CHAPTER IV Project Variants

IV.A INTRODUCTION

This section introduces five variants of the Project that were formulated by the Agency, the City and Lennar Urban, and other stakeholders. Two variants address the scenario of the San Francisco 49ers moving to the City of Santa Clara with no football stadium constructed at HPS Phase II. Those two variants include a different land use program at the HPS Phase II site. Compared to the Project, the development program of these variants at HPS Phase II would include increases in R&D space with the No Stadium—Additional Research and Development Variant (R&D Variant) and relocating residential units to HPS Phase II with the No Stadium—Housing Variant (Housing Variant). The Candlestick Point tower variant would have the same land use program and overall description as the Project, but would have different locations and heights for residential towers at Candlestick Point (expressed as three options for this variant: Candlestick Point Tower Variants A, B, and C). A utilities variant would include an automated solid waste collection system, decentralized wastewater treatment, and district energy. Another variant would include the scenario of a shared stadium where both the 49ers and Oakland Raiders would play at a new stadium at HPS Phase II.

Most of the features of the variants would be similar to the features of the Project. None of the variants would alter the Project Objectives, which are provided in detail in Chapter II (Project Description). For all of these variants, this chapter provides analysis such that this EIR would be adequate under CEQA for purposes of review and approval for any of the variants of the Project either individually or in combination with elements of the Project. The variants are analyzed at a project-level of detail, which is equal to the Project analysis included in Chapter III (Environmental Setting, Impacts, and Mitigation Measures) Section III.A through Section III.S of this document. The environmental impacts that would result from implementation of the variants are presented following the description of each variant. A comparison of the variant development programs to the Project is presented in Table IV-1 (Comparison of Variants to the Project). Table IV-2 (Impact Comparison of Project Variants) summarizes the effects of the Project compared to the variants. As necessary, figures are included to illustrate key details of the Variants and are presented below with the variant descriptions.

Table IV-1 Comparison of Variants to the Project

Differences	*Project*	*Variant 1: R&D Variant (No Stadium, Additional R&D)*	*Variant 2: Housing Variant (No Stadium, Housing)*	*Variant 3: Candlestick Point Tower Variants (Different Tower Heights)*	*Variant 4 Utilities Variant (Additional On-Site Infrastructure)*	*Variant 5 49ers/Raiders Shared Stadium*
					Same overall development plan as Project, but with minor shifts in building locations to accommodate 570,000 gsf for the proposed utility systems (with 330,000 gsf located below ground).	Same development plan as Project
Land Use Plan						
Residential (units)—Candlestick Point	7,850	7,850	**6,500**	7,850	7,850	7,850
Residential (units)—Hunters Point Phase II	2,650	2,650	**4,000**	2,650	2,650	2,650
				Same number of residential units, but different placement of towers		
Research & Development (gsf)	2,500,000	**5,000,000**	2,500,000	2,500,000	2,500,000	2,500,000
Neighborhood Retail	125,000	125,000	**125,000**	125,000	125,000	125,000
			Same overall amount of neighborhood retail as Project, but different distribution within HPS Phase II (refer to text for a description)			
Football Stadium (seats)	69,000 Stadium built by 2017	**0**	**0**	69,000 Stadium built by 2017	69,000 Stadium built by 2017	69,000 Shared stadium with 49ers and Oakland Raiders Stadium site built by 2017
Yosemite Slough Bridge	Auto/BRT/Ped	**BRT/Ped**	**BRT/Ped**	Auto/BRT/Ped	Auto/BRT/Ped	Auto/BRT/Ped
Parks, Open Space, and Recreation Uses						
Total Parks, Open Space, and Recreational Uses	336.4	**327.0**	**349.4**	336.4	336.4	337.5
New Parks	148.1	**160.5**	**158**	148.1	148.1	148.6
Sports Fields and Active Recreation	91.6	**69.8**	**94.7**	91.6	91.6	91.6
State Parklands (acres)	96.7	96.7	96.7	96.7	96.7	96.7

Boxes indicate a change in comparison to the Project.

Table IV-2 Impact Comparison of Project Variants

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

SOURCE: PBS&J, 2009.

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

IV.B VARIANT 1: R&D VARIANT (NO STADIUM—ADDITIONAL RESEARCH & DEVELOPMENT)

IV.B.1 Overview

The R&D Variant assumes that the 49ers Stadium would not be constructed, and, instead, additional R&D uses emphasizing emerging technologies would be developed at HPS Phase II. Total R&D uses with this Variant would be 5,000,000 gsf, compared to 2,500,000 gsf with the Project and developed on HPS Phase II. The land use program for Candlestick Point would remain the same as the Project. Parks and sports field areas at HPS Phase II would be decreased compared to the Project because the total development area for R&D uses would be increased.

