schools.
- A large portion of UCSF's research funding ($117.1MM) annually in research funding.

(a) 79% of faculty are "PI" with Sponsored Research Projects.

Current PH Research Enterprise

- Clinical Research programs involving patient contact

- 239 faculty (45% female)
- 190 are PIs on PH-based sponsored projects involving patient-facing research.
- 226 clinical research coordinators.
- Diverse, successful & growing programs in multiple clinical departments across schools.
- A large portion of UCSF's research funding ($117.1MM annually in research funding).

- Organ diseases (heart, lung, liver, kidney, brain, bowel)
- Transplant medicine & surgery
- Heme malignancies, immuno-oncology, neuro-oncology
- Rheumatology & orthopaedics
- Symptom science
- Diabetes & endocrine diseases
- Dental & oral diseases
- Health disparities
- Hospital medicine, palliative care
- Imaging & devices

Current PH Research Enterprise
Clinical Science Programs - Challenges

1. History of **poor advocacy** to generate research resources from campus leadership.

2. Lack of **properly designed space** for research involving patient cohorts, clinical trials and mechanism-oriented clinical research in human subjects

3. Lack of **designated research space** in patient care areas of the hospitals and clinics.

4. Suboptimal **interactions and collaborations** with UCSF Health.

UCSF

How much research space is needed to properly support current and future basic, clinical, and translational research at PH?

How much research space is needed at PH?

Factor Considered	Values Used	Explanation
Current PH Research ASF	550,000 ASF	• Research ASF in 2030 based on Campus Planning analysis
Current PH PIs	427 PIs	• PIs of sponsored research projects at PH.

-

UCSF

How much research space is needed at PH?

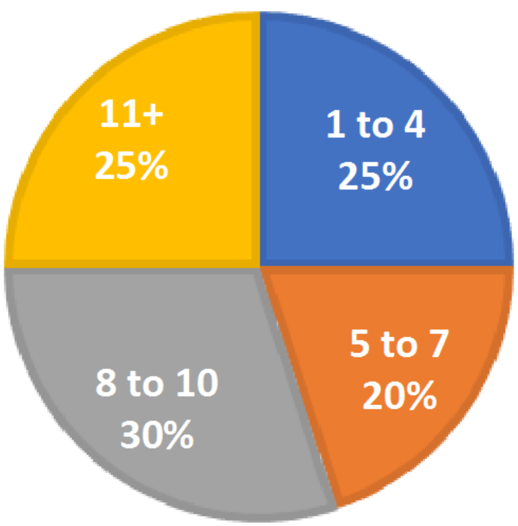
Factor Considered	Values Used	Explanation	
Current PH Research ASF	550,000 ASF	• Research ASF in 2030 based on Campus Planning analysis	
Current PH PIs	427 PIs	• PIs of sponsored research projects at PH.	
Growth over 20 Years	1-2%	• **1% Growth:** 521 PIs	• **2% Growth:** 634 PIs

-

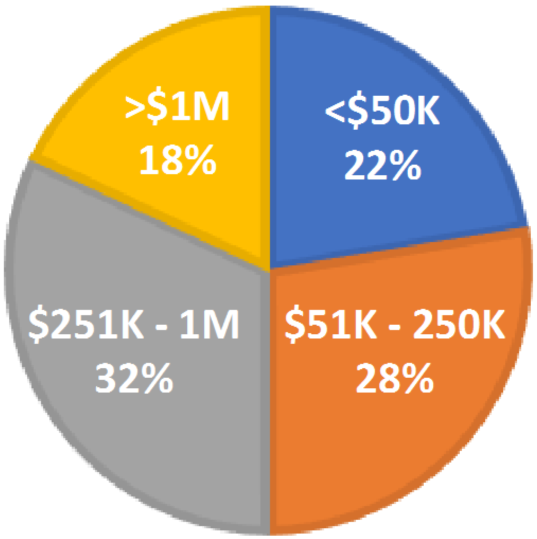
UCSF

How much research space is needed at PH?

Factor Considered	Values Used	Explanation
Current PH Research ASF	550,000 ASF	• Research ASF in 2030 based on Campus Planning analysis
Current PH PIs	427 PIs	• PIs of sponsored research projects at PH.
Growth over 20 Years	1-2%	• **1% Growth:** 521 PIs • **2% Growth:** 634 PIs
Group Size	9	• PH-specific analysis based on funding and survey: PI+8 • Consistent with national group size trends: PI+8



Researchers per PH PI



Direct Costs per PH PI

How much research space is needed at PH?

Factor Considered	Values Used	Explanation
Current PH Research ASF	550,000 ASF	• Research ASF in 2030 based on Campus Planning analysis
Current PH PIs	427 PIs	• PIs of sponsored research projects at PH.
Growth over 20 Years	1-2%	• **1% Growth:** 521 PIs • **2% Growth:** 634 PIs
Group Size	9	• PH-specific analysis based on funding and survey: PI+8 • Consistent with national group size trends: PI+8
Modern Design	Core-centric: -15%	• 15% space efficiency for wet and clinical research space

UCSF

How much research space is needed at PH?

Factor Considered	Values Used	Explanation	
Current PH Research ASF	550,000 ASF	• Research ASF in 2030 based on Campus Planning analysis	
Current PH PIs	427 PIs	• PIs of sponsored research projects at PH.	
Growth over 20 Years	1-2%	• **1% Growth:** 521 PIs	• **2% Growth:** 634 PIs
Group Size	9	• PH-specific analysis based on funding and survey: PI+8 • Consistent with national group size trends: PI+8	
Modern Design	Core-centric: -15%	• 15% space efficiency for wet and clinical research space	
Type of Research	All Types *New: Clinical*	• Addresses the need for all types of research at PH. • Addresses unmet need for clinical research space	
ASF/Investigator	Core-centric Standards	• Wet: 170 ASF • Computational: 100 ASF	• Hybrid: 135 ASF • Clinical: 190 ASF

How much research space is needed at PH?

Factor Considered	Values Used	Explanation	
Current PH Research ASF	550,000 ASF	• Research ASF in 2030 based on Campus Planning analysis	
Current PH PIs	427 PIs	• PIs of sponsored research projects at PH.	
Growth over 20 Years	1-2%	• **1% Growth:** 521 PIs	• **2% Growth:** 634 PIs
Group Size	9	• PH-specific analysis based on funding and survey: PI+8 • Consistent with national group size trends: PI+8	
Modern Design	Core-centric: -15%	• 15% space efficiency for wet and clinical research space	
Type of Research	All Types *New: Clinical*	• Addresses the need for all types of research at PH. • Addresses unmet need for clinical research space	
ASF/Investigator	Core-centric Standards	• Wet: 170 ASF • Computational: 100 ASF	• Hybrid: 135 ASF • Clinical: 190 ASF
Type of Research Space	Computationally integrated	• Wet: 45% • Computational: 19%	• Hybrid: 18% • Clinical: 18%
		• Plan to accommodate shift in research type over 20 years.	

UCSF

How much research space is needed at PH?

Factor Considered	Values Used	Explanation
Current PH Research ASF	550,000 ASF	• Research ASF in 2030 based on Campus Planning analysis
Current PH PIs	427 PIs	• PIs of sponsored research projects at PH.
Growth over 20 Years	1-2%	• **1% Growth:** 521 PIs • **2% Growth:** 634 PIs
Group Size	9	• PH-specific analysis based on funding and survey: PI+8 • Consistent with national group size trends: PI+8
Modern Design	Core-centric: -15%	• 15% space efficiency for wet and clinical research space
Type of Research	All Types *New: Clinical*	• Addresses the need for all types of research at PH. • Addresses unmet need for clinical research space
ASF/Investigator	Core-centric Standards	• Wet: 170 ASF • Hybrid: 135 ASF • Computational: 100 ASF • Clinical: 190 ASF
Type of Research Space	Computationally integrated	• Wet: 45% • Hybrid: 18% • Computational: 19% • Clinical: 18% • Plan to accommodate shift in research type over 20 years.
Core Space	20% Cores 15% Animals	• 20% of new ASF of non-computational space for Cores • 15% of new ASF of wet research space for Animal Space • Percentages derived from industry standards

UCSF

How much research space is needed at PH?

Growth in PIs	Group Size: 9 (PI+8)
1%	722,106 ASF
2%	878,724 ASF

Modest growth projections yield a research space calculation of 722,000 - 875,000 ASF.

Realizing the transformative potential of PH requires that we right size the research for growth and success.

UCSF

Why should PH accommodate 875K of research space?

1. A vibrant UCSF campus of the future requires **transformative new space for research and discovery.**

2. To realize the impact of new hospital and to support the flourishing PH clinical research enterprise, **clinical research** space is urgently needed.

3. PH can achieve the UCSF vision for **Precision Medicine** with an integrated network of outstanding investigators across the **continuum of research**.

4. To realize the potential of **world-class PH-based research programs**, such as ImmunoX and others, space for growth is needed.

5. To **pioneer new research areas**, such as aging, metabolomics, microbiome, and others, space for growth is needed.

6. To **attract and retain junior faculty** to balance 55% senior faculty, space is urgently needed.

Recommendation 1

How much research space does PH need?

Recommendation 1

Expand and transform the PH research campus to meet the urgent needs of current and future research programs.

TWO PHASE APPROACH

Phase 1 (Immediate, near term):

- **Construct** cores and a new research building with 150,000 ASF for research to accommodate growth of existing programs and development of new programs.

- **Construct** a clinical research building with 75,000 ASF as a Center for Innovative Medicine.

- **Renovate** the main research buildings (HSIR East and West, Medical Sciences) to modern gold-standard research space.

Phase 2 (Medium term):

- **Build** 100,000 ASF of additional research space to meet the ongoing needs of strong and emerging research programs.

Future Research Space at UCSF-PH: Phase 1

Completed	Building	Current	2019-2030
1917	UC Hall	26,000	
1941	Langley Porter (LPPI)	26,000	
1954	MSB	117,000	117,000
1955	Millberry Union	9,000	9,000
1955	Moffitt Hospital	14,000	14,000
1956	Proctor Foundation	4,000	
1964	HSIR East	130,000	130,000
1964	HSIR West	109,000	109,000
1964	LPPI Butler Building	1,000	
1966	Surge	5,000	
1972	ACC Building	10,000	10,000
1972	School of Nursing	19,000	19,000
1979	School of Dentistry	11,000	11,000
1982	Long Hospital	3,000	3,000
1986	Koret Vision Research	21,000	
1991	Kalmanovitz Library	4,000	4,000
2005	PSB	8,000	8,000
2010	Dolby	41,000	41,000
2020	Clinical Sciences		75,000
Immediate Future	“Parnassus Hall” Research Building		150,000
Immediate Future	Center for Innovative Medicine		75,000
	Total	**558,000**	**775,000**

Propose 775,000 ASF for Research at PH In Phase 1

Renovate HSIR East and West and MSB

Construct Parnassus Hall and the Center for Innovative Medicine

UCSF

Future Research Space at UCSF-PH: Phase 2

Completed	Building	Current	2019-2030
1917	UC Hall	26,000	
1941	Langley Porter (LPPI)	26,000	
1954	MSB	117,000	117,000
1955	Millberry Union	9,000	9,000
1955	Moffitt Hospital	14,000	14,000
1956	Proctor Foundation	4,000	
1964	HSIR East	130,000	130,000
1964	HSIR West	109,000	109,000
1964	LPPI Butler Building	1,000	
1966	Surge	5,000	
1972	ACC Building	10,000	10,000
1972	School of Nursing	19,000	19,000
1979	School of Dentistry	11,000	11,000
1982	Long Hospital	3,000	3,000
1986	Koret Vision Research	21,000	
1991	Kalmanovitz Library	4,000	4,000
2005	PSB	8,000	8,000
2010	Dolby	41,000	41,000
2020	Clinical Sciences		75,000
Immediate Future	"Parnassus Hall" Research Building		150,000
Immediate Future	Center for Innovative Medicine		75,000
"Phase 2"	Additional Research Space		100,000
	Total	**558,000**	**875,000**

Propose 875,000 ASF for Research at PH In Phase 2

Renovate HSIR East and West and MSB

Construct Parnassus Hall and the Center for Innovative Medicine

Construct Additional Research Space in Phase 2 To Provide Needed Space for Growth of Research Programs

UCSF

Constructing the new Parnassus Heights research space infrastructure

Critical considerations

1. Speed is paramount to rejuvenate PH research space.
   - capture current momentum of world-class programs
   - prevent talent flight
   - compete for best recruits (faculty and students)

2. Urgency in resolving the unmet need for clinical research space and infrastructure.

3. Mindful of unique space needs of each type of researcher.

4. Inclusive and transparent mechanism to solicit input from the research community on space design and adjacencies.

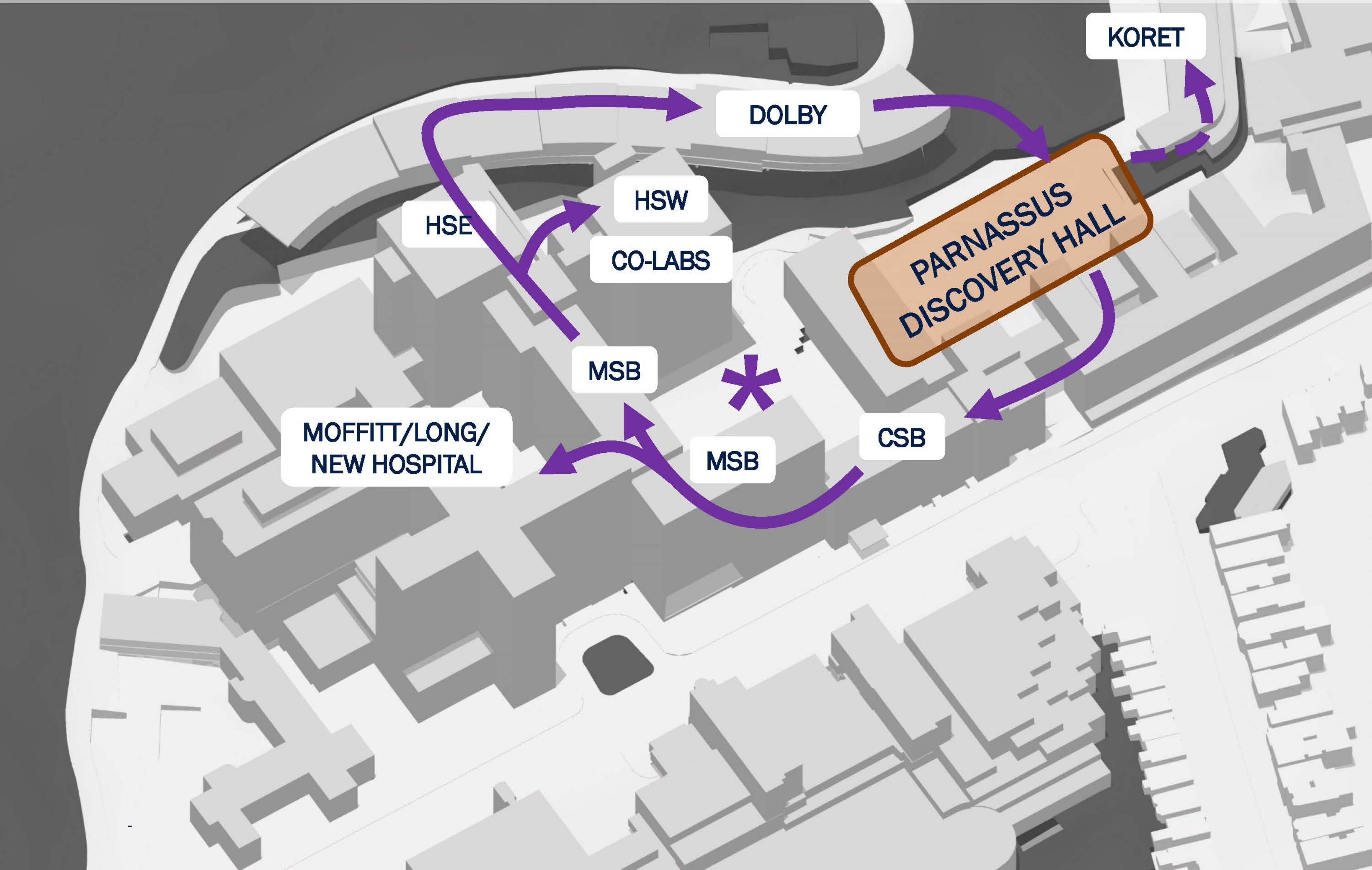
UCSF

Parnassus Discovery Hall
A new building with 150,000 ASF for research

- A **large, modern, and inspiring** new research building to be a **centerpiece** for the rejuvenated Parnassus Heights
- **Speed** of implementation is a crucial design factor
- **Centrally located** near Saunders Court
- Focus on basic and translational science – **wet lab space** with modern space for cores and animal research
- **Near term flexibility** to facilitate renovation of existing research buildings.
- **Physically connected** to other PH research buildings (i.e. concourses to Dolby).

UCSF

Parnassus Discovery Hall
A new building with 150,000 ASF for research



Parnassus Discovery Hall
A new building with 150,000 ASF for research

Programmatically connected

- Innovation thrives with fluid boundaries and self-assembled collaborative networks at UCSF
- Create space that encourages this prized aspect of our community
- Focus on interdisciplinary programs nucleated by faculty from multiple departments
- Grow existing world-class research programs
- Create space for emerging programs

Center for Innovative Medicine (75,000 ASF)

Research space for patient-facing clinical research

- A home for **patient-facing clinical research** at PH (cohort studies, clinical trials, mechanism-oriented clinical research).
- **Located on Parnassus** (adjacent to Helen Diller Hospital).
- Accommodating 12 investigator-led **clinical research units (CRUs)**

  - customized to needs of investigator groups
  - desks for coordinators, program managers, data managers
  - study rooms (visits, procedures)
  - storage (supplies, records).

- Space for **shared needs** – greeting, waiting, phlebotomy, training, compliance, seminars, communication, recruitment.

UCSF

UCSF Center for Innovative Medicine
A home for clinical research (75,000 ASF)

Center For Innovative Medicine

Cohort Studies, Clinical Research, & Clinical Trials

12 Investigator Led CRUs

Investigator-led units of groups (coalitions) of 5-10 investigators. Modeled on the Multidisciplinary Clinical Research Unit and the Airway Clinical Research Center.

Complex Clinical Trials Unit

Shared Resources for Training, Compliance, Recruitment, Other

UCSF Center for Innovative Medicine
A home for clinical research (75,000 ASF)

Center For Innovative Medicine

Cohort Studies, Clinical Research, & Clinical Trials

12 Investigator Led CRUs

Investigator-led units of groups (coalitions) of 5-10 investigators. Modeled on the Multidisciplinary Clinical Research Unit and the Airway Clinical Research Center.

Complex Clinical Trials Unit

Shared Resources for Training, Compliance, Recruitment, Other

"..actual clinical research activities (such as participant recruitment, interviews, etc.) take place in clinical areas, typically occupying a room that could otherwise be used for clinical work. And often that clinical work (not inappropriately) takes precedence, cutting short research participant interaction".

Greg Marcus, M.D.,
Director of Clinical Research
UCSF Cardiology

UCSF Center for Innovative Medicine
A home for clinical research (75,000 ASF)

Center For Innovative Medicine

Cohort Studies, Clinical Research, & Clinical Trials

12 Investigator Led CRUs

Investigator-led units of groups (coalitions) of 5-10 investigators. Modeled on the Multidisciplinary Clinical Research Unit and the Airway Clinical Research Center.

Complex Clinical Trials Unit

Shared Resources for Training, Compliance, Recruitment, Other

Other proposed clinical research infrastructure for PH

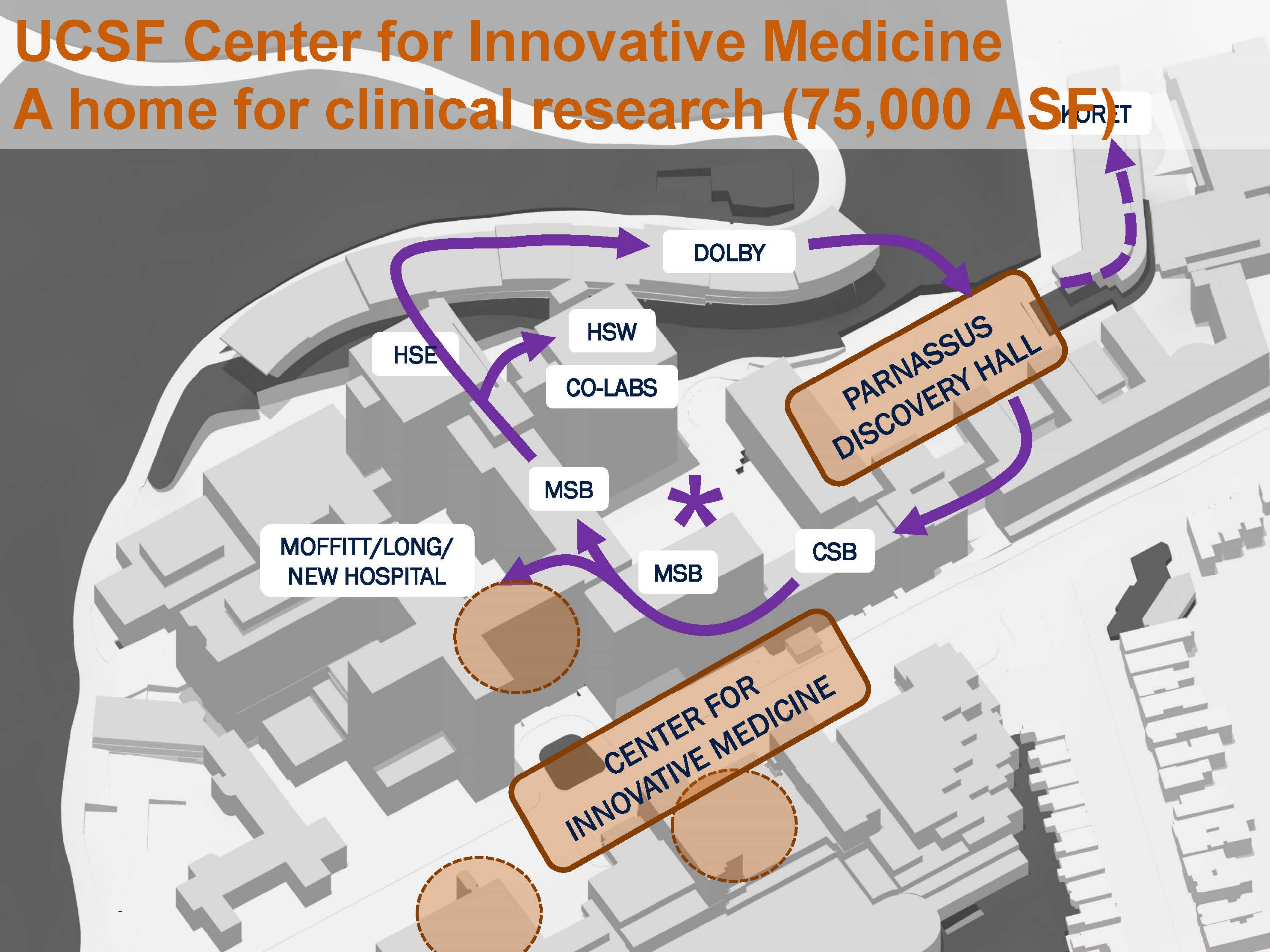
(i) Designated research areas in the new hospital (some shared with education ("*Designated academic areas*")

(ii) Overnight stay clinical research unit (OSCRU)

(iii) Right sized Investigational Drug Pharmacy (IDP)

UCSF

UCSF Center for Innovative Medicine
A home for clinical research (75,000 ASF)



Center for Innovative Medicine
75,000 ASF for patient facing research

1. **Provides currently missing clinical research infrastructure**

1. **Fosters clinical research**

   - showcases UCSF research; encourages patient participation

   - attracts trainees to careers in clinical research

   - builds community among CRCs.

3. Allows **links** between CRUs and basic & translational programs:

   - fosters disease biology research & multidisciplinary research
   - strengthens grant applications (PO1s, P30s, CTSI).

4. Enables Helen Diller Medical Center to position for **innovation.**

UCSF

Recommendation 1

Expand and transform the PH research campus to meet the urgent needs of current and future research programs.

TWO PHASE APPROACH

Phase 1 (Immediate, near term):

- **Construct** cores and a new research building with 150,000 ASF for research to accommodate growth of existing programs and development of new programs.

- **Construct** a clinical research building with 75,000 ASF as a Center for Innovative Medicine.

- **Renovate** the main research buildings (HSIR East and West, Medical Sciences) to modern gold-standard research space.

Phase 2 (Medium term):

- **Build** 100,000 ASF of additional research space to meet the ongoing needs of strong and emerging research programs.

Phase 2: (Medium term)
100,000 ASF of additional research space

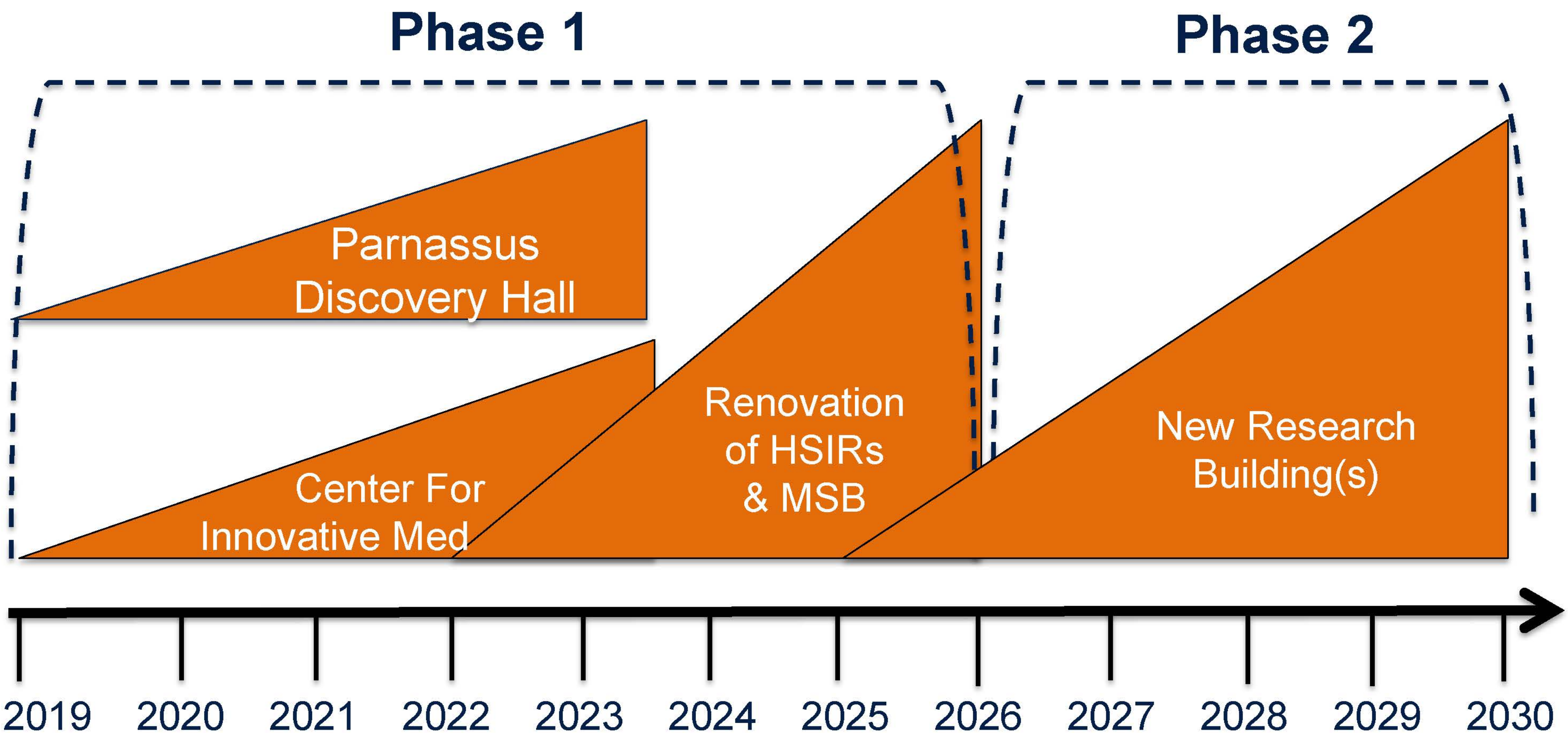
1. Allow for growth of the PH research enterprise (basic, translational, clinical, population).

2. Provide flexibility for research space that meets future research needs, with new programs across the research spectrum and in emerging disciplines, i.e. AI.

3. New space should be centrally located, connected to other research functions, and foster programmatic research interactions

UCSF

Quickly Realizing the new UCSF-PH Research Campus



Recommendation 2

What kind of research space does PH need?

Recommendation 2

Create inspiring research space with adjacencies and design elements that spur connectivity, community, innovation, and celebration.

(i) **Connectivity:** Center research space activities around Saunders Court.

(ii) **Community:** Create physical and digital connectivity, thoughtful adjacencies, and inviting, right-sized, formal and informal interaction spaces to overcome disciplinary and geographic boundaries.

(iii) **Innovation:** Co-locate programmatic research groups with critical mass in high quality space that is designed and allocated using inclusive and transparent mechanisms.

(iv) **Celebration:** Attract and inspire researchers and partners by celebrating UCSF science with art, architecture, and natural beauty.

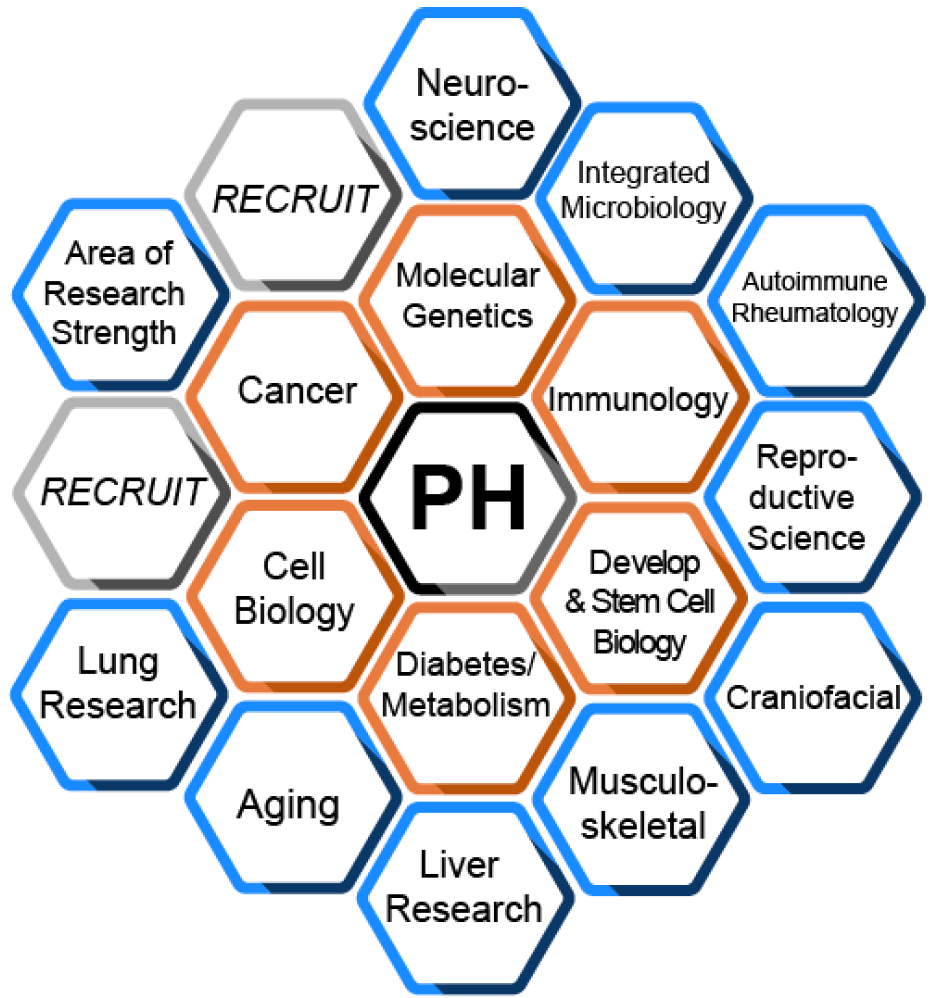
Integration of the PH Research Enterprise Basic Science Programs

Challenge: What are the research space needs of each critical mass of researchers?

One size does not fit all.

Disciplines: research areas with the most PH investigators that integrate all PH researchers

Topics: research areas with a critical mass of PH investigators

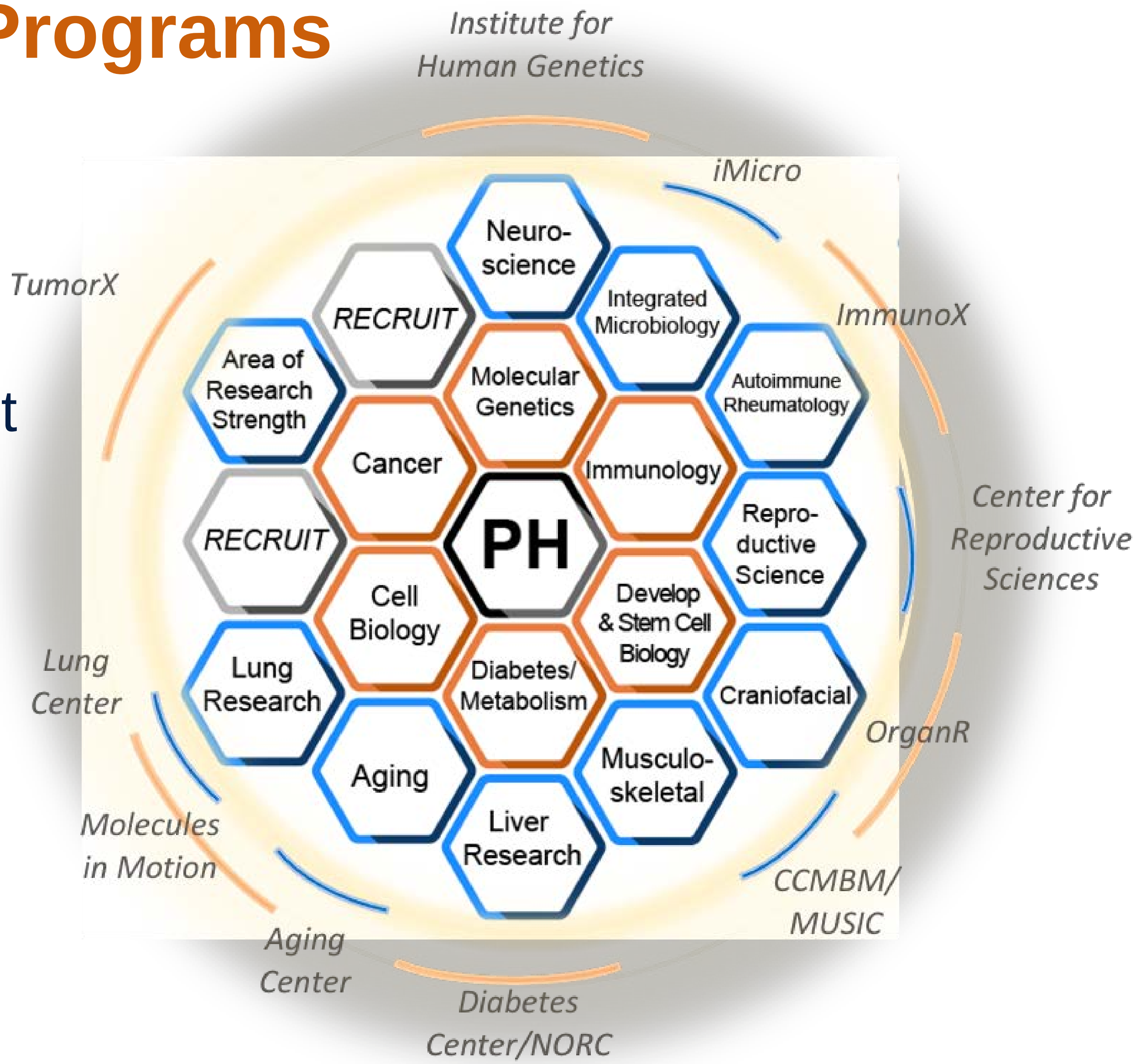


*Research Survey for PH basic scientists with 50%+ effort: “Please list 2 you identify with most and would like to be collocated with.” Survey data supported by funding, Centers, ORUs, and conversations.

UCSF

Integration of the PH Research Enterprise
Basic Science Programs

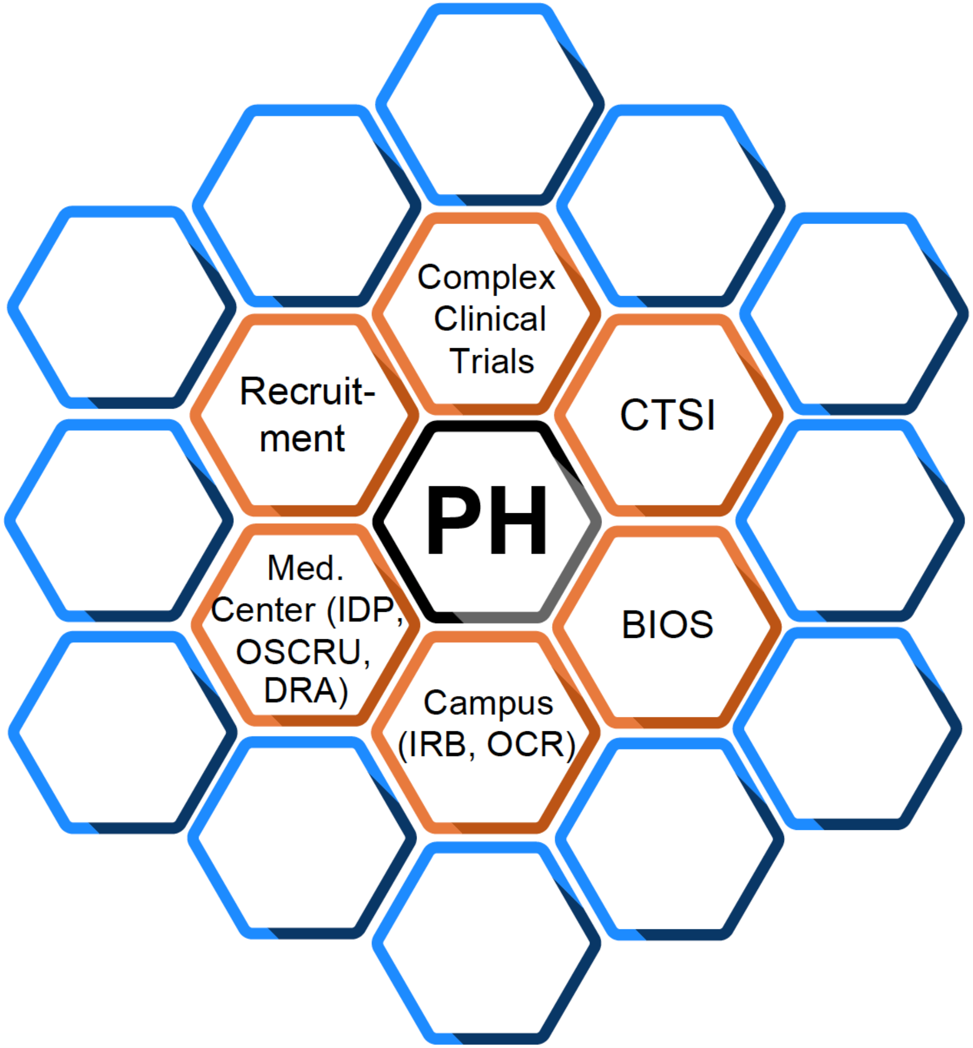
- Programs, Centers, ORUs, and Cores support PH research.
- The same model applies to other types of research.



*For illustration purposes, many other Programs, Centers, ORUs, and Cores are not shown here.

UCSF

Integration of the PH Research Enterprise
Clinical Research Programs



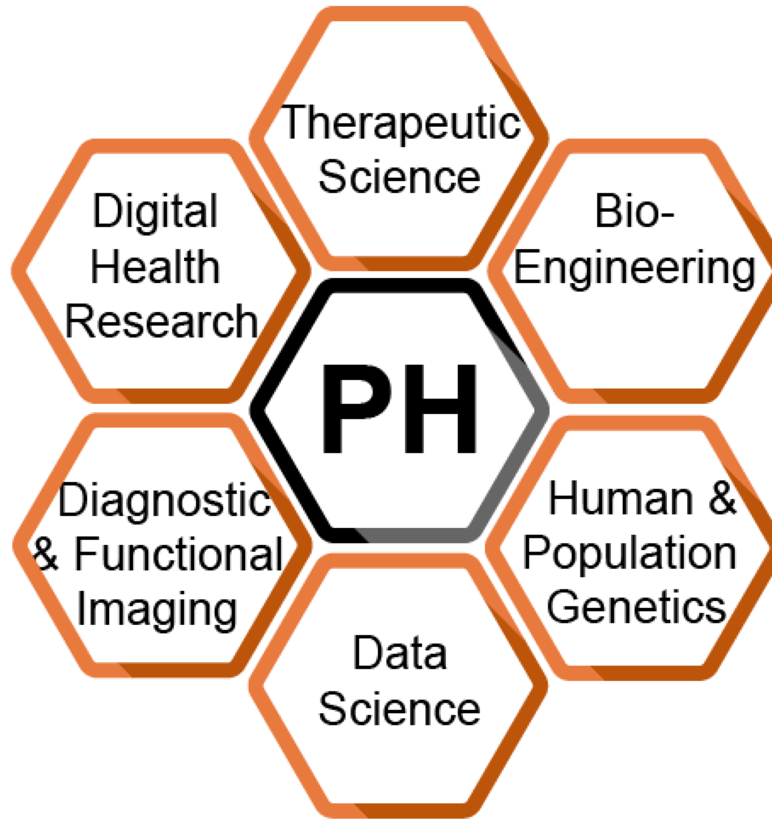
Investigator led clinical research units in the Center for Innovative Medicine

Centralized Services For Clinical Research

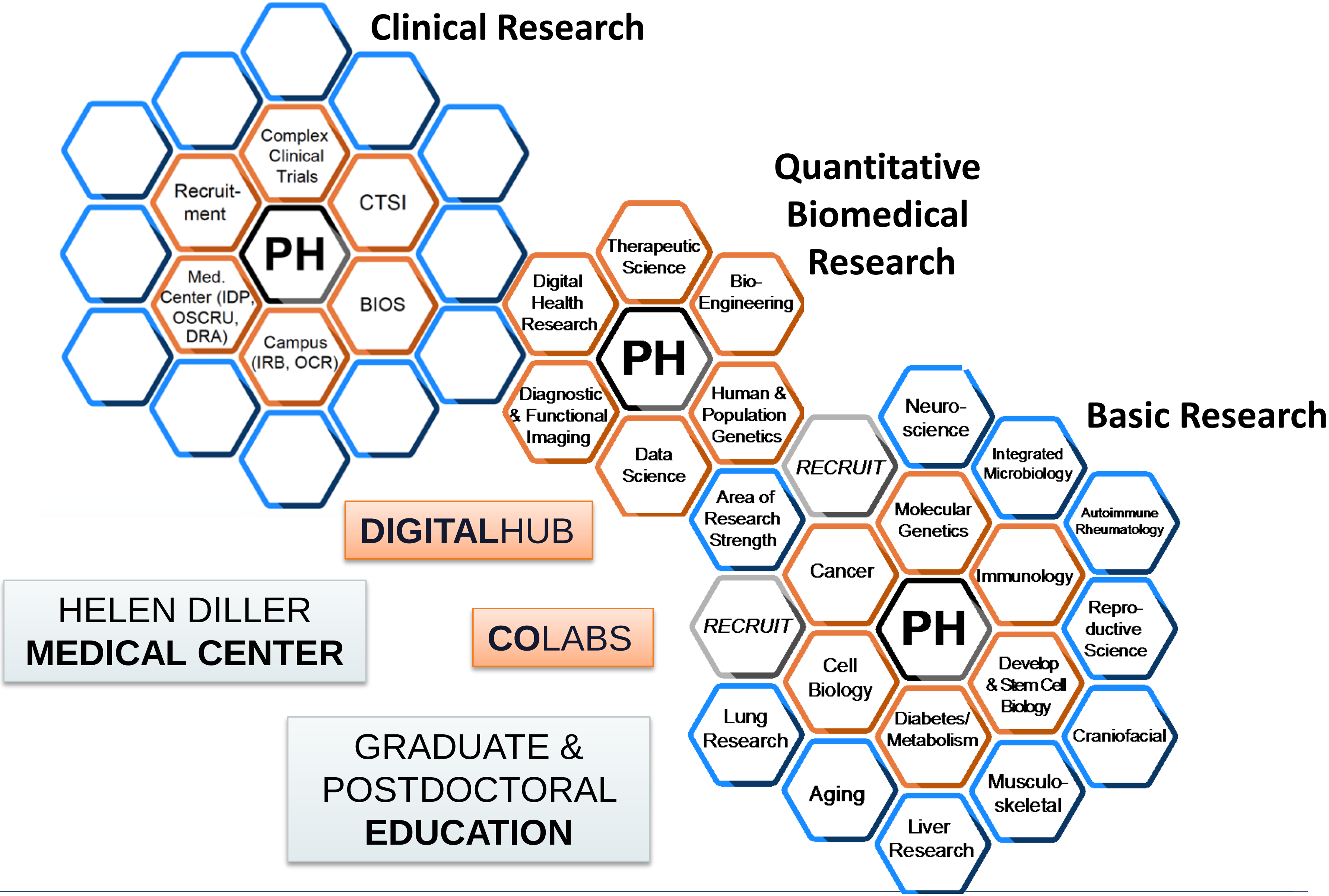
UCSF

Integration of the PH Research Enterprise Quantitative Biomedical Research

- Some groups are currently below critical mass.
- Disperse investigators (many schools, departments, disciplines, and buildings).
- Strategic investment will augment PH fundamental and clinical impact.
- Aligned with Precision Medicine Initiative
- Additional outreach still needed.



Integration of the PH Research Enterprise



UCSF

Summary and Conclusions

UCSF PH Research

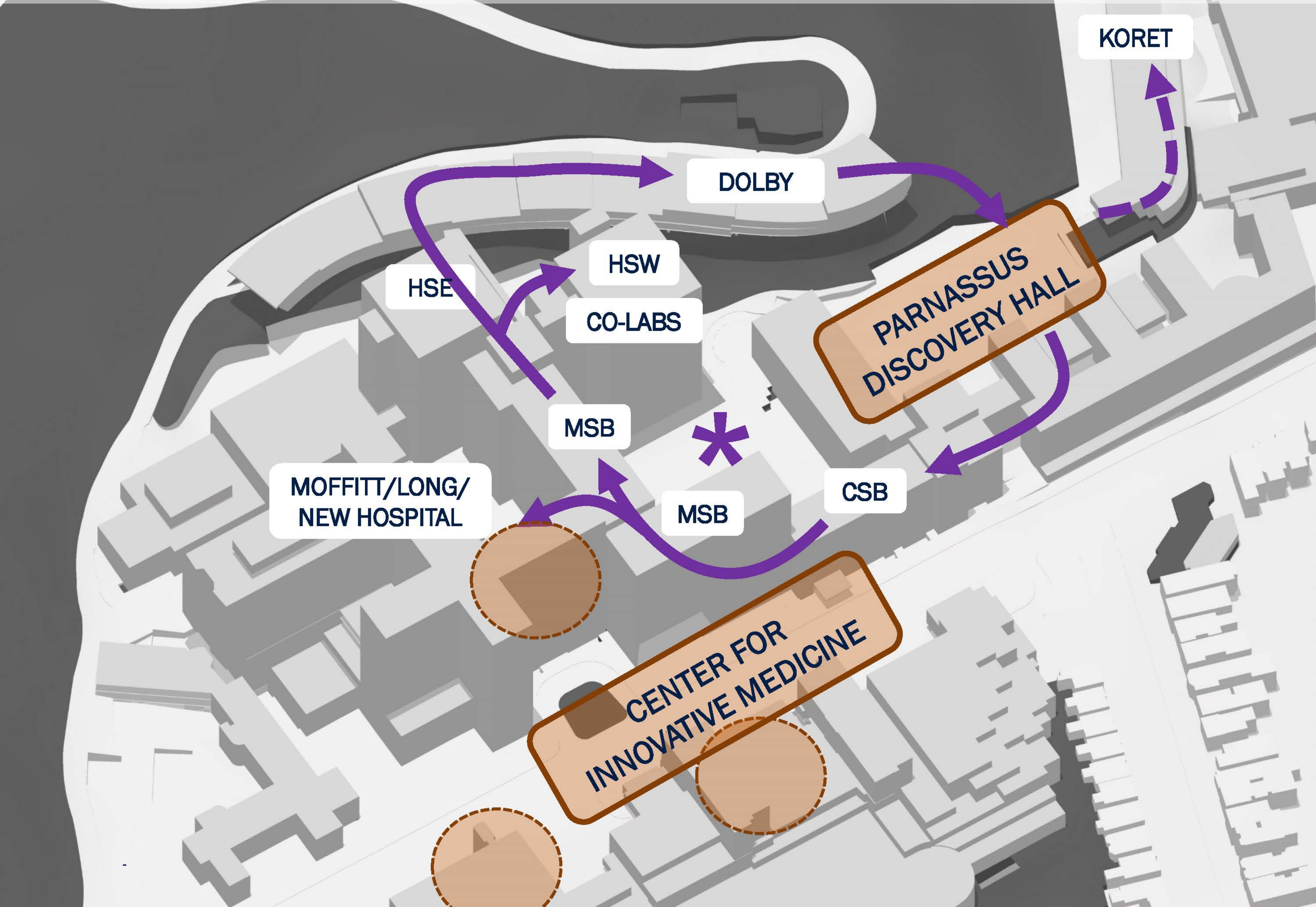
A world class and thriving enterprise

Multi-faceted strength across research disciplines, including basic, clinical, translational and computational.

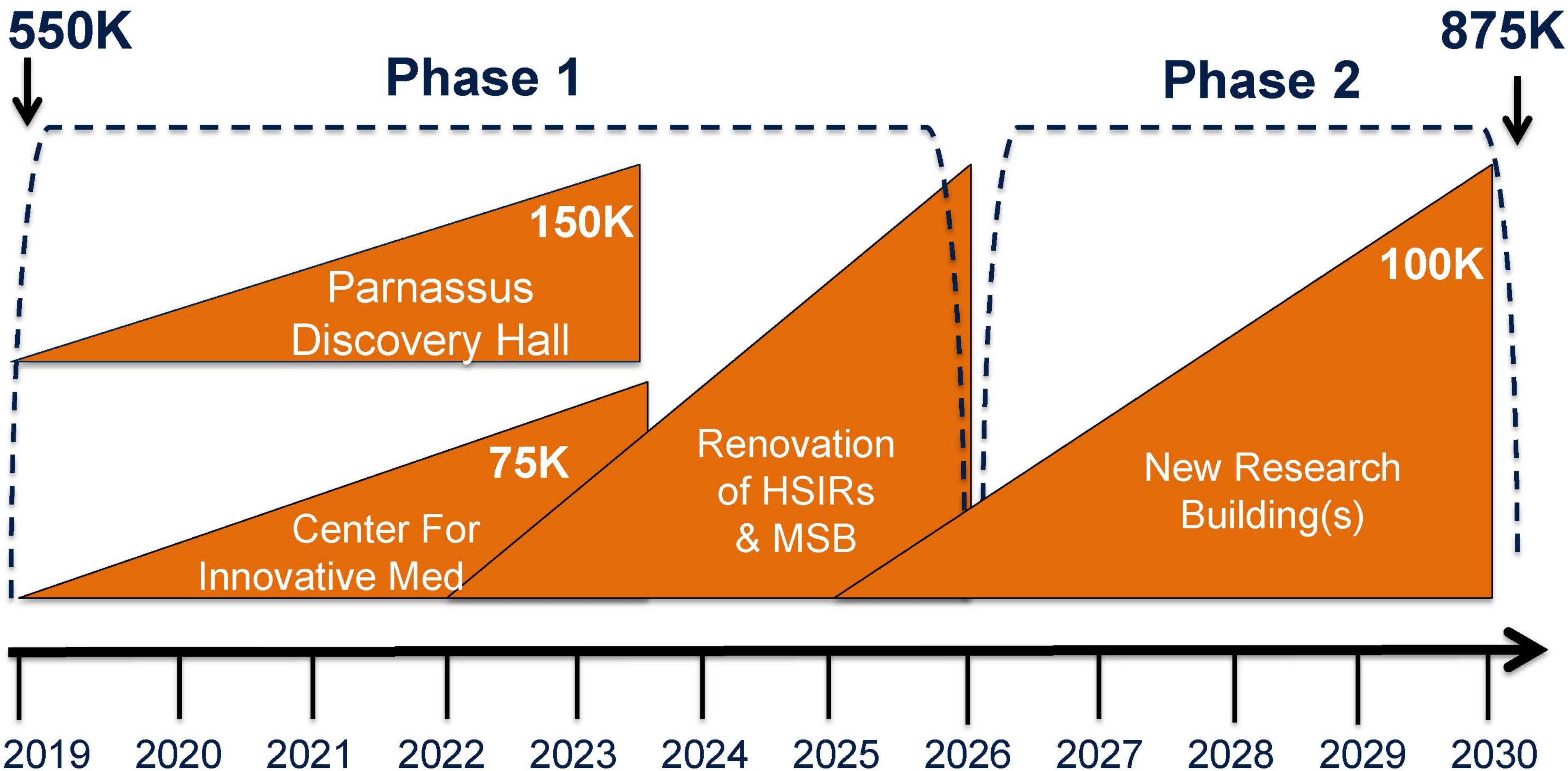
The new Helen Diller Medical Center and PMP process sparks a unique opportunity to create **transformative new space for research and discovery** that will:

- Realize the potential of outstanding PH research programs
- Pioneer clinical research infrastructure and innovation
- Cultivate exciting new research programs
- Advance a vision for impactful integrated research
- Attract and retain talented faculty and trainees

Integration of the PH Research Enterprise



Quickly Realizing the new UCSF-PH Research Campus



Appendix

Current PH Research Enterprise
Basic Science Programs

	Basic Science Research Programs	Representatives
1.	Cancer	Jay Debnath, Andrei Goga, Jeroen Roose, Valerie Weaver
2.	Cell Biology	Bassem Al-Sady, Rushika Perera, Noelle L'Etoile, Fred Chang, Sophie Dumont, Diane Barber
3.	Developmental & Stem Cell Biology	Licia Selleri, Holger Willenbring, Sarah Knox
4.	Diabetes/Metabolism	Matthias Hebrok, Christian Vaisse
5.	Immunology	Matthew Krummel, Jeroen Roose, Jason Cyster, Mark Ansel, Mark Anderson
6.	Molecular Genetics	Neil Risch, Ophir Klein, Nadav Ahituv, Kathy Giacomini
7.	Aging	Saul Villeda, Andrew Brack
8.	Autoimmune/Rheumatology	Mary Nakamura, Lindsey Criswell
9.	Craniofacial	Ophir Klein
10.	Integrated Microbiology	Joanne Engel, Anita Sil
11.	Liver	Jacquelyn Maher, Holger Willenbring
12.	Lung	Mark Looney, John Fahy
13.	Musculoskeletal	Edward Hsiao, Rich Schneider, Jeffrey Lotz
14.	Neuroscience	Arnold Kriegstein, Arturo Alvarez-Buylla, Daniel Lim
15.	Reproductive Sciences	Marco Conti

Current PH Research Enterprise
Clinical Science Programs

UCSF PH-Based Clinical Research Groups Engaged in Patient-Facing Clinical Research (Cohort Studies, Mechanism-Oriented Research in Human Subjects, Clinical Trials)				
Group	**Research Areas**	**Investigators[a]**	**Funding** *(ICR+TDC, 2016-17)*	**Approx# of CRCs[b]**
Oncology	(i) Heme Malignancies (ii) Immuno-Oncology	P Sayre, L Fong, P Munster, N Shah, J Rubenstein, T Martin, C Andreadis, C Smith, E Bergsland, A Logan, W Ai, G Mannis, L Kaplan, R Olin, L Damon, J Wolf, S Wong	$19.6MM	25
Surgery and Surgical Subspecialty	(i) Liver Transplant (ii) Kidney Transplant (iii) Pancreas & Pancreatic Islet Transplant (iv) HIV Transplantation (v) Treg immunology (vi) Thyroid disease & cancer (vii) Thoracic (lung cancer) (viii) Lung Transplant (ix) Vascular (aneurysms, peripheral artery disease) (x) Urology (prostate cancer) (xi) Cardiac Surgery (xii) Otolaryngology (head & neck cancer, polyps, sinusitis) (xiii) Hernias (xiv) Geriatric surgery	JA Sosa, H Harris, J Kukreja, M Conte, S Feng, P Stock, F Vincenti, C Freise S Kang, J Roberts, A Posselt, Q Tang, H Willenbring, M Sarwal, G Roll, S Syed, E Finlayson, C Lebares, D Jablons, G Wieselthaler, J Kratz, C Eichler, L Reilly, J Hiramoto, P Carroll, A Tward, S Pletcher, A Goldberg	$13.8MM	15
Lung	(i) Airway Diseases (asthma, COPD, CF) (ii) Interstitial Lung Diseases & Sarcoidosis (iii) Acute lung injury (iv) Lung Transplant	J Fahy, P Woodruff, M Matthay, H Collard, C Calfee, P Wolters, L Koth, J Golden, S Lazarus, S Christenson, E Gordon, N Bhakta, M Peters, B Ley, J Singer, J Gotts, *K Liu*	$12.0MM	15
Symptom Science	(i) Chemotherapy-induced peripheral neuropathy (CIPN), tinnitus, deafness (ii) Lymphedema in breast cancer survivors (iii) Bioethics (iv) Exercise & weight loss	C Miaskowski, J Levine, *S Chung*, M-O Kim, M Schumacher, G Abrams, K Topp, A Olshen, K Kober, B Smoot, B Koenig, C Dawson-Rose, Y Fukuoka, G Dowling, J Johnson, C Stephens, S Weiss, A Alkon, C Leung, D David, M Pelter	$8.3MM	16*
Neurological Surgery (Speech)	(i) Sensors/implants (ii) Deep brain stimulation	E Chang, S Nagarajan	$7.1MM	4
Center for Cerebrovascular Research	(i) Stroke trials (ii) Intracranial aneurysms AVMs, & atherosclerosis (iii) Pulsatile tinnitus (iv) Medical device trials	H Kim, N Ko, W Smith, K Meisel, A Kim, C Halabi, D Saloner, M Amans, S Hetts, D Cooke, A Abla, C Hess, X Hu (anesthesia, neurology, radiology, neurosurgery, nursing)	$6.0MM	10

[a]Names italicized for those whose funding is handled by a different department, thus not included in group funding total.
[b]Asterisk for CRCs counts pulled solely from HR database of active employees in CRC job family at PH

UCSF

Current PH Research Enterprise
Clinical Science Programs

UCSF PH-Based Clinical Research Groups Engaged in Patient-Facing Clinical Research (Cohort Studies, Mechanism-Oriented Research in Human Subjects, Clinical Trials)				
Group	**Research Areas**	**Investigators**[a]	**Funding** *(ICR+TDC, 2016-17)*	**Approx# of CRCs**[b]
Health Disparities / Internal Medicine	(i) Cancer control and prevention (ii) Tobacco control (iii) Health disparities	L Karliner, A Huang, P Ling, T Nguyen, C Kaplan, R Gonzales, J Walsh-Cassidy, V Yank, M Feldman	$5.9MM	14*
Cardiology	(i) Arrhythmias (ii) Heart Failure (iii) Cardiac Imaging (iv) General & Interventional Cardiology (v) Adult congenital heart disease (vi) Health eHeart Study; (vii) Eureka platform	J Olgin, G Marcus, T DeMarco, M Aras, L Klein, R Abraham, M Albert, F Delling, B Lee, R Lee, V Mahadevan, J Moss, R Redberg, N Schiller, M Scheinman, V Selby, E Stock, E Weiss, E Gerstenfeld, G Fung, N Parikh	$5.7MM	20
Nephrology	(i) Chronic kidney disease (ii) Kidney transplant (iii) Acute kidney injury (iv) Hypertension (v) Polycystic kidney disease	K Liu, K Johansen, D Tuot, M Lunn, M Park, C Hsu, R Hsu, E Ku, R Dubin, C Peralta, M Estrella, A Webber, S Gluck, S Kung, *F Vincenti*	$5.6MM	8
Rheumatology / Autoimmune Disease	(i) Rheumatoid arthritis (ii) Lupus (iii) Vasculitis (iv) Scleroderma (v) Ankylosing spondylitis	L Criswell, M Dall'Era, P Katz, J Graf, M Nakamura, C Ye, F Boin, C Lanata, J Ashouri, L Gensler, R Nayak, G Schmajuk, J Yazdany, S Chung	$4.9MM	12
GI	(i) Hepatitis (ii) Inflammatory bowel disease (iii) Steatohepatitis (iv) Acute liver injury	J Maher, M Khalil, J Baron, B Hameed, U Mahadevan, J Lai, M Peters, J Price, D Bissell, N El-Nachef, D Brandman, M Sarkar, F Yao, N Mehta, M Arain	$4.6MM	20*
Diabetes	(i) Diabetes management (ii) Obesity (iii) Pancreas & pancreas islet transplantation	U Masharani, S Koliwad, M Anderson, *P Stock*	$4.2MM	3*
Neurological Surgery (Brain Tumor Center - Medical and Surgical Neuro-Oncology)	(i) Tumors (brain, spine, & PNS; metastases) (ii) Immuno-oncology (iii) Neurofibromatosis & meningiomas (iv) Novel medical and surgical therapies	N Butowski, J Clarke, J Taylor, N Oberheim-Bush, S Chang, M Berger, M Aghi, M McDermot, S Jumper, P Larson, *C Christine*	$3.9MM	21

[a]Names italicized for those whose funding is handled by a different department, thus not included in group funding total.
[b]Asterisk for CRCs counts pulled solely from HR database of active employees in CRC job family at PH

UCSF

Current PH Research Enterprise Clinical Science Programs

UCSF PH-Based Clinical Research Groups Engaged in Patient-Facing Clinical Research (Cohort Studies, Mechanism-Oriented Research in Human Subjects, Clinical Trials)				
Group	**Research Areas**	**Investigators**[a]	**Funding** *(ICR+TDC, 2016-17)*	**Approx# of CRCs**[b]
Anesthesia	(i) Critical care (e.g.: ARDS, sepsis) (ii) Organ transplantation (iii) Perioperative medicine and outcomes (iv) Neuromuscular blockade (v) Pain	M Gropper, J Leung, J Hellman, J Sall, J Ramsay, P Bickler, J Lee, A Prakash, J Feiner, C Lee, C Niemann, M Bokoch, K Kolodzie	$2.8MM	9*
Dentistry / ENT / Craniofacial Research	(i) Dental caries, composites, & implants (ii) Dental quality (iii) HIV related oral mucosal disease (iv) Sjogren's syndrome	S Ho, C Shiboski, E Kalenderian, T Lang, P Leake, J Houde, S Kapila, D Fried	$2.6MM	2
Geriatrics	(i) Dementia (ii) Disability (iii) Quality of Life	C Ritchie, M Steinman, K Covinsky, B Williams, J Newman, S Rogers, C Ahalt, M Greene, T Allison	$2.5MM	8
Infectious Disease	(i) Human papilloma virus (HPV)	J Palefsky, P Chin-Hong	$2.4MM	11
Dermatology	(i) Pemphigus vulgaris (ii) Scleroderma (iii) Inflammatory skin diseases	M Rosenblum, A Haemel, H Naik	$1.6MM	0*
Endrocrinology	(i) Metabolic bone disease	E Hsiao, M Rao	$1.5MM	6
Palliative Care	(i) Pain (ii) Advance care planning (iii) Ethics	S Pantilat, W Anderson, M Rabow, E Dzeng	$960K	0*
Hospital Medicine	(i) Quality improvement (ii) Implementation science (iii) Digital health (iv) Clinical informatics	M Fang, A Auerbach, K Kangelaris, J Harrison, S Shah, P Prasad, N Najafi, J Adler-Milstein	$491K	0*
Neurology	(i) Parkinson's disease (ii) Neuromuscular disease (iii) ALS studies (iv) Neuroprotection	M Aminoff, C Christine, *P Larson*, C Lomen-Hoerth	$266K	8*
Orthopaedics	(i) Spine disorders (ii) Intervertebral Disc Degeneration (iii) Bone Cancer	R O'Donnell, S Berven, V Deviren, S Burch, B Tay, L Metz, R Wustrack	$264K	9

[a]Names italicized for those whose funding is handled by a different department, thus not included in group funding total.
[b]Asterisk for CRCs counts pulled solely from HR database of active employees in CRC job family at PH

UCSF

Guiding Principles

1. World-class biomedical research campus - a magnet science community.

2. Blend of research activities - basic, clinical, translational - not dominated by any research category or program and with each research activity populated by a critical mass of faculty.

3. High quality shared research resources for both bench and clinical sciences.

4. Integration with the UCSF-PH clinical enterprise.

5. Inspiring interaction and research space intentionally designed to provide:

- high quality research space, co-location of collaborating researchers, and high quality shared space for community, collaboration and communication.

6. Secure space allocation that accommodates dynamic needs and opportunities, programmatically and scientifically.

UCSF
University of California
San Francisco

Central Research Labs (CRL)

PLAN PROPOSAL

CRL Subgroup Report to the
Parnassus Master Planning Steering Committee

April 27, 2018

2017 CHANCELLOR'S ANNUAL ADDRESS

State of the University

"Excellence"

"Now is the time to start"

"Impassioned engagement of the Parnassus Heights-based faculty"

"Incredibly exciting ideas"

"World-class modern facilities"

"Big and **bold**"

CRL SUBGROUP COMMITTEE

Mandate

- Design a **new model** for central lab resources
  - Capitalizes on **critical personnel** and **cutting-edge methods & technologies**
  - Drives **collaboration** across disciplines
- Produce high level plans for **contiguous space** housing all CRL components
  - Integrates core activities into one centralized place, *e.g.* sample processing, high-dimensional imaging, cell separation/sorting, genomic analysis
- Maximize **impact & engagement**
- Launch within a **2-year timeline**

CRL SUBGROUP COMMITTEE

Membership and Process


NADAV AHITUV, PHD
Bioengineering & Therapeutics


VINCENT CHAN, PHD
Pathology


ERIC CHOW, PHD
Biochemistry & Biophysics


LINDSEY CRISWELL, MD, MPH
Medicine


DAVID ERLE, MD
Medicine


DIANE KAY
Space & Capital Planning


MAX KRUMMEL, PHD
Pathology


TIPPI MACKENZIE, MD
Surgery


ALEX MARSON, MD, PHD
Microbiology and Immunology


MICHAEL MCMANUS, PHD
Diabetes Center


PATTI MITCHELL
Capital Programs


ELIZABETH SINCLAIR, PHD
Research Resource Program


MATTHEW SPITZER, PHD
Microbiology and Immunology


SAUL VILLEDA, PHD
Anatomy


KATHERINE YANG, PHARMD, MPH
Clinical Pharmacy


JIMMIE YE, PHD
Epidemiology & Biostatistics


KARIN WONG
Space Strategy

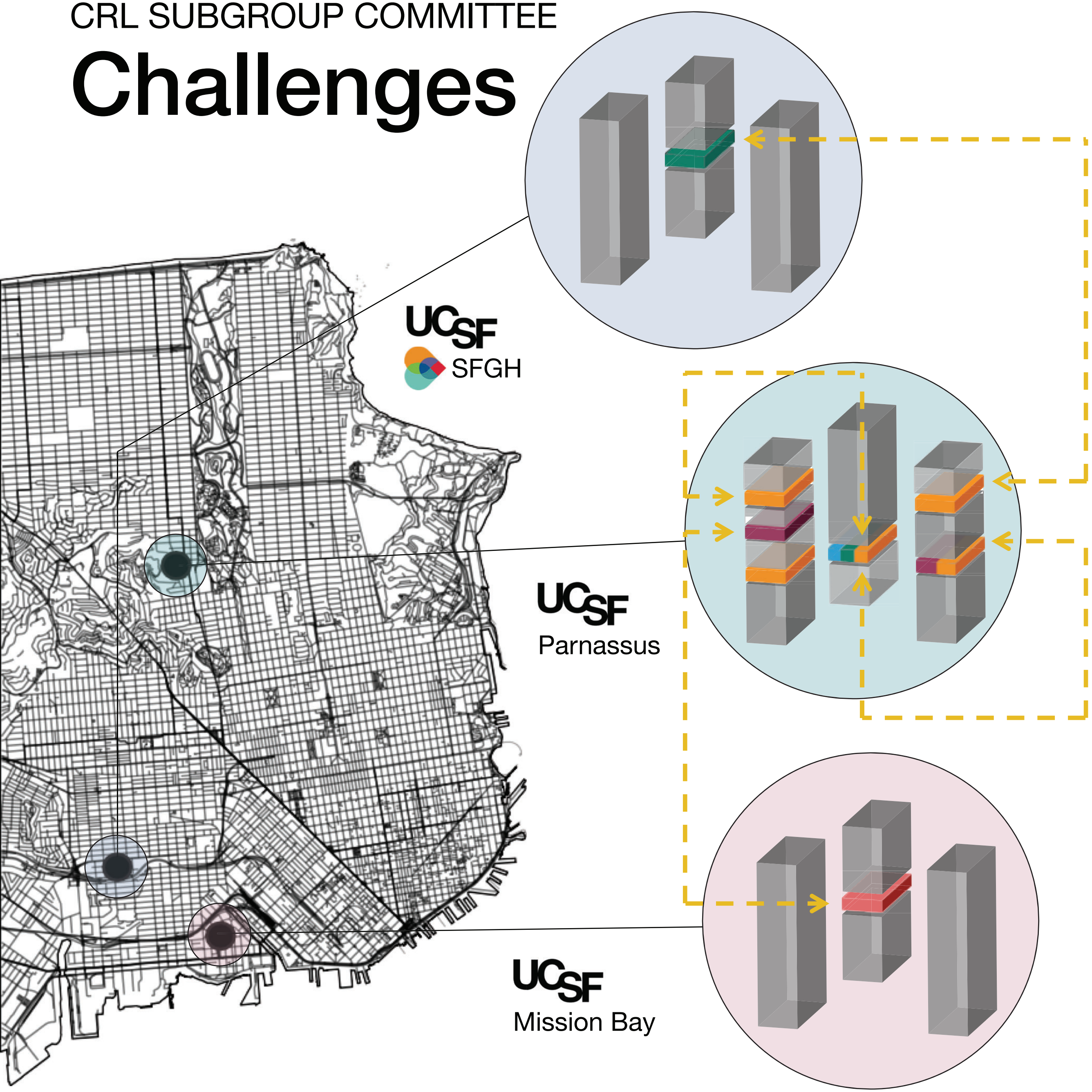

HUGH COTTER, AIA
Oculus Architects, Inc.

SINCE JANUARY 2018:

- 5 committee meetings
- 7 task forces
- Website
- Email announcements
- Existing facility inventory
- Site visits

CRL SUBGROUP COMMITTEE

Challenges



- **Fragmented** facilities
  - Difficult to find and use cores
  - Limits collaboration and synergies
  - Inefficient use of space and equipment
- **Lagging investments** in transformative methods & technologies
  - Data sciences
  - Genomics
- **Unreliable** long-term financial support
  - Inefficiencies
  - Inadequate institutional support for cores (9% versus 27% nationally)
- **Retention** of world-class staff

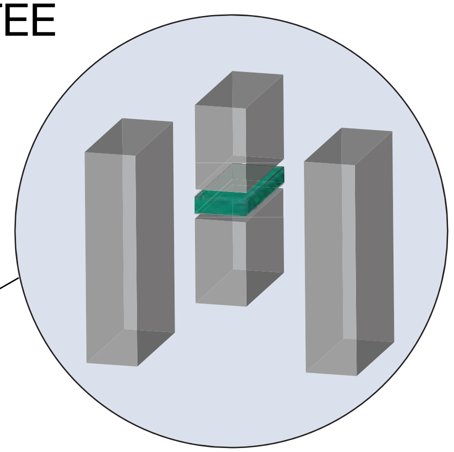
CRL SUBGROUP COMMITTEE

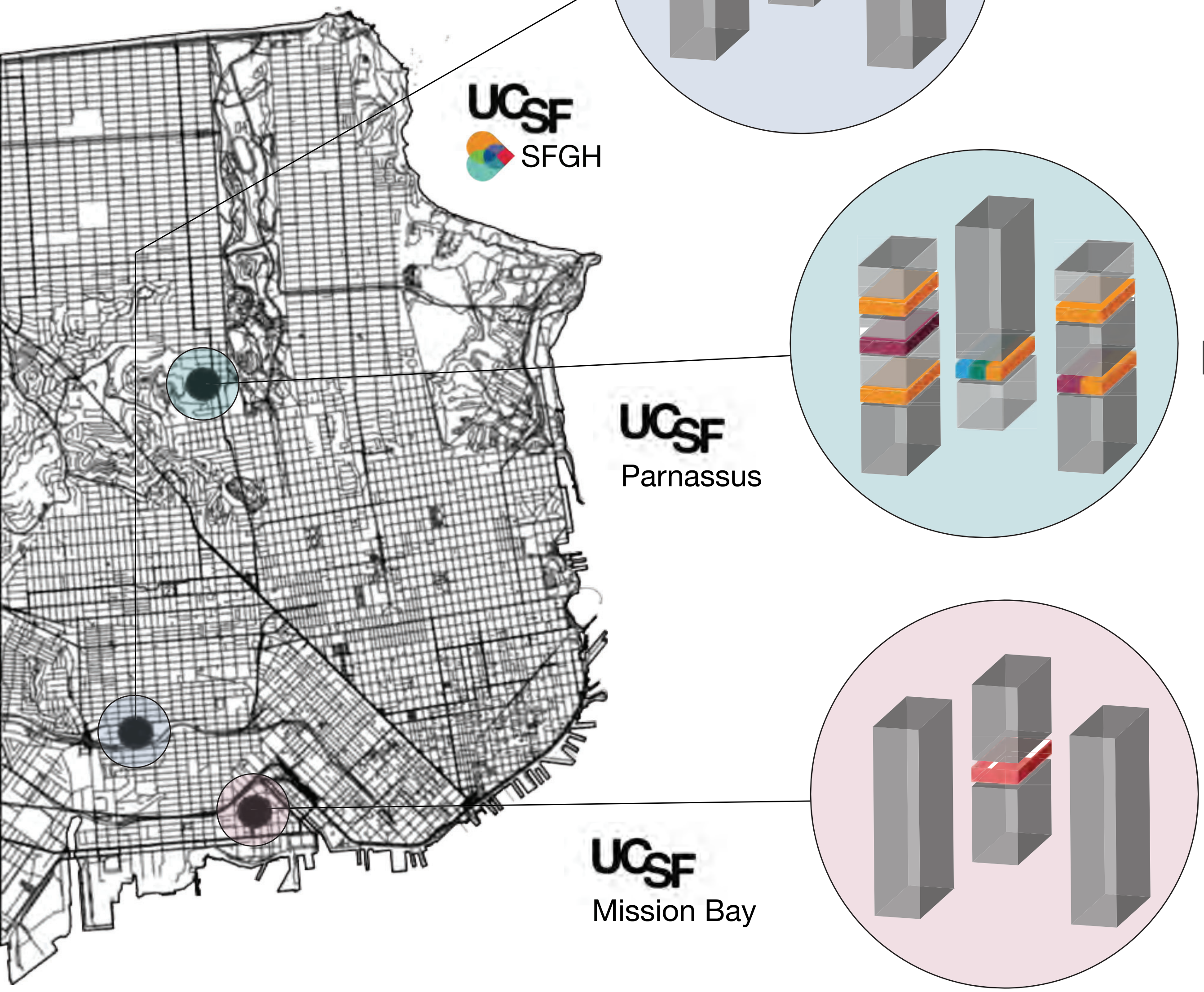
Goals & Opportunities

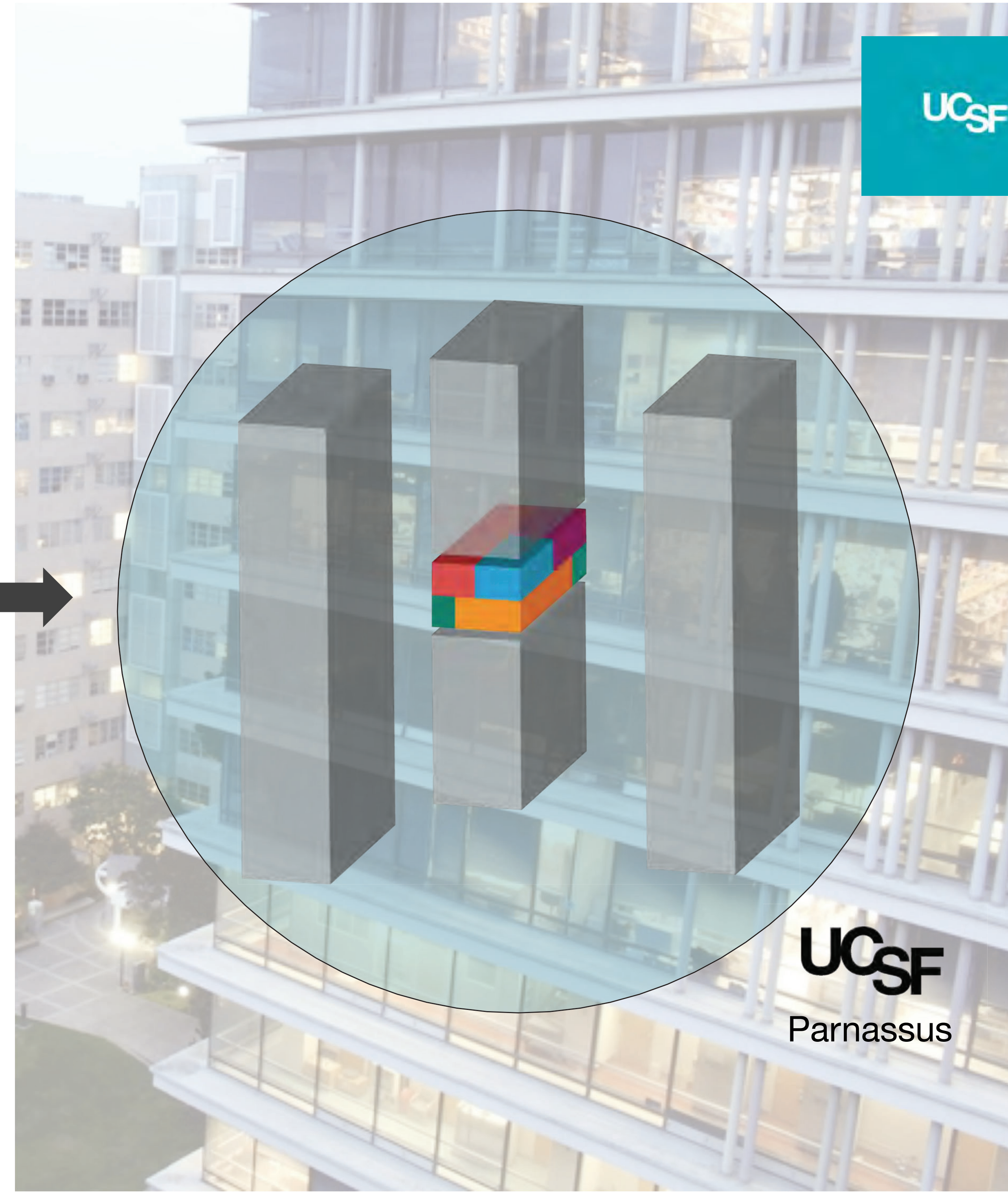
- **Rejuvenating Parnassus**
  Complete promptly a **highly-visible model for developing big and bold initiatives** at Parnassus
- **Building on Parnassus' strength**
  Emphasize **Parnassus' unique strengths** by exploring the biological basis of disease in transformative new ways and by complementing resources available elsewhere
- **Fostering collaboration**
  Enhance a sense of community by moving beyond the traditional "core" model and facilitating the **communization of resources, expertise, and data**
- **Creating excellence, responsiveness, and sustainability**
  Recruit and retain **excellent people who are engaged and nimble** in recognizing emerging opportunities, and who can promote the sharing of ideas and tools developed in individual labs
- **Supporting education and training**

CRL SUBGROUP COMMITTEE

Vision







CRL SUBGROUP COMMITTEE

Design Concept

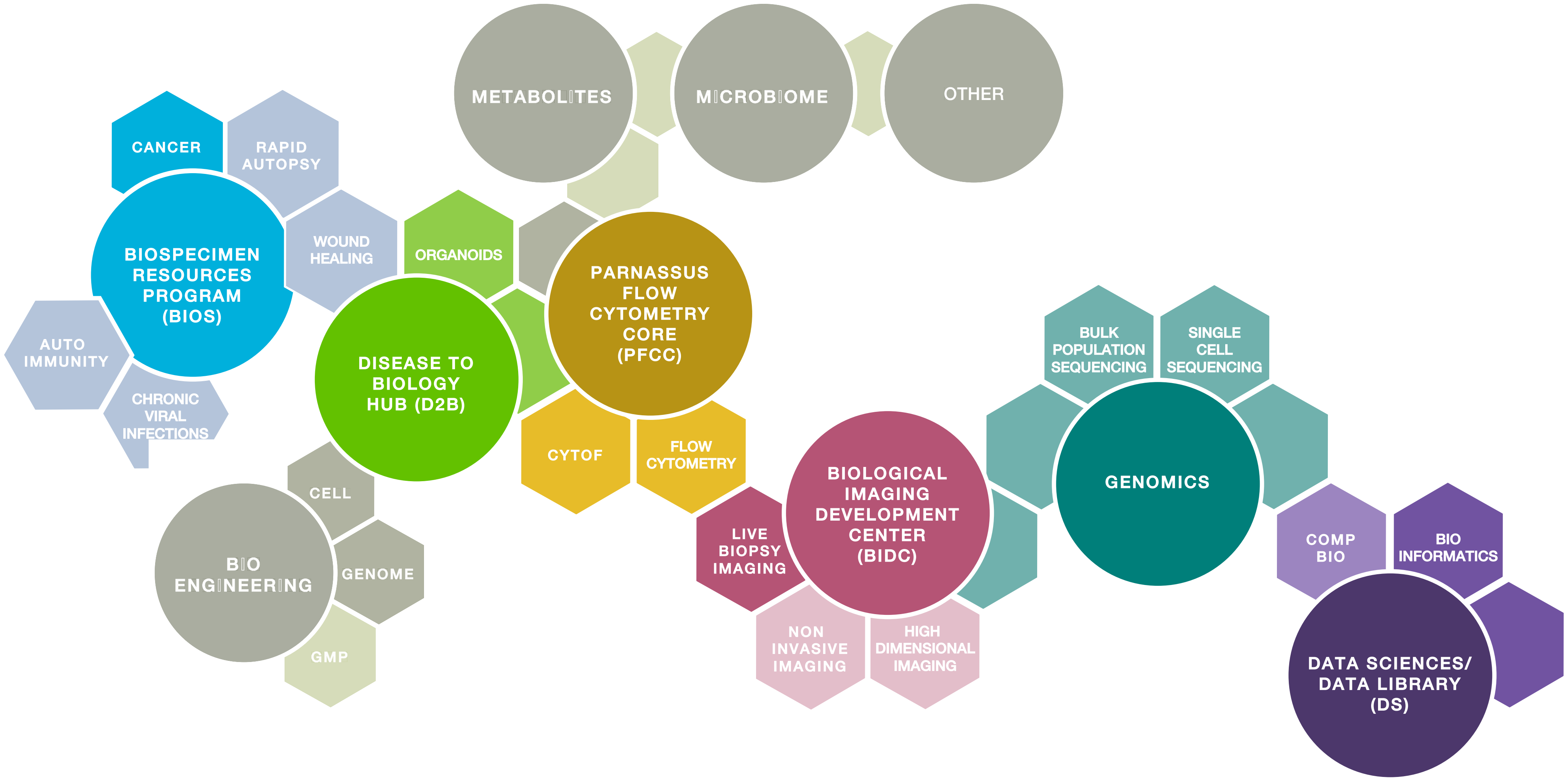
COLABS

AT PARNASSUS

The “C” is a multi-faceted representation of CoLabs: as a logomark; as an interconnected space of shared labs; as an open “ring of collaboration” that will mirror the eventual rejuvenation and space concept at Parnassus.

CRL SUBGROUP COMMITTEE

CoLabs at Parnassus



UCSF University of California San Francisco

COLABS AT PARNASSUS

Benefits to Parnassus and UCSF

Dramatically lower barriers for interdisciplinary collaborations

- Allows access to sophisticated approaches essential for cutting-edge science
- Especially important for early stage investigators and clinical-scientists

Drive more efficient use of costly sharable resources

- Reduce costs and need for space in other Parnassus projects that will follow
- Data sharing ensures maximizes benefits of patient-based research

Reduce glaring inequities between Parnassus and MB

- Improve Parnassus morale and build excitement about the future of Parnassus
- Decrease need to travel to MB for important services

Enable a new financial model

- Attract a broader range of funders
- Leverage large project funding to benefit the whole community

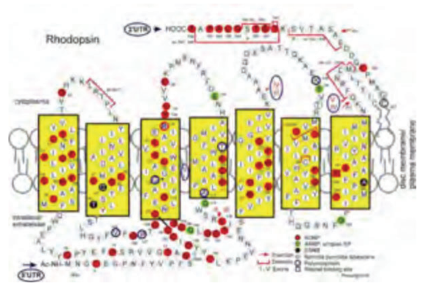
Provide a visible center for researchers at Parnassus

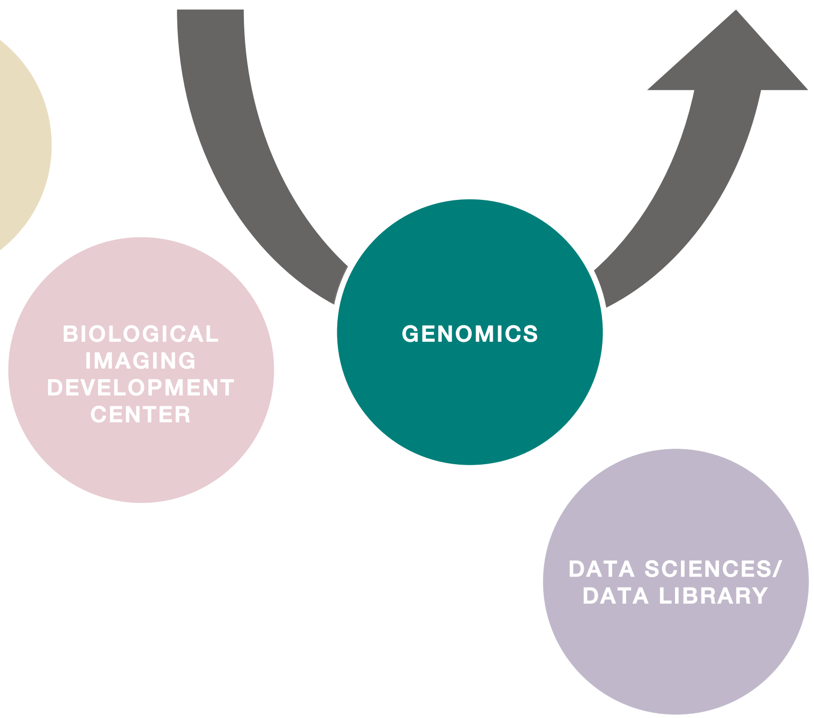
- Build a sense of community
- Provide new facilities and personnel for training and innovation

COLABS AT PARNASSUS

Single CoLab Use Case

Doug Gould, PhD and **Scott Oakes, MD** want to use gene editing to cure inherited forms of blindness. They are looking for mouse models for assessing the efficacy of editing a relevant target gene in the retina. Doug and Scott consult with Michael McManus who provides advice about suitable tools. They can develop the required transgene constructs in their own labs or travel to the MB Cell and Genome Engineering Core to work with them. For generation of transgenic mice from ES cells, Parnassus investigators can use either the Gladstone core or an off-campus service provider. Mice are then shipped to Doug and Scott, who genotype them and deliver some mice to the LARC Rederivation Core for preservation. Therapeutic CRISPR AAVs can be produced with help from the UCSF ViraCore.





SINGLE COLAB PROJECT

Step 1. Doug and Scott work with the Genomics **CoLab** director to design the experiment, offering new technologies that raise impact and often save both time and money.

Step 2. The Genomics **CoLab** performs ES gene targeting, microinjects ES cells, helps genotype animals and offers a phenotyping service via UCD liaison.

Step 3. The Genomics **CoLab** biobanks locally or with a UCD liaison.

Step 4. The Genomics **CoLab** produces the CRISPR AAV construct and coordinates with the ViraCore to produce therapeutic AAV.