Table IV-3 (R&D Variant Land Use Summary) presents the land use summary for the variant; Table IV-4 (R&D Variant HPS Phase II Proposed Land Use Summary) presents the land use summary on HPS Phase II. Figure IV-1 (R&D Variant Land Use Plan) illustrates proposed R&D Variant land uses.

IV.B.2 Project Objectives

The objectives for the R&D Variant would be the same as for the Project. In particular, the R&D Variant was prepared to address the following portion of Objective 1:

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

A full list of Project objectives is provided in Section II.D (Project Objectives).

IV.B.3 Characteristics

Section II.E (Project Characteristics) outlines the Project's land use plan, parks and open space plan, transportation improvements, infrastructure plan, community benefits, and green building concepts. While many of these components of the Project would also apply to this variant, the discussion below outlines the principal differences.

Candlestick Point

The land use program outlined in the Chapter II for Candlestick Point would be the same for this Housing Variant, with fewer housing units. The discussion below is focused on the changes that would occur at HPS Phase II.

Table IV-3 R&D Variant Land Use Summary

Land Use		Candlestick Point[a]	HPS Phase II	Total
Residential				
Residential Density Range I (15 to 75 units per acre)		750	680	1,430
Residential Density Range II (50 to 125 units per acre)		3,215	1,415	4,630
Residential Density Range III (100 to 175 units per acre)		2,445	265	2,710
Residential Density Range IV (175 to 285 units per acre)		1,440	290	1,730
	Total (units)	***7,850***	***2,650***	***10,500***
Retail				
Regional Retail (gsf)		635,000	N/A	635,000
Neighborhood Retail (gsf)		125,000	125,000	250,000
	Total (gsf)	***760,000***	***125,000***	***885,000***
Office (gsf)		150,000	N/A	150,000
Research & Development		N/A	5,000,000	5,000,000
Hotel (gsf)		150,000	N/A	150,000
Rooms		220	N/A	220
Artists' Studios/Art Center (gsf)		N/A	255,000	255,000
Community Services (gsf)[c]		50,000	50,000	100,000
Parks & Open Space				
New Parks (acres)		8.1	152.4	160.5
New Dual-Use Sports Fields/Multi-Use Lawn and Stadium Parking and Waterfront Recreation (acres)		N/A	69.8	69.8
Existing State Parkland Improved (acres)		91.0	N/A	91.0
New State Parkland (acres)		5.7	N/A	5.7
	Total (acres)	***104.8***	***222.2[d]***	***327.0***
Marina (slips)		N/A	300	300
Performance Venue/Arena (gsf)		75,000	N/A	75,000
Seats		10,000	N/A	10,000
Parking (spaces)				
Residential (structured)		7,850	2,650	10,500
Commercial (structured)		2,346	7,028[f]	9,374
General and Commercial (on-street)		1,360	1,678[f]	3,038

SOURCE: Lennar Urban, 2009.

a. Same as Project.
b. Research and development uses are doubled compared to the Project.
c. Community facilities may be provided that cumulatively exceed 100,000 square feet. If so, the Project contemplates an equal reduction in retail and/or research and development and/or office use. Total uses would not exceed those amounts identified in this table.
d. Parks and sports field areas at HPS Phase II would be reduced compared to the Project because land would not be reserved for dual-use turf, which allows for game day parking and active playing fields.
e. Commercial and on-street parking at HPS Phase II would be increased compared to the Project to provide parking for the additional R&D space.
f. Although there has been consideration of ferry service at HPS-II during the years of planning for this project, at this time there is no plan or specific proposal from the WETA to provide such service. While the development plan for HPS-Phase II, including the design of the shoreline improvements, would not preclude the future accommodation of a ferry terminal and ferry service should WETA decide in the future to propose and pursue such a project, it is not proposed as part of the project studied in this EIR. Any such future proposal by WETA would require a separate environmental review under CEQA.

Table IV-4 R&D Variant HPS Phase II Proposed Land Use Summary

District	*Net Acres*[a]	*Dwelling Units*	*Density*	*Neighborhood Retail (gsf)*	*Artist Space (gsf)*	*R&D (gsf)*	*Community Services (gsf)*	*Total Commercial (gsf)*	*Parks (acres)*
Hunters Point Shipyard North	27.30	2,085	I, II, III, IV	25,000	0	0	0	25,000	19.9
Hunters Point Shipyard Village Center	7.55	125	I	25,000	255,000	0	0	280,000	15.6
Research & Development	26.22	440	I, II	75,000	0	2,000,000	0	2,075,000	25.3
Hunters Point Shipyard South	62.09[b]	0	N/A	0	0	3,000,000	50,000	3,050,000	161.4
Total	***123.16***	***2,650***	***N/A***	***125,000***	***255,000***	***5,000,000***[c]	***50,000***[d]	***5,430,000***[c]	***222.2***[e]

SOURCE: Lennar Urban, 2009.