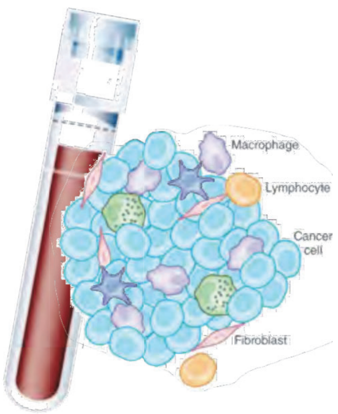
UCSF University of California San Francisco

COLABS AT PARNASSUS

COLABS AT PARNASSUS

CoLabs Projects

Jocelyn Chapman, MD is keen to understand the immune diversity of gynecological tumors that she is obtaining in the clinic. Like many clinician-scientists, she does not have her own lab with the capacity to undertake this work. Instead, she is able to contribute tumor and blood specimens and a clinical research coordinator FTE to CoLabs.



BIOSPECIMEN RESOURCES PROGRAM

DISEASE TO BIOLOGY HUB

PARNASSUS FLOW CYTOMETRY CORE

BIOLOGICAL IMAGING DEVELOPMENT CENTER

GENOMICS

DATA SCIENCES/ DATA LIBRARY

COLABS PROJECT

Step 1. Jocelyn works with the **CoLabs** director to define pilot project of 12 ovarian samples in the pipeline. **BIOS** works with Jocelyn to identify, consent, and acquire tissue & blood from patients.

Step 2. **BIOS** transfers tissue & blood to **D2B** technician. **D2B** technician takes a tissue slice for H&E/IF and dissociates the rest; the technician also isolates PBMCs from blood.

Step 3. **D2B** technician works with **PFCC** personnel to reserve FACS, sort tumor/immune cells for multi-omic analyses, and runs several stain panels to understand the immune composition.

Step 4. **BIDC** personnel receives tissue slices from **D2B** technician and uses multiplexed IF imaging techniques and quantification methods to understand spatial interplay of tumor/immune cells.

Step 5. **Genomics** personnel receives sorted tumor/immune cells from **D2B** technician and isolates RNA & DNA for transcriptomic & genomic sequencing of tumor/immune compartments.

Step 6. **Bioinformaticians** receive, curate, and store all data (including clinical) in the **UCSF Data Library**, and work with Jocelyn to develop analytical tools to mine the ovarian tumor dataset. Data is “freed” to all UCSF investigators after set determined time.

UCSF University of California San Francisco

COLABS AT PARNASSUS

Impact on Researchers

Improve services for existing users of Parnassus cores

- **PFCC (Flow Cytometry)** 140 PIs
- **BIDC (Imaging)** 51 PIs, 19 departments
- **CTSI CRS Sample Processing Core** 59 PIs
- **IHG Core Single Cell RNA-seq** ~50 PIs
- **Parnassus Center for Advanced Technology** ~15 PIs
- **Immunoprofiler Flow/Sequencing and Allied Projects** ~25 PIs

Provide on-site access to key services now only available elsewhere

- **Nikon Imaging Center in Genentech Hall** 191 PIs, ~15% at Parnassus
- **Center for Advanced Technology in Genentech Hall** 150 PIs, ~15% at Parnassus
- **Transgenic Core at Gladstone** ~35 UCSF PIs, >50% at Parnassus
- **Functional Genomics Core in Rock Hall** 55 PIs, 49% at Parnassus
- **Clinical Immunology Lab at ZSFG** 27 PIs, all would benefit from access to PFCC

Unlock access to transformative technologies for existing and new users

- **Data sciences** for storage and analysis of large datasets (including genomics)
- New **imaging** and **single cell analysis** methods
- **Advanced gene editing** (CRISPR and beyond)
- **Massively parallel functional assays**

New User Access

New users can enter the CoLabs in one of several ways:

- **Direct access:**
  Access by interacting directly with the CoLabs Director. The new user will typically be the PI and the project will largely be managed by personnel determined by the Director.
- **Sponsored access:**
  Access through collaboration with an existing user (Sponsor). The project will largely be managed by personnel "linked" to the Sponsor's existing project.
- **Recharge/subscription access:**
  Each CoLab will retain its traditional "core" capacities, *e.g.* daily users who use a single-piece of equipment

COLABS AT PARNASSUS

CoLabs OrgChart

COLABS AT PARNASSUS

COLABS DIRECTOR

D2B

COLABS AT PARNASSUS

D2B STEERING COMMITTEE

D2B DIRECTOR

PFCC

COLABS AT PARNASSUS

PFCC STEERING COMMITTEE

PFCC DIRECTOR

BIDC

COLABS AT PARNASSUS

BIDC STEERING COMMITTEE

BIDC DIRECTOR

GENOMICS

COLABS AT PARNASSUS

GENOMICS STEERING COMMITTEE

GENOMICS DIRECTOR

DS

COLABS AT PARNASSUS

DS STEERING COMMITTEE

DS DIRECTOR

UCSF University of California San Francisco

COLABS AT PARNASSUS

COLABS AT PARNASSUS

D2B OrgChart

D2B: CENTRAL LABS

D2B STEERING COMMITTEE

D2B DIRECTOR

TISSUE PROCESSING LAB

Embedded Researchers

- **Franz Villaroel, PhD** — Imaging-Specific Embed #1
- **Clinician/Scientist TBD** — Imaging-Specific Embed #2
- **Arjun Rao, PhD** — Data Science-Specific Embed
- **Clinician/Scientist TBD** — Flow-Specific Embed
- **Alexis Combes, PhD** — Embedded Scientist
- **Kevin Barry, PhD** — Embedded Scientist
- **Amar Patel, MD** — Embedded Clinician

Technicians

- **Gabi Reeder** — 100/20 Technician
- **Karen Tolentino** — 100/20 Technician
- **Jasmine Sjarif** — 100/20 Technician
- **Evans Shao** — 100/20 Technician
- **Jessica Tsui** — 100/20 Technician
- **Joy Hsu** — 100/20 Technician
- **Arun Burra** — 100/20 Technician

ORGANOIDS LAB

- **Michelle Oghenekevwe** — Organoids Lead

Embedded Researchers

- **Taymour Hammoudi, MD** — Organoid-Specific Embed #1
- **Clinician/Scientist TBD** — Organoid-Specific Embed #2

Technicians

- **Technician TBD** — 100/20 Technician
- **Technician TBD** — 100/20 Technician

EXPANSION PROJECTS

Embedded Researchers

- **Clinician/Scientist TBD** — Mouse-Specific Embed
- **Clinician/Scientist TBD** — Embedded Scientist
- **Clinician/Scientist TBD** — Embedded Scientist
- **Clinician/Scientist TBD** — Embedded Scientist
- **Clinician/Scientist TBD** — Embedded Scientist

Technicians

- **Technician TBD** — Mouse Technician
- **Technician TBD** — 100/20 Technician
- **Technician TBD** — 100/20 Technician
- **Technician TBD** — 100/20 Technician
- **Technician TBD** — 100/20 Technician

University of California San Francisco

COLABS AT PARNASSUS

COLABS AT PARNASSUS

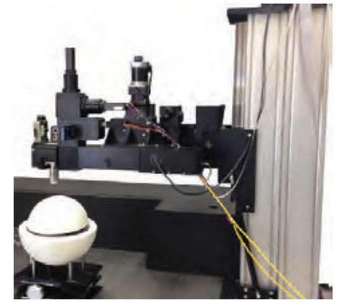
Space Programming

01/ 02 wet labs - 31 knee holes

05/ 06 tissue culture rooms - 20 BSC

01 large shared microscope room

05 small microscope rooms



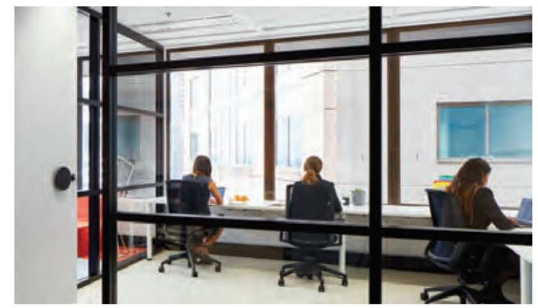
01 large flow cytometry room

01/ 02 equipment rooms

01/ 02 dry labs - 46 desks

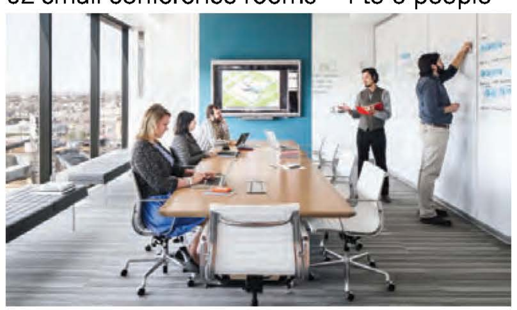
03 private offices - 3 desks

03 shared offices - 12 desks



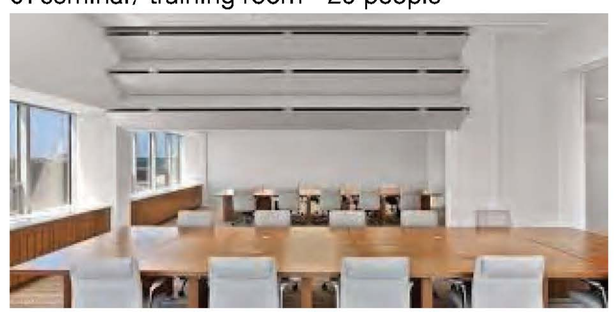
06 small meeting room - 2 to 4 people

02 small conference rooms - 4 to 6 people

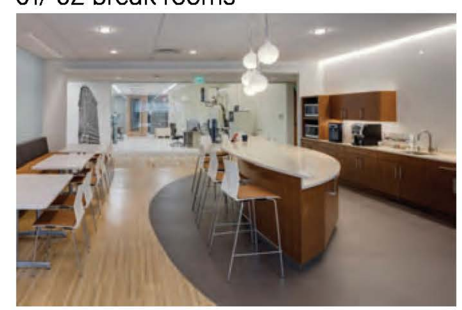


01 conference room - 12 to 16 people

01 seminar/ training room - 20 people



01/ 02 break rooms



Estimated program
space needs:
19,251 SQFT

UCSF
University of California
San Francisco

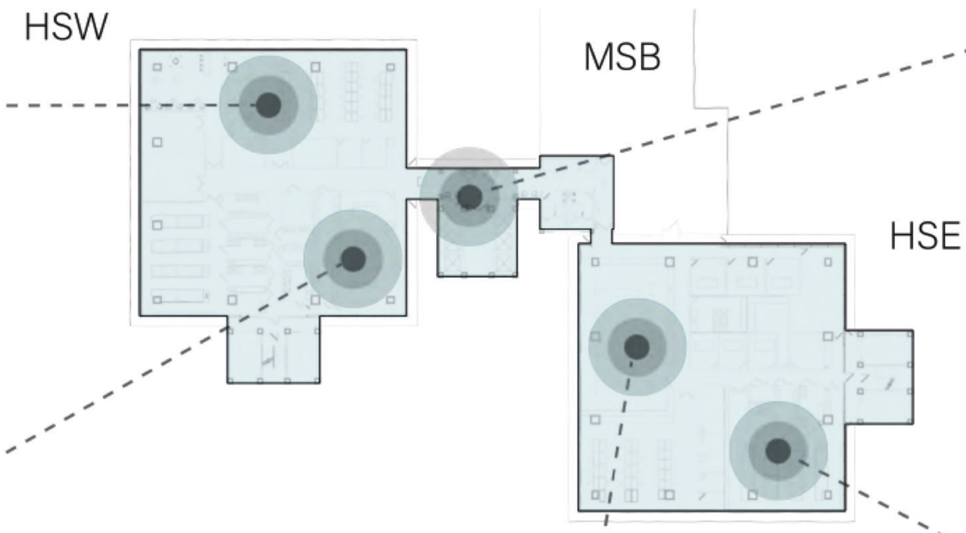
COLABS
AT PARNASSUS

COLABS AT PARNASSUS

Design Considerations

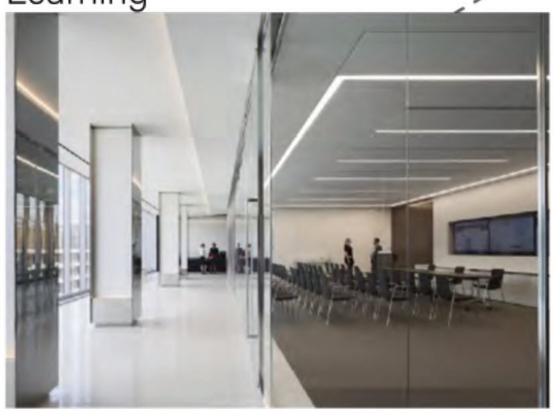
UCSF

Collaborating



Socializing

Learning



Visual connection

Flexibility

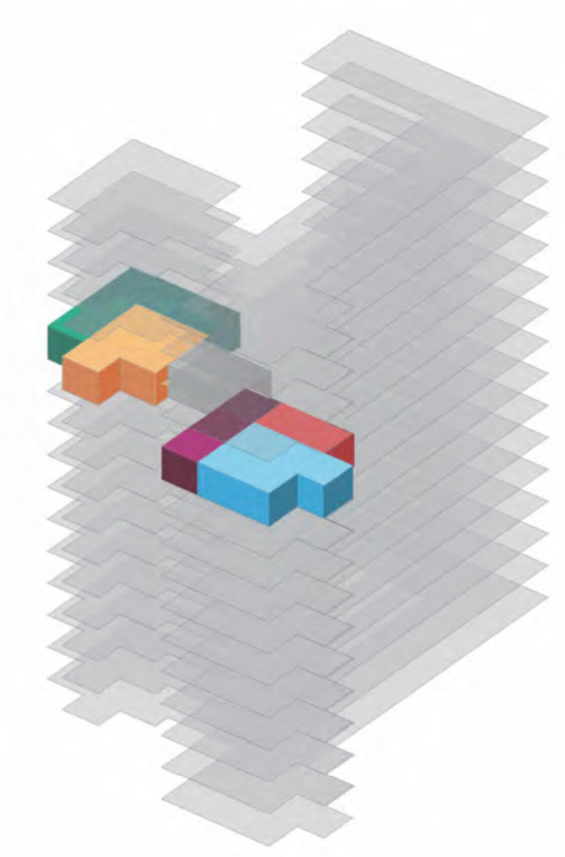
UCSF
University of California
San Francisco

COLABS
AT PARNASSUS

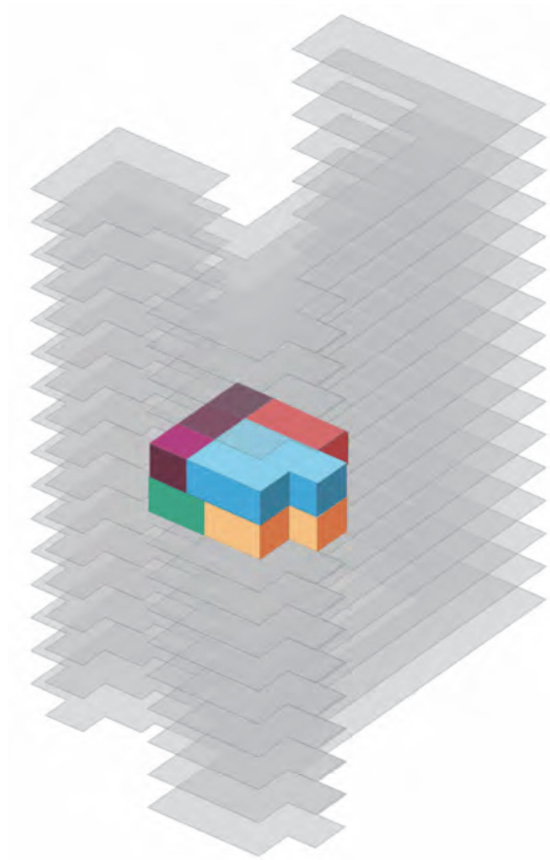
COLABS AT PARNASSUS

Space Options Considered

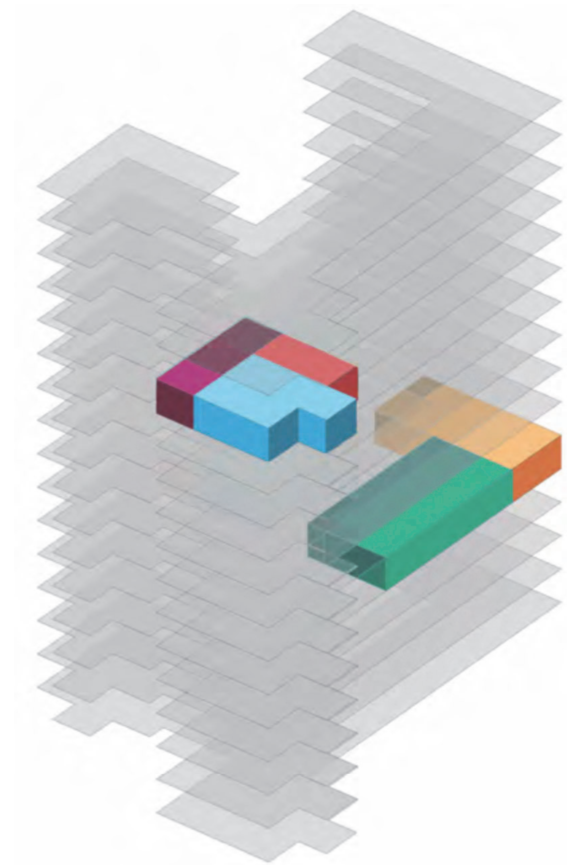
Adjacent



Stacked



Separated

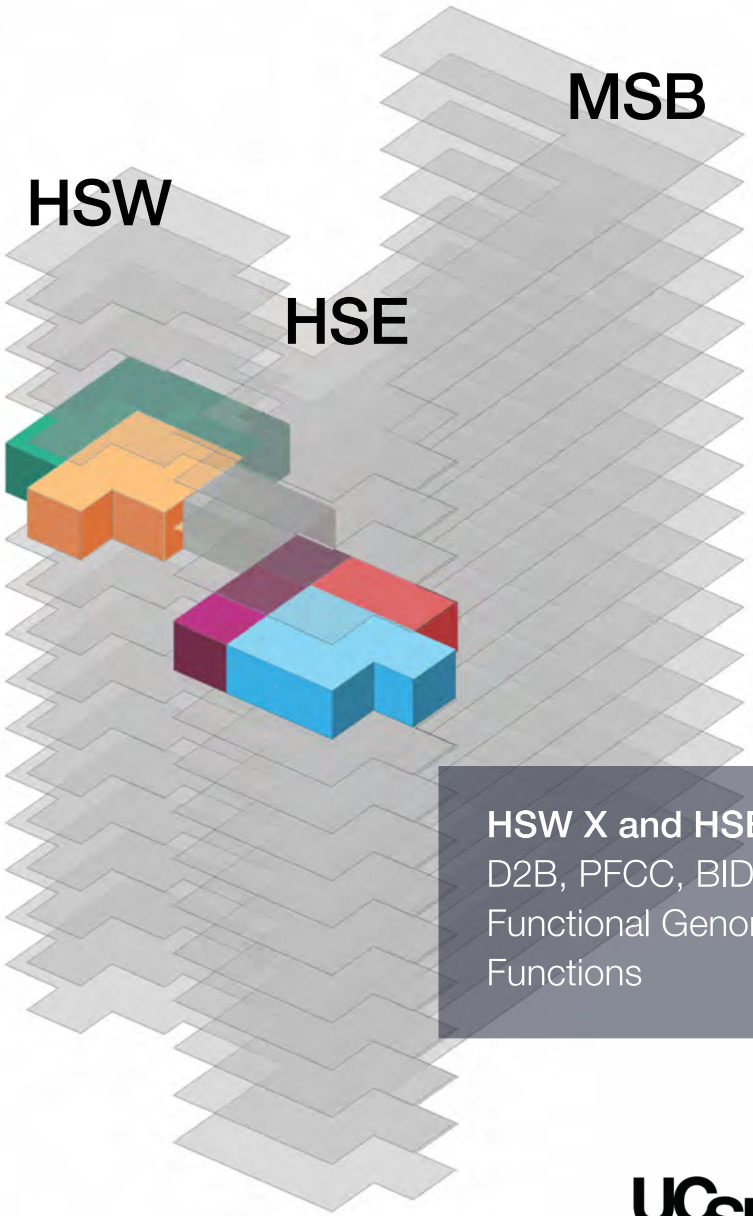


UCSF University of California San Francisco | COLABS AT PARNASSUS

Space Options

Adjacent Floors

- **Pros**
  - Optimal for integration of all CoLabs
  - Maximizes chance "human collisions" designed to spark innovation and collaboration
  - Enables development of space between HSE & HSW for interaction area
  - Maximizes visibility of the CoLabs
- **Cons**
  - There are no HSIR levels with two floors (HSE & HSW) that are both in urgent need of renovation



HSW X and HSE X
D2B, PFCC, BIDC, Data Sciences, Functional Genomics, and Communal Functions

COLABS AT PARNASSUS

Space Options

Stacked Floors

- **Pros**
  - Sets of stacked HSIR floors are in need of renovation (HSE4/5/6, HSE11/12/13, HSW14/15/16)
  - Could be developed as functionally contiguous space with inclusion of an internal staircase and an atrium
- **Cons**
  - Does not promote interactions as well as a single-level design
  - Internal stairs/atrium sacrifices space
  - Does not leverage underutilized space between HSE & HSW

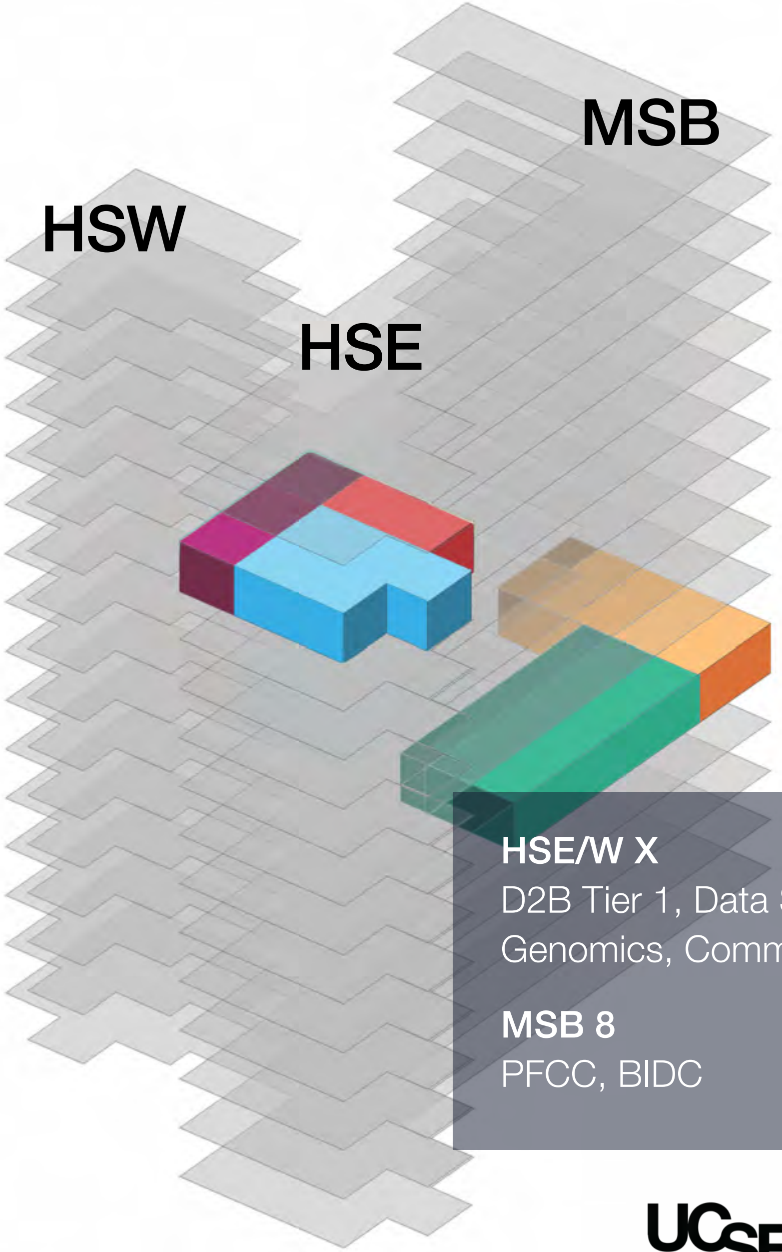
HSE X
D2B Tier 1, Data Sciences, Functional Genomics, Communal Functions

HSE X+1
PFCC, BIDC, D2B Tier 2 & 3

Space Options

Separated Floors

- **Pros**
  - Retains PFCC in existing space
  - Only need to relocate occupants of one floor
- **Cons**
  - Non-contiguous space
  - Discourages interactions
  - Less ability to adapt to new demands for space
  - Requires some duplication of space program elements
  - Requires development of additional space outside of the main CoLabs HSIR floor to accommodate expansion of PFCC and a new BIDC facility



HSE/W X
D2B Tier 1, Data Sciences, Functional Genomics, Communal Functions

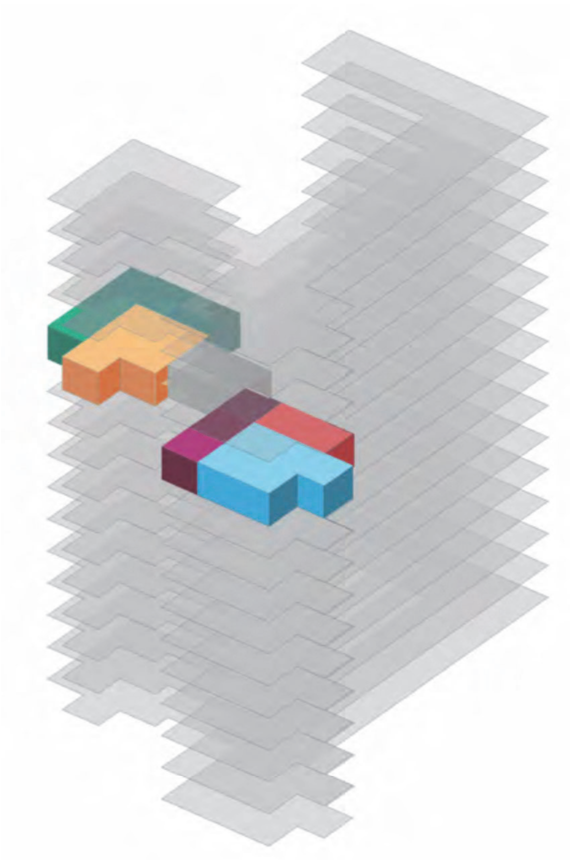
MSB 8
PFCC, BIDC

COLABS AT PARNASSUS

Space Options Recommendations

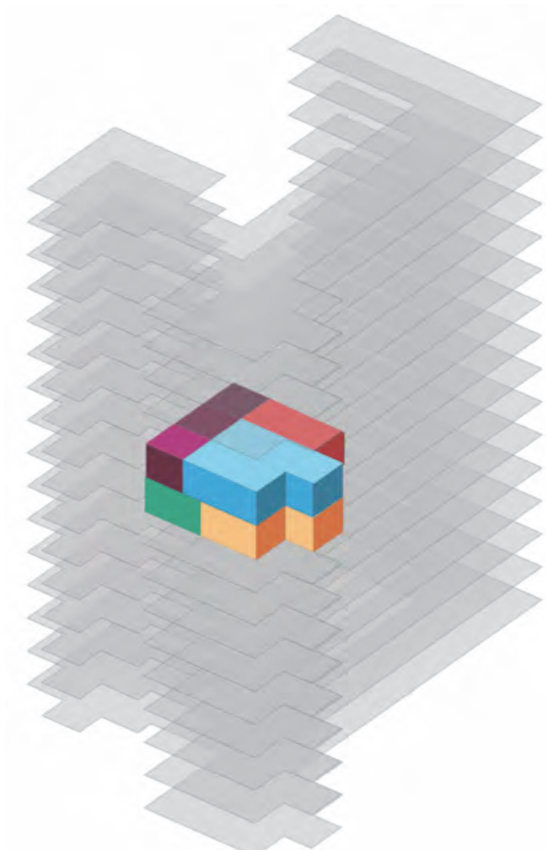
Adjacent

HIGHLY RECOMMENDED



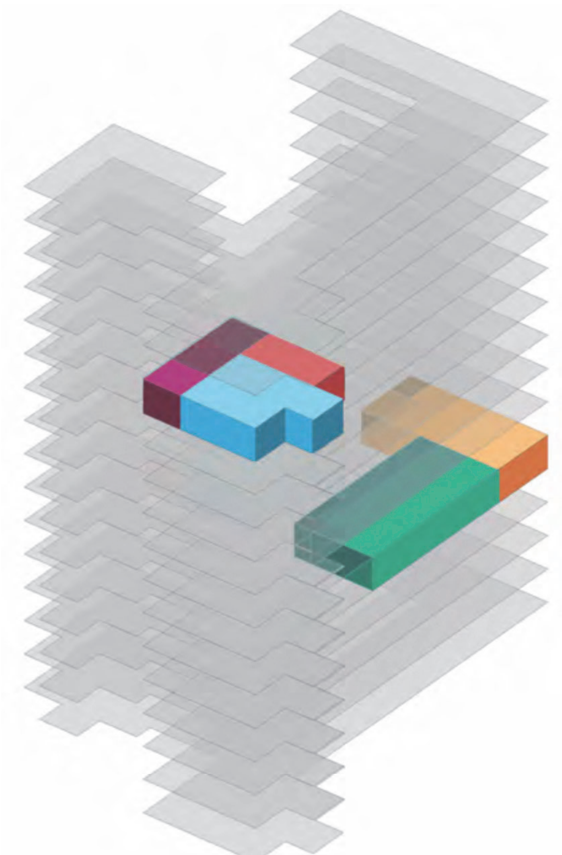
Stacked

VIABLE OPTION



Separated

NOT RECOMMENDED



UCSF University of California San Francisco

COLABS AT PARNASSUS

Adjacency issues

- **Should be centrally located**
  - Increased visibility
  - Better access for those in multiple buildings including the HS towers, MSB, and the Dolby Regeneration Medicine Building
  - Encourages more interactions
- **Uncertainties about future locations of other facilities is a challenge**
  - More information about Parnassus plans could help
  - Waiting for a complete Parnassus plan would introduce major delays
  - The CoLabs design should be flexible enough to allow repurposing of CoLabs space as needed

Financing

- Start-up costs
  - **CoLabs construction costs:**
    Working estimate is $30M for 2 tower floors
  - **CoLabs equipment costs:**
    Large majority of equipment already exists and can be relocated to CoLabs
  - **Displaced labs relocation costs:**
    Estimated relocation budget is between $400 asf and $2,000 asf
- Operating costs
  - **Funding sources:** Recharge, subscription, grants, 100/20 model, & campus support ($400K/year)
  - **Launch:** 2018-2019

COLABS AT PARNASSUS

Timeline (subject to change)

UCSF

Parnassus CoLabs

High-Level Milestone Schedule

		2018												2019												2020											
	Duration	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3	4	5	6	7	8	9	10	11	12
CoLabs																																					
Meetings of CRL subgroup	3 months																																				
Voting for program elements																																					
Obtain approval of design/budget/scope	1 week																																				
PMP Meeting April 27 Approval																																					
Design Team Selection & Design Documents	52 weeks																																				
Mobilize/abatement/demo floor 1*	17 weeks																		*																		
Construction – Floor 1	34 weeks																																				
Mobilize/abatement/demo floor 2*	17 weeks																						*														
Construction – Floor 2	34 weeks																																				
Floor 1																																					
Confirm floor 1	2 weeks																																				
Design and construction documentation	14 weeks																																				
Mobilize/abatement/demo/construct floor 1	30 weeks																																				
EHS clears lab for CoLabs construction*	1 week																	*																			
Floor 2																																					
Confirm floor 1	2 weeks																																				
Design and construction documentation	14 weeks																																				
Mobilize/abatement/demo/construct floor 2*	30 weeks																																				
EHS clears lab for CoLabs construction*	1 week																	*																			

** Dependent events*

UCSF University of California San Francisco

COLABS AT PARNASSUS

CoLabs and the Future of Parnassus

The CoLabs project is important both as a resource and as a symbol

Many are deeply skeptical that Parnassus is the best place to do science and acutely aware of the lack of parity with Mission Bay

CoLabs can help by:

- Making Parnassus a better, more exciting place to do research
- Providing a highly visible early example of how UCSF is reinvesting in Parnassus

The success of the CoLabs will require a real commitment

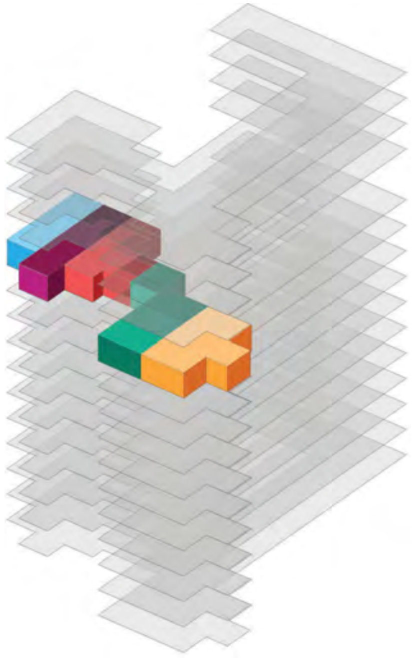
There are competing demands for space, funds, and attention

Finding a suitable CoLabs site will be hard

Detailed CoLabs planning must continue over the coming months

An ongoing investment will be required

Summary



Key principles

- Be “big and bold”
- Start now, maintain a sense of urgency, communicate clearly
- Continue to engage the faculty since many want to help solve problems and identify opportunities
- Make the CoLabs a transformational resource for Parnassus

Major recommendations

- Focus on site selection since this is currently the rate-limiting step
- We strongly recommend a centrally located, contiguous space (~20,000 sq. ft. or two tower floors)
- Develop a system for working with displaced groups to find good relocation solutions for them
- Funds will be required for ongoing CoLabs operations as well as CoLabs construction (including relocation)
- Many CoLabs activities should begin before the new space is completed

UCSF

COLABS AT PARNASSUS

CRL Task Force Members

Disease-to-Biology (D2B)
Saurabh Asthana
Vincent Chan (lead)
Hugh Cotter, Oculus Architects
Diane Kay
Max Krummel (lead)
Tippi Mackenzie
Patti Mitchell
Jeff Mulish
Jeroen Roose
Elizabeth Sinclair
Matt Spitzer
Scott Vandenberg

Biological Imaging Development Center (BIDC)
Hugh Cotter, Oculus
Diane Kay
Max Krummel
Diana Laird
Delaine Larsen
Mark Looney
Patti Mitchell
Matt Spitzer
Val Weaver
Torsten Wittmen
Katherine Yang (lead)

Flow Cytometry
Hugh Cotter, Oculus
Diane Kay
Max Krummel
Mike Lee
Cliff Lowell
Patti Mitchell
Matt Spitzer (lead)
Qizhi Tang

Transgenic
Nadhav Ahituv
Hugh Cotter, Oculus
Diane Kay
Averil Ma
Alex Marson
Mike McManus (lead)
Patti Mitchell
Elizabeth Sinclair

Physical Environment
Eric Chow (lead)
Hugh Cotter, Oculus
Diane Kay
Patti Mitchell
Elizabeth Sinclair
Matt Spitzer

Genomics
Nadhav Ahituv (lead)
Andrea Barczak
Eric Chow
Hugh Cotter, Oculus
Lindsey Criswell
David Erle
Chun (Jimmie) Ye
Diane Kay
Alberto Marquez
Alex Marson (lead)
Michael McManus
Patti Mitchell
Yin Shen
Elizabeth Sinclair
Ryan Wagner
Pui Yan Kwok

Data Sciences/Data Library (Bioinformatics)
Hugh Cotter, Oculus
Lindsey Criswell (lead)
Walter Eckalbar
Diane Kay
Patti Mitchell
Elizabeth Sinclair
Matt Spitzer
Chun (Jimmie) Ye (lead)

Current locations of related facilities (partial)

Disease to Biology/Sample Processing	HSE 3 multiple rooms (Immunoprofiler) MSB 1234 (CTSI Clinical Specimen Processing Lab) Fong, Spitzer, Ye labs at PH ZSFG Building 100 (Core Immunology Lab)
Flow Cytometry	MSB 8 (854a/b, 854, 860) MSB 14 (1456) HSE 3 (301D, 302E) HSW 5 (542) HSW 12 (1209)
Imaging	MSB 11 (1105, 1109/S1109A, 1114, 1121, 1123) HSW 5 (536, 539) MB Genentech Hall (Nikon Imaging Center)
Data Sciences/Data Library	HSE 304 Ye lab at PH MB Rock Hall (Functional Genomics Core Bioinformatics)
Functional Genomics (including Transgenic Animals)	HSW 9 (IHG) and HSW 10 (Diabetes Center/PCAT) Marson, McManus, and Ye labs at PH MB Genentech Hall (Center for Advanced Technologies, Cell & Genome Engineering Core) MB Rock Hall (Functional Genomics Core) Gladstone (Transgenic Core) Ahituv and Erle labs at MB

COLABS AT PARNASSUS

Preliminary Space Program

Group	Perm Staff	Priv. Office	Shared Office #	Shared Office P	Work Desks	Anal. Stats	Wet Lab Stats.	BSC	GSF	Notes
Disease to Biology - D2B										
Tier 1 (Immuno/ Bios/ Organoids)	13	0	0	0	11	0	9	7	1531	
Tier 2- CIL	6	0	1	4	0	0	0	3	520	
Tier 3- CTSI- Specimen Collection	6	0	0	0	4	0	0	2	455	
PFCC Flow Cytometry	10	1	0	0	6	0	2	0	3511	
BIDC	5	0	1	5	0	6	4	0	2426	
Data Sciences/Data Library	6	0	0	0	0	8	0	0	216	
Genomics	9	0	0	0	6	0	16	4	1541	
General Admin/ Shared Support	5	2	1	3	0	0	0	0	3610	Allows for private offices for ImmunoX/ CRL director, RRP director, shared office for Strategic Alliance, D2B and Bios managers (total approx. 330 GSF); shared spaces such as Huddle rooms (6); small Conference (2); Large Conf. (1), Seminar/ Training room; Kitchen/ Break; IDF's; Recycling, Electrical Rms.
Shared Lab Support	0	0	0	0	0	0	0	0	450	Shared functions such as gas bottle storage, shared fume hoods, chemical storage rooms.
Sub-total	60	3	3	12	27	14	31	16	14260	
Circulation @ 35%									4991	May vary from 15% to 35% in lab suites, but calculated at 35% at this time due to design aesthetic and desire to have open spaces which may increase required SF for various program elements and access to them.
ESTIMATED TOTAL GSF									19251	

Notes
1. This program has been developed based on meetings/calls with each of the individual groups and meetings/calls with full sub-committee members.
2. General Admin / Shared Support includes (3) Management Offices (Private offices for CRL Lab Manager, RRP Manager and shared office for Strategic Alliance, D2B and BIOS); (6) Focus/Huddle Rooms; (2) Small Conference Rooms; (1) Large Seminar Room; (1/2) Break Room; (2) IDF; (2) Electrical Rooms; (2) Emergency Supply Rooms
3. Shared Lab Support includes shared (2) Gas Bottle Storage; (2) Chemical Storage Rooms; (2) Fume Hoods.
4. Hoteling stations not added at this stage; multiple "embedded researcher" stations provided.
5. BSL 2* Tissue Culture may not be provided.
6. Wet Lab stations are wet lab knee holes and do not include desks adjacent. Some shared desks will be added.
7. All information here should be considered as preliminary and should be fully verified.

Annual operational support request (first draft)

CoLabs Directors Support	$ 180,000
Technology Development Projects	70,000
General Lab Maintenance	50,000
Operational Support	100,000
Total Annual cost	$ 400,000

Courtesy of Elizabeth Sinclair

University of California
San Francisco

CoLabs initiative

December 2017 Charge from the PH Master Plan Steering Committee

- Design a new model for central lab resources
  - Capitalizes on critical personnel and cutting-edge methods & technologies
  - Drives collaboration across disciplines
- Produce high level plans for contiguous space housing all CRL components
  - Integrates core activities into one centralized place, *i.e.* sample processing, high-dimensional imaging, multi-“omic” analyses, and others
- Maximize impact & engagement
- Launch within a 2-year timeline

CRL SUBGROUP COMMITTEE

Membership and Process


NADAV AHITUV, PHD
Bioengineering & Therapeutics


VINCENT CHAN, PHD
Pathology


ERIC CHOW, PHD
Biochemistry & Biophysics


LINDSEY CRISWELL, MD, MPH
Medicine


DAVID ERLE, MD
Medicine


DIANE KAY
Space & Capital Planning


MAX KRUMMEL, PHD
Pathology


TIPPI MACKENZIE, MD
Surgery


ALEX MARSON, MD, PHD
Microbiology and Immunology


MICHAEL MCMANUS, PHD
Diabetes Center


PATTI MITCHELL
Capital Programs


ELIZABETH SINCLAIR, PHD
Research Resource Program


MATTHEW SPITZER, PHD
Otolaryngology—
Head and Neck Surgery


SAUL VILLEDA, PHD
Anatomy


KATHERINE YANG, PHARMD, MPH
Clinical Pharmacy


JIMMIE YE, PHD
Epidemiology & Biostatistics


KARIN WONG
Space Strategy

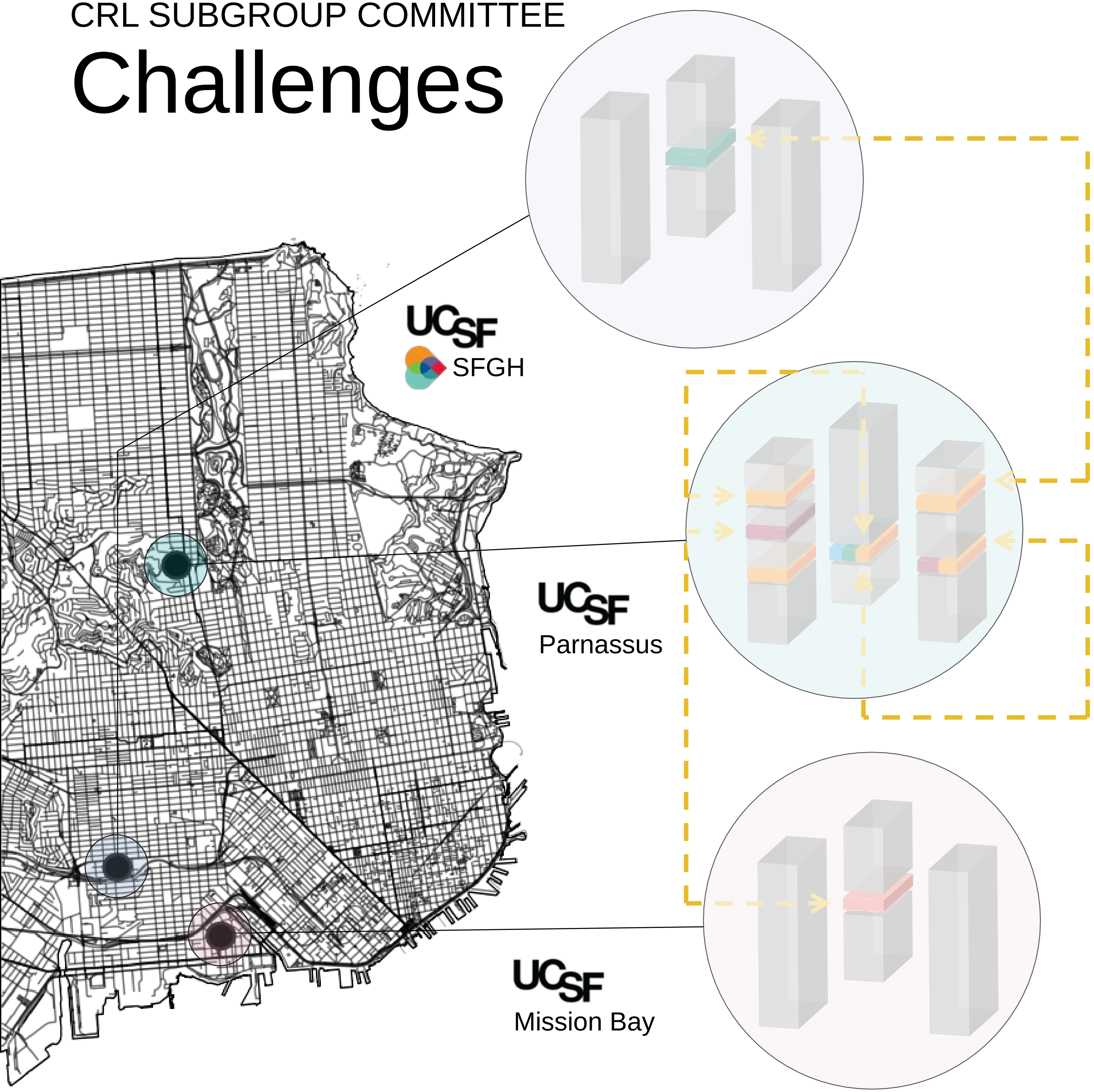

HUGH COTTER, AIA
Oculus Architects, Inc.

JANUARY-APRIL 2018:

- 5 committee meetings
- 7 task forces
- Website, email announcements
- Existing facility inventory
- Site visits
- Endorsement by PH Master Plan Steering Committee

CRL SUBGROUP COMMITTEE

Challenges



- Fragmented facilities
    - Difficult to find and use cores
    - Limits collaboration and synergies
    - Inefficient use of space and equipment
- Lagging investments in transformative methods & technologies
    - Data sciences
    - Genomics
- Unreliable long-term financial support
    - Inefficiencies
    - Inadequate institutional support for cores (9% versus 27% nationally)
- Retention of world-class staff

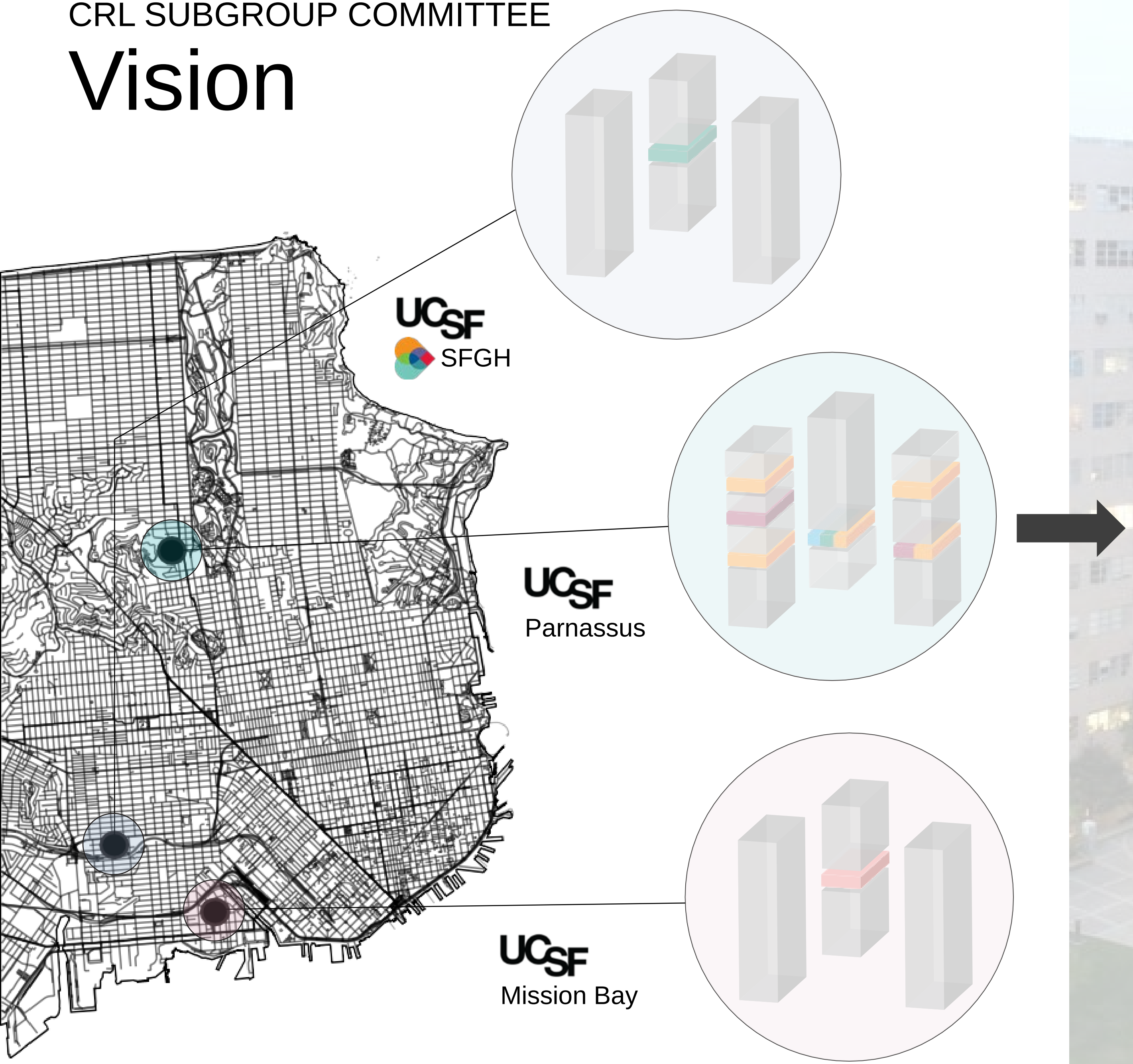
CRL SUBGROUP COMMITTEE

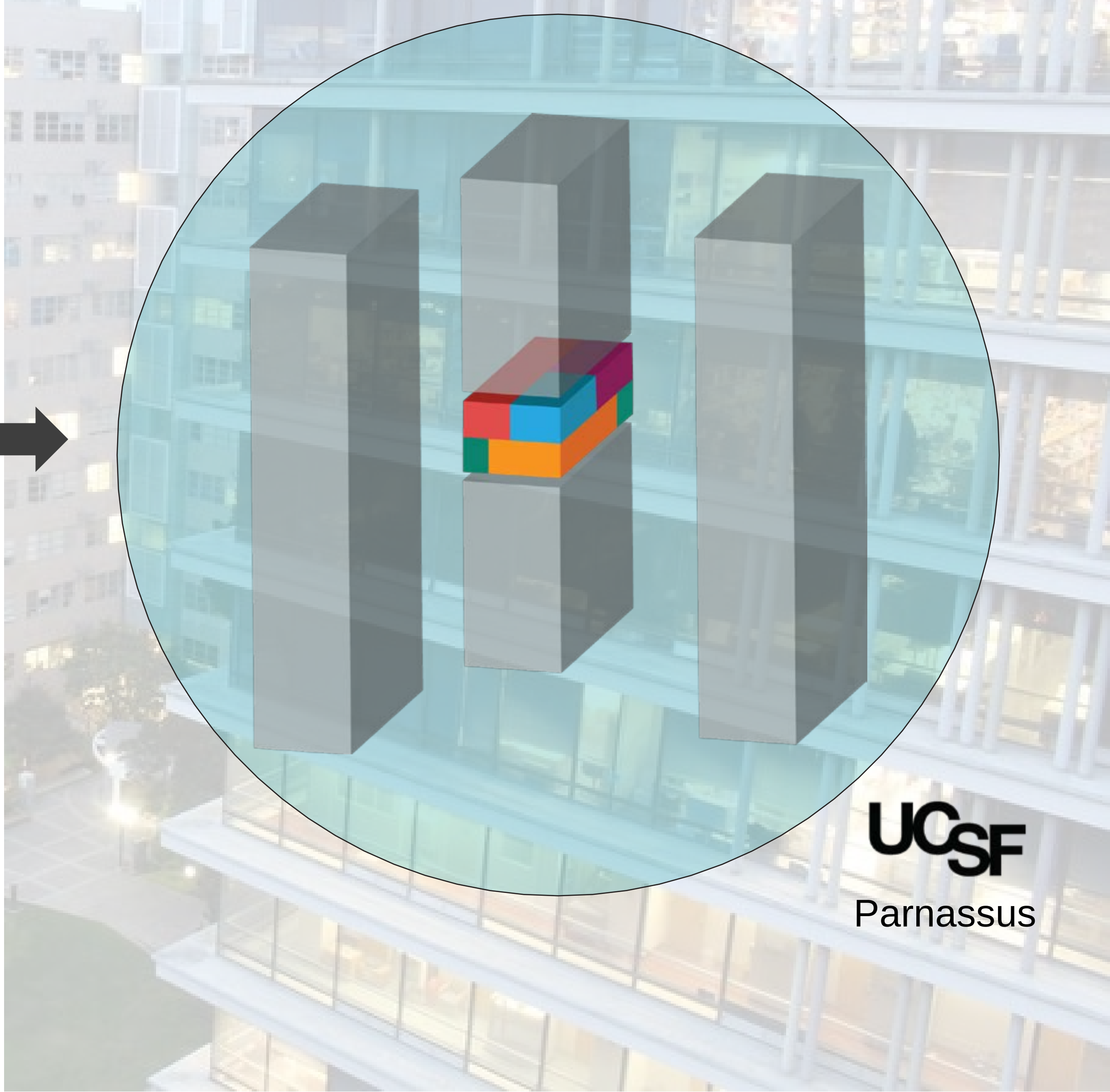
Goals & Opportunities

- **Rejuvenating Parnassus**
  Complete promptly a highly-visible model for developing big and bold initiatives at Parnassus
- **Building on Parnassus' strength**
  Emphasize Parnassus' unique strengths by exploring the biological basis of disease in transformative new ways and by complementing resources available elsewhere
- **Fostering collaboration**
  Enhance a sense of community by moving beyond the traditional "core" model and facilitating the communization of resources, expertise, and data
- **Creating excellence, responsiveness, and sustainability**
  Recruit and retain excellent people who are engaged and nimble in recognizing emerging opportunities, and who can promote the sharing of ideas and tools developed in individual labs
- **Supporting education and training**
  New concept of embedded researchers

CRL SUBGROUP COMMITTEE

Vision





CRL SUBGROUP COMMITTEE

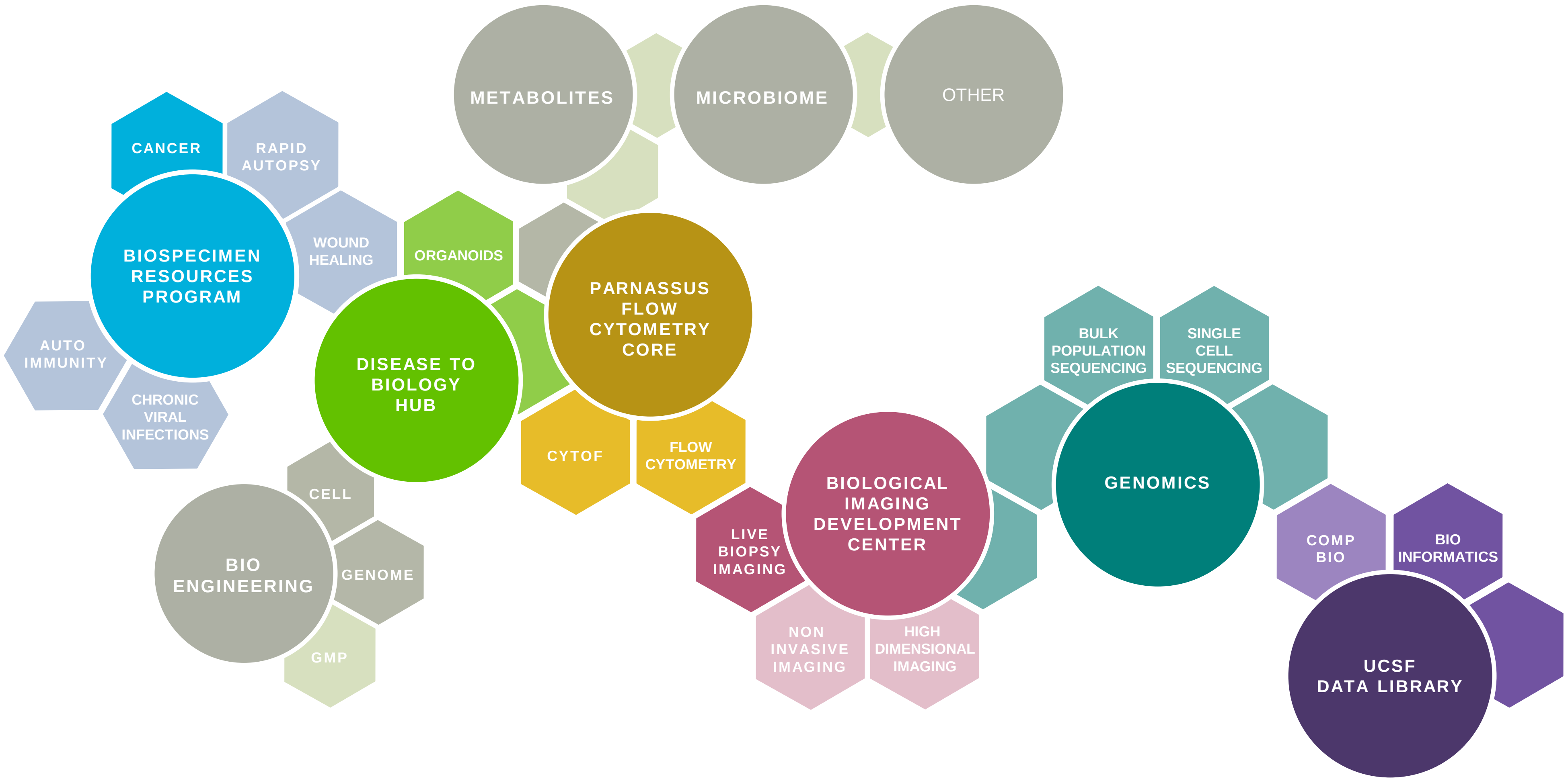
Design Concept

COLABS

AT PARNASSUS

The “C” is a multi-faceted representation of CoLabs: as a logomark; as an interconnected space of shared labs; as an open “ring of collaboration” that will mirror the eventual rejuvenation and space concept at Parnassus.

CoLabs at Parnassus



UCSF University of California San Francisco | COLABS AT PARNASSUS

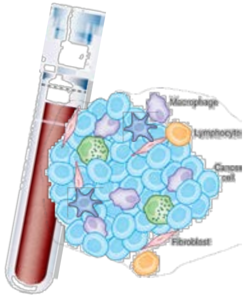
CoLabs CoProjects

CoProject Example

Pipeline Makes New Science Happen:

CLINIC TO LAB AND BACK

Jocelyn Chapman, MD is keen to understand the immune diversity of gynecological tumors that she is obtaining in the clinic. Like many clinician scientists, she does not have her own lab with the capacity to undertake this work. Instead, she is able to contribute tumor and blood specimens and a clinical research coordinator FTE to CoLabs.



BIOSPECIMEN RESOURCES PROGRAM

DISEASE TO BIOLOGY COLAB

FLOW CYTOMETRY COLAB

BIOLOGICAL IMAGING DEVELOPMENT COLAB

GENOMICS COLAB

DATA SCIENCES COLAB

COLABS PROJECT

Step 1. Jocelyn works with ImmunoX to define pilot project of 12 ovarian samples in the pipeline. BIOS works with Jocelyn to identify, consent, and acquire tissue & blood from patients.

Step 2. BIOS transfers tissue & blood to D2B technician. D2B technician takes a tissue slice for H&E/IF and dissociates the rest; the technician also isolates PBMCs from blood.

Step 3. D2B technician works with PFCC personnel to reserve FACS, sort tumor/immune cells for multi-omic analyses, and runs several stain panels to understand the immune composition.

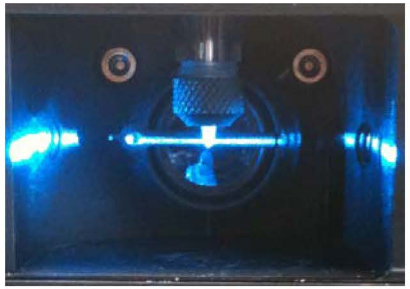
Step 4. BIDC personnel receives tissue slices from D2B technician and uses multiplexed IF imaging techniques and quantification methods to understand spatial interplay of tumor/immune cells.

Step 5. Genomics personnel receives sorted tumor/immune cells from D2B technician and isolates RNA & DNA for transcriptomic & genomic sequencing of tumor/immune compartments.

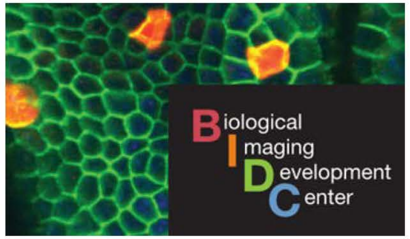
Step 6. Bioinformaticians receive, curate, and store all data (including clinical) in the UCSF Data Library, and work with Jocelyn to develop analytical tools to mine the ovarian tumor dataset. Data is "freed" to all UCSF investigators after set determined time.

Established Entities to Be Incorporated Into CoLabs

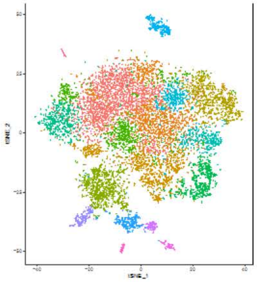
UCSF



Parnassus Flow Cytometry Core
>100 PI’s, ~$1.6M/year (recharge)



Biological Imaging Development Center
>50 PI’s, ~$750K/year (subscription)



Functional Genomics Core Facility
>50 PI’s, ~$1.1M/year (recharge, grants)

UCSF immunoprofiler CONSORTIUM

ImmunoProfiler
~25 PI’s, ~$15M (industry)

COLABS

Selected services

UCSF Institute for Human Genetics

IHG Genomics Core

UCSF University of California San Francisco | COLABS AT PARNASSUS

Net Impact on Researchers

Improve services for existing users of Parnassus cores

- PFCC (Flow Cytometry) >100 PIs
- BIDC (Imaging) 51 PIs, 19 departments
- CTSI CRS Sample Processing Core 59 PIs
- IHG Core Single Cell RNA-seq ~50 PIs
- Parnassus Center for Advanced Technology ~15 PIs
- Immunoprofiler Flow/Sequencing and Allied Projects ~25 PIs

Provide on-site access to key services now only available elsewhere

- Nikon Imaging Center in Genentech Hall 191 PIs, ~15% at Parnassus
- Center for Advanced Technology in Genentech Hall 150 PIs, ~15% at Parnassus
- Transgenic Core at Gladstone ~35 UCSF PIs, >50% at Parnassus
- Functional Genomics Core in Rock Hall 55 PIs, 49% at Parnassus
- Clinical Immunology Lab at ZSFG

Unlock access to powerful emerging technologies for existing and new users

- Data sciences for storage and analysis of large datasets (including genomics)
- New imaging and single cell analysis methods
- Advanced gene editing (CRISPR and beyond)
- Massively parallel functional assays

Financing

- Start-up costs
  - Construction, new personnel and equipment
  - Funds identified through campus, philanthropy, EVCP strategic opportunities
- Operating costs
  - ~$10M annual operating budget
  - Recharge, subscription, & grants will cover most costs
  - Institutional support (~$850K/year) to support innovation and administration
    - EVCP strategic funds will cover institutional support for first 5 years

COLABS AT PARNASSUS

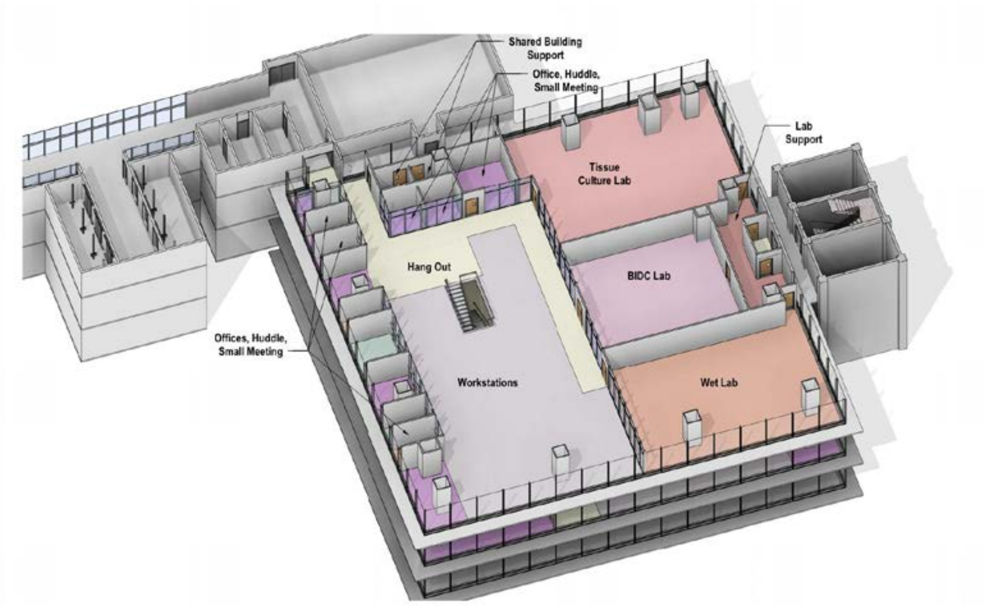
Current status

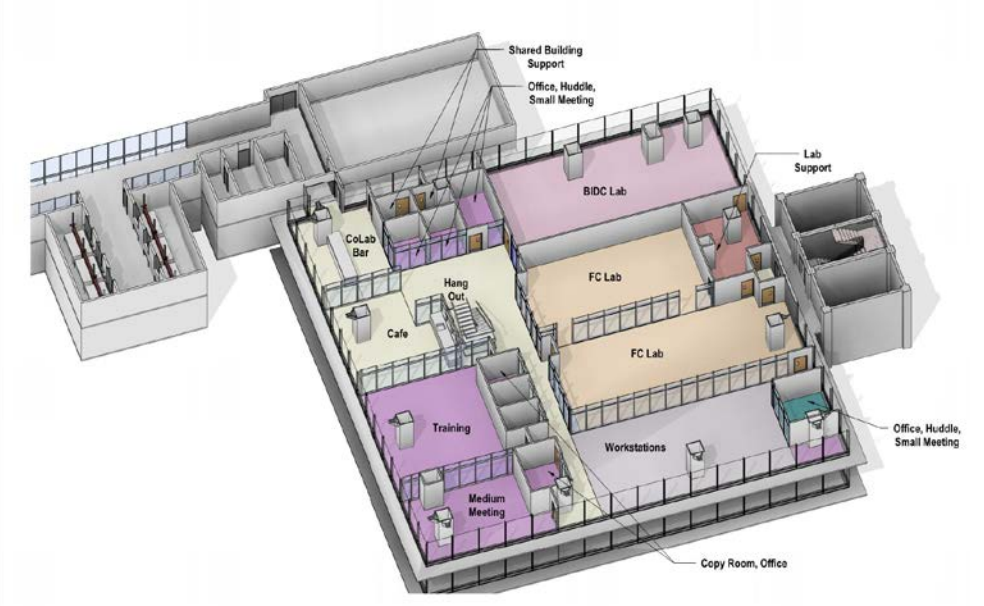
Phase 1 will open in temporary space on MSB-8 in 2019

- Start Data Science CoLab, support first CoProjects
- ~4500 sf (plus adjacent existing flow core space)

Space planning for phase 2

- Selected HDR as design firm
- 30+ participants in 3 workshops spanning 7 full days in November and December 2018
- Key goals
  - High impact/visibility, welcoming, promote collaboration, flexibility, efficiency
- Finalizing space program for 23K asf (2 tower floors)
- Includes wet lab, equipment rooms, tissue culture and other lab support, desktop research, teaching lab, conference/huddle, interaction space, admin, lactation room
- Anticipated head count: 79
- Design phase will follow *(images at right are test fits and not final designs)*





UCSF
University of California
San Francisco

Digital Hub
@ Parnassus Heights

November 27, 2018
Parnassus Master Plan Steering Committee

Julia Adler-Milstein, PhD
Aaron Neinstein, MD
Robert Wachter, MD

I am a: clinician at UCSF

I want to: inform a treatment decision for one of my patients by building an on-demand cohort of similar UC patients to compare.

UCSF

I am a: clinician at UCSF

I want to: improve the way our current EHR supports medication reconciliation for my clinic’s patient population.

UCSF

I am a: researcher at UCSF

I want to: build a decision support app that delivers real-time risk predictions to UCSF intensive care teams.

I am a: faculty member at Harvard doing cutting-edge robotics research

I want to: move to an institution where I can seamlessly collaborate with other digital health faculty and a health system that will allow me to test and refine my designs.

UCSF

I am a: well-established Silicon Valley technology company

I want to: work with an academic health center to co-develop a breakthrough technology that improves population health.

I am a: start-up tech company

I want to: pilot test my new solution that improves OR scheduling and throughput.

I am a: third year Orthopedics resident at UCSF

I want to: work with UCSF digital health faculty to refine and pilot a new clinical decision support algorithm.

UCSF's early successes in Digital Health

	UCSF Bakar Computational Health Sciences Institute	cdhi Center for Digital Health Innovation at UCSF	UCSF Health Informatics	CTSI at UCSF	UCSF Department of Medicine Center for Clinical Informatics and Improvement Research	UCSF Clinical Innovation Center	UCSF Innovation Ventures	Enterprise Information & Analytics
Successes	Information Commons UC Data Warehouse	GE voalte SAMSUNG TIDEPOOL	Epic EHR Clinical Decision Support Telehealth	Eureka Learning Health System Projects De-ID'd Data	The Office of the National Coordinator for Health Information Technology AMIA AHRQ	Inside Out Accelerator	Catalyst Program Entrepren. Center	Clinical Data Request Process Ops & Clinical Dashboards
Expertise	• Bioinformatics • Omics • Data Science	• Data Science • Software Development • Clinical Informatics • Commercial Partnerships • Early-Stage Innovation	• Clinical Informatics • Clinical Analytics • Operations	• Clinical Research	• Health Informatics Research • Health Informatics Policy	• Implementation Science • Service Design	• Licensing • Intellectual Property • Partnerships	• Analytics • Dashboards

… and much more within Departments

Stefano Bini, MD

Department of
Orthopedic Surgery

HealthLoop

Gabby Schmajuk, MD

Jinoos Yazdany, MD

Department of Medicine

Patient Reported Outcomes
in Rheumatology

Xiao Hu, PhD

School of Nursing

SuperAlarm

UCSF

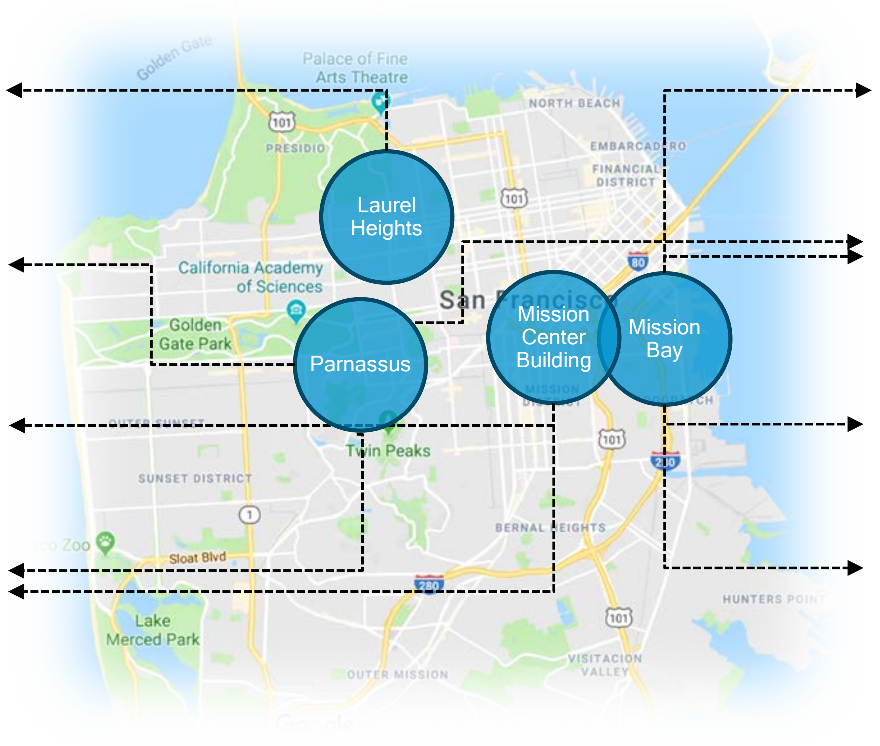
Our digital groups are geographically dispersed…

Center for Clinical Informatics & Improvement Research

Clinical Innovation Center

Enterprise Information & Analytics

Health Informatics & Clinical Systems



Bakar Computational Health Sciences Institute

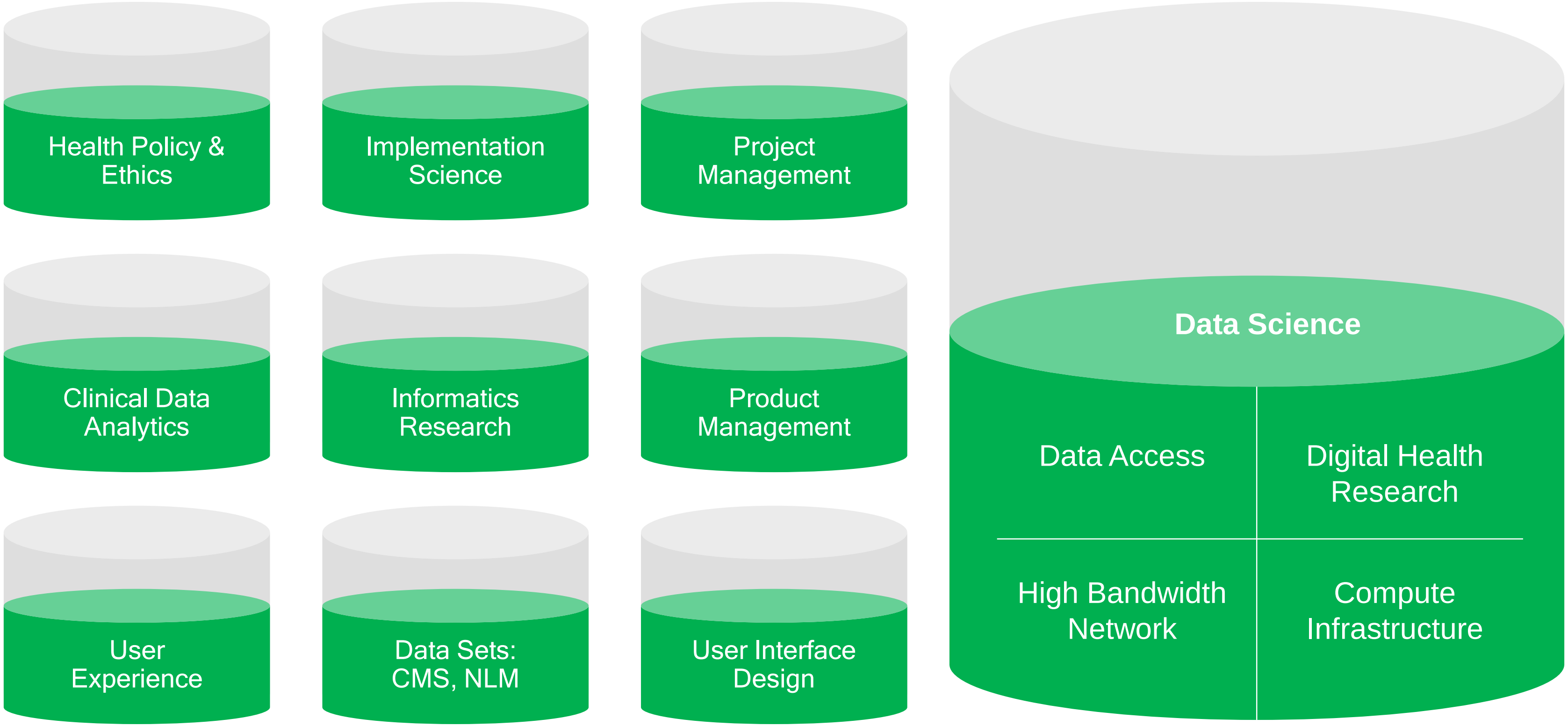
Center for Digital Health Innovation

Clinical & Translational Science Institute

Innovation Ventures

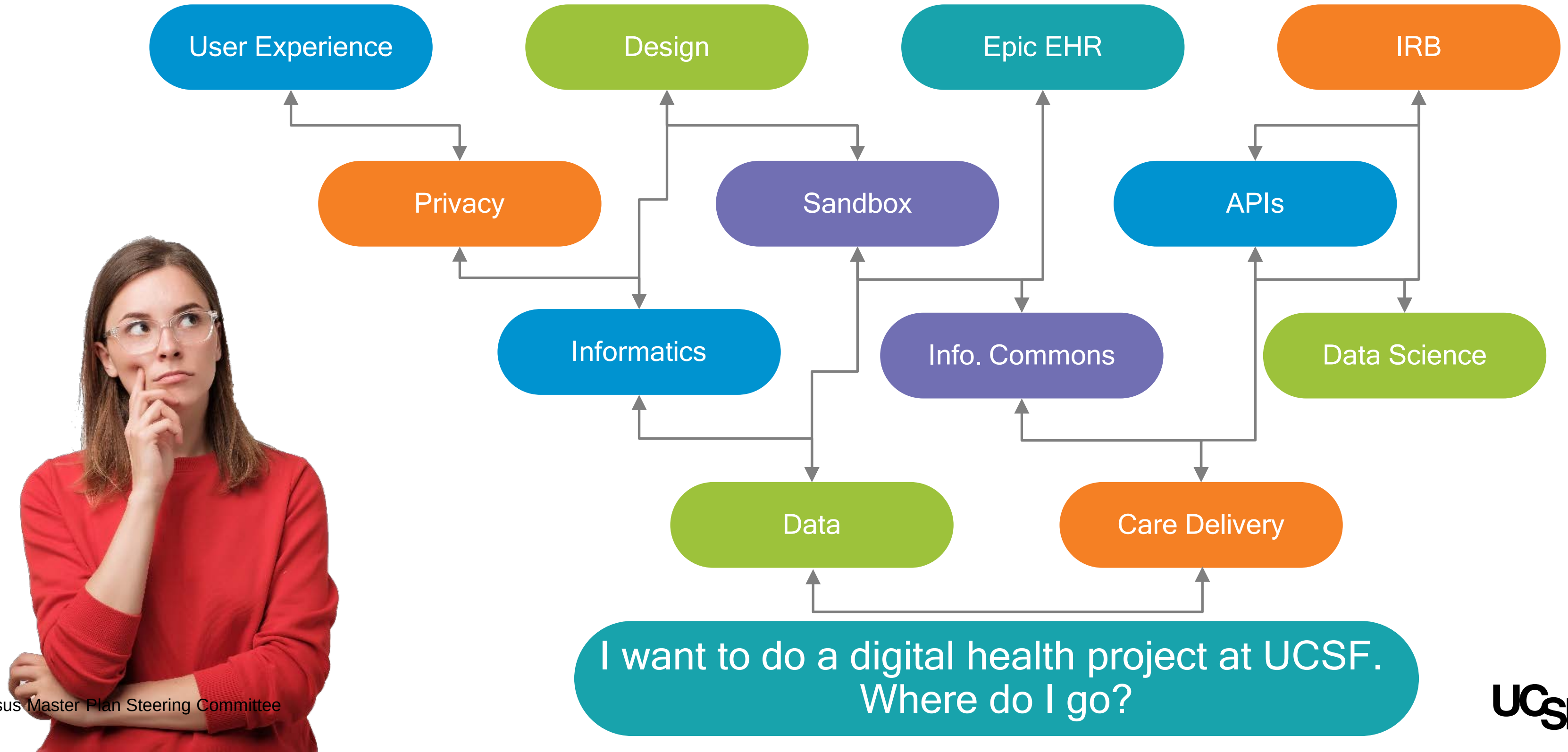
UCSF

… and we have key resource gaps



UCSF

… as well as poorly coordinated resources, leading to frustrated UCSF faculty and external partners



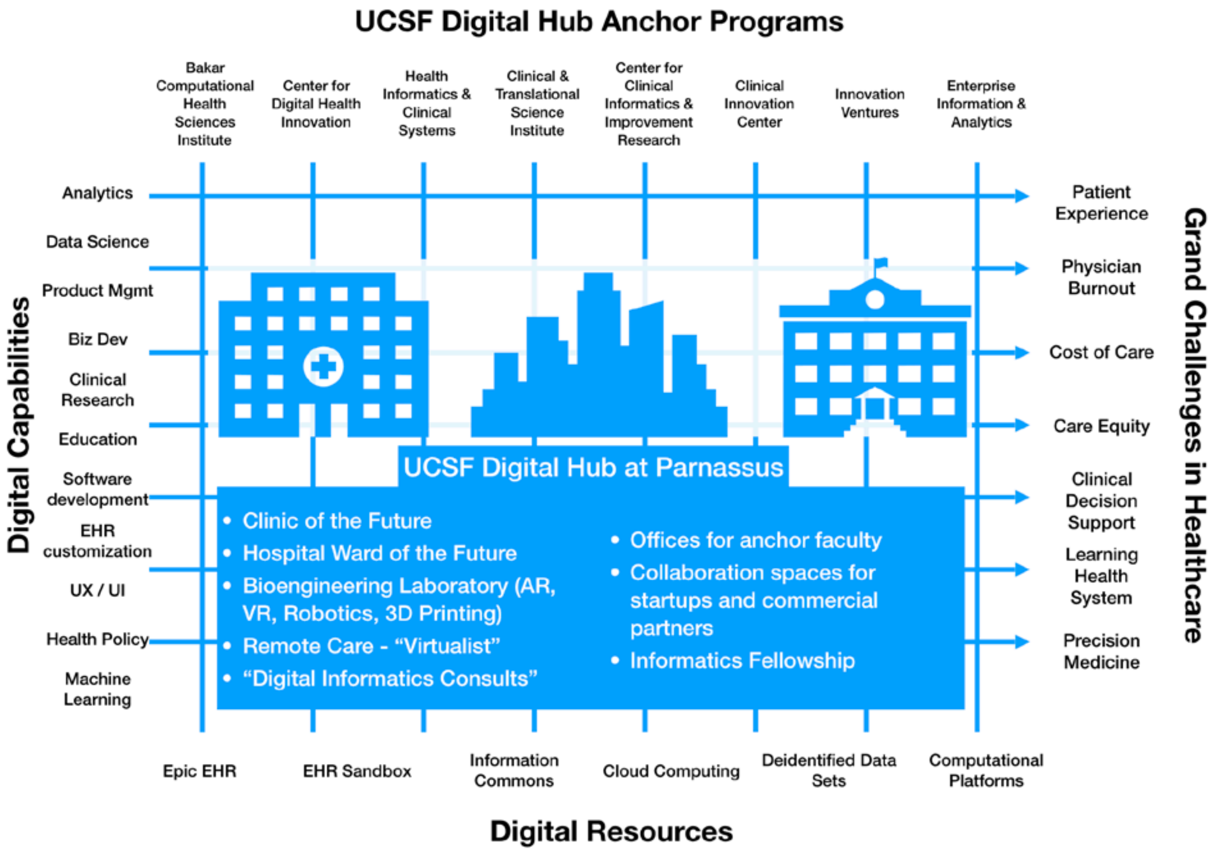
UCSF has an opportunity to be *the* premier university for digital…

- … care
- … education
- … innovation
- … research
- … entrepreneurship
- … partnerships

Vision

To be the premier university in the world for digital, by…

streamlining Digital Health at UCSF to seamlessly support the needs of clinicians, researchers, trainees, and external partners…

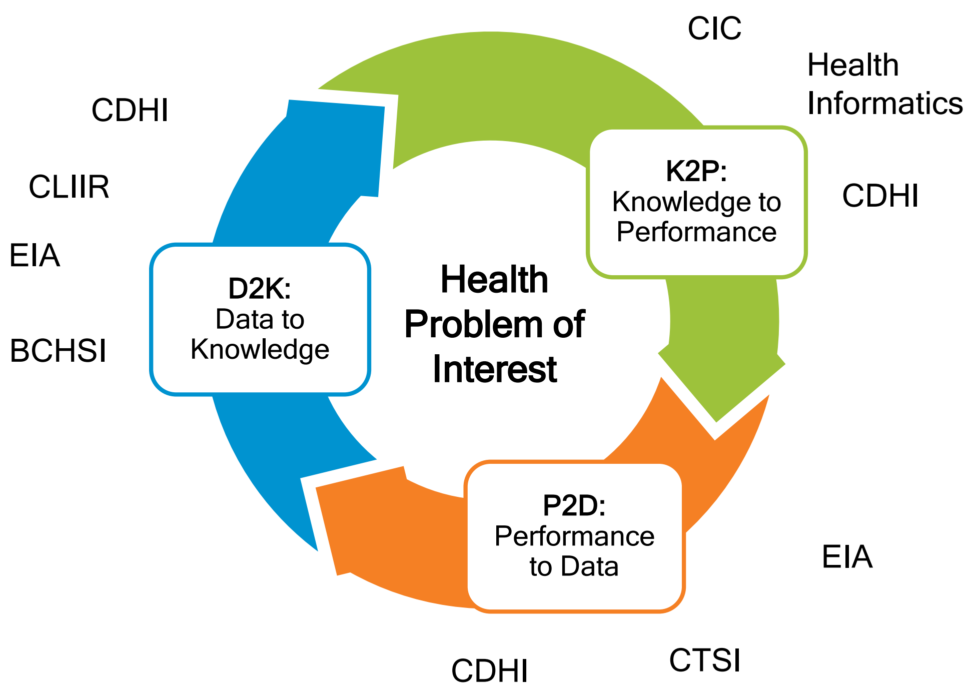


Note: BCHSI remains at Mission Bay, but will be core member of the Digital Hub and have a presence at Parnassus

Vision

… allowing current UCSF Digital Health assets to work together to deliver a true Learning Health System.

Learning Health Cycle



*With engagement of policy, ethics, patient engagement, disparities groups

UCSF Digital Hub: Four Core Areas

Examples

Entrepreneurship & Innovation

Accelerator for Internal Ideas

Entrepreneurs in Residence

Co locate with Industry Partners

Simulation & Testing

Basic & Translational Digital Research

Implem. Science: Ward of the Future

Collaboration & Resources

One Stop Shop for Consultations: IRB, Privacy, Legal, Risk, Security, Design, EHR Integration

Product Management

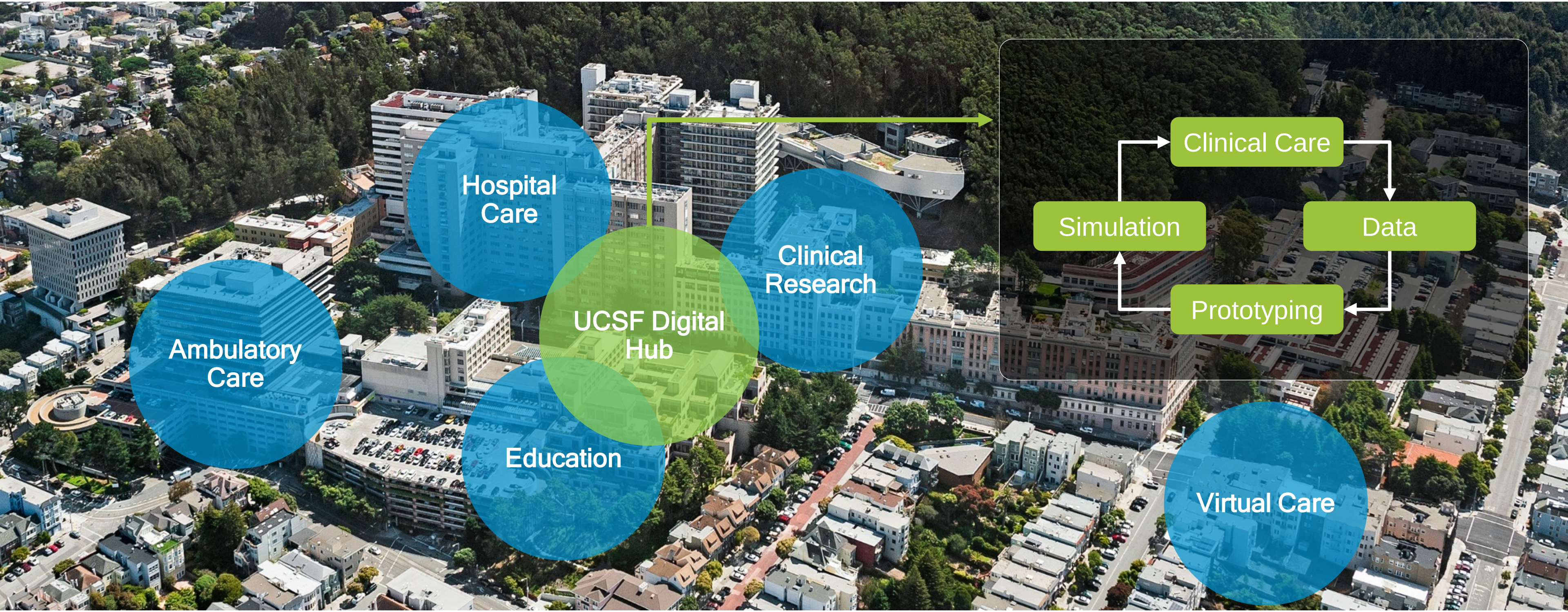
Education & Training

Clinical Informatics Fellowship Program

Public Facing Digital Health "Exploratorium"

UCSF

UCSF Digital Hub belongs at Parnassus Heights



UCSF Digital Hub – Governance

- Broad representation from community of digital entities and core users (e.g. clinical departments)
- Federated model: maintain autonomy of constituent units while emphasizing cross-cutting projects, communication (between silos and externally-facing), convening, education, collaboratory
- Decision Making & Authority
  - $1-2M/yr, staff to purpose, 3-5 staff to start
  - Focused on strategic planning, space mgmt., building & managing cross-cutting projects

UCSF

Unified space @ Parnassus Heights

New federated program, strategy and governance

Appendix

University of California
San Francisco

Working Group Membership


Julia Adler-Milstein


Aaron Neinstein


Steven Bin


Stefano Bini


Rachael Callcut


David Dobbs


Xiao Hu


Carolyn Jasik


Elsbeth Kalenderian


Marc Kohli


Michael Lesh


Chandler Mayfield


Rosa Rodriguez-Monguio


Cara Fladd


Sharon Priest

UCSF

Full-Time Occupants – Current & Projected

Team	Current @ Parnassus Heights		FY20 @ Digital Hub		FY25 @ Digital Hub	
	Low	High	Low	High	Low	High
CDHI	12	17	25	50 (Increasing team size & shift staff from MB)	35	80
CLIIR	0	0	10	20		
CIC	8	10	8	10		
CTSI	0	0	5	15	5	25
Dept of Epi/Biostats						
BCHSI	0	0	1	2		
EI&A	0	0	5	15	8	20
Health Informatics	5	10	4	6		
Informatics Trainees	5	10	5	10	8	15
EIR / Incubator	0	0	2	3		
Clinical Dept people			10	15		
Totals	30	47	70	131		

Entrepreneurship & Innovation

- Collaborative Environment
  - Attract and recruit top talent
  - Strengthen synergies of existing UCSF people and assets
- One Stop Shop for Consultations: IRB, Privacy, Legal, Risk, Security, Design, UX, Product Management, EHR

Simulation & Testing

- Basic Digital Research: Utilization of large data sets with ML & AI
- Translational Digital Research: Rapid design and prototyping
- Implementation Science: Laboratory Practice. Ward of the Future. Hospital at Home
- Post-Market Digital Surveillance

Collaboration & Resources

- Data Science Resources
- Accelerator for Internal Ideas
- Entrepreneurs-in-Residence
- Co-locate with Industry Partners
    - Co-Development
    - Validation

Education & Training

- Seminars and Events
- Education: Data Science, Informatics, Design, Entrepreneurship
- Clinical Informatics Fellowship Program
- Public-Facing Digital Health “Exploratorium”

UCSF

UCSF
University of California
San Francisco

A Compelling Vision *for* Education *at* Parnassus

Comprehensive Parnassus Heights Plan

Education Space Working Group

2/22/2019

Education excellence is the catalyst for all UCSF missions.