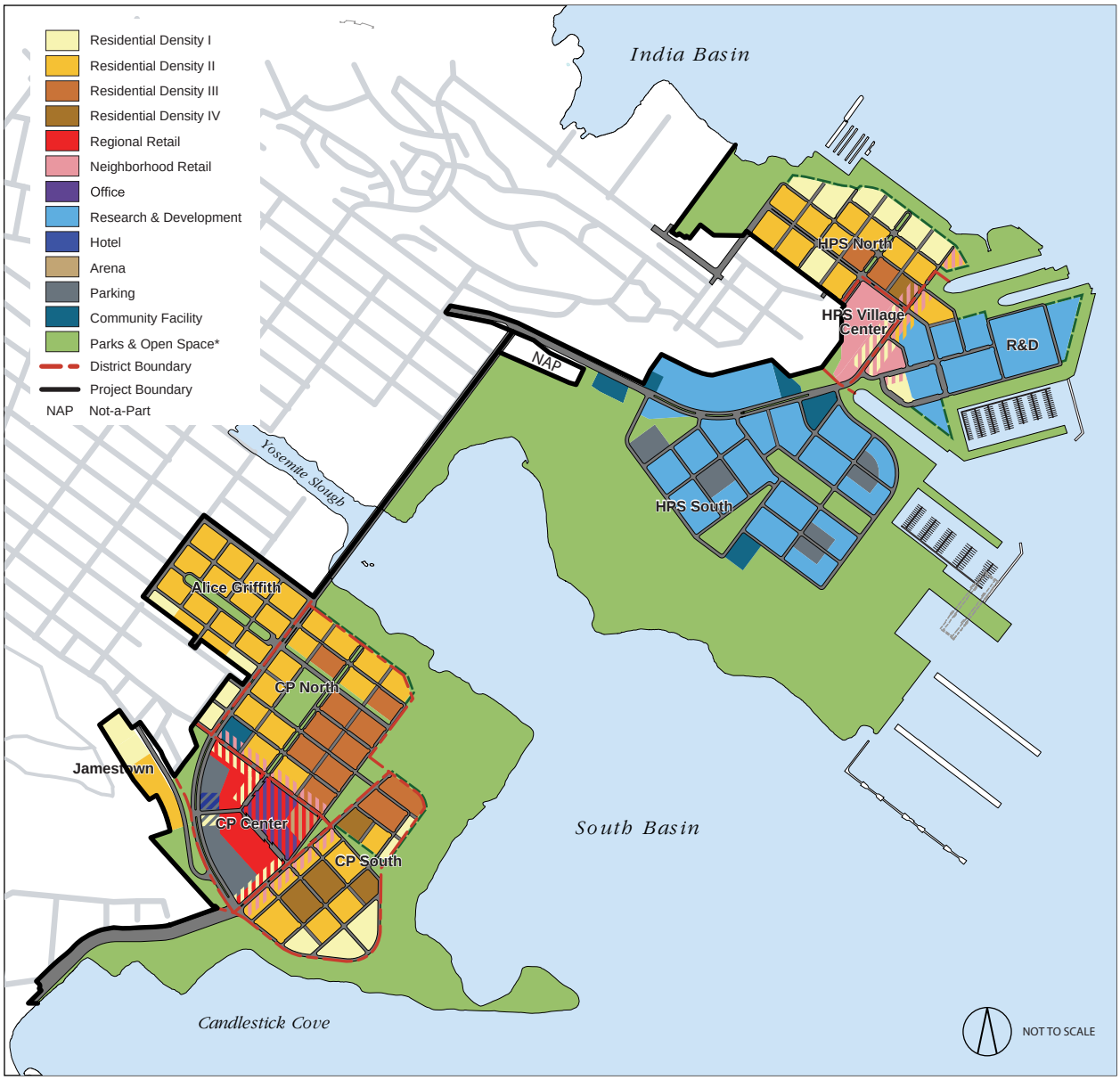
a. Net acreage excludes the street network.

b. The net acreage of the HPS South district would be increased compared to the Project (32.26 acres with stadium).

c. Research and development uses are doubled compared to the Project.

d. Community facilities parcels are intended to provide the existing BVHP community and the future Project community with dedicated land for uses designed to provide, preserve and leverage such critical local resources as social services, education, the arts and other community services, including public safety facilities such as fire and police stations and facilities for the benefit of senior citizens. Additional uses proposed for the community facilities parcels such as retail, services, offices, and R&D space, beyond the 100,000 proposed for community facilities, would be absorbed within the retail or R&D program proposed in HPS Phase II. Total uses would not exceed those amounts identified in this table

e. Parks and sports fields areas at HPS Phase II would be reduced compared to the Project because the total development area for R&D uses would be increased.



SOURCE: Lennar Urban, 2009.

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FIGURE IV-1

Candlestick Point — Hunters Point Shipyard Phase II EIR

R&D VARIANT LAND USE PLAN

Districts

As discussed in Chapter II, the HPS Phase II land use plan would consist of four districts: HPS Village Center, HPS North, R&D, and HPS South. The changes proposed with the R&D Variant compared to the Project would primarily affect the land use plan for the R&D and HPS South districts. The land uses in all other districts would be consistent with the Project, as described in detail in Chapter II. A summary of the development proposed in each of the districts with the R&D Variant is provided in Table IV-4. Figure IV-2 (R&D Variant Maximum Building Heights) illustrates the maximum building heights for the R&D Variant.

Hunters Point Shipyard South

With the R&D Variant, the 69,000-seat National Football League stadium proposed with the Project would not be constructed. Instead, the R&D Variant would result in construction of 3,000,000 gross square feet (gsf) of R&D uses in the HPS South district. Total R&D uses with this Variant would be 5,000,000 gsf, compared to 2,500,000 gsf with the Project. Parking to serve game-day patrons proposed for the R&D development site north of Crisp Road would not be required. As described below, the Sports Field Complex proposed with the R&D Variant would be 40.7 acres (19 acres smaller than the Sports Field Complex proposed with the Project).

Parks and Open Space

The R&D Variant parks and open space on Candlestick Point would be the same as the Project; this discussion focuses on HPS Phase II changes. The R&D Variant would include additional parks and would reconfigure the design and sizes of parks and open space areas at HPS Phase II compared to the Project. The Sports Field Complex proposed with the R&D Variant would be 40.7 acres, which is 19 acres less than the Sports Field Complex proposed with the Project. Approximately 9.4 acres of new parks and plaza spaces are proposed to be located adjacent to the R&D uses. With the R&D Variant, a total of 222.2 acres of parkland would be provided at HPS Phase II, 9.4 acres less than proposed with the Project. Table IV-5 (R&D Variant HPS Phase II Parks and Open Space) presents the proposed parks and open space at HPS Phase II in the R&D Variant. Figure IV-3 (R&D Variant Parks and Open Space) illustrates the location of the proposed parks and open space.

Transportation and Circulation

A new Yosemite Slough bridge serving transit, bike, and pedestrian traffic only would extend Arelious Walker Drive from Candlestick Point to HPS Phase II. The additional four auto lanes on the bridge to serve game-day traffic, proposed with the Project, are not included in the R&D Variant. The bridge would be approximately 40-feet wide and would cross the slough at the same location as the Project. The bridge and its approach streets would have two dedicated transit lanes and a separate Class I bicycle and pedestrian lane, which would be open at all times.

SOURCE: Lennar Urban, 2009.

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Candlestick Point — Hunters Point Shipyard Phase II EIR

R&D VARIANT MAXIMUM BUILDING HEIGHTS

FIGURE IV-2

Table IV-5 R&D Variant HPS Phase II Parks and Open Space

Park/Open Space		*Acres*
New Parks		
Northside Park		12.8
Waterfront Promenade		31.9
Heritage Park		15.6
Grasslands Ecology Park at Parcel E		44.9
Grasslands Ecology Park at Parcel E-2		37.8
Hunters Point Park Blocks		4.5
Hunters Point Wedge Park		2.8
R&D Plaza		2.1
	Subtotal	*152.4*
New Sports Fields and Active Urban Recreation		
Sports Field Complex		40.7
Multi-Use Lawn		22.4
Waterfront Recreation & Event Pier		6.7
	Subtotal	*69.8*
	Total	***222.2***
	Project Total	***239.5***

SOURCE: Lennar Urban, 2009.

The primary roadway connection for automobiles and other vehicular traffic between Candlestick Point and HPS Phase II would be west on Carroll Avenue to Ingalls Street, north along Ingalls Street to Thomas Avenue, and east on Thomas Avenue to Griffith Street. Ingalls Street would remain an industrial mixed-use street with two auto lanes and parking and loading zones on its northern and southern sides. The width of sidewalks on that portion of Ingalls Street from Carroll Avenue to Yosemite Avenue would be decreased from 16 feet to 11 feet to create a uniform street width to accommodate the auto lanes, parking, and loading.

At HPS Phase II, additional roadways to serve the R&D uses on HPS South would be included and commercial parking would be increased to serve the additional R&D space, compared to the Project.

Infrastructure

The location of major infrastructure improvements would be very similar to that which is proposed for the Project but rather than terminating at the stadium site, the improvements would be sited under the roadways of the HPS South district. Stormwater treatment methods are designed for site-specific conditions and have been identified for the R&D Variant and are discussed below. [1179]

[1179] Arup, *Candlestick Point/Hunters Point Shipyard LID Stormwater Opportunities Study*, August 2009.

SOURCE: Lennar Urban, RHAA, 2009.