UCSF

We looked to the UCSF 2030 Education Space Values to frame our recommendations.

UCSF 2030 Education Space Values

Inquiry, innovation, and investigation

Interprofessional collaborative care

UCSF 2030 Education Space Values

Mentorship, connectivity, and networks of learning

Aligning education, research, and clinical care

UCSF 2030 Education Space Values

Continuous learning

Health and wellbeing

Diversity and inclusion


UCSF 2030 Education Space Values
Empowered and engaged patients and communities
PRIDE in our institution

Major Activities

The Education Space Working Group (ESWG):

- Engaged with stakeholders in all education mission areas, including students.
- Adopted the *UCSF 2030 Education Space Values*.
- Developed *ESWG Education Space Guidelines* which should guide implementation of the recommendations.
- Issued a call for innovative education space proposals, which generated 14 responses, most targeting near-future needs.
- Worked with Perkins Eastman to evaluate the scope and utilization of current classrooms and recommend a revised portfolio.

Working Group Roster

• **Chris Shaffer**	Library
• **Kim Baltzell**	Center for Global Health & School of Nursing
• **John Davis**	School of Medicine
• **Matt Epperson**	Student Academic Affairs
• **Marcus Ferrone**	School of Pharmacy
• **Amber Fitzsimmons**	School of Medicine & Graduate Division
• **Cara Fladd**	Space & Capital Planning
• **LaMisha Hill**	Office of Diversity and Outreach
• **Sara Hughes**	School of Dentistry
• **Kirby Lee**	School of Pharmacy
• **Chandler Mayfield**	School of Medicine
• **Lisa Magargal**	School of Medicine
• **Maureen Shannon**	School of Nursing
• **Kevin Souza**	School of Medicine
• **Hailey Taylor**	School of Dentistry
• **Michael Trevino**	School of Nursing
• **Sandrijn van Schaik**	Kanbar Center for Clinical Skills and Simulation & School of Medicine

Endorsements

We endorse a vision for education space in alignment with the Perkins Eastman “preferred alternative:”

- A new education building east of the Library.
- Dorms and wellness on the west side.
- Clinical activities, including dentistry, on the east side.
- A research building west of Saunders Court.
- Streetscaping to reduce traffic on Parnassus Ave.
- Significant reduction in use of classrooms for meetings.

Therefore, this report proposes spaces that support our education programs and human-centered design to support student life, well-being, and learning.

Endorsements

We endorse the recommendations of the Academic Senate Space Committee (Appendix E):

- Academic Space for Clinicians Policy Task Force Report
- Educator and Education Space Policy Task Force Report

Assumptions

This report assumes:

- There will be no reduction in overall education space at Parnassus.
- Parnassus Avenue cannot be closed to traffic, but we imagine that it could and what a wonderful world it would be.


Education Space Working Group Recommendations
UCSF

Space Recommendations

Create an innovative central **Education Core** to support active-learning and interprofessional pedagogies.

Expand **clinical simulation spaces** with comprehensive interprofessional skills and simulation capacities that can accommodate all school and UCSF Health needs.

Space Recommendations

Establish designated **academic areas for all in clinical buildings** in support of the education and research missions of UCSF.

Revise the portfolio of **classroom and class lab spaces to meet modern education** needs. Provide adequate spaces for campus meeting needs.

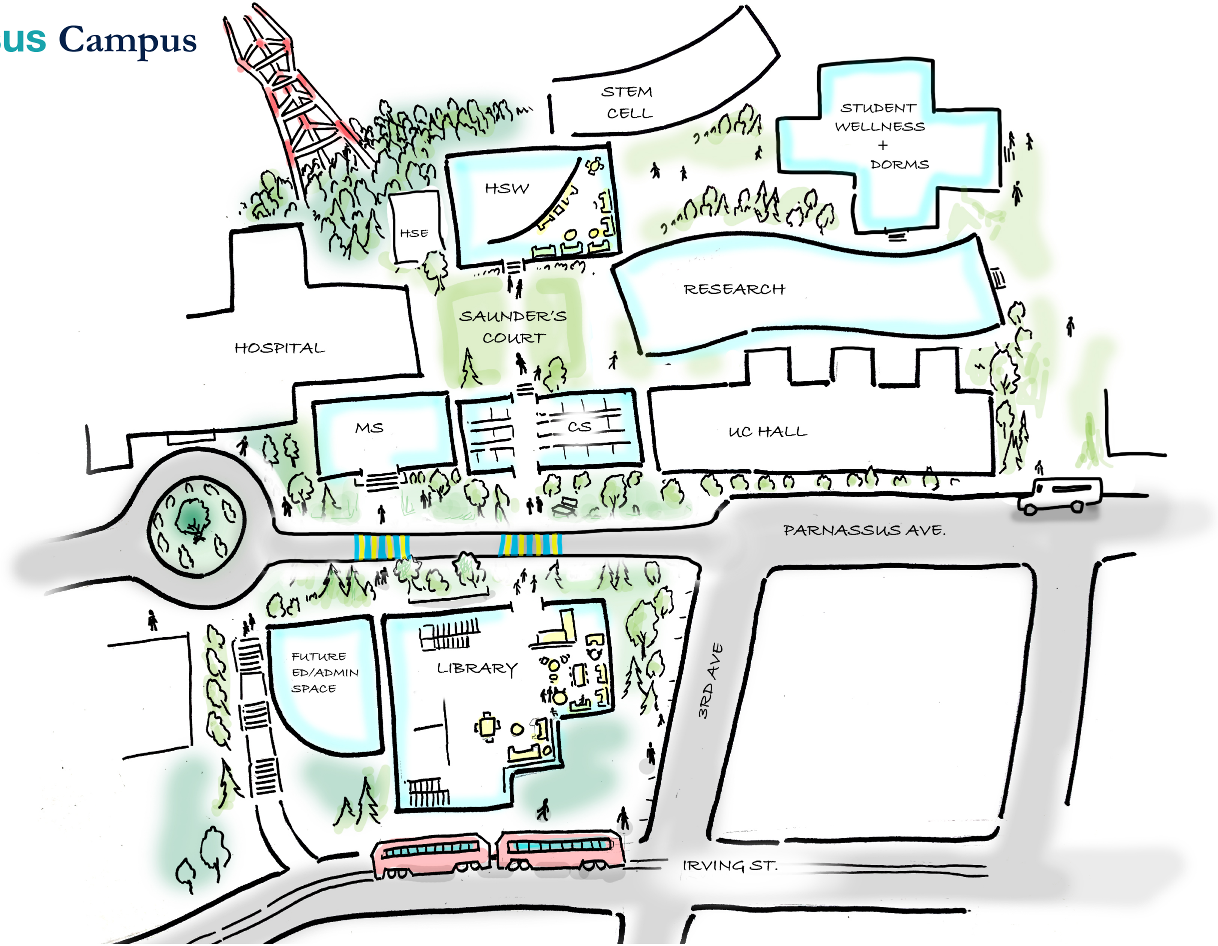
UCSF

Space Recommendations

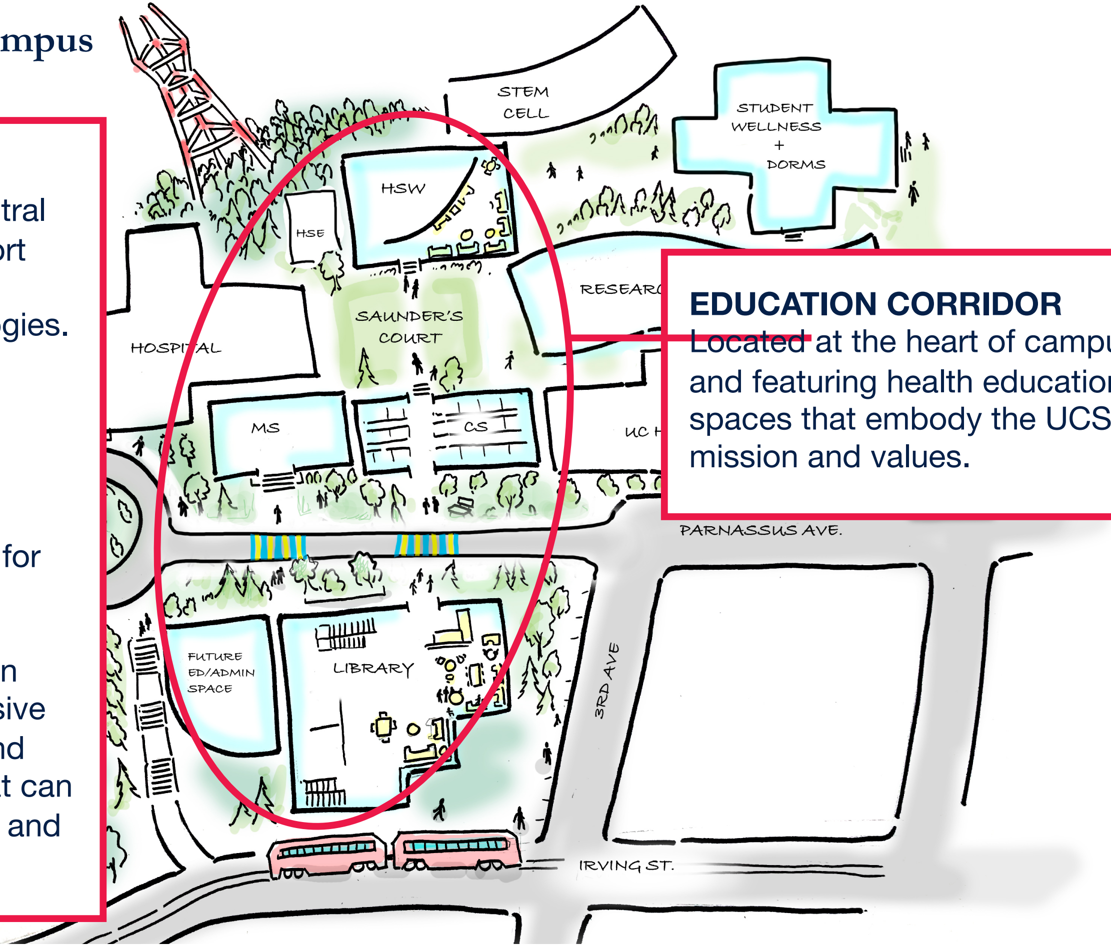
Promote a vibrant community to academic support student life, well-being, and learning on our campus.

A Reimagined Teaching & Learning Experience

Future Parnassus Campus



Future Parnassus Campus



Recommendations

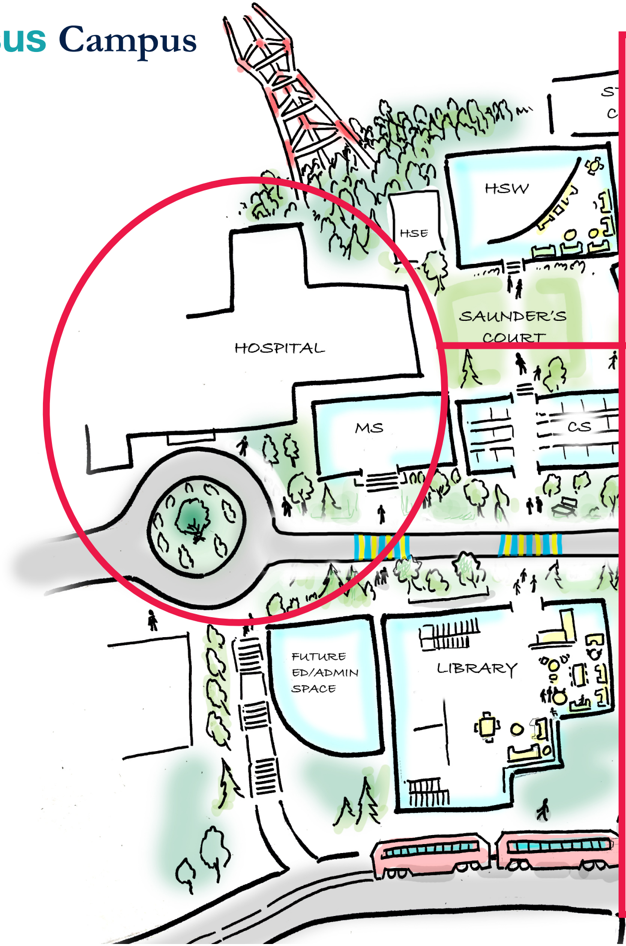
- Create an innovative central Education Core to support active-learning and interprofessional pedagogies.
- Revise the portfolio of classroom and class lab spaces to meet modern education requirements. Provide different spaces for campus meeting needs.
- Expand clinical simulation spaces with comprehensive interprofessional skills and simulation capacities that can accommodate all school and UCSF Health needs.

EDUCATION CORRIDOR

Located at the heart of campus and featuring health education spaces that embody the UCSF mission and values.

UCSF

Future **Parnassus** Campus



Recommendations

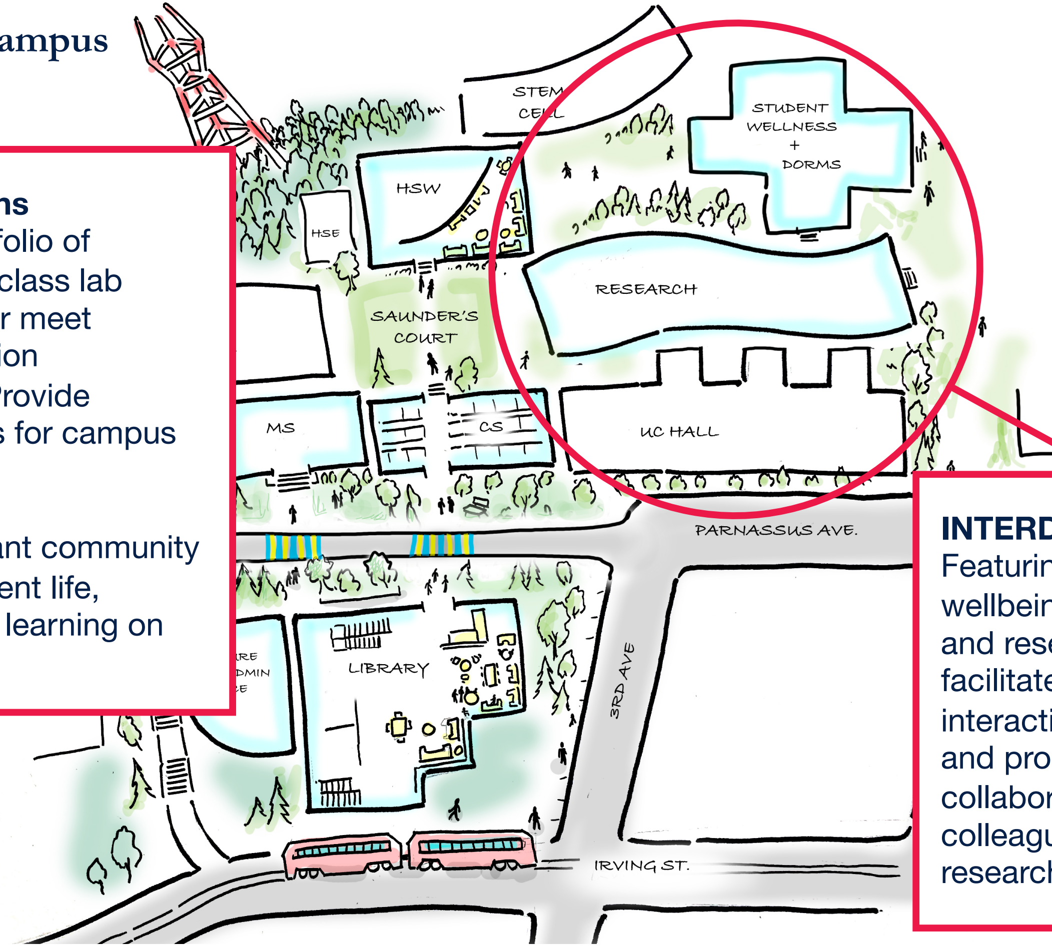
- Establish Designated Academic Areas in clinical buildings (i.e. the new hospital) in support of the education and research missions of UCSF.
- Expand clinical simulation spaces with comprehensive interprofessional skills and simulation capacities that can accommodate all school and UCSF Health needs.

NEW HOSPITAL

A new hospital that meets the growing patient demand for care and the need for designated active teaching and learning areas in clinical care spaces.

UCSF

Future Parnassus Campus



Recommendations

- Revise the portfolio of classroom and class lab spaces to better meet
- modern education requirements. Provide different spaces for campus meeting needs.

- Promote a vibrant community to support student life, well-being, and learning on our campus.

INTERDISCIPLINARY SPACES
Featuring spaces that support wellbeing, student life, housing and research. These spaces facilitate interdisciplinary interactions between schools and programs, and collaborations between colleagues in clinical and research environments.


A place is only as good as the *people* in it.
Pittacus Lore

Educators & Learners at Parnassus

AUBREY
Graduate Student

MUTHAMMA
Research Faculty

BRIANNA
Clinical Student

SAMUEL
Clinical Faculty

Learner: Graduate Student

AUBREY
Pronouns: they/them/theirs
Status: First Year Biomed
Primary Campus: Parnassus
Time on Parnassus: 12 hours
Additional Info:

- Lives in student housing on Mission Bay Campus
- Volunteers at Carry the One Radio to be a part of a broader health and science community on campus

Pain Points

- **Spends the majority of time in lab** and misses student experience
- **Feels siloed** working with only graduate peers and program faculty
- **Hard time finding meeting rooms,** so regularly meets with mentor at Palios
- Has **consistent technology issues** in classrooms and meetings

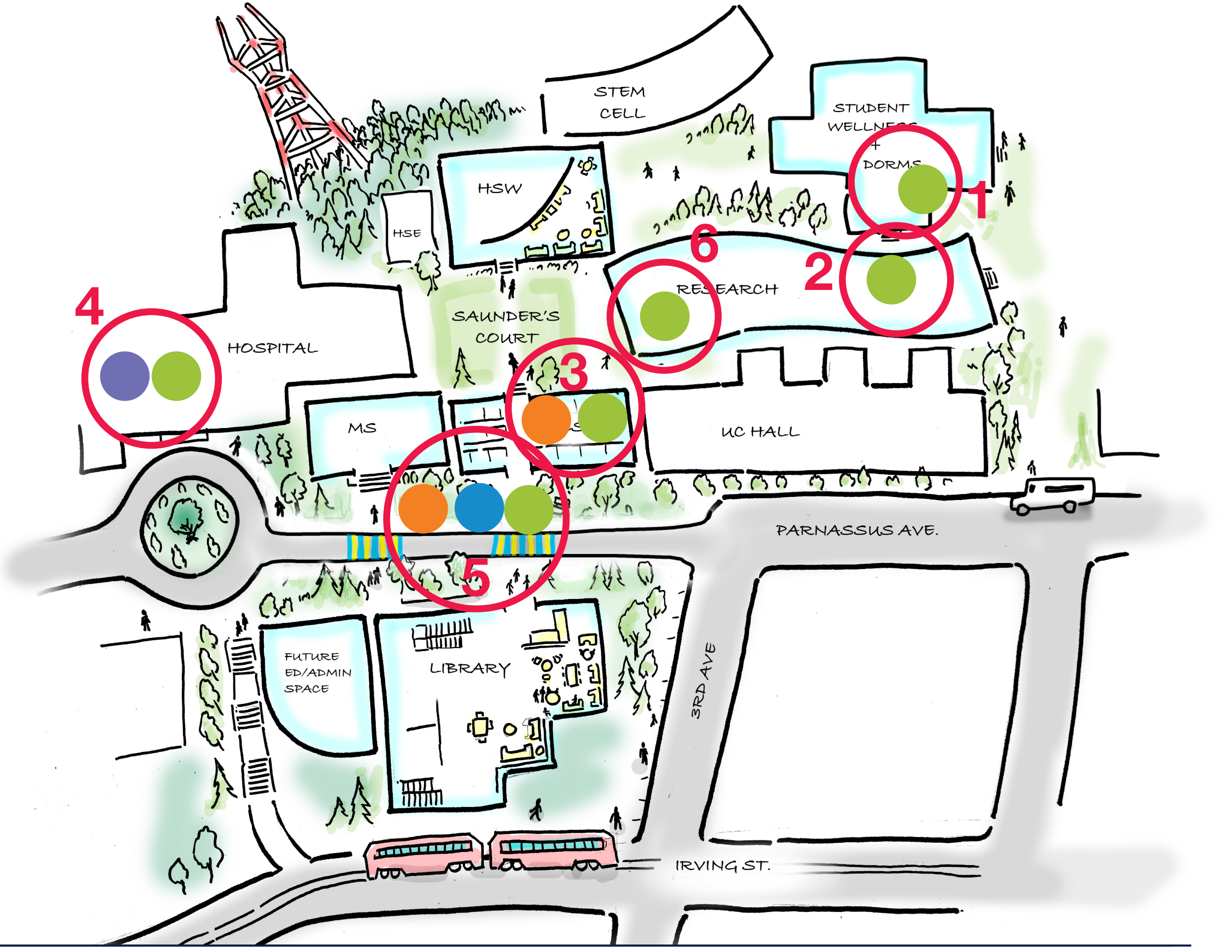
Needs

- Sense of **community**
- More **clinical problems to solve**
- More formal **interdisciplinary** learning and collaboration
- **Informal settings** to interact with faculty and peers
- **Bring classrooms up to date** with technology

UCSF

AUBREY
Graduate Student
12 Hour Day

1) 6 am: Leaves dorm and goes to gym in Student Wellness Center.
Needs Met: Space to create community, health and well-being.
2) 7:05am: Works in lab with graduate and professional students.
Needs Met: Space for interdisciplinary learning and collaboration.
3) 9:10am: Meets with Brianna to discuss a new research project.
Needs Met: Space for Interprofessional collaboration.
4) 11:35am: Meets Samuel regarding collaboration on translational research.
Needs Met: Space for learning in hospitals.
5) 12:05pm: Checks in with Muthamma and Brianna on the quad and agrees to co-lead a multi-campus research elective.
Needs Met: Modern classrooms with advanced video-conferencing.
6) 1:30pm: Lab-based classes in research building. Meets with study group.
Needs Met: Modern lab-based teaching spaces and small group learning



UCSF

Learner: Research Faculty

MUTHAMMA
Pronouns: she/her/hers
Status: Associate Professor
Primary Campus: Mission Bay
Time on Parnassus: 7.5 hours
Additional Info: Serves on two curriculum committees that regularly meet on Parnassus campus

Pain Points

- Always in search of **space to meet and take calls**
- Notices **outdated spaces that lack creativity** during every visit to Parnassus
- Sometimes **gets lost in buildings** when visiting Parnassus
- Consistently has **issues with Zoom** at Parnassus

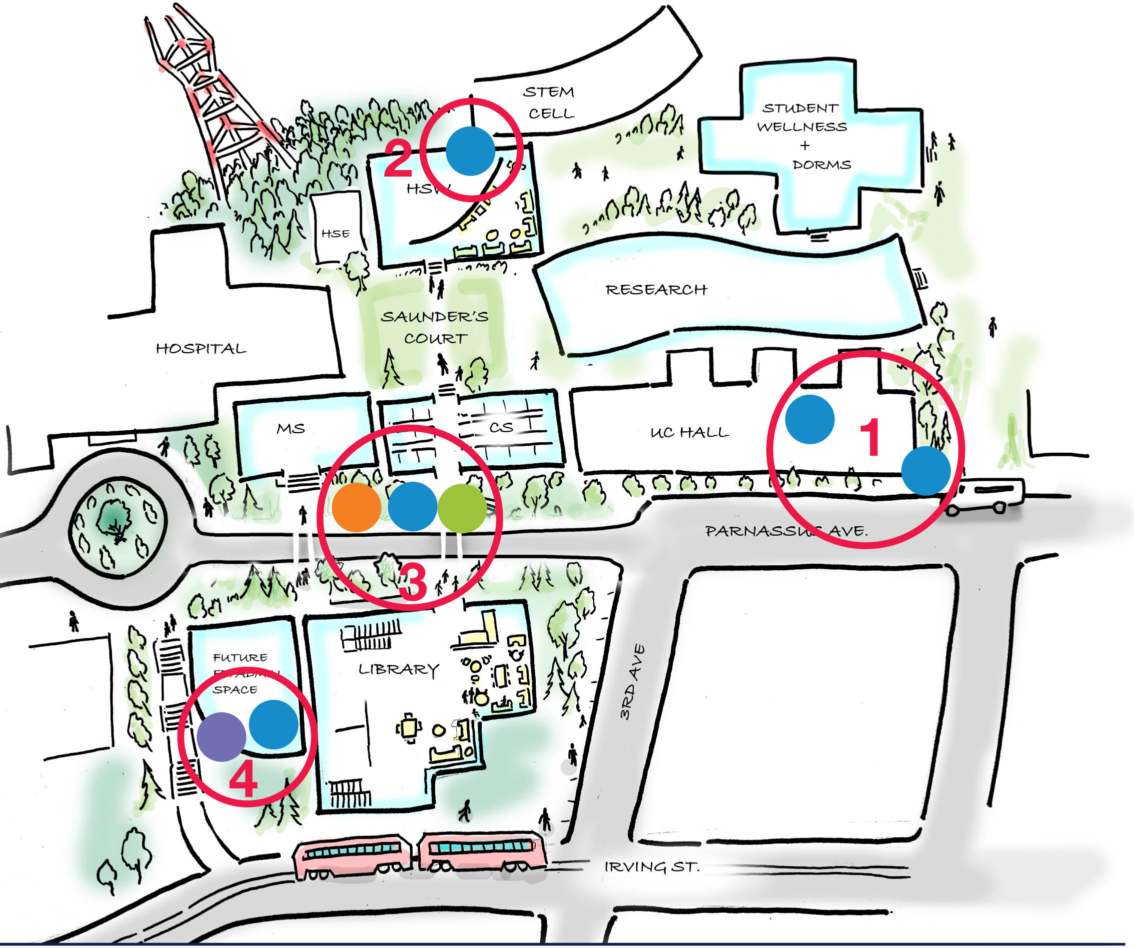
Needs

- **Update campus** to complement the Mission Bay campus
- More **flexible spaces to informally meet**
- More **art and color** to encourage creativity and inspiration
- Effective **signage**
- Modern classrooms with **advanced video conferencing**

UCSF

MUTHAMMA
Research Faculty
7.5 Hour Day

1) 7am: Arrives at Parnassus via shuttle and heads to UC Hall for meeting.
Needs Met: Access to flexible meeting space.
2) 9am: Attend curriculum committee in HSW with remote access to Mission Bay.
Need Met: Advance technology for remote meetings.
3) 12:05pm: Checks in with Brianna and Aubrey on the quad and recruits them to co-lead a multi-campus research elective.
Needs Met: Modern classrooms with advanced video-conferencing.
4) 1pm: Visits the Faculty & Student Success Center to attend a diversity training. Meets up with Samuel afterwards to discuss a research project.
Need Met: Space for faculty training in a creative and inspiring space.



UCSF

Learner: Clinical Student

BRIANNA
Pronouns: she/her/hers
Status: Second Year Pharmacy
Primary Campus: Parnassus
Time on Parnassus: 10 hours
Additional Info:
- Always in class. When not in class, studies alone and with peers in the Library
- Serves as officer on the Graduate and Professional Student Association

Pain Points

- Has difficulty finding **spaces to meet and work with groups**
- Hard time finding **outlets to charge** laptop and phone
- Wants more **comfortable and welcoming areas** on campus.
- Reluctantly takes **medication for anxiety**, particularly **during exams**

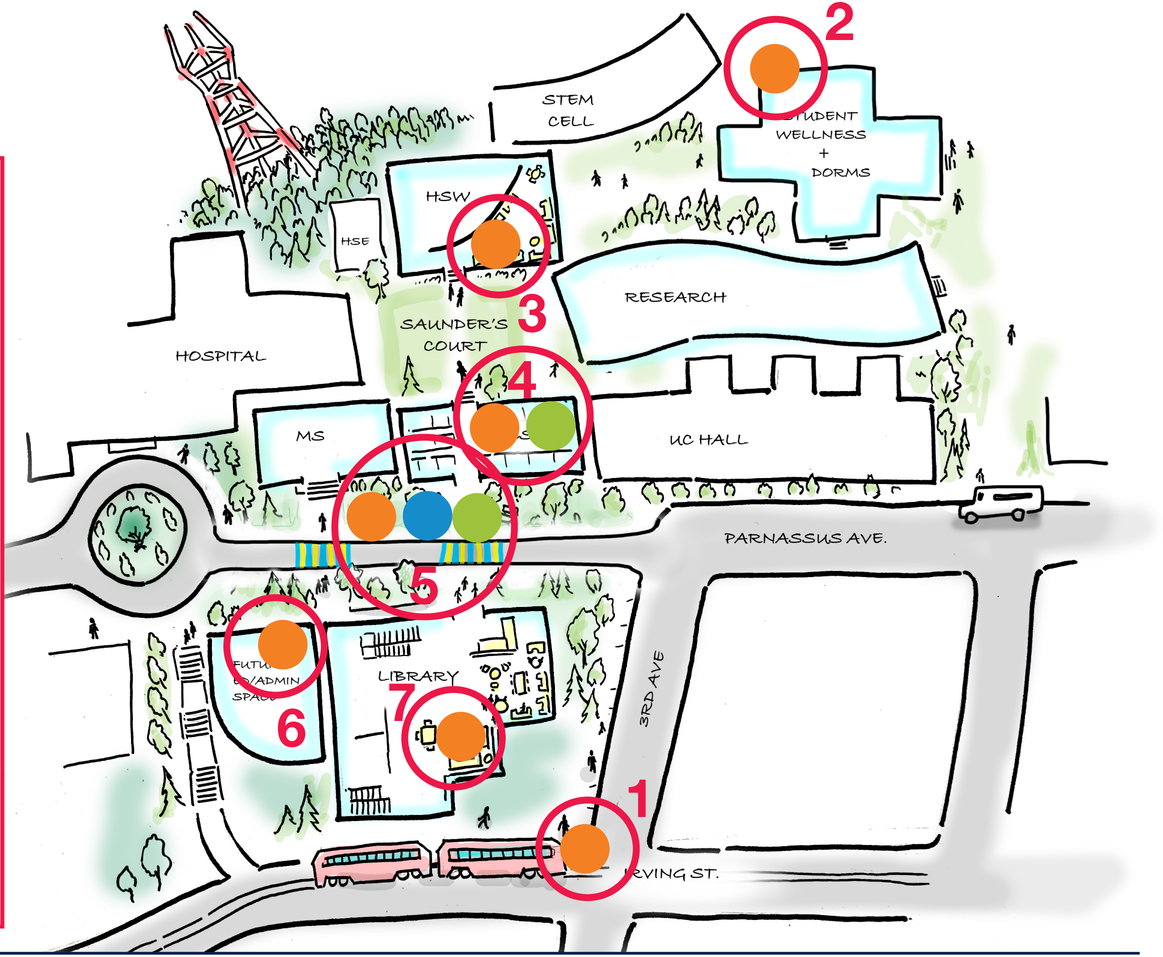
Needs

- **Modular spaces** to get work done individually and collaboratively
- More spaces to **accommodate technology**
- Living room space for **informal learning, community, and study**
- Prioritize and offer more services for **student wellness**

UCSF

BRIANNA
Clinical Student
10 Hour Day

1, 2) 6:50am: Arrives on Muni to attend morning yoga class in Student Wellness Center.
Needs Met: Space for wellness activities.
3) 8:30am: Eats breakfast at HSW Redwood Terrace before a meeting.
Needs Met: Living room space for informal learning, community, and study on south end of campus.
4) 9:10am: Meets with Aubrey to work on a collaborative research project in the new CSB.
Needs Met: Modern classrooms and access to natural light.
5,6) 12:05pm: Checks in with Muthamma and Aubrey on the quad and agrees to co-lead a multi-campus research elective. Enjoys lunch on the plaza with friends.
Needs Met: Modern classrooms with advanced video-conferencing; community space
7) 1:05pm: Studying for Therapeutics class. Meet-up with other pharmacy students for a consultation with a librarian.
Needs Met: Modular spaces to get work done individually and collaboratively.



UCSF

Educator: Clinical Faculty

SAMUEL
Pronouns: he/him/his
Status: Professor & Surgeon
Primary Campus: Parnassus
Time on Parnassus: 16 hours
Additional Info:

- Comes in early and leaves late
- Interested in applying new technology to surgical procedures
- 3D prints anatomy models in Makers Lab for teaching

Pain Points

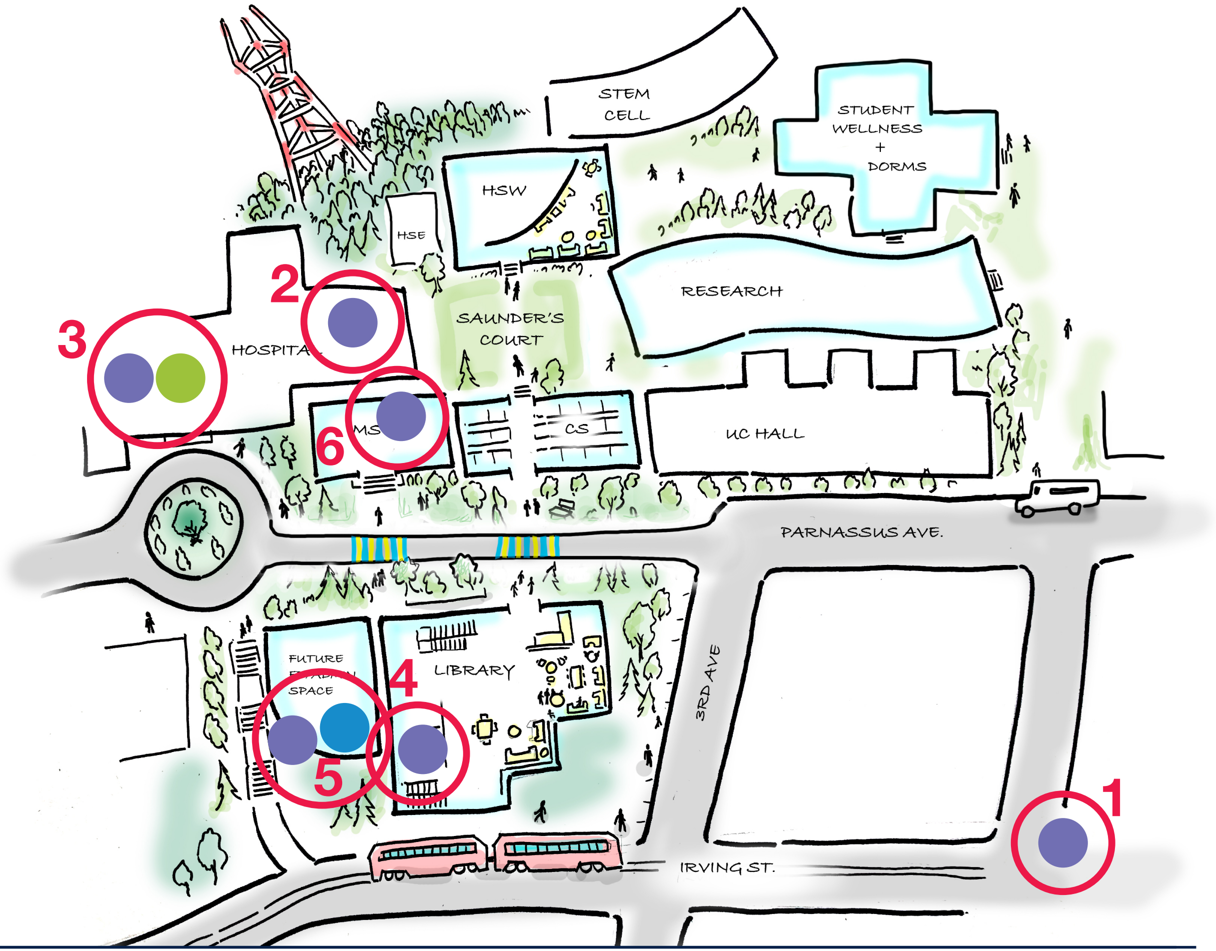
- Few clinicians engaging in **new technology**
- **No surgical skills lab in hospital** for team and student training
- **Minimal collaboration** with simulation experts
- Hard to find **private meeting spaces**
- **Not much interaction** beyond hospital

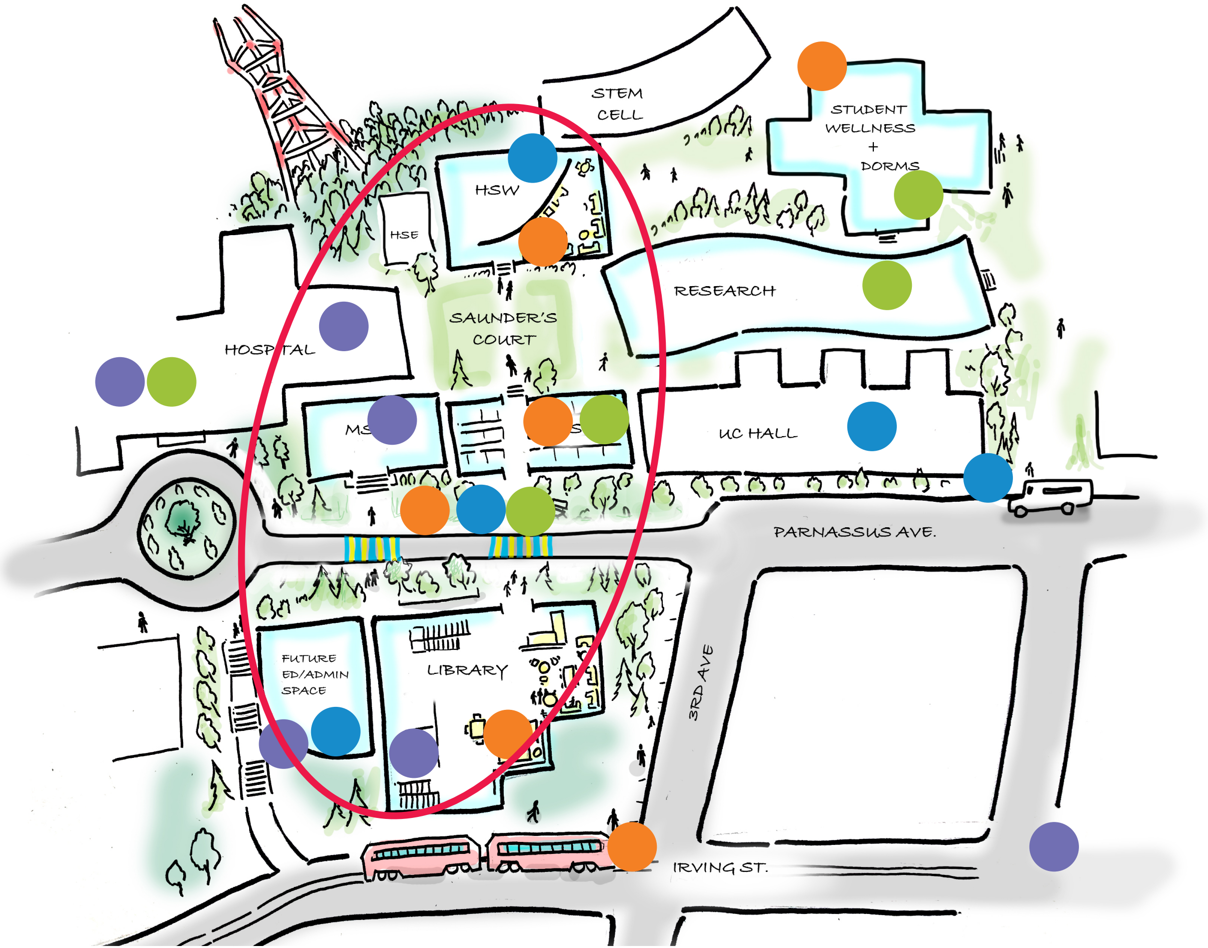
Needs

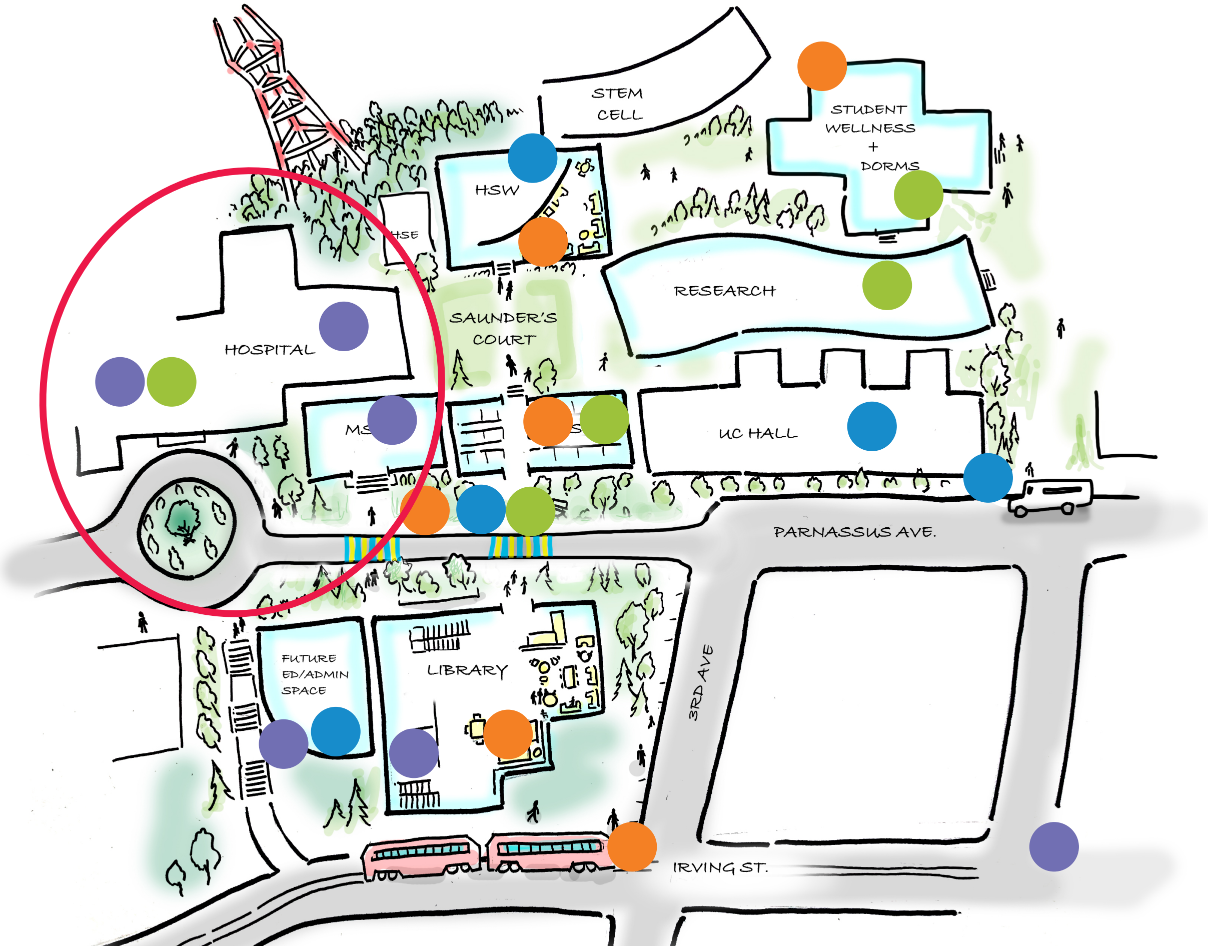
- **Designated academic areas** in hospital
- Greater capacity for **surgical simulation**
- More private and accessible **meeting spaces** throughout campus
- Space to facilitate **interactions outside of the hospital**