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Candlestick Point — Hunters Point Shipyard Phase II EIR

R&D VARIANT PARKS AND OPEN SPACE

FIGURE IV-3

Implementation

Buildout of the R&D uses would begin in 2017 with completion in 2021. Figure IV-4 (R&D Variant Building and Park Construction Schedule) illustrates the overall sequence of development for the R&D Variant.

IV.B.4 Potential Environmental Effects

Overall, the R&D Variant would increase the total amount of development compared to the Project due to an increase in R&D space at HPS Phase II by 2,500,000 square feet over the Project and the reduction of a 69,000-seat stadium (approximately 1,860,000 gsf). Generally, the R&D Variant includes all uses proposed with the Project with the exception of the stadium area, which would be replaced by the additional R&D space. All characteristics of Candlestick Point would be the same as the Project; therefore, this analysis focuses on the changes that would occur at HPS Phase II. Potential construction-related environmental effects of the R&D Variant would be primarily related to an increase in the amount of total building space. Potential operational effects of the R&D Variant would be related to the day-to-day activities of the additional R&D space, which operates much like office use with increases in traffic, while avoiding the game-day traffic that would occur 12 times a year, and other event traffic that would occur 20 times a year, with a 49ers stadium.

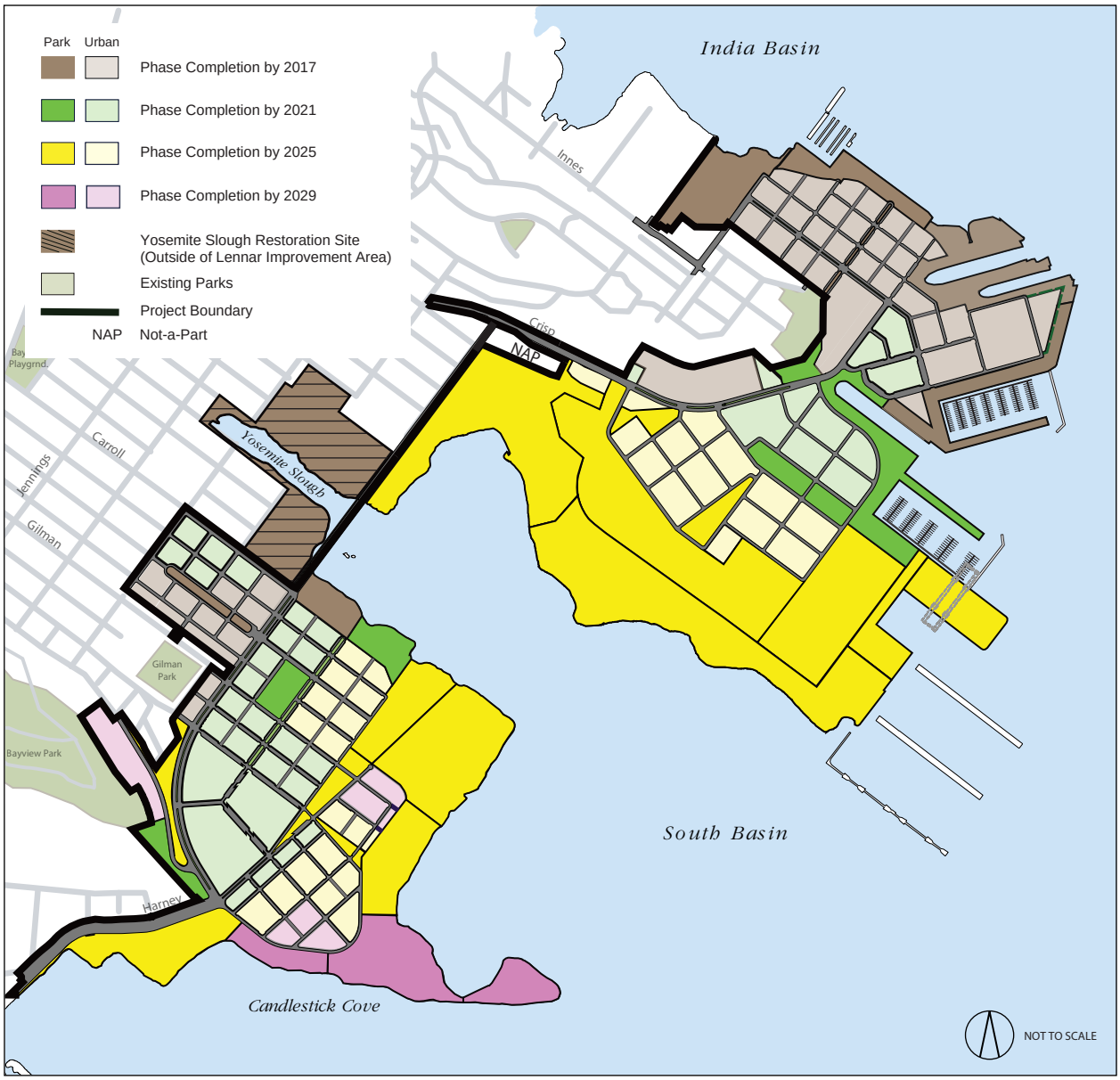
Land Use and Plans

As shown in Figure IV-1, the R&D Variant would replace the stadium proposed with the Project with an additional 2,500,000 square feet of R&D space, and a total net new gsf of 5,000,000. This would have the potential to increase land use impacts at the site as removal of the stadium from the land use program could conflict with existing applicable land use plans.

Division of an Established Community

The Project site generally includes underutilized and vacant parcels with limited access to the Bay shoreline and CPSRA. Connectivity between the Bayview Hunters Point neighborhood, Candlestick Point and HPS Phase II is limited. Large parking lots and vacant parcels at Candlestick Point separate the Bayview Hunters Point neighborhood from the Bay shoreline, and primary access roads do not include pedestrian, transit or bicycle features. Access to HPS Phase II is restricted to certain areas (those areas used for artist studios), and the area remains isolated from surrounding neighborhoods. The R&D Variant would maintain residential communities at Alice Griffith public housing and at Jamestown Avenue, similar to the Project.

The R&D Variant proposes infill development, centered on nodes of commercial and retail activity at Candlestick Point and HPS Phase II with no physical divisions. Residential and non-residential infill around these nodes of activity would provide a more continuous land use pattern and street grid, provide new services and community amenities in the Bayview Hunters Point neighborhood, allow better access to parks and recreational facilities (which would be improved under the R&D Variant), and remove existing barriers to circulation and access. The R&D Variant would not divide an established community; therefore, no impact would occur, similar to the Project.



SOURCE: Lennar Urban, 2009.

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Candlestick Point — Hunters Point Shipyard Phase II EIR

FIGURE IV-4

R&D VARIANT BUILDING AND PARK CONSTRUCTION SCHEDULE

Consistency with Plans and Policies

Applicable plans that direct or regulate development on the Project site include the San Francisco General Plan, Candlestick Point State Recreation Area General Plan, San Francisco Bay Plan, San Francisco Bay Trail Plan, Bay Area Seaport Plan, Bayview Hunters Point Area Plan, Bayview Hunters Point Redevelopment Plan, Hunters Point Shipyard Redevelopment Plan, and San Francisco Planning Code. San Francisco's Sustainability Plan also applies to the Project. While the R&D Variant is generally consistent with goals and objectives of most plans, the R&D Variant would be inconsistent with land use designations that reflect former economic realities or former plans for the site. These inconsistencies would require amendments to the relevant plans, but do not reflect any impacts to the environment that the plans and policies seek to avoid. As described in connection with the Bay Plan and Seaport Plan, the designation of industrial uses along the waterfront is not a policy adopted to protect the environment, and the R&D Variant's proposals for this land represent an environmental improvement. Inconsistencies regarding the development pattern at HPS and the uses on Candlestick Point simply reflect the shifting locations of proposed uses within the site. As the primary change in land use compared to the Project would be no-stadium use, the R&D Variant's proposed changes in the arrangement of land uses would not implicate any environmental protection objectives of the current land use designations in the redevelopment plans and other applicable land use plans; thus, the inconsistencies do not give rise to a significant impact on the environment, similar to the Project.

Change to the Land Use Character

The R&D Variant would alter the land use character at the Project site with new development of residential uses, double the amount of R&D uses contemplated under the Project, regional and neighborhood retail uses, an arena, and public open space. The R&D Variant would extend the existing street grid and block pattern into HPS Phase II. The open space network would connect to the shoreline to the north and south.

This development would be considered to improve the existing land use conditions, and would not have an adverse effect on land use character of the Project site itself.

The R&D Variant would result in a substantially different built environment compared to the existing character of the site and vicinity. With the transition in scale and uses, the extension of the existing street grid, and with the connectivity of new open space with existing shoreline open space, the R&D Variant would be compatible with surrounding land uses. In addition, the scale of development on the stadium site would be shorter with lower height limits than the 156-foot tall stadium building. The R&D Variant would not result in a substantial adverse change in the existing land use character at the Project site or vicinity. The impact would be less than significant, similar to the Project.

Population, Housing, and Employment

As shown in Figure IV-1, the R&D Variant would replace the football stadium proposed with the Project with an additional 2,500,000 square feet of R&D space. This would have the potential to increase employment opportunities at the site over levels anticipated with the Project, as discussed below

(Table IV-6 [R&D Variant Employment by Land Use]). However, the permanent residential population would not change.

Direct Impacts

With the R&D Variant, construction is scheduled for completion beginning in the Year 2017, extending through the Year 2029, a period of approximately 12 years. This is similar to the construction schedule proposed at HPS Phase II; therefore, the number of construction personnel required at any given time at HPS Phase II would be similar to the total projected to be required for the Project. Construction employment opportunities are temporary in nature and would not result in a substantial increase in the number of employees in the area. Therefore, the R&D Variant would result in a less-than-significant impact to population during construction.