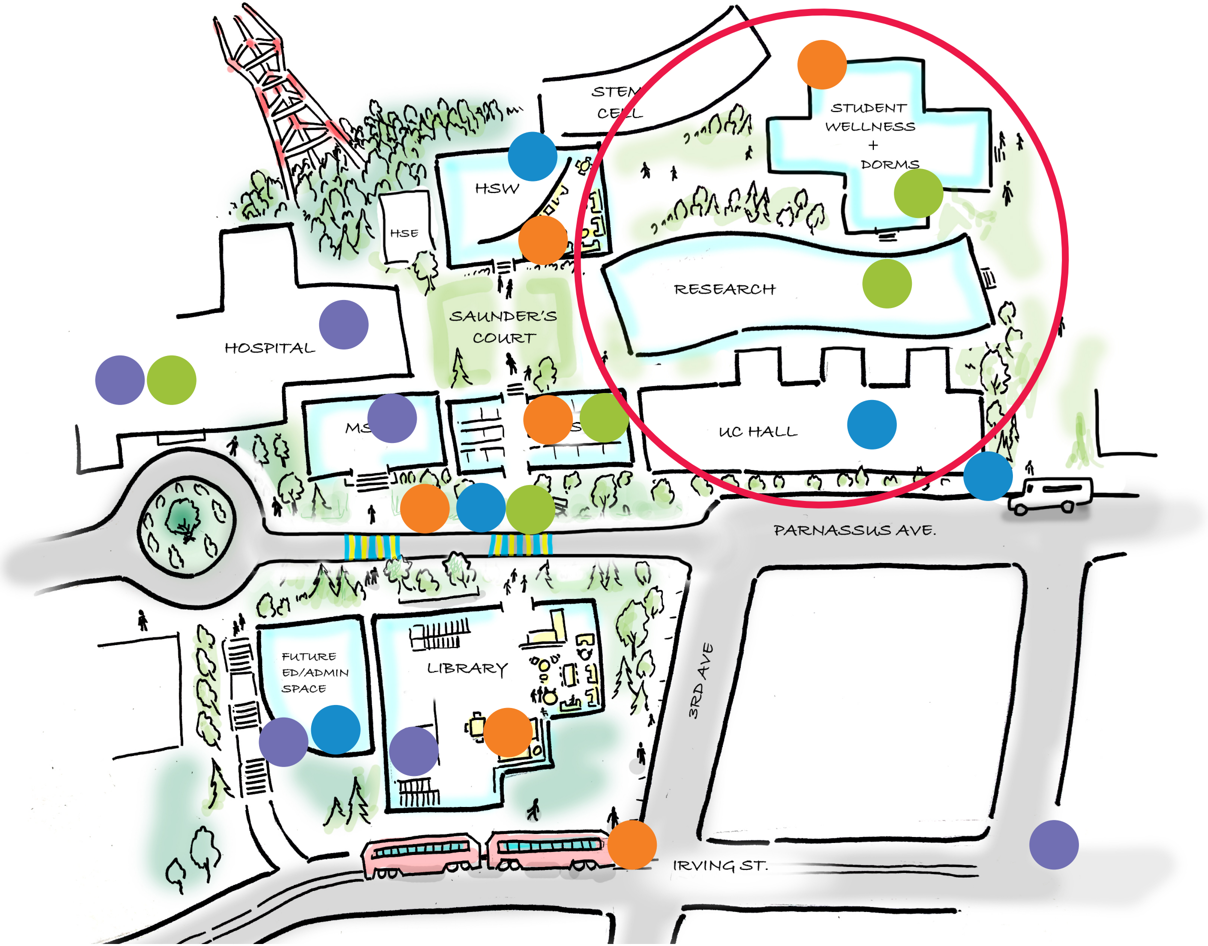
SAMUEL
Clinical Faculty
16 Hour Day

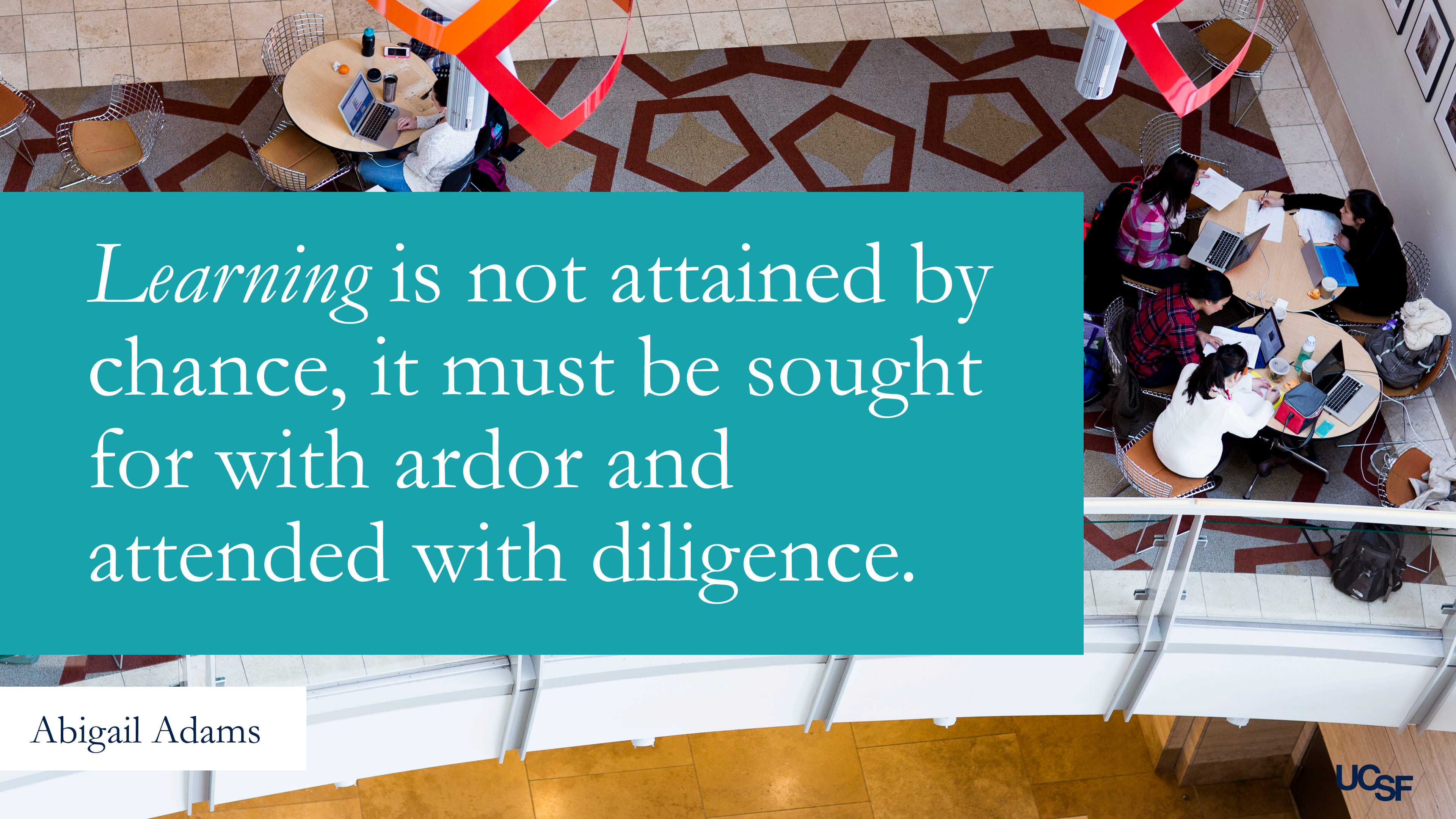
1, 2) 5:30am: Arrives on bike and heads to surgical skills simulation space in hospital.
Need Met: Greater capacity for simulation.
3) 11:35am: Meets Aubrey regarding collaboration on translational research.
Needs Met: Space for academic activities in hospitals.
4) 12:30pm: Grabs coffee and runs into colleague before heading to meeting.
Need Met: Space to facilitate interactions outside of the hospital.
5) 1:05pm: Visits the Faculty & Student Success Center to attend a diversity training. Meets up with Muthamma afterwards to discuss a research project.
Need Met: Space for faculty training in a creative and inspiring space. Faculty meeting space.
6) 2:35pm: Meets with residents in surgical skills simulation space for teaching session.
Need Met: Space for academic activities in the hospital.




STEM CELL
STUDENT WELLNESS + DORMS
HSW
HSE
RESEARCH
SAUNDER'S COURT
HOSPITAL
UC HALL
PARNASSUS AVE.
3RD AVE
FUTURE ED/ADMIN SPACE
LIBRARY
IRVING ST.


STEM CELL
STUDENT WELLNESS + DORMS
HSW
HSE
RESEARCH
HOSPITAL
SAUNDER'S COURT
UC HALL
PARNASSUS AVE.
FUTURE ED/ADMIN SPACE
LIBRARY
3RD AVE
IRVING ST.


STEM CELL
STUDENT WELLNESS + DORMS
HSW
HSE
HOSPITAL
SAUNDER'S COURT
RESEARCH
UC HALL
PARNASSUS AVE.
FUTURE ED/ADMIN SPACE
LIBRARY
3RD AVE
IRVING ST.


Learning is not attained by chance, it must be sought for with ardor and attended with diligence.
Abigail Adams
UCSF

Appendices

A. Education Community Proposals

B. Kanbar Center for Simulation – Expansion of Facilities Space Needs

C. Designated Academic Areas

D. Perkins Eastman Classroom Portfolio Recommendations

E. Academic Senate Space Committee Reports

F. ESWG Education Space Guidelines

G. Library Education Space Principles

Space Recommendations

- Create an innovative central Education Core to support active-learning and interprofessional pedagogies.
- Expand clinical simulation spaces with comprehensive interprofessional skills and simulation capacities that can accommodate all school and UCSF Health needs.
- Establish designated academic areas for all in clinical buildings in support of the education and research missions of UCSF.
- Revise the portfolio of classroom and class lab spaces to meet modern education requirements. Provide adequate spaces for campus meeting needs.
- Promote a vibrant community to support student life, well-being, and learning on our campus.

Hospital 2030 Facility Sizing

Parnassus Heights Community Planning

June 12, 2020

Summary: UCSF New Hospital Sizing

1. The forecasted growth in population and changes in utilization trends in the bay area will mean a corresponding growth in inpatient admissions
2. High acuity/complex admissions (for example cancer and neurosurgery) will drive a good portion of the inpatient growth. These admissions will be concentrated at a small number of medical centers with the equipment and staff capable of caring for complex patients. These types of cases are critical to the tripartite mission of research, education, and patient care delivered by UCSF.
3. The existing volume of inpatient admissions at UCSF Parnassus are understated due to capacity constraints preventing patient transfers and scheduling of surgical cases. Expansion of inpatient capacity which will allow us to treat these patients, will drive a need for a larger hospital footprint than we have today.

An Evolving Market: Bay Area Population Trends

Substantial population growth is expected in the 9-County Bay Area over the next 5 years

Age Groups	Market 2020 Population	Market 2025 Population	Market Population % Change
00-17	1,591,065	1,619,311	1.78%
18-44	2,912,554	2,890,424	(0.76 %)
45-64	2,057,361	2,140,360	4.03%
65-UP	1,240,545	1,460,621	17.74%
Total	**7,801,525**	**8,110,716**	**3.96 %**

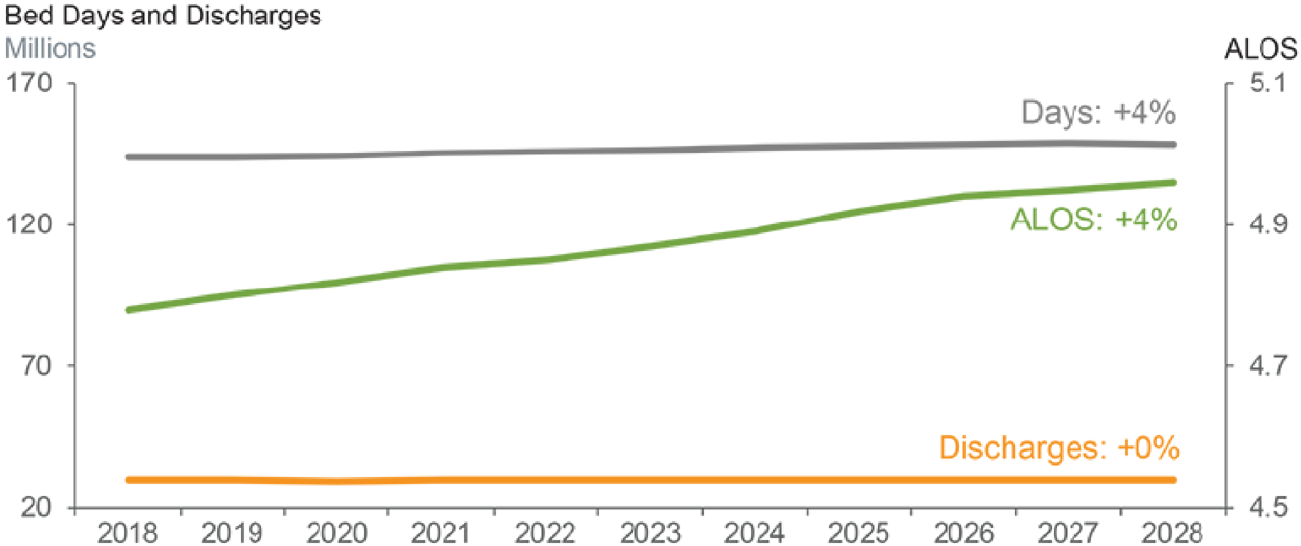
- The Bay Area population has grown steadily over the last 10 years (1% per year); growth is expected to continue at a similar pace.
- According to Claritas, the Bay Area population is expected to grow from an estimated 7.8M in 2020 to 8.1M by 2025.
- Growth is expected to be much greater in the older populations, with 65+ growing almost 18% during this period, much faster than the younger age groups.

Complex Case Length of Stay National Forecast

Demographic changes over the next 10 years, including an increase in national Medicare enrollment will increase the acuity and length of stay of patients seen.

- 31% increase in the Medicare Population over the next 10 years
- Increase in medical complexity of patients coming to the hospital as less complex cases transition to outpatient
- Higher complexity will mean longer length of stay for each admission and greater bed need

Discharges, Total Days and ALOS Forecast
2018–2028



Note: Forecast excludes 0–17 age group. **Sources:** Impact of Change®, 2018; HCUP National Inpatient Sample (NIS). Healthcare Cost and Utilization Project (HCUP) 2015. Agency for Healthcare Research and Quality, Rockville, MD; Claritas Pop-Facts®, 2018; Sg2 Analysis, 2018.

Inpatient Bed Demand at UCSF

Since 2014, UCSF has had significant inpatient volume growth driven by increases in adult complex care. This growth, though significant would have been even higher if adequate capacity was available at UCSF to accept these transfers. The growth of complex care demand is driving the need for additional beds.

Service Line	Cases Parnassus 2019	Medically Appropriate Transfer Cases Turned Away 2019	UCSF Requested volume 2019	Compound Growth Rate 2019-2030	Cases Parnassus 2030	2030 Bed Need	UCSF Compound Historical Growth Rate 2014-2018
Adult Cancer	4,335	63	4,398	0.4%	4,544	136	
Cardiovascular	2,739	257	2,996	3.0%	3,802	113	
Medicine	6,233	111	6,344	2.1%	7,857	194	
Neurosciences	2,059	243	2,302	5.1%	3,546	84	
Orthopedics	1,614	113	1,727	3.5%	2,369	24	
Other	480	166	646	0.0%	480	6	
Surgery	1,273	184	1,457	0.8%	1,385	33	
Transplant	1,913	48	1,961	2.5%	2,508	47	
Spine	1,680		1,680	0.3%	1,730	34	
All Services	22,326	1185	23,511	1.7%	28,221	671	4.30%

- Model assumes a significantly lower compound growth rate through 2030 than UCSF has experienced over the last five years.
- Bed need based on growth from actual volume, rather than total requested volume.

Requested Volume: Medically appropriate transfers requested plus inpatient cases Parnassus.

UCSF Health

UCSF Health

Redefining possible.™

Appendix TRANS
Transportation Appendix

Traffic Operations Considerations

Consistent with the CEQA Guidelines and the *SF Guidelines*, the transportation impact analysis in *Section 4.15, Transportation*, of this EIR analyzes the change in VMT per capita that would result from the implementation of the Comprehensive Parnassus Heights Plan (CPHP or Plan) at the Parnassus Heights campus site. Changes to traffic operations in the study area (i.e., the level of service of project area intersections) and transit operations (e.g. project generated transit ridership and effect on capacity utilization, potential delay to transit vehicles) are outside the scope of the CEQA analysis and are not discussed in *Section 4.15, Transportation*. An analysis of the changes to traffic and transit operations has, however, been completed and is presented below for informational purposes only. This analysis is provided for decision-makers' consideration, independent of the environmental review process.

This appendix describes traffic operations considerations related to the CPHP. The study area and campus site that are the subject of this discussion are shown on **Figure 4.15-1** (see *Section 4.15, Transportation*).

First, local traffic operations during the weekday PM peak period (4:00 PM to 6:00 PM) are discussed, which characterize the time of day when there is the most concentrated demand for travel. The weekday PM peak period analysis is based on existing traffic volumes and Level of Service ("LOS") calculations, as well as traffic volume estimates for Existing Plus CPHP conditions. Next a discussion of local traffic operations during the daytime period (between 7:00 AM and 7:00 PM) is presented to illustrate how operations centered on Parnassus Avenue generally fluctuate over the course of the day, beyond the PM peak hour period. This discussion is based on existing parking garage activity data and Parnassus Avenue vehicle volume data collected between 7:00 AM and 7:00 PM. The local traffic operations sections then inform a discussion of the potential effects of traffic operations on multimodal operations – including for people walking, biking, or taking transit – throughout the day, beyond the PM peak hour period.

This appendix also includes a discussion of cumulative traffic operation conditions, which represent implementation of the CPHP in combination with past, present, and reasonably foreseeable future projects in the vicinity of the campus site. Cumulative volumes were developed based on the San Francisco Chained Activity Model Process (SF-CHAMP) travel demand forecasting model.

Local Traffic Operations – Weekday PM Peak Period (4:00-6:00 PM)

Intersection operating conditions at the 17 intersections shown on **Figure 1** were evaluated during the weekday PM peak period (4:00 PM to 6:00 PM). Twelve of the 17 intersections are located within or immediately adjacent to the campus site on Kirkham Street, Parnassus Avenue, or Irving Street. These intersections were evaluated using the metric Level of Service (“LOS”), which is a qualitative description of driver comfort and convenience. Typical factors that affect motorized vehicle LOS include speed, travel time, traffic interruptions, and freedom to maneuver. This analysis was prepared for informational purposes only, as vehicle delay which is reflected in LOS analysis is no longer considered under CEQA in determining if a project results in significant environmental impacts.

The study intersections were evaluated using the Highway Capacity Manual (HCM) 6th Edition methodology, which is the prevailing standard used throughout the United States and is used in this study. For signalized intersections, this methodology determines the capacity for each lane group approaching the intersection. The LOS is based on average delay (in seconds per vehicle) for the various movements within the intersection. A combined weighted average delay and LOS is presented for the intersection. For unsignalized intersections, operations are defined by the average control delay per vehicle (in seconds per vehicle) for each stop-controlled movement or movement that must yield the right-of-way, and the LOS is determined by the worst (highest average delay) approach. Generally, the delay ranges for each LOS are lower for unsignalized intersections than for signalized intersections because drivers expect less delay at unsignalized intersections. Intersection LOS range from LOS A, which indicates free flow or excellent vehicle flow conditions with short delays, to LOS F, which indicates congested or overloaded vehicle flow conditions with long delays. In San Francisco, LOS A through D have historically been considered acceptable, and LOS E and LOS F have historically been considered unsatisfactory service levels. **Table** below summarizes the relationship between average delay per vehicle and LOS for signalized and unsignalized intersections according to the HCM 6th Edition method.

TABLE 1
INTERSECTION LOS CRITERIA

Description	LOS	Average Control Delay (seconds per vehicle) Unsignalized Intersections	Signalized Intersections
Represents free flow. Individual users are virtually unaffected by others in the traffic stream.	A	≤ 10	≤ 10
Stable flow, but the presence of other users in the traffic stream begins to be noticeable.	B	> 10 to 15	> 10 to 20
Stable flow, but the operation of individual users becomes significantly affected by interactions with others in the traffic stream.	C	> 15 to 25	> 20 to 35
Represents high-density, but stable flow.	D	> 25 to 35	> 35 to 55
Represents operating conditions at or near the capacity level.	E	> 35 to 50	> 55 to 80
Represents forced or breakdown flow.	F	> 50	> 80

SOURCE: *Highway Capacity Manual 6th Edition*, Transportation Research Board of the National Academies of Science, 2017.

--------- Parnassus Heights Campus Boundary

Study Intersections

Figure 1

Parnassus Campus Study Intersections

The PM peak period is generally chosen for study as it represents the time of day when there is the most concentrated demand for travel, which can lead to congested conditions. The *2014 UCSF Long Range Development Plan* (*2014 UCSF LRDP*) analyzed traffic conditions for both the AM peak period and PM peak period. In the existing conditions scenario analyzed under the *2014 UCSF LRDP*, study intersections generally operated similarly – or worse – during the PM peak period compared to the AM peak period; 19 of the 23 study intersections analyzed had the same or worse LOS rating during PM peak period compared to AM peak period. Therefore, the CPHP traffic operation analysis for informational purposes focuses on the PM peak period.

Existing Conditions

Traffic volumes and lane configurations during the PM peak hour for each of the 17 study intersections are shown in **Figure 2**. As shown in **Table 1**, all of the 17 study intersections operate at LOS D or better during the PM peak hour.

TABLE 1
EXISTING PM PEAK HOUR INTERSECTION LEVEL OF SERVICE (LOS)

Intersection	Traffic Control[a]	Delay (seconds)[b]	LOS[c]
1. Kirkham Street / Seventh Avenue	Signal	44	D
2. Kirkham Street / Fifth Avenue	AWS	<10 (<10, SB)	A (A, SB)
3. Judah Street / Seventh Avenue	Signal	22	C
4. Judah Street-Parnassus Avenue / Fifth Avenue	SSS	32 (SB)	D (SB)
5. Parnassus Avenue / Fourth Avenue	AWS	20 (25, WB)	C (D, WB)
6. Parnassus Avenue / Third Avenue	SSS	18 (SB)	C (SB)
7. Parnassus Avenue / Hillway Avenue	SSS	22 (NB)	C (NB)
8. Parnassus Avenue / Medical Center Way / Hill Point Avenue	SSS	17 (NB)	C (NB)
9. Parnassus Avenue / Stanyan Street	Signal	17	B
10.Irving Street / Fourth Avenue	Signal	16	B
11. Irving Street / Second Avenue	AWS	<10 (<10, WB)	A (A, WB)
12. Irving Street / Arguello Boulevard	SSS	24 (NB)	C (NB)
13. Lincoln Way / Seventh Avenue	Signal	23	C
14. Lincoln Way / Fourth Avenue	SSS	17 (NB)	C (NB)
15. Johnstone Drive / Clarendon Avenue	SSS	12 (SB)	B (SB)
16. Clayton Street / 17th Street	Signal	46	D
17. Oak Street-Fell Street-Kezar Drive / Stanyan Street	Signal	35	D

a AWS = All-way stop controlled; SSS = Side Street stop controlled; Signal = Signal controlled
b Delay reported as seconds per vehicle. For signalized intersections, a combined weighted average delay for the various movements within the intersection is reported. For SSS intersections, the highest average delay for an approach is reported. For AWS intersections, the combined weighted average delay of the intersection is reported, followed by the highest average delay for an approach (indicated in parentheses).
c For signalized intersections, LOS based on average intersection delay, based on the methodology in the *Highway Capacity Manual*, 2000. For SSS intersections, LOS is based on the worst approach. For AWS intersections, LOS is based on average intersection delay, and the LOS based on the worst approach is presented in parentheses.
Source: Fehr & Peers, 2020.

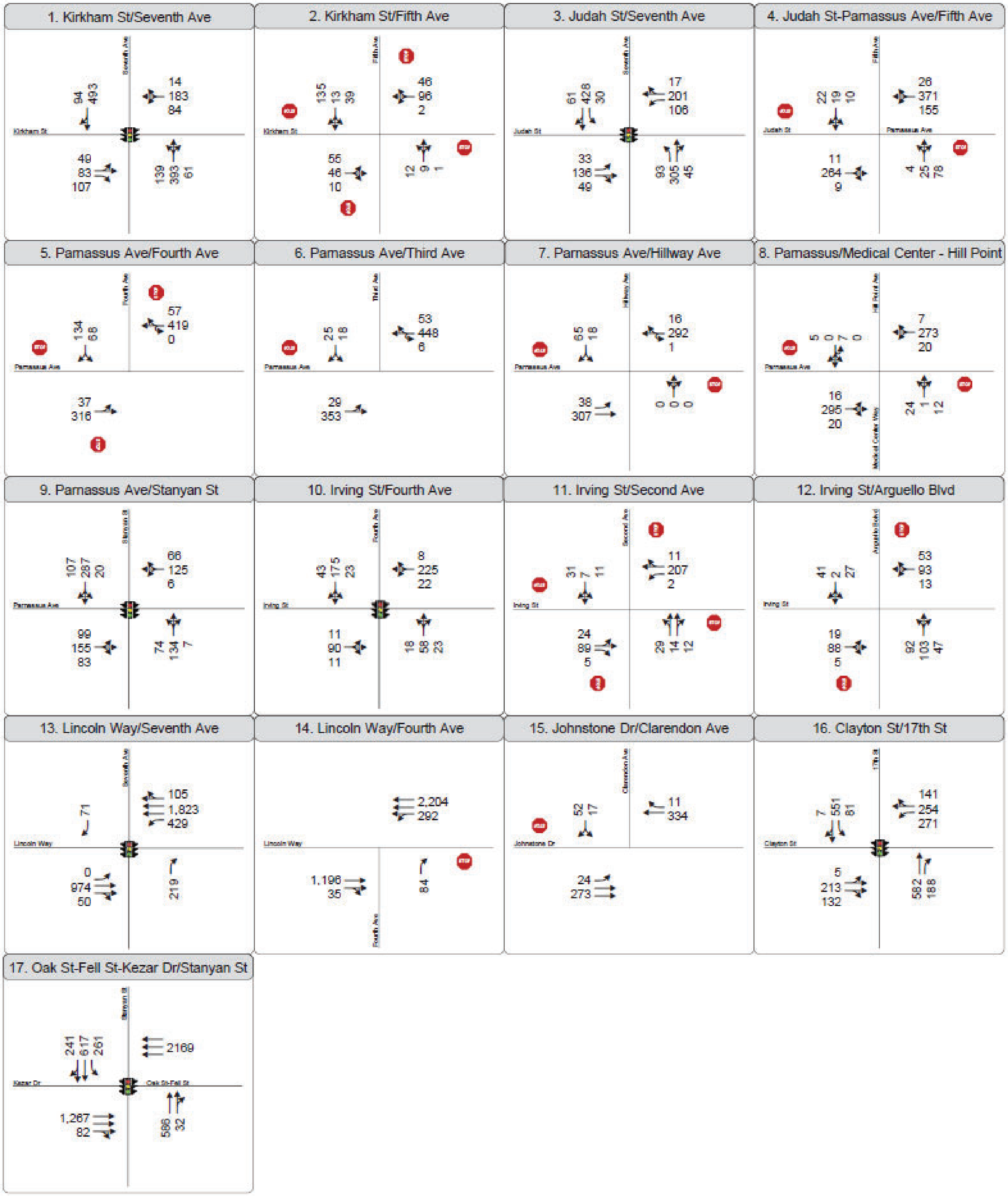


Figure 2

PM Peak Hour Traffic Volumes and Lane Configurations

Existing Plus CPHP Conditions

In order to estimate intersection turning movement volumes associated with the CPHP, a trip assignment analysis was conducted based on the travel demand estimates described in *Section 4.15, Transportation* (see "Travel Demand Estimates" section). Table 2 presents a comparison of daily and PM peak hour vehicle trips associated with the campus site under existing conditions and those associated with full implementation of the CPHP. As part of this analysis, vehicle trips associated with the CPHP were assigned to specific routes they would likely take to and from the campus site during the weekday PM peak hour. Vehicle trips were assigned to roadways and intersection turning movements according to the trip distribution percentages identified in **Table 4.15-13** and based on local knowledge, historical traffic counts, and garage entry/exit counts conducted in October 2018. The CPHP trip assignment analysis was used to determine existing plus project trips by intersection turning movement, which are shown on **Figure 3**.

TABLE 2. EXISTING CONDITIONS (PARNASSUS HEIGHTS CAMPUS) AND CPHP (FUTURE PHASE) DAILY AND PEAK HOUR VEHICLE TRIPS

Population Group	Existing Conditions		CPHP (Future Phase)	
	Daily	PM Peak	Daily	PM Peak
Faculty/Staff/Students	6,400	1,100	10,600	1,900
Patient/Visitor	7,900	700	16,500	1,200
Residents	500	100	1,700	300
Total[1]	**14,900**	**1,900**	**28,800 (+95%)**	**3,400 (+75%)**

Notes:
1. Percentages presented in parentheses represent the percent change between existing conditions and full buildout of the CPHP.

Based on the 'Existing plus CPHP' analysis, the number of vehicles and delay, particularly on Parnassus Avenue will increase during the PM peak hour. For example, for the five study intersections on Judah Street-Parnassus Avenue between Fifth Avenue and Medical Center Way, total traffic volumes are expected to increase by approximately 50 percent between the 'Existing' and 'Existing plus CPHP' scenarios. As presented in **Table 3** below, five of these 17 study intersections are expected to operate at LOS F, which is traditionally considered unsatisfactory, under 'Existing plus CPHP' conditions:

- Kirkham Street/Seventh Avenue
- Judah Street-Parnassus Avenue/Fifth Avenue
- Parnassus Avenue/Fourth Avenue
- Parnassus Avenue/Third Avenue
- Parnassus Avenue/Hillway Avenue

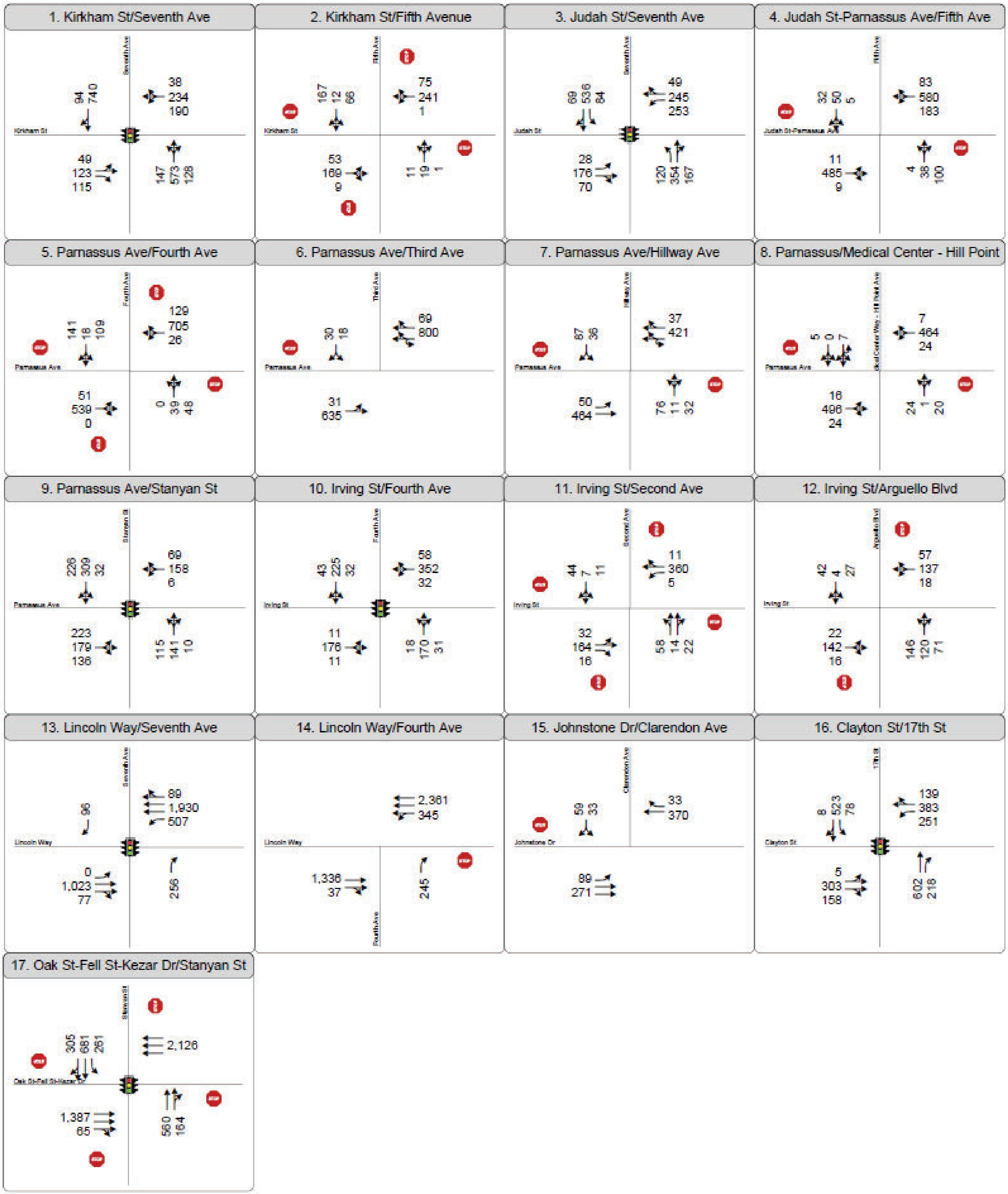


Figure 3

'Existing Plus CPHP' Peak Hour Turning Movement Volumes

TABLE 3
EXISTING PLUS CPHP PM PEAK HOUR INTERSECTION LEVEL OF SERVICE (LOS)

Intersection	Traffic Control[a]	Delay (seconds)[b]	LOS[c]
1. Kirkham Street / Seventh Avenue	Signal	>80	F
2. Kirkham Street / Fifth Avenue	AWS	11 (11, WB)	B (B, WB)
3. Judah Street / Seventh Avenue	Signal	34	C
4. Judah Street-Parnassus Avenue / Fifth Avenue	SSS	>50 (SB)	F (SB)
5. Parnassus Avenue / Fourth Avenue	AWS	>50 (>50, WB)	F (F, WB)
6. Parnassus Avenue / Third Avenue	SSS	>50 (SB)	F (SB)
7. Parnassus Avenue / Hillway Avenue	SSS	>50 (F)	F (NB)
8. Parnassus Avenue / Medical Center Way / Hill Point Avenue	SSS	25 (NB)	C (NB)
9. Parnassus Avenue / Stanyan Street	Signal	40	D
10. Irving Street / Fourth Avenue	Signal	19	B
11. Irving Street / Second Avenue	AWS	<10 (11, WB)	A (B, WB)
12. Irving Street / Arguello Boulevard	SSS	44 (NB)	E (NB)
13. Lincoln Way / Seventh Avenue	Signal	26	C
14. Lincoln Way / Fourth Avenue	SSS	26 (NB)	D (NB)
15. Johnstone Drive / Clarendon Avenue	SSS	14 (SB)	B (SB)
16. Clayton Street / 17th Street	Signal	49	D
17. Oak Street-Fell Street-Kezar Drive / Stanyan Street	Signal	47	D

a AWS = All-way stop controlled; SSS = Side Street stop controlled; Signal = Signal controlled
b Delay reported as seconds per vehicle. For signalized intersections, a combined weighted average delay for the various movements within the intersection is reported. For SSS intersections, the highest average delay for an approach is reported. For AWS intersections, the combined weighted average delay of the intersection is reported, followed by the highest average delay for an approach (indicated in parentheses).
c For signalized intersections, LOS based on average intersection delay, based on the methodology in the *Highway Capacity Manual*, 2000. For SSS intersections, LOS is based on the worst approach. For AWS intersections, LOS is based on average intersection delay, and the LOS based on the worst approach is presented in parentheses.
.

Source: Fehr & Peers, 2020.

The intersections that are expected to operate at LOS F during the PM peak hour are largely in the western portion of Parnassus Avenue that runs through the campus between Third Avenue and Fifth Avenue. The future intersection of Parnassus Avenue-Hillway Avenue and the New Hospital loading loop, and the Seventh Avenue/Kirkham Street intersection just outside the campus site are also expected to operate at LOS F with implementation of the project.

Most of the intersections with other streets on Parnassus Avenue are side-street stop-controlled intersections; only the intersection of Fourth Avenue currently requires vehicles to stop while traveling on Parnassus Avenue itself. However, there are also two traffic signals at the pedestrian crosswalks on Parnassus Avenue across from the Millberry Union and Moffitt Hospital which require vehicles to occasionally stop when the crossing button is actuated by a waiting pedestrian on either side of the street. Although vehicles occasionally need to stop at these crosswalks, they are not treated as intersections for the purpose of this analysis, because there is not a side-street that connects into the street. Vehicle delay at the side-street stop-controlled intersections along Parnassus Avenue (at Fifth Avenue and Third Avenue) occurs primarily on the side-street intersection approaches, due to lack of gaps in major street traffic. While additional delay is likely to occur at these intersections with the CPHP, including on Parnassus Avenue itself, the magnitude of potential reduction in average vehicle travel speeds on Parnassus Avenue is not perfectly captured and conveyed by the intersection LOS results, which report side-street delay. In addition, given the challenge of finding gaps in Parnassus Avenue traffic in which they can proceed at these intersections, drivers may proactively avoid these approaches in an effort to reduce their delay. This would, in turn, affect vehicle delay estimates at these intersections as traffic shifts elsewhere.

At Parnassus Avenue/Fourth Avenue, vehicles are delayed by design at each of the stop-controlled approaches. This, however, has the effect of providing gaps in Parnassus Avenue traffic for drivers on Fourth Avenue approaches to proceed. With the design and implementation of the extension of Fourth Avenue, UCSF will further study the tradeoffs and feasibility of installing a traffic signal at this location. Installation of a traffic signal would require coordination with the SFMTA.

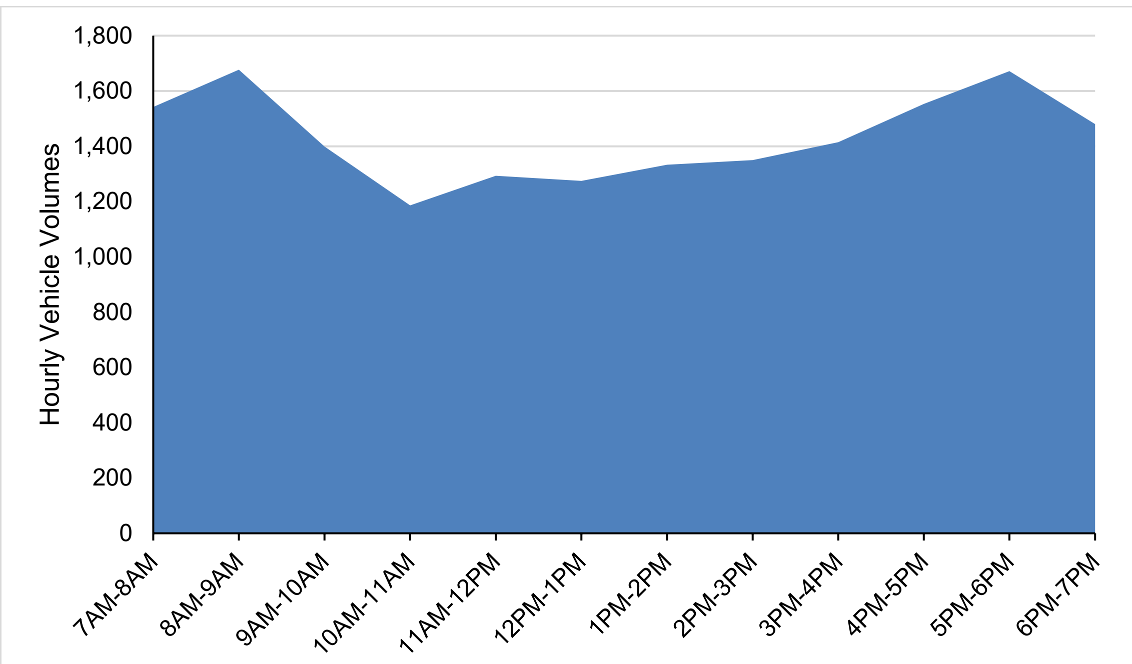
Side-street delay is also anticipated to increase at the future intersection of Parnassus Avenue-Hillway Avenue and the New Hospital loading loop, with the most delay expected for vehicles exiting the proposed hospital loading loop. With the design and future environmental study related to the New Hospital, UCSF will further study the tradeoffs and feasibility of installing a traffic signal at this location. Installation of a traffic signal would require coordination with the SFMTA.

Average delay is expected to increase at Seventh Avenue/Kirkham Street, specifically on the northbound and westbound approaches, where project-generated vehicle trips would be added during the PM peak.

Local Traffic Operations – Daytime Period (7:00 AM-7:00 PM)

The previous section, *Local Traffic Operations – Weekday PM Peak Period*, summarizes traffic conditions during the weekday PM peak period, and compares Existing and Existing plus CPHP conditions, using traffic volumes, vehicle delay, and LOS calculations. The traffic volumes analyzed above represent the most detailed forecast traffic volumes developed as part of this study. In contrast, this section draws upon intersection counts at two intersections on Parnassus Avenue and existing parking garage activity data (which serves as a reasonable proxy for demand for travel to/from the campus site), both over the course of the weekday between 7:00 AM and 7:00 PM.

Figure 4 presents the relative total hourly intersection turning movements for the two campus "gateway" intersections on Parnassus Avenue,[1] which represent both UCSF and non-UCSF-related travel and provide a general indication of vehicle activity on Parnassus Avenue throughout the day. **Figure 4** illustrates that volumes on Parnassus Avenue are greater during the AM and PM peak hours and relatively constant during the midday period between the two peak hour periods. During the 10:00 AM-3:00 PM period, total vehicle volumes on Parnassus Avenue are approximately 20 percent less compared to the PM peak hour.