Direct population growth with the R&D Variant would include residents and employees who would occupy new homes. With the R&D Variant, the football stadium proposed with the Project would be replaced with 2,500,000 square feet of additional R&D space. There would be no change to the number of proposed housing units; therefore, compared to the Project, the permanent resident population with the R&D Variant would be the same as with the Project. The R&D Variant would generate additional jobs compared to the Project. As discussed in Section III.C (Population, Housing, and Employment), the stadium is anticipated to generate approximately 359 jobs for 12 football games and 20 other events at the stadium. The R&D Variant would generate an additional approximately 6,250 jobs at HPS Phase II, which would result in a net increase of approximately 5,905 jobs over the Project. This net increase with the Variant would represent approximately 0.8 percent of the 748,100 jobs anticipated citywide in 2030; the total number of jobs with the R&D Variant would be about 2.2 percent of the total number of jobs citywide in 2030.

Although the R&D Variant would result in an increase in employment at the HPS Phase II site, growth in this area has long been the subject of many planning activities. The R&D Variant would provide all on-site infrastructure for connections to City mains, and would include on-site treatment of stormwater runoff. Therefore, the R&D development would not encourage growth where appropriate infrastructure would not be available.

Employment growth at HPS Phase II would be considered substantial if it resulted in housing demand that would exceed planned regional housing development. The R&D Variant would not alter the number of housing units proposed with the Project. Based on the total employment available with the R&D Variant (16,635 jobs), total housing demand would be approximately 12,807 units.[1180] Total demand for housing with the R&D Variant would represent 6.0 percent of the total Bay Area housing need of 214,500 units (based on the Regional Housing Needs Assessment (RHNA) targets; refer to Section III.C.3 [Regulatory Framework]) projected by ABAG through 2014.[1181] Based on the total employment available with the R&D Variant (16,635 jobs), total housing demand would be

[1180] Calculated as the projected employment divided by 1.36, plus 4.7% additional housing units to account for vacancy rate, times 55% total demand in San Francisco.
[1181] The RHNP is updated every five years and does not extend through 2030.

Table IV-6 R&D Variant Employment by Land Use

Land Use	*Employment Factor*[a]	*Development Program, Candlestick Point*[b]	*Employment, Candlestick Point (jobs)*	*Development Program, HPS Phase II*[b]	*Employment, HPS Phase II (jobs)*	*Total Employment (jobs)*
Residential	25 units/job	7,850 units	314	2,650 units	106	420
Regional Retail	350 gsf/job	635,000 gsf	1,814	0 gsf	—	1,814
Neighborhood Retail	270 gsf/job	125,000 gsf	463	125,000 gsf	463	926
Office	276 gsf/job	150,000 gsf	543	0 gsf	—	543
Research and Development	400 gsf/job	0 gsf	—	5,000,000 gsf	12,500	12,500
Hotel	700 gsf/job	150,000 gsf	214	0 gsf	—	214
Arena/Performance Venue	300 jobs/event[c]	150 events/year[c]	87	0 events	—	87
Public Parking	270 spaces/job[e]	3,706[e]	14	8,706[e]	32	46
Parks and Open Space	0.26 jobs/acre[f]	104.8[g]	27	222.2[g]	58	85
Total			***3,476***		***13,159***	***16,635***
Project Total						***10,730***

SOURCES: Economic and Planning Systems, Inc., *Fiscal Analysis of the Candlestick Point/Hunters Point Shipyard Redevelopment Project*, 2009.

a. Employment factors are from City and County of San Francisco, *Transportation Impact Analysis Guidelines*, October 2002.

b. Based on buildout floor areas provided in Table II-2 of this EIR, Chapter II for Candlestick Point, and on Table IV3 for HPS Phase II.

c. Lennar Urban, LLC estimates that there would be approximately 150 events at the arena annually and that employees would work 4-hour shifts.

d. Employment factors for public parking facilities provided by Economic and Planning Systems, Inc., 2009.

e. Parking based on Table IV-3 of this EIR, Chapter II. Includes Commercial (structured) and General and Commercial (on street). Commercial and on-street parking at HPS Phase II would be increased compared to the Project to provide parking for the additional R&D space.

f. Employment factors for parks and open space provided by Economic and Planning Systems, Inc., 2009.

g. Open space acreages based on Table II-2 of this EIR, Chapter II for Candlestick Point, and on Table IV-4 for HPS Phase II.

approximately 12,807 units. However, as discussed in Section III.C, approximately 55 percent of the workers would seek housing in the City, consistent with existing commuting patterns.[1182] As such, approximately 7,044 dwelling units would be required with the R&D Variant to meet the demand by anticipated employees. As discussed above, the R&D Variant would provide approximately 10,500 dwelling units. This would exceed the approximately 7,044 dwelling unit demand anticipated with the R&D Variant. Therefore, the population increase associated with employment with the R&D Variant could be entirely accommodated. However, it is likely that some employees with the R&D Variant would elect to live elsewhere in the City or within surrounding Bay Area communities. Based on existing commuting patterns, the R&D Variant would generate a demand for about 5,763 units in surrounding Bay Area communities. This housing demand would be dispersed throughout the nine-county Bay Area, which would result in negligible potential increases in housing demand within the Bay Area.