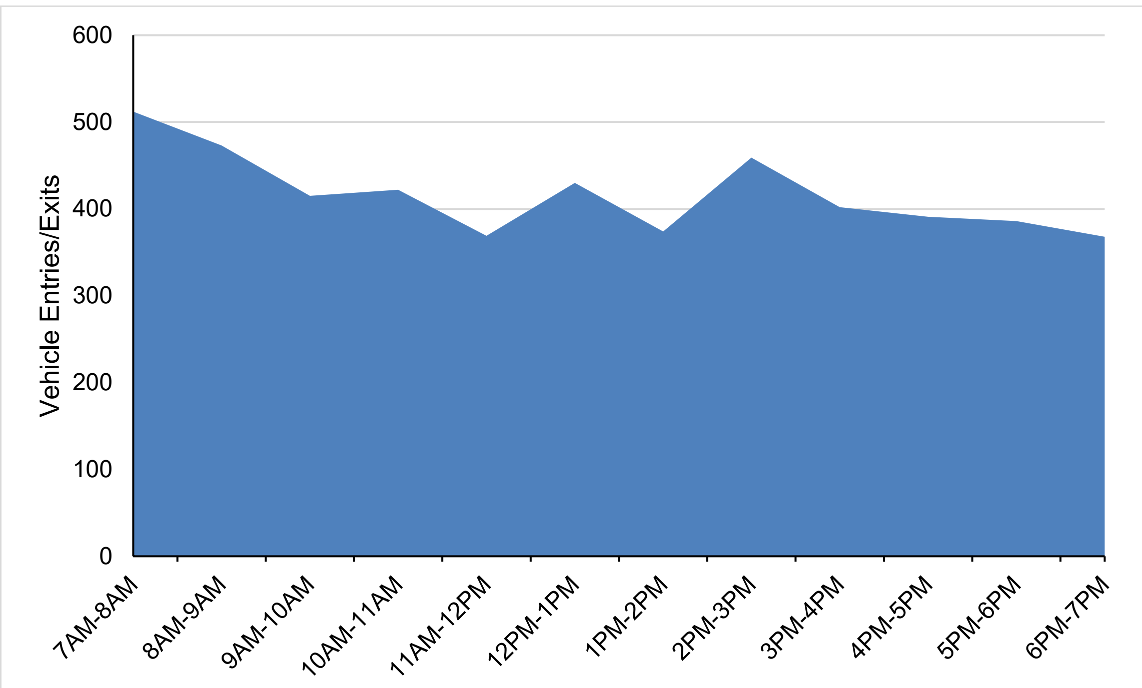
SOURCE: Fehr & Peers, 2020.

Figure 4
Existing Hourly Vehicle Volumes – Parnassus Avenue (Intersection Turning Movements)

[1] Data was collected at the Judah Street-Parnassus Avenue/Fifth Avenue and Parnassus Avenue/Medical Center Way/Hill Point Avenue intersections as part of the *UCSF LRDP Monitoring – Parnassus Gateway Counts Summary* in Fall 2018.

Vehicle volumes on Irving Street were not collected throughout the day; however, based on an understanding of general traffic patterns in the area, vehicle volumes on Irving Street are likely to follow a similar pattern as Parnassus Avenue, with more “peaking” (i.e., greater vehicle volumes during the AM and PM peak period compared to the midday period between the two peak periods).

While vehicle volumes on Parnassus Avenue are generally lower during the midday period compared to the AM and PM peak periods, the campus site generates steady demand for travel over the course of the weekday, as opposed to being concentrated during commute periods only. To this point, **Figure 5** below summarizes vehicle in/out data for the Medical Building 1 and Millberry Union garages, which shows that garage activity is relatively constant throughout the day. The greater concentration of activity between 7:00 AM-8:00 AM is mostly related to faculty/staff arrivals into the Medical Building 1 garage, and represents approximately 30 percent higher activity than during the PM peak hour period. Later in the day, between 9:00 AM-3:00 PM garage in/out activity is relatively constant, with a peak between 2:00 PM-3:00 PM, which represents approximately 20 percent higher activity than during the PM peak hour period. Garage in/out activity is then relatively constant from 3:00 PM until 7:00 PM.



SOURCE: Fehr & Peers, 2020

Figure 5
Medical Building 1 and Millberry Union Garages – Existing Hourly Vehicle Entries/Exits

In the future, with implementation of the CPHP, UCSF populations are expected to travel to/from the campus site during similar time periods as existing conditions. Therefore, while vehicle activity is expected to increase with implementation of the CPHP, increased vehicle activity would occur throughout the day with a similar pattern as existing conditions.

In terms of vehicle circulation and access, vehicles using Medical Building 1 garage, which mainly serves faculty and staff and valet services, access the garage using Irving Street. Vehicles using Millberry Union garage, which mainly serves patients and visitors, as well as some staff after 2:00 PM, can access the garage from both Irving Street and Parnassus Avenue. Approximately 70 percent of vehicles accessing the Millberry Union garage do so via Parnassus Avenue. In the future, with implementation of the CPHP, vehicles are expected to access the two garages similar to existing conditions since the garage access points and travel patterns to/from campus are expected to remain the same. In addition, a new proposed passenger loading facility in the Millberry Union garage is proposed in the CPHP and would be accessed via Parnassus Avenue and the existing garage ramps.

In summary, **Figure 5** illustrates that total vehicle volumes on Parnassus Avenue are greater during the AM and PM peak hours and approximately 20 percent lower during the 10:00 AM-3:00 PM period. However, UCSF-related vehicle activity is approximately 20 percent higher during that same period, compared to the PM peak hour (see **Figure 4**), and any increase in vehicle activity associated with the CPHP is expected to follow a similar pattern. This study does not include a quantitative analysis of the 'Existing plus CPHP' scenario throughout the day; the *Local Traffic Operations – Weekday PM Peak Period* section, analyzes the 'Existing plus CPHP' scenario during the PM peak hour only. However, using the discussion related to **Figure 4** and **Figure 5** as a proxy, the relationship between traffic conditions during the PM peak hour and throughout the rest of the day, is expected to be generally similar under both Existing and 'Existing plus CPHP' conditions.

Potential Effects of Traffic Operations on Multimodal Operations

The CPHP would result in more vehicles at the campus site throughout the day, traveling more slowly, as described in the "Existing Plus CPHP Conditions" and "Local Traffic Operations – Daytime Period" sections above. To the degree to which the CPHP is unable to accommodate vehicle trips in off-street parking and/or passenger loading facilities as described in the "Approach to Analysis" section of the Transportation Section, vehicle queues – or people circling for parking (on-street or in garages) – may periodically:

- Result in transit delay on Parnassus Avenue (6 Haight/Parnassus, 43 Masonic) and Irving Street (N Judah)
- Reduce accessibility by blocking multimodal transportation facilities, such as crosswalks, bicycle lanes, and/or transit stops

With implementation of the CPHP, the campus site would have both more locations and capacity for passenger loading to occur, than it presently does. Specifically, the location of new loading areas off Parnassus Avenue like the new extension of Fourth Avenue, the New Hospital loading loop, and the proposed passenger loading facility in the Millberry Union garage are described in *Section 4.15, Transportation* (see description of roadway network changes in "Impact TRANS-3" section). These locations present opportunities for vehicles to exit the travel lane in a designated location in order for passengers to enter and exit near their destinations. However, UCSF cannot guarantee that drivers will follow the California Vehicle Code in a consistent manner, exiting the travel lane, and not blocking crosswalks, bicycle lanes, and delaying access to transit stops by transit vehicles when picking up and dropping off passengers. Further, although passenger loading supply for the campus site is expected to be greater than demand for most of the day, there may be peak passenger travel periods where demand, either for the campus site overall, or for specific locations is greater than supply. During these periods there would be a higher chance of delay to transit or a reduction in access to transportation facilities. See the “Loading Demand” section in *Section 4.15, Transportation* for descriptions of anticipated passenger loading demand and passenger loading supply with implementation of the CPHP.

Cumulative Conditions

Future year cumulative traffic volumes were developed in order to assess the long-term cumulative effects of the CPHP in combination with projected development within San Francisco and the rest of the Bay Area as well as expected implementation of planned transportation infrastructure and transit service projects. The CPHP would be implemented over a 30-year horizon, meaning it is expected to be complete around year 2050. For future year cumulative analyses, intersection traffic volumes are derived from outputs from the current version of the San Francisco County Transportation Authority’s travel demand forecasting model (SF-CHAMP Model), which is used consistently for transportation planning studies in San Francisco. The current future year version of the model represents year 2040 conditions. The CPHP is expected to extend beyond this period, however there are no identified or reasonably foreseeable projects that would begin and conclude during the period between 2040 and 2050 that should be included in the analysis. SF-CHAMP’s current future model year therefore represents an appropriate comparison for cumulative conditions.

SF-CHAMP divides San Francisco into 981 transportation analysis zones (TAZs). It also includes about 1,260 additional TAZs outside of San Francisco, for which it uses the same geography as the current Metropolitan Transportation Commission (MTC) travel demand forecasting model. Five TAZs in SF-CHAMP encompass the Parnassus Heights campus site and its immediately adjacent areas.[2]

For each TAZ, SF-CHAMP estimates the travel demand based on TAZ population and employment assumptions developed by the Association of Bay Area Governments (ABAG). Within San Francisco, the Planning Department is responsible for allocating ABAG’s countywide growth forecast to each TAZ for the future cumulative year model, based upon existing zoning and approved plans, using an area’s potential zoning capacity, and the anticipated extent of redevelopment of existing uses.

Regional travel demand models such as SF-CHAMP are designed to be able to represent city-wide and regional trends and do not directly provide intersection turning movement volumes. Instead, the SF-CHAMP model provides traffic volume growth between existing (in this case, 2015, which represents the most recently available “base year” travel model scenario) and future years that can then be added to existing turning movement volumes collected in the field in a

2 These include TAZs 226, 227, 545, 546 and 547.

process that involves engineering judgment, past experience, and knowledge of the transportation characteristics of the study area. The resulting cumulative turning movement volumes can then be used as input to traffic analysis software to evaluate future intersection and turning movement operations.

Cumulative traffic conditions peak hour turning movement volumes are shown on **Figure 6**. LOS results for cumulative conditions are presented in **Table 4** and show that six out of the 17 study intersections are expected to operate at LOS F, which is traditionally considered unsatisfactory, under cumulative conditions:

- Kirkham Street / Seventh Avenue
- Judah Street-Parnassus Avenue / Fifth Avenue
- Parnassus Avenue / Fourth Avenue
- Parnassus Avenue / Third Avenue
- Parnassus Avenue / Hillway Avenue
- Irving Street / Arguello Boulevard

Cumulative traffic conditions are similar to the ‘Existing Plus CPHP,’ which reflects that the CPHP would be implemented over a 30-year horizon, and that there are no other identified projects proposed in the vicinity of the study area. However, the results are not exactly the same as the cumulative condition reflects growth in travel in the city and region, beyond the immediate study area, whereas the ‘Existing plus CPHP’ conditions only account for growth in travel due to the CPHP.

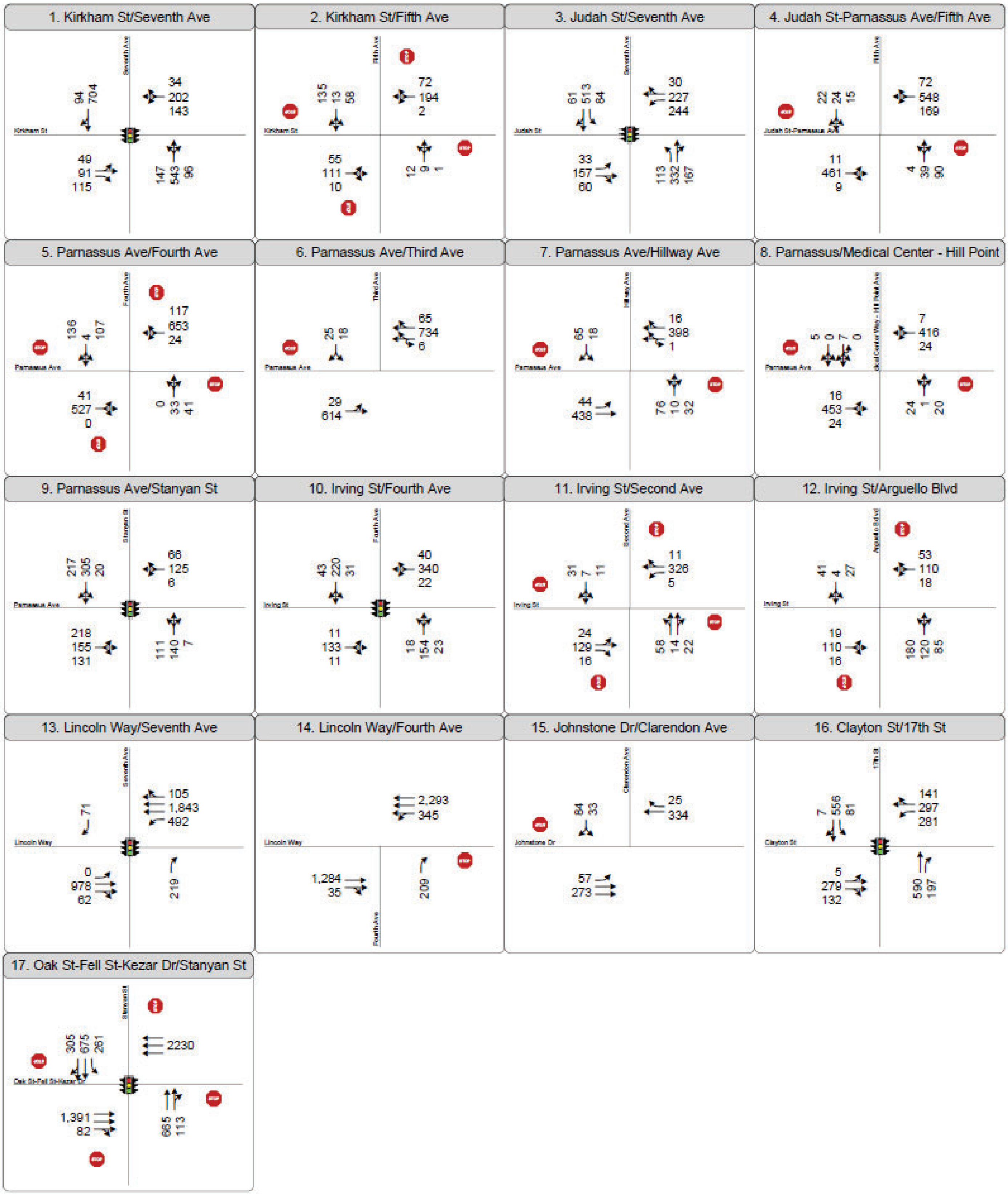


Figure 6

'Cumulative' Peak Hour Turning Movement Volumes

TABLE 4
CUMULATIVE PM PEAK-HOUR INTERSECTION LEVEL OF SERVICE (LOS)

Intersection	Traffic Control[a]	Delay (seconds)[b]	LOS[c]
1. Kirkham Street / Seventh Avenue	Signal	>80	F
2. Kirkham Street / Fifth Avenue	AWS	13 (14, WB)	B (B, WB)
3. Judah Street / Seventh Avenue	Signal	43	D
4. Judah Street-Parnassus Avenue / Fifth Avenue	SSS	>50 (SB)	F (SB)
5. Parnassus Avenue / Fourth Avenue	AWS	>50 (>50, WB)	F (F, WB)
6. Parnassus Avenue / Third Avenue	SSS	44 (SB)	E (SB)
7. Parnassus Avenue / Hillway Avenue	SSS	>50 (>50, NB)	F (NB)
8. Parnassus Avenue / Medical Center Way / Hill Point Avenue	SSS	27 (NB)	D (NB)
9. Parnassus Avenue / Stanyan Street	Signal	62	E
10. Irving Street / Fourth Avenue	Signal	19	B
11. Irving Street / Second Avenue	AWS	12 (14, WB)	B (B, WB)
12. Irving Street / Arguello Boulevard	SSS	>50 (NB)	F (NB)
13. Lincoln Way / Seventh Avenue	Signal	29	C
14. Lincoln Way / Fourth Avenue	SSS	41 (NB)	E (NB)
15. Johnstone Drive / Clarendon Avenue	SSS	16 (SB)	C (SB)
16. Clayton Street / 17th Street	Signal	51	D
17. Oak Street-Fell Street-Kezar Drive / Stanyan Street	Signal	45	D

a AWS = All-way stop controlled; SSS = Side Street stop controlled; Signal = Signal controlled
b Delay reported as seconds per vehicle. For signalized intersections, a combined weighted average delay for the various movements within the intersection is reported. For SSS intersections, the highest average delay for an approach is reported. For AWS intersections, the combined weighted average delay of the intersection is reported, followed by the highest average delay for an approach (indicated in parentheses).
c For signalized intersections, LOS based on average intersection delay, based on the methodology in the *Highway Capacity Manual*, 2000. For SSS intersections, LOS is based on the worst approach. For AWS intersections, LOS is based on average intersection delay, and the LOS based on the worst approach is presented in parentheses.

Source: Fehr & Peers, 2020.

Appendix WSE
Water Supply Evaluation

FINAL REPORT

University of California San Francisco Comprehensive Parnassus Heights Plan Water Supply Evaluation

PREPARED FOR

University of California San Francisco

JUNE 2020

WEST YOST ASSOCIATES

FINAL REPORT | JUNE 2020

Comprehensive Parnassus Heights Plan Water Supply Evaluation

Prepared for

University of California San Francisco

Project No. 712-60-20-06

REGISTERED PROFESSIONAL ENGINEER
JAMES P. CONNELL
No. 63052
Exp. 6-30-20
CIVIL
STATE OF CALIFORNIA

	June 11, 2020
Project Manager: James P. Connell, PE	Date
	June 11, 2020
QA/QC Review: Elizabeth T. Drayer, PE	Date

WEST YOST ASSOCIATES

Concord

1001 Galaxy Way, Suite 310
Concord, CA 95420
(925) 949-5800

Davis

2020 Research Park Drive, Suite 100
Davis, CA 95618
(530) 756-5905

Eugene

1650 W 11th Ave. Suite 1-A
Eugene, OR 97402
(541) 431-1280

Irvine

6 Venture, Suite 290
Irvine, CA 92618
(949) 517-9060

Phoenix

4505 E Chandler Boulevard, Suite 230
Phoenix, AZ 85048
(602) 337-6110

Pleasanton

6800 Koll Center Parkway, Suite 150
Pleasanton, CA 94566
(925) 426-2580

Portland

5 Centerpointe Drive, Suite 130
Lake Oswego, OR 97035
(503) 451-4500

Sacramento

8950 Cal Center Drive, Bldg. 1, Suite 363
Sacramento, CA 95826
(916) 306-2250

San Diego

11939 Rancho Bernardo Road Suite 100
San Diego, CA 92128
(858) 505-0075

Santa Rosa

2235 Mercury Way, Suite 105
Santa Rosa, CA 95407
(707) 543-8506

Table of Contents

List of Tables

List of Figures

List of Appendices

List of Acronyms and Abbreviations

AF	Acre-feet
BARDP	Bay Area Regional Desalination Project
BAWSCA	Bay Area Water Supply and Conservation Agency
BDPLs	Bay Division Pipelines
DWR	California Department of Water Resources
CEQA	California Environmental Quality Act
City	City of San Francisco
WSE Study	Water Supply Evaluation Study
Cordilleras MWC	Cordilleras Mutual Water Company
DSS Model	Demand Management Decision Support System Model
EIR	Environmental Impact Report
ETo	Evapotranspiration
FY	Fiscal Year
gpm	Gallons Per Minute
Groveland CSD	Groveland Community Services District
HTWTP	Harry Tracy Water Treatment Plant
ISG	Individual Supply Guarantees
MAWA	Maximum Applied Water Allowance
MG	Million gallons
mgd	Million gallons per day
MG/yr	Million gallons per year
MWELO	Model Water Efficient Landscape Ordinance
MID	Modesto Irrigation District
RWQCB	Regional Water Quality Control Board

R&D	Research & Development
SFPUC	San Francisco Public Utilities Commission
SB 221	Senate Bill 221
SB 610	Senate Bill 610
RWS	SFPUC Regional Water System
sf	Square feet
SWRCB	State Water Resources Control Board
SVWTP	Sunol Valley Water Treatment Plant
SMP	Surface Mining Permit
SGMA	Sustainable Groundwater Management Act
TID	Turlock Irrigation District
USEPA	U.S. Environmental Protection Agency
UWMP	Urban Water Management Plan
WSAP	Water Shortage Allocation Plan
WSCP	Water Shortage Contingency Plan
WSA	Water Supply Assessment
WSIP	Water System Improvement Program
WBSD	West Bay Sanitary District
West Yost	West Yost Associates

EXECUTIVE SUMMARY

The purpose of this Water Supply Evaluation (WSE) is to perform an evaluation of the availability and reliability of water supplies to serve existing facilities and future planned development that is proposed under the University of California San Francisco (UCSF) Comprehensive Parnassus Heights Plan (CPHP or Plan) at the Parnassus Heights campus site. This evaluation is based on existing UCSF water demands at the Parnassus Heights campus site, water use trends, projected water demands for the future planned development under the CPHP and available water supplies from the San Francisco Public Utilities Commission (SFPUC).

The CPHP would modify the UCSF 2014 Long Range Development Plan (LRDP) by providing a long-term development framework for the revitalization of the Parnassus Heights physical environment and is intended to ensure that a modernized Parnassus Heights campus enhances UCSF's status as an anchor institution in the City of San Francisco (City). This WSE was prepared in support of the CPHP.

Projected Water Demands

The existing Parnassus Heights campus site water demand is approximately 0.33 million gallons per day (mgd) (FY 2018/2019 data). The net increase in water demand for both the Initial Phase and Future Phase of the CPHP is projected to be 0.20 mgd. With this projected increase in water demand, the total future water demand for the Parnassus Heights campus site is projected to be approximately 0.53 mgd. This projected water demand conservatively does not take into consideration ongoing projects by UCSF to reduce water demands at the Parnassus Heights campus site. Over the past ten years, potable water demand at the Parnassus Heights campus site has decreased from a maximum of 0.56 mgd in FY 2010/11 to a minimum of 0.31 mgd in FY 2016/17 as a result of the UCSF Water Action Plan. With full implementation of the ongoing water conservation projects, UCSF staff estimate UCSF can reduce existing FY 2018/19 water demand by about 20 percent, not including the proposed project.

Water Supply Availability and Reliability

As discussed in this WSE, UCSF purchases all of its water supplies from the SFPUC. UCSF is an in-City Retail Customer of the SFPUC. According to the 2015 UWMP for the City and County of San Francisco, prepared by SFPUC (SFPUC 2015 UWMP), SFPUC does not anticipate any water supply shortage during Normal water years through 2040. However, SFPUC does expect water shortages for Single Dry and Multiple Dry water years through 2040. During Single Dry and Multiple Dry water years, SFPUC expects to meet the water supply shortfalls through implementation of its Water Shortage Contingency Plan, as described in the SFPUC 2015 UWMP.

The reliability of SFPUC's water supplies is impacted by the SFPUC's Water System Improvement Plan (WSIP) and the Water Shortage Allocation Plan (WSAP). The WSIP aims to meet customer water needs in non-drought and drought conditions through the completion of defined improvements to the Regional Water System (RWS) that improve seismic, delivery, water quality, and water supply reliability for the RWS. The WSAP outlines the reductions in water allocated to wholesale and retail customers that would occur if SFPUC declares a water shortage emergency.

As discussed in this WSE, greater shortfalls may be possible as a result of the 2018 amendments to the Water Quality Control Plan for the San Francisco Bay/Sacramento-San Joaquin Delta Estuary (Bay-Delta Plan Amendment) requiring additional water demand reductions in Dry Years.

With full implementation of the Bay-Delta Plan Amendment, water supplies for in-City retail customers could be curtailed by up to approximately 50 percent. Given that the Parnassus Heights includes a variety of medical uses, and the SFPUC General Manager has some discretion in allocating Dry Year demand reductions, the SFPUC rationing during periods of drought may not be as severe for Parnassus Heights as for other retail customers.

In 2019, SFPUC updated the water supply availability and reliability findings of the 2015 UWMP considering the potential impacts of the Bay-Delta Plan Amendment on future SFPUC supply availability and reliability projections. These potential impacts are discussed in Section 7 of this WSE (see Appendix A for SFPUC's updated water supply availability and reliability projections).

Based on the technical analyses described in this WSE and the SFPUC 2015 UWMP, as modified by updated SFPUC water supply availability and reliability projections, this WSE finds that the increase in potable water demands for the Parnassus Heights campus site upon implementation of the CPHP would not be so large as to affect the ability of the SFPUC to meet demand with existing and planned supplies during Normal, Single Dry, and Multiple Dry years through 2040, which is the farthest year of analysis included in the SFPUC 2015 UWMP.

1.0 INTRODUCTION

The UCSF 2014 LRDP outlines projected development levels and patterns for UCSF at all of its main campus sites through the year 2035. The 2014 LRDP Final EIR (FEIR) was certified by the Regents in November 2014 and includes, among other things, analysis of the potential environmental impacts from then-envisioned development at the Parnassus Heights campus site.

Since the adoption of the 2014 LRDP and certification of the 2014 LRDP FEIR, UCSF undertook a planning process to re-envision and revitalize the Parnassus Heights campus site as a whole, to integrate UCSF's clinical, educational, and research missions in ways that promote collaboration and synergies in the UCSF Parnassus Heights campus community. The planning process resulted in the development of the CPHP, which provides a long-term development framework for the revitalization of the Parnassus Heights physical environment. In addition, it is intended to ensure that a modernized Parnassus Heights enhances UCSF's status as an anchor institution in San Francisco. This WSE was prepared in support of the CPHP.

1.1 Legal Requirement for Completion of a Water Supply Assessment

California Senate Bill 610 (SB 610) amended state law, effective January 1, 2002, to improve the link between information on water supply availability and certain land use decisions made by cities and counties. SB 610 sought to promote more collaborative planning between local water suppliers and cities and counties. The statute requires detailed information regarding water availability to be provided to the city and county decision-makers prior to approval of specified large development projects. The purpose of this coordination is to ensure that prudent water supply planning has been conducted, and that planned water supplies are adequate to meet existing demands, anticipated demands from approved projects and tentative maps, and the demands of proposed projects.

SB 610 amended California Water Code sections 10910 through 10915 (inclusive) to require land use lead agencies to:

- Identify any public water purveyor that may supply water for a proposed development project; and
- Request a WSA from the identified water purveyor.

The purpose of a WSA is to demonstrate the sufficiency of the purveyor's water supplies to satisfy the water demands of the proposed development, while still meeting the water purveyor's existing and planned future uses. Water Code sections 10910 through 10915 delineate the specific information that must be included in the WSA.

Although the SB 610 requirements do not specifically apply to UCSF, because it is not a city or a county, UCSF has voluntarily elected to prepare a WSA-like document, a WSE, to determine and demonstrate the sufficiency of the SFPUC's water supplies to satisfy the water demand of the planned development at the Parnassus Heights campus site under the 2014 LRDP and CPHP.

The SFPUC prepared an UWMP for the City and County of San Francisco in 2015[1], which evaluated the projected water demands, including demands for UCSF, and available water supplies for the City and County.

1.2 Water Supply Evaluation Purpose, Format and Organization

The purpose of this WSE is to perform an evaluation of the availability and reliability of water supplies to serve development completed to date, future planned development under the UCSF 2014 LRDP, and the future planned development under the CPHP, based on existing UCSF water demands, water use trends, and available water supplies from the City.

Evaluation criteria and assumptions used for this WSE are consistent with those used by SFPUC in the 2015 UWMP. Furthermore, this WSE has been prepared and organized to parallel and be consistent with the requirements for a WSA per Water Code sections 10910 through 10915, such that this evaluation provides a comprehensive and up-to-date evaluation of the availability and reliability of water supplies to serve the planned development.

This WSE includes the following sections:

- Section 1: Introduction
- Section 2: Description of Proposed Project
- Section 3: Required Determinations
- Section 4: SFPUC Water System
- Section 5: SFPUC Water Demands
- Section 6: SFPUC Water Supplies
- Section 7: Water Supply Reliability
- Section 8: Determination of Water Supply Sufficiency Based on Requirements of SB 610
- Section 9: References

Relevant citations of Water Code sections 10910 through 10915 are included throughout this WSE in italics to demonstrate consistency with the specific requirements of SB 610.

The purpose of this WSE is not to reserve water, or to function as a "will serve" letter or any other form of commitment to supply water (see Water Code section 10914). The provision of water service will continue to be undertaken in a manner consistent with applicable City policies and procedures, consistent with existing law.

This WSE will be included as an appendix to the Draft EIR for the CPHP, and the conclusions reached in this document will be considered in analyzing the project's potential impacts on water supply.

[1] 2015 Urban Water Management Plan for the City and County of San Francisco, adopted by the SFPUC, June 2016.

2.0 DESCRIPTION OF THE PROPOSED PROJECT

On November 20, 2014, the Regents adopted the UCSF 2014 LRDP. The 2014 LRDP serves as a comprehensive physical land use plan and policy document to guide the physical development of the San Francisco campus at its various campus sites, accommodating future increases in enrollment and clinical, academic, and research activities, and increased housing demand at UCSF and meeting its projected educational and research demand. The 2014 LRDP serves as the planning document for development anticipated to occur by horizon year 2035. The 2014 LRDP contains objectives to guide decisions for future facilities to meet demands and projects the quantities and uses of new building space needed during this time frame.

Since the adoption of the 2014 LRDP and certification of the 2014 LRDP Final EIR, UCSF initiated a planning process to re-envision the Parnassus Heights campus as a whole, seeking ways to update and reorganize campus facilities to better respond to UCSF's clinical, educational, and research missions. This planning process resulted in a CPHP that provides a vision for the future of the campus site, ensuring that a modernized Parnassus Heights campus enhances UCSF's status as an anchor institution in San Francisco. Figure 2-1 shows the location of the proposed project.

Because the CPHP proposes to modify the Parnassus Heights development plan identified in the 2014 LRDP, an amendment of the 2014 LRDP is proposed. The proposed LRDP amendment would revise those portions of the 2014 LRDP pertaining to the Parnassus Heights campus site to incorporate concepts and proposals identified in the CPHP. Proposed changes would include revisions to functional zones; revisions to the space program, update to estimated population; revisions to existing planning agreements, including revisions to the Regents' Resolution and an update to the Greenhouse Gas Reduction Strategy.

If the Regents approve the proposed 2014 LRDP amendment to incorporate the CPHP, the CPHP would become the primary planning document for the Parnassus Heights campus site and would guide the development of the Parnassus Heights campus site for the next 30 years, or an approximate horizon year of 2050.

Symbology

Project Area

0 400 800

Scale in Feet

UCSF
University of California San Francisco

WEST YOST ASSOCIATES

Figure 2-1

Parnassus Heights Campus Site Location

University of California San Francisco
Comprehensive Parnassus Heights Plan
Water Supply Evaluation

2.1 Objectives of the CPHP

In total, the CPHP provides for development of approximately 2.9 million gross square feet (gsf) of new building space at the Parnassus Heights campus site. The CPHP includes an "Initial Phase" that comprises: 1) Irving Street Arrival improvements, 2) Research and Academic Building (RAB), 3) New Hospital, and 4) initial Aldea Housing Densification, as well as other Initial Phase improvements. The Initial Phase would account for approximately 1.4 million gsf of new building development and is anticipated to be completed by approximately year 2030.

Beyond the Initial Phase, the Future Phase encompasses the remaining approximately 1.5 million gsf of new building development described in the CPHP envisioned for completion by the horizon year of 2050. The CPHP Future Phase comprises all remaining development opportunities identified under the CPHP. Potential development includes the following: 1) Millberry Union New Towers and Terrace, 2) hotel for patients and families, 3) new program adjacent to RAB, 4) West Side Housing, 5) childcare on Proctor Site, 6) future phase of Aldea Housing, 7) open space, 8) utilities and infrastructure, and 9) circulation, transportation, and parking.

The net increase in building space at the campus site under the CPHP would be approximately 2.0 million gsf, when accounting for demolition that was approved under the 2014 LRDP but yet not implemented, and potential additional building demolition that would occur under the CPHP.

2.2 Projected Water Demand

The UCSF campus has made substantial progress towards reducing its overall water consumption. UCSF implemented new technologies that contributed to this decrease such as the recycling of condensed steam, recycling excess filter water from laboratories, replacing or retrofitting old water equipment, and fixing leaks. Table 2-1 summarizes the decline of the Parnassus Heights campus site total water consumption from 2009 to 2019.

Table 2-1. Parnassus Heights Campus Site Total Water Consumption

Fiscal Year	Potable Water Use, gal	Potable Water Use, average mgd
2009-2010	197,546,800	0.54
2010-2011	204,395,488	0.56
2011-2012	187,829,532	0.51
2012-2013	171,047,404	0.47
2013-2014	154,981,860	0.42
2014-2015	136,492,048	0.37
2015-2016	121,867,900	0.33
2016-2017	114,034,096	0.31
2017-2018	121,779,636	0.33
2018-2019	121,967,384	0.33

Source: University of California San Francisco, Parnassus Water Data 2009/2010 to 2018/2019

The Parnassus Heights campus site water demands were estimated based on the projected land use from the CPHP. The projected water demand is summarized in Table 2-2. A comprehensive land use and projected water demand summary table is shown in Appendix B. The existing Parnassus Heights water demand is estimated to be 0.33 mgd (FY 2018/2019 data). The net increase in water demand for both the Initial Phase and Future Phase of the CPHP is projected to be 0.20 mgd. With this projected increase in total water demand, the future water demand for the Parnassus Heights campus site is projected to be approximately 0.53 mgd. This projected water demand does not take into consideration ongoing projects by UCSF to reduce water demands at the Parnassus Heights campus. With full implementation of the ongoing water conservation projects, UCSF staff estimate UCSF can reduce existing FY 2018/19 water demand by about 20 percent, not including the proposed project.

Table 2-2. Parnassus Heights Plan Projected Water Demand

Project	Net Change in Water Demand, mgd	Net Change in Water Demand, af/year
Initial Phase		
Irving Street Arrival Improvements (Medical Building 1 modifications)	-	-
Research and Academic Building (RAB)[(a)]	0	4.1
New Hospital	0.06	62.7
Initial Aldea Housing Densification[(b)]	0.01	14.3
Future Phase		
Millberry Union New Towers and Terrace[(c)]	0.01	12
Hotel for Patients and Families	0.01	10.8
New Program Adjacent to RAB[(d)]	0.04	50.1
West Side Housing	0.04	43.3
Child Care on Proctor Site[(e)]	0	2.7
Future Phase of Aldea Housing[(f)]	0.02	19.2
Small Daycare Center at Aldea	0	1.7
Open Space	-	-
Utilities and Infrastructure	-	-
Circulation, Transportation and Parking	-	-
Total Additional Demand for CPHP	0.2	220.9
Existing Parnassus Demand (2018)	0.33	363.2
Future Parnassus Demand	0.53	584

(a) The demolition of UC Hall is accounted for in the Net Change estimate for the proposed RAB project. The School of Nursing building would also be demolished; those uses would be continued in other buildings at the campus site.
(b) The demolition of three existing Aldea housing structures is accounted for in the Net Change estimate for the Initial Aldea Housing Densification.
(c) The demolition of the existing Millberry Union is accounted for in the Net Change estimate for the proposed Millberry Union New Towers and Terrace
(d) The demolition is Dental Clinics building is accounted for in the Net Change estimate for the proposed New Program Adjacent to RAB.
(e) The demolition of the existing Kirkham and Lucia Child Care Centers are accounted for in the Net Change estimate.
(f) The demolition of nine existing Aldea housing structures is accounted for in the Net Change estimate for the proposed Future Phase of Aldea Housing.

3.0 REQUIRED DETERMINATIONS

This section describes the required determinations for a WSA.

3.1 Does SB 610 apply to the Proposed Project?

Cities and counties are the only lead agencies specifically required by SB 610 to prepare a water supply assessment for certain projects. Although the SB 610 requirements do not specifically apply to UCSF because it is not a city or county, the University has voluntarily elected to prepare a WSA-like document to determine and demonstrate the sufficiency of the SFPUC's water supplies to satisfy the water demand of the planned development under the CPHP.

This WSE has been prepared to document the projected water demands for the UCSF Parnassus Heights campus site to be developed under the CPHP and to demonstrate that adequate water supplies are available to meet the projected UCSF water demands. For completeness and clarity, this WSE has been prepared to be consistent with the requirements of SB 610 for a WSA, although SB 610 does not apply to campus development under the CPHP.

3.2 Who is the Identified Public Water System?

> *10910(b) The city or county, at the time that it determines whether an environmental impact report, a negative declaration, or a mitigated negative declaration is required for any project subject to the California Environmental Quality Act pursuant to Section 21080.1 of the Public Resources Code, shall identify any water system that is, or may become as a result of supplying water to the project identified pursuant to this subdivision, a public water system, as defined by Section 10912, that may supply water for the project*
>
> *10912 (c) "Public water system" means a system for the provision of piped water to the public for human consumption that has 3,000 or more service connections…*

The UCSF Parnassus Heights campus site is located within the City and County of San Francisco within the SFPUC water service area; therefore, the SFPUC is the public water system for the proposed project.

3.3 Does the City have an adopted Urban Water Management Plan (UWMP) and does the UWMP include the projected water demand for the Proposed Project?

> *10910(c)(1) The city or county, at the time it makes the determination required under Section 21080.1 of the Public Resources Code, shall request each public water system identified pursuant to subdivision (b) to determine whether the projected water demand associated with a proposed project was included as part of the most recently adopted urban water management plan adopted pursuant to Part 2.6 (commencing with Section 10610).*

The SPFUC 2015 UWMP does not specifically identify existing and projected water demands for UCSF. The potable water demand projections included in the SFPUC 2015 UWMP are summarized in Table 3-1.

Table 3-1. Potable Water Demands Included in the SFPUC 2015 UWMP[a,b]

	Actual	Projected				
	2015	2020	2025	2030	2035	2040
Total Retail Demand, mgd	70.1	77.5	79.0	82.3	85.9	89.9

(a) Total Retail 2015 actual demands from the SFPUC 2015 UWMP, Table 4-1.

(b) Includes both In-City and Suburban Retail demands. Groveland Community Services District (Groveland CSD) is accounted for as a retail customer for the purpose of this table and subsequent retail supply and demand comparisons. Demand projections were provided by Groveland CSD based on its population projections and assumed per capita water use of 130 GPCD (projections are subject to change as part of its UWMP process).

As described below, the existing water demands for the UCSF Parnassus Heights campus site are estimated to be approximately 0.33 mgd and would increase by 0.20 mgd with buildout of the CPHP for a total future demand of 0.53 mgd, not accounting for additional water conservation measures anticipated by UCSF. The projected water demand at buildout of the CPHP (0.53 mgd) is approximately 0.6 percent of the SFPUC projected total 2040 Retail potable water demand. If the incremental demand (0.20 mgd) due to the CPHP is compared to the SFPUC 2040 total retail demand, it would represent an even smaller fraction (about 0.2 percent). If the 20 percent reduction in existing use can be achieved, the net increase in demand would be 0.13 mgd, which would represent about 0.14 percent of the total retail demand in 2040.

4.0 SFPUC WATER SYSTEM

Refer to Section 3.1 of the SFPUC 2015 UWMP for descriptions of the RWS and Section 6.1 of the SFPUC 2015 UWMP for water rights held by City and County of San Francisco and the SFPUC WSIP.

5.0 SFPUC WATER DEMANDS

10910(c)(2) If the projected water demand associated with the proposed project was accounted for in the most recently adopted urban water management plan, the public water system may incorporate the requested information from the urban water management plan in preparing the elements of the assessment required to comply with subdivisions (d), (e), (f), and (g).

The descriptions provided below for the SFPUC's retail water demands have been taken, for the most part, from the SFPUC 2015 UWMP.

5.1 Historical and Existing Water Demand

Water use within San Francisco (i.e., the in-City retail service area) continues to be among the lowest in the State and below historical consumption. Both total consumption and per capita water use (i.e., gallons of water consumed per person per day [GPCD]) have been on a general decline since the mid-1970s. Many factors have contributed to this reduction in water use, including significant changes to the mix of industrial and commercial businesses and their associated water demand, and the general characteristics of water use by San Franciscans. As shown in Figure 5-1, annual gross retail water use has declined since 2001, in spite of increasing population.

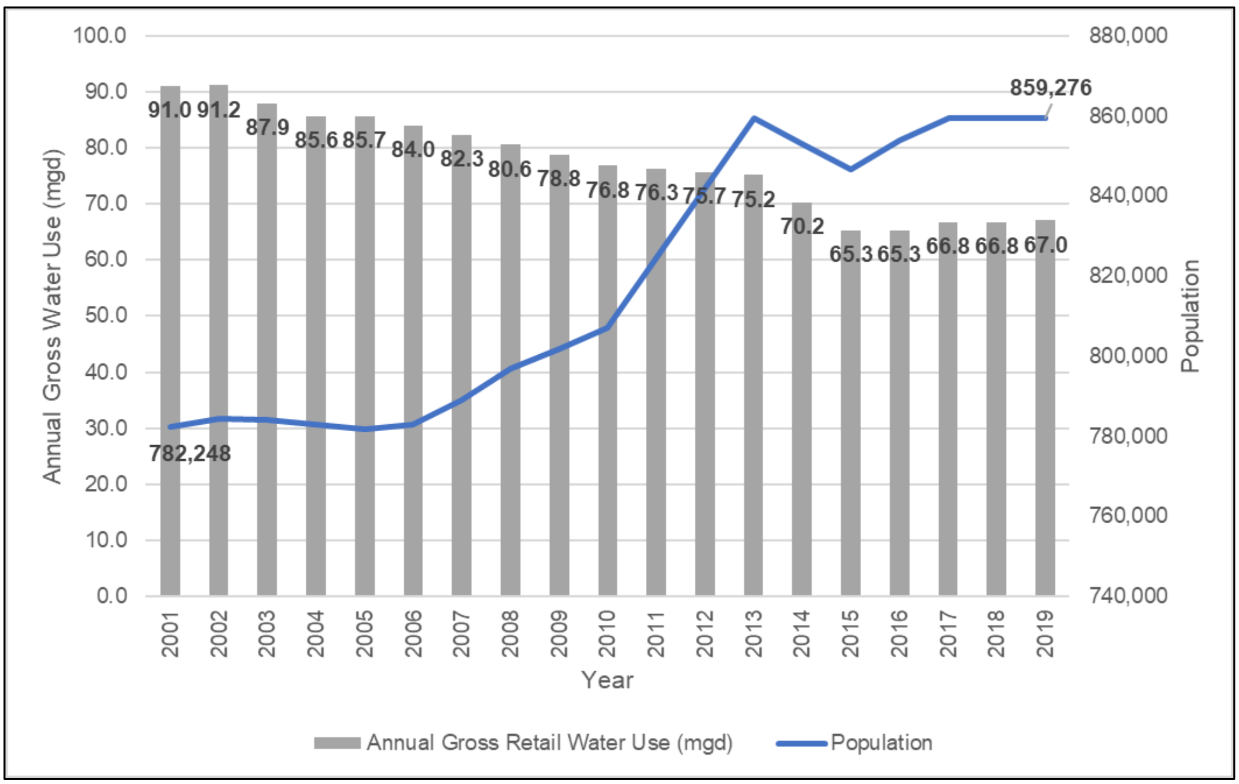


Figure 5-1. Trends in In-City Retail Water Use Since 2001[2]

[2] Data for 2001 through 2010 from SFPUC 2015 UWMP Tables 5-1 and 5-2. Data for 2013 and 2015 through 2019 from California State Water Resources Control Board Urban Water Supplier Monitoring Reports, downloaded May 28, 2020. Data for 2011, 2012, and 2014 interpolated from adjacent data.

5.2 Future Water Demand

In the 2015 UWMP, the SFPUC utilized end-use methodology to forecast both demands and conservation savings. The model was updated over the years to incorporate the latest growth forecasts, extend the projection period, reflect changes to the SFPUC's conservation programming, incorporate the latest codes and ordinances, and to respond to a variety of other needs. It relies on household and employment forecasts provided by the San Francisco Planning Department's Land Use Allocation (LUA) 2012.

Table 5-1 provides a summary of SFPUC's future water demand projections for its various water use types. The table segregates water demands into three sectors of water use: single family residential, multi-family residential, and non-residential, and shows both in-City retail and suburban retail water demands.

Table 5-1. Projected Retail Water Demands, mgd

Retail Sector or Use Type	Actual[a]	Projected[b]				
	2015	2020	2025	2030	2035	2040
In-City Retail						
Single Family Residential	14.5	15.5	16.3	17.8	19.5	21.1
Multi-Family Residential	22.2	22.1	22.8	24	25	26.2
Non-residential	23.6	28.9	28.9	29.5	30.4	31.6
Water Loss[c]	5.3	6	6	6	6	6
Subtotal In-City Retail Demand	65.6	72.5	74	77.3	80.9	84. **9**
Suburban Retail						
Single Family Residential[d]	0.1	0.1	0.1	0.1	0.1	0.1
Non-residential	4.1	4.4	4.4	4.4	4.4	4.4
Groveland CSD[e]	0.3	0.5	0.5	0.5	0.5	0.5
Water Loss[c]	0	0	0	0	0	0
Subtotal Suburban Retail Demand	4.5	5	5	5	5	5
Total Retail Demand	70.1	77.5	79	82.3	85.9	89.9

Source: SFPUC 2015 UWMP; Table 4-1

(a) Actual consumption data are obtained from customer billing data.
(b) Projected single family residential, multi-family residential, and non-residential demands are obtained from the SFPUC Water Conservation Tracking Model and reflect both passive and active conservation
(c) Water losses include both apparent and real losses. Suburban retail water losses are considered to be negligible. Estimate of actual water loss in 2015 is based on a draft audit under review as of the publication of the 2015 UWMP.
(d) Suburban retail residential demands are for single family only as no multi-family residential buildings are served.
(e) Groveland CSD is accounted for as a retail customer for the purpose of this table and subsequent retail supply and demand comparisons. Demand projections were provided by Groveland CSD based on its population projections and assumed per capita water use of 130 GPCD (projections are subject to change as part of its UWMP process).

6.0 SFPUC MUNICIPAL WATER SUPPLIES

10910(c)(2) If the projected water demand associated with the proposed project was accounted for in the most recently adopted urban water management plan, the public water system may incorporate the requested information from the urban water management plan in preparing the elements of the assessment required to comply with subdivisions (d), (e), (f) and (g).

10910(d)(1) The assessment required by this section shall include an identification of any existing water supply entitlements, water rights, or water service contracts relevant to the identified water supply for the proposed project, and a description of the quantities of water received in prior years by the public water system…under the existing water supply entitlements, water rights, or water service contracts.

10910(e) If no water has been received in prior years by the public water system…under the existing water supply entitlements, water rights, or water service contracts, the public water system…shall also include in its water supply assessment…an identification of the other public water systems or water service contract holders that receive a water supply or have existing water supply entitlements, water rights, or water service contracts, to the same source of water as the public water system.

10910(f) If a water supply for a proposed project includes groundwater, the following additional information shall be included in the water supply assessment.

(1) A review of any information contained in the urban water management plan relevant to the identified water supply for the proposed project.

(2) A description of any groundwater basin or basins from which the proposed project will be supplied. For those basins for which a court or the board has adjudicated the rights to pump groundwater, a copy of the order or decree adopted by the court or the board and a description of the amount of groundwater the public water system, or the city or county if either is required to comply with this part pursuant to subdivision (b), has the legal right to pump under the order or decree. For basins that have not been adjudicated, information as to whether the department has identified the basin or basins as overdrafted or has projected that the basin will become overdrafted if present management conditions continue, in the most recent bulletin of the department that characterizes the condition of the groundwater basin, and a detailed description by the public water system, or the city or county if either is required to comply with this part pursuant to subdivision (b), of the efforts being undertaken in the basin or basins to eliminate the long-term overdraft condition.

(3) A detailed description and analysis of the amount and location of groundwater pumped by the public water system, or the city or county if either is required to comply with this part pursuant to subdivision (b), for the past five years from any groundwater basin from which the proposed project will be supplied. The description and analysis shall be based on information that is reasonably available, including, but not limited to, historical use records.

(4) A detailed description and analysis of the amount and location of groundwater that is projected to be pumped by the public water system, or the city or county if either is required to comply with this part pursuant to subdivision (b), from any basin from which the proposed project will be supplied. The description and analysis shall be based on information that is reasonably available, including, but not limited to, historical use records.

(5) An analysis of the sufficiency of the groundwater from the basin or basins from which the proposed project will be supplied to meet the projected water demand associated with the proposed project. A water assessment shall not be required to include the information required by this paragraph if the public water system determines, as part of the review required by paragraph (1), that the sufficiency of groundwater necessary to meet the initial and projected water demand associated with the project was addressed in the description and analysis required by paragraph (4) of subdivision (b) of Section 10631.

The descriptions provided below for SFPUC's water supplies have been taken, for the most part, from SFPUC's 2015 UWMP.

6.1 Water Supply Overview

Over 2.6 million people in San Francisco and throughout the Bay Area rely on water supplied by the SFPUC to meet their daily water needs. The RWS is a municipal-owned utility operated by the SFPUC, a department of the City and County of San Francisco, and serves both retail and wholesale customers. The RWS supplies high-quality drinking water from the Tuolumne River watershed and from local reservoirs in the Alameda and Peninsula watersheds. The RWS draws an average of 85 percent of its supply from the Tuolumne River watershed, collected in Hetch Hetchy Reservoir in Yosemite National Park. This water feeds into an aqueduct system delivering water 167 miles by gravity to Bay Area reservoirs and customers. The remaining 15 percent of the RWS supply is drawn from local surface waters in the Alameda and Peninsula watersheds. The split between these resources varies from year to year depending on the water year hydrology and operational circumstances. Separate from the RWS, the in-City distribution system is also owned and operated by the SFPUC and serves a population of nearly 850,000 in San Francisco. In-City retail customers are primarily served with RWS supply, but a few customers also receive groundwater and recycled water. Similarly, suburban retail customers are primarily served with RWS supply, but a few customers receive groundwater.

Complete descriptions of the RWS and local water supplies are provided in the SFPUC 2015 UWMP as follows:

- Retail water supplies from the RWS are described in Section 6.1 of the SFPUC 2015 UWMP
- Local groundwater supplies, including the Westside Groundwater Basin, are described in Section 6.2.1 of the SFPUC 2015 UWMP
- Local recycled water supplies, including the Harding Park Recycled Water Project and Pacifica Recycled Water Project, are described in Section 6.2.1 of the SFPUC 2015 UWMP

6.2 Future Local Supplies

The San Francisco Groundwater Supply Project is described in Section 6.2.2 of the SFPUC 2015 UWMP. Since adoption of the SFPUC 2015 UWMP, four wells have been completed and the start-up phase of the project has begun. Starting in April 2017, small amounts of groundwater have been blended with RWS supplies for drinking water. Two remaining wells are under construction as part of the next phase of the project.

The proposed Westside and Eastside Recycled Water Projects, as well as non-potable water supplies associated with onsite water systems implemented in compliance with San Francisco's Non-potable Water Ordinance (Health Code Chapter 12C), are also described in Section 6.2.2 of the SFPUC 2015 UWMP.

6.3 Summary of Existing and Additional Planned Future Water Supplies

Table 6-1 shows the existing and projected retail water supply documented in the SFPUC 2015 UWMP.

Table 6-1. Existing and Projected Retail Water Supply, mgd

Retail Sector or Use Type	Actual	Projected[b]				
	2015	2020	2025	2030	2035	2040
Regional Water System[a]	67.7	70.5	71.9	73.2	76.7	80.6
Groundwater						
San Francisco Groundwater Supply Project[b]	—	4	4	4	4	4
Westside Groundwater Basin for In-City Irrigation[b]	1.5	0.3	0.3	0.3	0.3	0.3
Castlewood Well System[c]	0.3	0.4	0.4	0.4	0.4	0.4
Sunol Filter Gallery[d]	0.4	0.3	0.3	0.3	0.3	0.3
Subtotal Groundwater	2.2	5	5	5	5	5
Recycled Water						
Westside Recycled Water Project	—	1.6	1.6	1.6	1.6	1.6
Eastside Recycled Water Project	—	—	—	2	2	2
Harding Park Recycled Water Project[e]	0.2	0.2	0.2	0.2	0.2	0.2
Pacifica Recycled Water Project[f]	0	0.1	0.1	0.1	0.1	0.1
Subtotal Recycled Water[g]	0.2	1.9	1.9	3.9	3.9	3.9
Non-potable Water[h]	0	0.1	0.2	0.2	0.3	0.4
Total Retail Supply	70.1	77.5	79	82.3	85.9	89.9

Source: SFPUC 2015 UWMP; Table 6-7

(a) Assuming that the retail supply allocation of 81 mgd per the 2009 WSAP between SFPUC and its Wholesale Customers is extended to 2040, up to 81 mgd of RWS supply may be used.

(b) About 1.5 mgd of groundwater currently serves irrigation at Golden Gate Park, the San Francisco Zoo, and the Great Highway medians. A reserve of 0.3 mgd for irrigation purposes will remain as part of the non-potable groundwater supply, while 1.2 mgd will be converted to potable supply under the San Francisco Groundwater Supply Project.

(c) Castlewood CSA is served by the Castlewood Well System.

(d) Irrigation uses in Sunol (currently the Sunol Valley Golf Club) are served by subsurface diversions from the Sunol Filter Gallery.

(e) Irrigation at Harding Park and Fleming Golf Courses is provided recycled water from NSMCSD.

(f) Irrigation at Sharp Park Golf Course is provided recycled water from NCCWD. Approximately 0.01 mgd was provided in 2015 after deliveries began in October 2014.

(g) A small amount of recycled water is dispensed from the Southeast Water Pollution Control Plant recycled water truck-fill station for various approved uses, but the annual volume is not considered large enough to be reported in the 2015 UWMP (about 739,000 gallons, or 0.002 mgd, in 2015).

(h) Non-potable water includes onsite water reuse as mandated by the Non-Potable Water Ordinance.

7.0 WATER SUPPLY RELIABILITY

10910(c)(4) If the city or county is required to comply with this part pursuant to subdivision (b), the water supply assessment for the project shall include a discussion with regard to whether the total projected water supplies, determined to be available by the city or county for the project during Normal, Single Dry, and Multiple Dry water years during a 20-year projection, will meet the projected water demand associated with the proposed project, in addition to existing and planned future uses, including agricultural and manufacturing uses.

10911(a) If, as a result of its assessment, the public water system concludes that its water supplies are, or will be, insufficient, the public water system shall provide to the city or county its plans for acquiring additional water supplies, setting forth the measures that are being undertaken to acquire and develop those water supplies. If the city or county, if either is required to comply with this part pursuant to subdivision (b), concludes as a result of its assessment, that water supplies are, or will be, insufficient, the city or county shall include in its water supply assessment its plans for acquiring additional water supplies, setting forth the measures that are being undertaken to acquire and develop those water supplies. Those plans may include, but are not limited to, information concerning all of the following:

(1) The estimated total costs, and the proposed method of financing the costs, associated with acquiring the additional water supplies.

(2) All federal, state, and local permits, approvals, or entitlements that are anticipated to be required in order to acquire and develop the additional water supplies.

Based on the consideration set forth in paragraphs (1) and (2), the estimated timeframes within which the public water system, or the city or county if either is required to comply with this part pursuant to subdivision (b), expects to able to acquire additional water supplies.

The reliability discussion provided below has been taken, for the most part, from the SFPUC 2015 UWMP and recent updates to SFPUC's water supply availability and reliability projections.

The SFPUC 2015 UWMP describes the reliability of the SFPUC water supply. Reliability of the RWS is expressed in terms of the system's ability to deliver water during droughts. Reliability may be quantified by the amount and frequency of water delivery reductions (i.e., deficiencies) required to balance customer demands with available supplies. The SFPUC plans deliveries under the premise that a drought more severe than the worst drought on record may occur. Potential system-wide and retail deficiencies are described in this section.

The total amount of water the SFPUC can deliver to retail and wholesale customers depends on several factors, including the amount of water that is available to the SFPUC from natural runoff, the amount of water in reservoir storage, and the amount of that water that must be released from the RWS for purposes other than customer deliveries (e.g., required instream flow releases below RWS reservoirs). For planning purposes, the SFPUC "normal year" is based on historical hydrology under conditions that allow the reservoirs to be filled over the course of the snowmelt season, allowing full deliveries to customers.

In the 1987-92, a shortfall developed between the SFPUC's supplies and its customers' demands such that significant rationing of water supply became necessary. Other than during the drought of 1976-77, drought sequences in the past did not seriously affect the ability of the RWS to sustain full deliveries to its retail and wholesale customers. Following the 1987-92 drought experience, the SFPUC includes the concept of its "firm" capability in water supply planning, which is defined as the amount of water the RWS can be expected to deliver during drought periods. The following sections describe the SFPUC water supply reliability and potential impacts to that reliability:

- Water System Improvement Program
- Dry-year Water Supply Projects
- Projected SFPUC RWS Supply Reliability
- Potential Changes in SFPUC RWS Reliability

7.1 Water System Improvement Program

SFPUC's Water System Improvement Program (WSIP) was approved on October 31, 2008, with the purpose of improving the delivery reliability of the RWS. The initial objectives of the WSIP related to water supply were to:

- Meet average annual water demand of 265 mgd from the SFPUC watersheds for retail and wholesale customers during non-drought years for system demands through 2018
- Meet dry-year delivery needs through 2018 while limiting rationing to a maximum 20 percent system-wide reduction in water service during extended droughts
- Diversify water supply options during non-drought and drought periods
- Improve use of new water sources and drought management, including groundwater, recycled water, conservation, and transfers

The WSIP provides benefits to retail customers by improving the reliability of wholesale water purchased from SFPUC, especially during period of drought. The program aims to meet customer water needs in non-drought and drought conditions and provides dry-year water supply projects to augment all year type water supplies during drought. The WSIP includes both local projects (located within San Francisco) and regional projects (spread over seven different counties from the Sierra foothills to San Francisco). As of March 31, 2020, 34 of the 35 local projects have been completed, with one project is in construction closeout[3], and regional projects are 98.6 percent complete[4]. The current forecasted date to complete the overall WSIP (including regional and local projects) is May 2023.

7.2 Dry-Year Water Supply Projects

Approximately 85 percent of the SFPUC supply is sourced from the Tuolumne River watershed (through Hetch Hetchy Reservoir) and the remaining 15 percent comes from local watersheds, which include the Alameda Creek watershed and San Mateo County watersheds. Water supply from the local watersheds is stored in the following reservoirs: San Antonio, Calaveras, Crystal Springs, Pilarcitos, and San Andreas. These water supplies are used for all year types, and SFPUC has historically met demand in its service area in all year types.

[3] SFPUC WSIP Local Projects Quarterly Report (Q3/FY19-20) dated May 19, 2020.

[4] SFPUC WSIP Regional Projects Quarterly Report (Q3/FY19-20) dated May 19, 2020.

During dry years, the WSIP limits systemwide rationing to a maximum of 20 percent in any one year. The following projects are a part of the WSIP and will help meet water demand during dry years, as well as will help to improve the seismic, delivery, water quality, and water supply reliability for the RWS:

- Calaveras Dam Replacement Project
- Alameda Creek Recapture Project
- Lower Crystal Springs Dam Improvements
- Regional Groundwater Storage and Recovery Project
- Dry-Year Water Transfer

In order to achieve its target of meeting at least 80 percent of its customer demand during droughts at 265 mgd, the SFPUC must successfully implement the Dry-Year water supply projects included in the WSIP and described in detail in the following sections.

Furthermore, the permitting obligations for the Calaveras Dam Replacement Project and the Lower Crystal Springs Dam Improvements include a combined commitment of 12.8 mgd for instream flows on average. When this is reduced for an assumed Alameda Creek Recapture Project recovery of 9.3 mgd, the net loss of water supply is 3.5 mgd. The SFPUC's participation in regional water supply reliability efforts, such as the Bay Area Regional Desalination Project (BARDP), additional water transfers, and other projects may help to make up for this shortfall.

7.2.1 Calaveras Dam Replacement Project

Calaveras Dam is located near a seismically active fault zone and was determined to be seismically vulnerable. To address this vulnerability, the SFPUC constructed a new dam of equal height downstream of the existing dam. The Environmental Impact Report was certified by the San Francisco City Planning Commission in 2011, construction of the new dam was completed in September 2018, and the overall project was completed in June 2019.

7.2.2 Alameda Creek Recapture Project

The Alameda Creek Recapture Project will recapture the water system yield lost due to instream flow releases at Calaveras Reservoir or bypassed around the Alameda Creek Diversion Dam and return this yield to the RWS through facilities in the Sunol Valley. Water that naturally infiltrates from Alameda Creek will be recaptured into an existing quarry pond known as SMP (Surface Mining Permit) -24 Pond F2. The project will be designed to allow the recaptured water to be pumped to the Sunol Valley Water Treatment Plant or to San Antonio Reservoir.

The San Francisco Planning Department published the Draft EIR for the project in November 2016, and the San Francisco Planning Commission certified the Final EIR in June 2017. However, in response to an appeal on the certification action, additional analysis was required and sections of the Draft EIR were recirculated for public review and comment in late 2019. Certification of the revised Final EIR occurred on April 28, 2020 and construction of the project is anticipated to take approximately 20 months with completion in 2022.

7.2.3 Lower Crystal Springs Dam Improvements

The Lower Crystal Springs Dam Improvements were substantially completed in November 2011. While the project has been completed, permitting issues for reservoir operation have become significant. While the reservoir elevation was lowered due to Division of Safety of Dams restrictions, the habitat for the Fountain Thistle, an endangered plant, followed the lowered reservoir elevation. Raising the reservoir elevation now requires that new plant populations be restored incrementally before the reservoir elevation is raised. The result is that it may be several years before the original reservoir elevation can be restored.

7.2.4 Regional Groundwater Storage and Recovery Project

The Groundwater Storage and Recovery Project is a strategic partnership between SFPUC and three San Mateo County agencies: the California Water Service Company (serving South San Francisco and Colma), the City of Daly City, and the City of San Bruno. The project seeks to balance the management of groundwater and surface water resources in a way that safeguards supplies during times of drought. During years of normal or heavy rainfall, the project would provide additional surface water to the partner agencies in San Mateo County, allowing them to reduce the amount of groundwater that they pump from the South Westside Groundwater Basin. Over time, the reduced pumping would allow the aquifer to recharge and result in increased groundwater storage of up to 20 billion gallons. In dry years, when less surface water is available, the saved water will be pumped from up to 16 new groundwater well recovery facilities. Construction is expected to be completed in 2021.

7.2.5 Dry-Year Water Transfer

In 2012, a Dry-Year transfer was proposed between the Modesto Irrigation District and the SFPUC. Negotiations were terminated because an agreement could not be reached. Subsequently, the SFPUC is having ongoing discussions with the Oakdale Irrigation District for a one-year transfer agreement with the SFPUC for 2 mgd (2,240 AF).

7.3 Projected SFPUC RWS Supply Reliability

Procedures to allocate RWS supplies during SFPUC system shortages are specified in agreements between SFPUC and the Wholesale Customers. Water shortage allocation procedures and projected supplies during Normal and Dry Years are described below.

The wholesale customers and SFPUC adopted the Amended and Restated Water Supply Agreement in 2019, which included a Water Shortage Allocation Plan (WSAP) to allocate water from the RWS to retail and wholesale customers during system-wide shortages of 20 percent or less. The WSAP has two tiers which are described below.

- The Tier One Plan allocates water between SFPUC and the wholesale customers collectively based on the level of the shortage (up to 20 percent). This plan applies only when SFPUC determines that a system-wide water shortage exists and issues a declaration of a water shortage emergency under California Water Code Section 350. The SFPUC may also opt to request voluntary cutbacks from retail customers and the wholesale customers to achieve necessary water use reductions during drought periods. The allocations outlined in the Tier One Plan are provided in Table 7-1.

Table 7-1. Tier One Plan Water Shortage Allocations

System-Wide Reduction Required	Share of Available Water	
	SFPUC	Wholesale Customers
≤ 5%	35.5%	64.5%
6% to 10%	36.0%	64.0%
11% to 15%	37.0%	63.0%
16% to 20%	37.5%	62.5%

- The Tier Two Plan allocates the collective wholesale customer share among the wholesale customers based on a formula that accounts for each wholesale customer's Individual Supply Guarantee (ISG), seasonal use of all available water supplies, and residential per capita use. The water made available to the wholesale customers collectively will be allocated among them in proportion to each wholesale customer's Allocation Basis, which is the weighted average of the wholesale customer's ISG and the Base/Seasonal Component. The Allocation Basis is used as the numerator over the sum of all wholesale customers' Allocation Bases to calculate each wholesale customer's Allocation Factor. The final shortage allocation for each wholesale customer is determined by multiplying the amount of water available to the wholesale customers collectively over the Tier One Plan by the wholesale customer's Allocation Factor. BAWSCA calculates each wholesale customer's Allocation Factors annually in preparation for a potential water shortage emergency.

For water shortages greater than 20 percent, the SFPUC will meet with the wholesale customers to determine if modifications to the Tier 1 Plan can be agreed upon by the SFPUC and its wholesale customers. If an agreement cannot be reached, SFPUC may allocate water at its discretion, subject to challenge by the wholesale customers, unless all of the wholesale customers direct that a particular Tier 2 allocation methodology be used.

7.4 Potential Changes in SFPUC RWS Reliability

In December 2018, the SWRCB adopted amendments to the Water Quality Control Plan for the San Francisco Bay/Sacramento-San Joaquin Delta Estuary (Bay-Delta Plan Amendment) to establish water quality objectives to maintain the health of the Bay-Delta ecosystem. The SWRCB is required by law to regularly review this plan. The adopted Bay-Delta Plan Amendment was developed with the stated goal of increasing salmonid populations in three San Joaquin River tributaries (the Stanislaus, Merced, and Tuolumne Rivers) and the Bay-Delta. The Bay-Delta Plan Amendment requires the release of 40 percent of the "unimpaired flow" on the three tributaries from February through June in every year type, whether wet, normal, dry, or critically dry.

The SFPUC 2015 UWMP already assumes shortages in Single and Multiple Dry Years through 2040, but implementation of the Bay-Delta Plan Amendment would result in greater shortages.

The SWRCB has stated that it intends to implement the Bay-Delta Plan Amendment on the Tuolumne River by the year 2022, assuming all required approvals are obtained by that time. But implementation of the Plan Amendment is uncertain for several reasons.

- First, under the Clean Water Act, the USEPA must approve the water quality standards identified in the Plan Amendment within 90 days from the date the approval request is received. By letter dated June 11, 2019, USEPA rejected the SWRCB's two-page submittal as inadequate under the requirements of the Clean Water Act. Pursuant to USEPA's letter, the Board has 90 days to respond with a submittal that complies with the law. At this point, USEPA has neither approved, nor disapproved, any of the revised water quality objectives. It is uncertain whether the USEPA will approve or disapprove the water quality standards in the future. Furthermore, the determination could result in litigation.
- Second, since adoption of the Bay-Delta Plan Amendment, over a dozen lawsuits have been filed in both state and federal court, challenging the SWRCB's adoption of the Bay-Delta Plan Amendment, including two legal challenges filed by the federal government, at the request of the U.S. Department of Interior, Bureau of Reclamation in state and federal courts. These cases are in the early stage and there have been no dispositive court rulings to date.
- Third, the Bay-Delta Plan Amendment is not self-implementing and does not allocate responsibility for meeting its new flow requirements to the SFPUC or any other water rights holders. Rather, the Plan Amendment merely provides a regulatory framework for flow allocation, which must be accomplished by other regulatory and/or adjudicatory proceedings, such as a comprehensive water rights adjudication or, in the case of the Tuolumne River, the 401 certification process in the Federal Energy Regulatory Commission's relicensing proceeding for Don Pedro Dam. The license amendment process is currently expected to be completed in the 2022-23 timeframe. This process and the other regulatory and/or adjudicatory proceedings would likely face legal challenges and have lengthy timelines, and quite possibly could result in a different assignment of flow responsibility (and therefore a different water supply impact on the SFPUC).
- Fourth, in recognition of the obstacles to implementation of the Bay-Delta Plan Amendment, SWRCB Resolution No. 2018-0059 adopting the Bay-Delta Plan Amendment directed staff to help complete a "Delta watershed-wide agreement, including potential flow measures for the Tuolumne River" by March 1, 2019, and to incorporate such agreements as an "alternative" for a future amendment to the Bay-Delta Plan to be presented to the SWRCB "as early as possible after December 1, 2019." In accordance with the SWRCB's instruction, on March 1, 2019, SFPUC, in partnership with other key stakeholders, submitted a proposed project description for the Tuolumne River that could be the basis for a voluntary substitute agreement with the SWRCB ("March 1st Proposed Voluntary Agreement"). On March 26, 2019, the SFPUC adopted Resolution No. 19-0057 to support SFPUC's participation in the Voluntary Agreement negotiation process. To date, those negotiations are ongoing under the California Natural Resources Agency, California Environmental Protection Agency and the leadership of the Newsom administration. The negotiations for a voluntary agreement have made significant progress since an initial framework was presented to the SWRCB on December 12, 2018. The package submitted on March 1, 2019 is the product of renewed discussions since Governor Newsom took office. While significant work remains, the package represents an important step forward in bringing together diverse California water interests.

- As discussed above and in other recently prepared SFPUC WSAs, implementation of the plan amendment is uncertain for several reasons. Whether the Bay Delta Plan Amendment will be implemented, when it will be implemented, and the form that implementation will take, as well as how the amendment will affect SFPUC's water supply, are currently unknown. Given the uncertainty, the SFPUC has estimated total shortfalls in water supply through 2040 under three increasingly supply-limited scenarios:
  - Scenario 1: Without implementation of the Bay-Delta Plan Amendment, wherein the water supply and demand assumptions contained in the SFPUC 2015 UWMP, would remain applicable
  - Scenario 2: With implementation of a voluntary agreement between the SFPUC and the SWRCB, including a combination of flow and non-flow measures that would be designed to benefit fisheries at a lower water cost, particularly during Multiple Dry Years, than that under the Bay-Delta Plan Amendment
  - Scenario 3: With implementation of the Bay-Delta Plan Amendment as adopted

The SFPUC has estimated that water supply shortfalls during Dry Years would be lowest without implementation of the Bay-Delta Plan Amendment and highest with implementation of the Bay-Delta Plan Amendment. The range of shortfalls under the proposed voluntary agreement would be between those with and without implementation of the Bay-Delta Plan Amendment.

Under all three scenarios, the SFPUC would have adequate water to meet total retail demands through 2040 in normal years. For Single Dry Years and Multiple Dry Years of an extended drought, the SFPUC estimates that shortfalls in water supplies relative to retail demand would occur both with and without implementation of the Bay-Delta Plan Amendment. Without implementation of the Bay-Delta Plan Amendment, there would be a 5 percent shortfall in Single Dry Years or the first year of a multiple year drought. Shortfalls in subsequent years of multiple year droughts (years 2 through 8) would range from 6.2 percent to 6.8 percent. With implementation of the Bay-Delta Plan Amendment, shortfalls of up to 23.4 percent would occur in Single Dry Years and up to 49.8 percent in Multiple Dry Years.

The projected SFPUC water supply reliability under Scenarios 1 and 3 are shown in Appendix A and are taken from information included in a 2019 WSA prepared for another project located in San Francisco. No water supply reliability projections were produced for Scenario 2 because the details of the voluntary agreement had not been completed at that time of that 2019 WSA.

On February 4, 2020 the Newsom administration proposed a new framework for voluntary agreements[5]. The new framework would likely be less severe than full implementation of the Bay-Delta Plan Amendment; however, as of May 2020, it is not known if the SFPUC has prepared an evaluation of the potential impacts of the new voluntary agreement framework to its wholesale and retail customers.

[5] California Natural Resources Agency website (https://resources.ca.gov/Initiatives/Voluntary-Agreements). Accessed April 1, 2020.

8.0 DETERMINATION OF WATER SUPPLY SUFFICIENCY BASED ON THE REQUIREMENTS OF SB 610

10910(c)(4) If the city or county is required to comply with this part pursuant to subdivision (b), the water supply assessment for the project shall include a discussion with regard to whether the total projected water supplies, determined to be available by the city or county for the project during Normal, Single Dry, and Multiple Dry water years during a 20-year projection, will meet the projected water demand associated with the proposed project, in addition to existing and planned future uses, including agricultural and manufacturing uses.

10911 (a) If, as a result of its assessment, the public water system concludes that its water supplies are, or will be, insufficient, the public water system shall provide to the city or county its plans for acquiring additional water supplies, setting forth the measures that are being undertaken to acquire and develop those water supplies.

Pursuant to Water Code section 10910(c)(4) and based on the technical analyses described in this WSE, and the SFPUC 2015 UWMP, as modified by updated SFPUC water supply availability and reliability projections, this WSE finds that the increase in potable water demands for the Parnassus Heights campus site upon implementation of the CPHP would not be so large as to affect the ability of the SFPUC to meet demand with existing and planned supplies during Normal, Single Dry, and Multiple Dry years through 2040, which is the farthest year of analysis included in the SFPUC 2015 UWMP.

As discussed in this WSE, SFPUC is aggressively implementing projects to improve the reliability of the RWS to meet the water demands of its customers through 2040.

Table 8-1 summarizes the projected availability of SFPUC's existing and planned future water supplies and SFPUC's projected water demands in Normal, Single Dry, and Multiple Dry years through 2040 based on the SFPUC's recently updated water supply availability and reliability projections. As shown in Table 8-1, water demand within the SFPUC in-City service area is not expected to exceed the SFPUC water supply during Normal water years. However, water demand is expected to exceed the reduced SFPUC water supply during Single Dry and Multiple Dry water years, which results in the supply deficits shown in Table 8-1. SFPUC expects to meet these supply shortfalls through water demand reductions met by implementation of its Water Shortage Contingency Plan.

As discussed above in Section 7.4, greater shortfalls may be possible as a result of the Bay-Delta Plan Amendment requiring additional water demand reductions in Dry Years. However, whether and when the Bay-Delta Plan Amendment will be implemented, and how those amendments if implemented will affect the SFPUC's water supply is currently uncertain and possibly speculative. Furthermore, the SFPUC may allocate different levels of rationing to individual retail customers based on customer type to achieve the required level of retail system-wide rationing. The SFPUC may also impose a lower level of rationing that takes into account the installation of water-efficient plumbing fixtures and non-potable water systems associated with new construction.

Table 8-1. SFPUC Summary of Retail Water Demand Versus Supply During Hydrologic Normal, Single Dry, and Multiple Dry Years[(a)]

Hydrologic Condition		Supply and Demand Comparison, mgd				
		2020	2025	2030	2035	2040
Normal Year						
Available Water Supply[(b)]		72	79	82	86	90
Total Water Demand[(c)]		72	79	82	86	89.9
Potential Surplus (Deficit)		0	0	0	0	0
Percent Shortfall of Demand		—	—	—	—	—
Single Dry Year						
Available Water Supply		69	75	78	82	85.4
Total Water Demand		72	79	82	86	90
Potential Surplus (Deficit)		(3.6)	(4.0)	(4.1)	(4.3)	(4.5)
Percent Shortfall of Demand		5.0%	5.1%	5.0%	5.0%	5.0%
Multiple Dry Years						
Multiple Dry Year 1[(d)]	Available Water Supply	69	75	78	82	85.4
	Total Water Demand	72	79	82	86	90
	Potential Surplus (Deficit)	(3.6)	(4.0)	(4.1)	(4.3)	(4.5)
	Percent Shortfall of Demand	5.0%	5.1%	5.0%	5.0%	5.0%
Multiple Dry Year[(e)]	Available Water Supply	69	75	78	82	85.4
	Total Water Demand	72	79	82	86	90
	Potential Surplus (Deficit)	(3.6)	(4.0)	(4.1)	(4.3)	(4.5)
	Percent Shortfall of Demand	5.0%	5.1%	5.0%	5.0%	5.0%
Multiple Dry Year 3[(e)]	Available Water Supply	69	75	78	82	85.4
	Total Water Demand	72	79	82	86	90
	Potential Surplus (Deficit)	(3.6)	(4.0)	(4.1)	(4.3)	(4.5)
	Percent Shortfall of Demand	5.0%	5.1%	5.0%	5.0%	5.0%

(a) From Table 4, Projected Supply and Demand Comparison Under Scenario 1 (No Implementation of the Bay-Delta Plan Amendment or the Voluntary Agreement) of the 655 4th Street Project Water Supply Assessment (see Appendix A).

(b) Total retail demands correspond to those in Table 4-1 of the 2015 UWMP, except for the 2020 demand projection, which was re-projected to take into account the lower demands being experienced due to the recent drought and the lag in occupancy of built units.

(c) Local supplies (i.e., supplies not from the RWS, including groundwater, recycled water, and non-potable water) correspond to those in Table 6-7 of the 2015 UWMP, with an additional 5% reduction in retail water use (incorporated as a reduction in total retail supply) per the amended Water Supply Agreement. Local supplies are assumed to be used before RWS supplies to meet retail demand.

(d) During a single dry year and multiple dry year 1 (year 2 of SFPUC's design drought sequence), the retail allocation under the WSAP is 36.0% of available RWS supply, or 85.9 mgd. However, due to the Phased WSIP Variant, only 81 mgd of RWS supply can be delivered. RWS supply is capped at this amount.

(e) During multiple dry years 2-6 (years 3-7 of SFPUC's design drought sequence), the retail allocation under the WSAP is 37.5% of available RWS supply, or 79.5 mgd.

9.0 REFERENCES

San Francisco Public Utilities Commission. 2015 Urban Water Management Plan for the City and County of San Francisco. April 2016.

San Francisco Public Utility Commission. Water Supply Assessment for the 655 4th Street Project, May 17, 2019.

June 2016. San Francisco Public Utilities Commission. Alameda Creek Recapture Project. https://www.sfwater.org/index.aspx?page=977. Accessed in April 2020.

San Francisco Public Utilities Commission. Calaveras Dam Replacement Project. https://sfwater.org/index.aspx?page=979. Accessed in April 2020.

San Francisco Public Utilities Commission. Regional Groundwater Storage and Recovery. https://www.sfwater.org/index.aspx?page=982. Accessed in April 2020.

University of California San Francisco. Water Action Plan FY2013/2014. 2014.

APPENDIX A

Updated SFPUC Water Supply Availability and Reliability Projections

Table 4: Projected Supply and Demand Comparison Under Scenario 1
(No Implementation of the Bay-Delta Plan Amendment or the Voluntary Agreement) (mgd)

		Normal Year	Single Dry Year[1]	Multiple Dry Years							
				Year 1[1]	Year 2[2]	Year 3[2]	Year 4[2]	Year 5[2]	Year 6[2]	Year 7[3]	Year 8[3]
2020	Total Retail Demand[4]	72.1	72.1	72.1	72.1	72.1	72.1	72.1	72.1	72.1	72.1
	Total Retail Supply[5]	72.1	68.5	68.5	68.5	68.5	68.5	68.5	68.5	68.5	68.5
	Shortfall	0.0	3.6	3.6	3.6	3.6	3.6	3.6	3.6	3.6	3.6
	Shortfall as % of Demand	0.0%	5.0%	5.0%	5.0%	5.0%	5.0%	5.0%	5.0%	5.0%	5.0%
2025	Total Retail Demand[4]	79.0	79.0	79.0	79.0	79.0	79.0	79.0	79.0	79.0	79.0
	Total Retail Supply[5]	79.0	75.0	75.0	75.0	75.0	75.0	75.0	75.0	75.0	75.0
	Shortfall	0.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
	Shortfall as % of Demand	0.0%	5.0%	5.0%	5.0%	5.0%	5.0%	5.0%	5.0%	5.0%	5.0%
2030	Total Retail Demand[4]	82.3	82.3	82.3	82.3	82.3	82.3	82.3	82.3	82.3	82.3
	Total Retail Supply[5]	82.3	78.2	78.2	78.2	78.2	78.2	78.2	78.2	78.2	78.2
	Shortfall	0.0	4.1	4.1	4.1	4.1	4.1	4.1	4.1	4.1	4.1
	Shortfall as % of Demand	0.0%	5.0%	5.0%	5.0%	5.0%	5.0%	5.0%	5.0%	5.0%	5.0%
2035	Total Retail Demand[4]	85.9	85.9	85.9	85.9	85.9	85.9	85.9	85.9	85.9	85.9
	Total Retail Supply[5]	85.9	81.6	81.6	81.6	81.6	81.6	81.6	81.6	79.5	79.5
	Shortfall	0.0	4.3	4.3	4.3	4.3	4.3	4.3	4.3	6.4	6.4
	Shortfall as % of Demand	0.0%	5.0%	5.0%	5.0%	5.0%	5.0%	5.0%	5.0%	7.4%	7.4%
2040	Total Retail Demand[4]	89.9	89.9	89.9	89.9	89.9	89.9	89.9	89.9	89.9	89.9
	Total Retail Supply[5]	89.9	85.4	85.4	84.4	84.4	84.4	84.4	84.4	83.8	83.8
	Shortfall	0.0	4.5	4.5	5.5	5.5	5.5	5.5	5.5	6.1	6.1
	Shortfall as % of Demand	0.0%	5.0%	5.0%	6.2%	6.2%	6.2%	6.2%	6.2%	6.8%	6.8%

Notes:
1. During a single dry year and multiple dry year 1 (year 2 of SFPUC's design drought sequence), the retail allocation under the WSAP is 36.0% of available RWS supply, or 85.9 mgd. However, due to the Phased WSIP Variant, only 81 mgd of RWS supply can be delivered. RWS supply is capped at this amount.
2. During multiple dry years 2-6 (years 3-7 of SFPUC's design drought sequence), the retail allocation under the WSAP is 37.5% of available RWS supply, or 79.5 mgd.
3. During multiple dry years 7 and 8 (years 8 and 8.5 of SFPUC's design drought sequence), the retail allocation under the WSAP is 37.5% of available RWS supply, or 74.5 mgd.
4. Total retail demands correspond to those in ***Table 4-1 of the UWMP***, except for the 2020 demand projection, which was re-projected to take into account the lower demands being experienced due to the recent drought and the lag in occupancy of built units.
5. Local supplies (i.e., supplies not from the RWS, including groundwater, recycled water, and non-potable water) correspond to those in ***Table 6-7 of the UWMP***, with an additional 5% reduction in retail water use (incorporated as a reduction in total retail supply) per the amended Water Supply Agreement. Local supplies are assumed to be used before RWS supplies to meet retail demand.

Table 5: Projected Supply and Demand Comparison Under Scenario 3 (Implementation of the Bay-Delta Plan Amendment) (mgd)

		Normal Year	Single Dry Year[1]	Multiple Dry Years							
				Year 1[1]	Year 2[2]	Year 3[2]	Year 4[2]	Year 5[2]	Year 6[2]	Year 7[3]	Year 8[3]
2020	Total Retail Demand[4]	72.1	72.1	72.1	72.1	72.1	72.1	72.1	72.1	72.1	72.1
	Total Retail Supply[5]	72.1	68.5	68.5	68.5	68.5	68.5	68.5	68.5	68.5	68.5
	Shortfall	0.0	3.6	3.6	3.6	3.6	3.6	3.6	3.6	3.6	3.6
	Shortfall as % of Demand	0.0%	5.0%	5.0%	5.0%	5.0%	5.0%	5.0%	5.0%	5.0%	5.0%
2025	Total Retail Demand[4]	79.0	79.0	79.0	79.0	79.0	79.0	79.0	79.0	79.0	79.0
	Total Retail Supply[5]	79.0	66.7	66.7	52.8	52.8	52.8	52.8	52.8	42.9	42.9
	Shortfall	0.0	12.3	12.3	26.2	26.2	26.2	26.2	26.2	36.1	36.1
	Shortfall as % of Demand	0.0%	15.6%	15.6%	33.2%	33.2%	33.2%	33.2%	33.2%	45.7%	45.7%
2030	Total Retail Demand[4]	82.3	82.3	82.3	82.3	82.3	82.3	82.3	82.3	82.3	82.3
	Total Retail Supply[5]	82.3	68.7	68.7	54.8	54.8	54.8	54.8	54.8	44.9	44.9
	Shortfall	0.0	13.6	13.6	27.5	27.5	27.5	27.5	27.5	37.4	37.4
	Shortfall as % of Demand	0.0%	16.5%	16.5%	33.4%	33.4%	33.4%	33.4%	33.4%	45.4%	45.4%
2035	Total Retail Demand[4]	85.9	85.9	85.9	85.9	85.9	85.9	85.9	85.9	85.9	85.9
	Total Retail Supply[5]	85.9	68.8	68.8	54.9	54.9	54.9	54.9	54.9	45.0	45.0
	Shortfall	0.0	17.1	17.1	31.0	31.0	31.0	31.0	31.0	40.9	40.9
	Shortfall as % of Demand	0.0%	19.9%	19.9%	36.1%	36.1%	36.1%	36.1%	36.1%	47.6%	47.6%
2040	Total Retail Demand[4]	89.9	89.9	89.9	89.9	89.9	89.9	89.9	89.9	89.9	89.9
	Total Retail Supply[5]	89.9	68.9	68.9	55.0	55.0	55.0	55.0	55.0	45.1	45.1
	Shortfall	0.0	21.0	21.0	34.9	34.9	34.9	34.9	34.9	44.8	44.8
	Shortfall as % of Demand	0.0%	23.4%	23.4%	38.8%	38.8%	38.8%	38.8%	38.8%	49.8%	49.8%

Notes:
1. During a single dry year and multiple dry year 1 (year 2 of SFPUC's design drought sequence), the retail allocation under the WSAP is 37.5% of available RWS supply, or 59.6 mgd.
2. During multiple dry years 2-6 (years 3-7 of SFPUC's design drought sequence), the retail allocation under the WSAP is 37.5% of available RWS supply, or 45.7 mgd.
3. During multiple dry years 7 and 8 (years 8 and 8.5 of SFPUC's design drought sequence), the retail allocation under the WSAP is 37.5% of available RWS supply, or 35.8 mgd.
4. Total retail demands correspond to those in ***Table 4-1 of the UWMP***, except for the 2020 demand projection, which was re-projected to take into account the lower demands being experienced due to the recent drought and the lag in occupancy of built units.
5. Local supplies (i.e., supplies not from the RWS, including groundwater, recycled water, and non-potable water) correspond to those in ***Table 6-7 of the UWMP***. Local supplies are assumed to be used before RWS supplies to meet retail demand.

APPENDIX B

Comprehensive Parnassus Heights Plan
Land Use and Water Demand Summary Table

Appendix B. Comprehensive Parnassus Heights Plan Land Use and Water Demand Summary Table

Project	Existing Area, gsf	Area to be Demolished , gsf	Area to be Added, gsf	Net Change in Area, gsf	Net Change[a]	Units	Unit Water Demand	Units for unit water demand	Net Change in Water Demand, gpy	Net Change in Water Demand, af/year	Net Change in Water Demand, CCF/year	Net Change in Water Demand, MGD
Initial Phase												
Irving Street Arrival Improvements (Medical Building 1 modifications)	-	30,000	45,000	15,000	NA	Gross Square Feet	-	NA	-	-	-	-
Research and Academic Building (RAB)[b]	-	233,000	270,000	37,000	37,000	Gross Square Feet	0.10	gpd/gsf [c]	1,350,500	4.1	1,805	3,700.0
New Hospital	-	-	955,000	955,000	200	Beds	280	gpy/APD [d]	20,440,000	62.7	27,326	56,000.0
Initial Aldea Housing Densification	-	24,000	177,000	153,000	142	Dwelling Units	90	gpd/Dwelling unit [e]	4,664,700	14.3	6,236	12,780.0
Future Phase												
Millberry Union New Towers and Terrace	-	153,000	260,000	107,000	107,000	Gross Square Feet	0.10	gpd/gsf [c]	3,905,500	12.0	5,221	10,700.0
Hotel for Patients and Families	-	-	48,000	48,000	64	Rooms	150	gpd/room [f]	3,504,000	10.8	4,684	9,600.0
New Program Adjacent to RAB	-	135,000	582,000	447,000	447,000	Gross Square Feet	0.10	gpd/gsf [c]	16,315,500	50.1	21,812	44,700.0
West Side Housing	-	-	281,000	281,000	430	Dwelling Units	90	gpd/Dwelling unit [e]	14,125,500	43.3	18,884	38,700.0
Child Care on Proctor Site[g]	-	11,000	35,000	24,000	24,000	Gross Square Feet	0.10	gpd/gsf [c]	876,000	2.7	1,171	2,400.0
Future Phase of Aldea Housing	-	102,000	327,000	225,000	190	Dwelling Units	90	gpd/Dwelling unit [e]	6,241,500	19.2	8,344	17,100.0
Small Daycare Center at Aldea	-	-	15,000	15,000	15,000	Gross Square Feet	0.10	gpd/gsf [c]	547,500	1.7	732	1,500.0
Open Space	-	-		-			-	NA	-	-	-	-
Utilities and Infrastructure	-	-		-			-	NA	-	-	-	-
Circulation, Transportation and Parking	-	-		-			-	NA	-	-	-	-
Total Additional Demand for CPHP									71,970,700	220.9	96,218	197,180.0
Existing Parnassus Demand (2018)									118,335,096	363.2	158,202	324,205.7
Future Parnassus Demand									190,305,796	584.0	254,420	521,385.7

(a) From draft Project Description.
(b) The demolition of UC hall is accounted for in the Net Change estimate.
(c) Based on average water demand for Parnassus FY 2017/2018 (118,335,096 gallons per year/365/3,266,900 gsf).
(d) Based on water demand per Adjusted Patient Day for UC San Francisco FY 2018/2019.
(e) Based on Aldea housing water demand for 2019.
(f) Assumes three persons per room and 50 gpd/person.
(g) The demolition of the existing Kirkham and Lucia Child Care Centers are accounted for in the Net Change estimate.