It is not anticipated that the increase in employment with the R&D Variant would create a substantial demand for housing in the immediate neighborhood, in San Francisco, or in the region in excess of the housing provided as part of the R&D Variant or housing otherwise available in the Bay Area. Necessary improvements to infrastructure, public services, and housing associated with direct population growth proposed as part of the R&D Variant has been anticipated in ongoing local and regional planning activities. All impacts associated with direct population growth are considered less than significant, similar to the Project.

Indirect Impacts

As infrastructure, public services, roads, and other services and communities amenities are expanded, there would also be potential for development with the R&D Variant to generate indirect population growth. Indirect growth is often defined as "leapfrog" development, development that occurs as infrastructure is expanded to previously un-served areas. Such development patterns usually occur in suburban areas adjacent to undeveloped lands. Areas surrounding the R&D Variant site are built out, except for sites such as Executive Park or India Basin that are currently undergoing development or are the subject of planned future development. Thus, the surrounding lands are not vulnerable to leapfrog-type development.

Infrastructure and services would be expanded to serve both the Candlestick Point and HPS Phase II sites, without significant excess capacity that might encourage additional local growth beyond that already anticipated with Proposition G and with the redevelopment plans. Development with the R&D Variant would not expand infrastructure to geographic areas that were not previously served, nor would it create new transportation access to a previously inaccessible area. All impacts associated with indirect population growth are considered less than significant, similar to the Project.

The potential for impacts due to housing displacement would be substantially similar to the Project. No housing or residents would be displaced. There would be no impact, the same as under the Project. The R&D Variant would not increase residential units proposed with the Project.

[1182] This assumption provides a conservative estimate of the housing demand that the Project would generate in other Bay Area communities, such as nearby cities in San Mateo County. Information pertaining to commuting trends was derived from US Department of Transportation, *Census 2000 Transportation Planning Package*, 2006.

Transportation and Circulation

The R&D Variant would increase the total amount of development compared to the Project with an increase in R&D space at HPS Phase II of 2,500,000 gsf; there would be no 69,000-seat football stadium. Therefore, the R&D Variant would not have game day or other stadium event transportation impacts associated with the Project. The R&D Variant would have the same arena-related transportation effects as with the Project. The R&D Variant would have the same roadway, transit, bikeway, and Bay Trail improvements proposed with the Project, including the Yosemite Slough bridge. However, the bridge would be narrower than the bridge with the Project, with a 39-foot-wide right-of-way to accommodate two 11-foot-wide BRT lanes, a sidewalk, and a Class I bicycle path. At HPS Phase II, this variant would have additional roadways to serve the R&D uses at HPS South and commercial parking would be increased to serve the additional R&D space, compared to the Project.

The R&D Variant would include a Transportation System Management plan and would develop and implement a Transportation Demand Management plan, as with the Project.

The Transportation Study analyzed the R&D Variant and conclusions from the Transportation Study are presented below.

Construction Impacts

Construction activities associated with the R&D Variant would be similar to the Project. Depending on the phasing of the additional development, the R&D Variant may result in fewer construction traffic impacts between future years 2012 and 2017 when the new stadium would be constructed, and somewhat greater impacts in the years the additional R&D space would be constructed. Implementation of a Construction Traffic Management Program (the same as described for the Project) would help minimize the R&D Variant's contribution to cumulative construction-related traffic impacts. However, since some disruption and increased delays could still occur even with implementation of traffic control plans, it is possible that significant construction-related traffic impacts on local and regional roadways could still occur. Localized construction-related traffic impacts would therefore remain significant and unavoidable.

Trip Generation

The R&D Variant would have 236,291 total daily person trips and would generate 16,253 weekday AM trips, 22,586 weekday PM trips, and 19,719 Sunday PM trips. The total trips would be greater than the Project trips.

Intersection Conditions

With the R&D Variant, 44 of the 60 study intersections would operate at LOS E or LOS F conditions during the weekday AM or PM, or Sunday PM peak hours. Development associated with the R&D Variant would result in significant unavoidable impacts at 31 intersections. The R&D Variant would have similar project and cumulative effects at most study intersections as would occur with the Project. Section III.D, discusses traffic effects those intersections, and the feasibility of mitigation measures. As noted in Impact TR-3, Impact TR-4, Impact TR-5, Impact TR-6, and Impact TR-8, Project intersection impacts, including cumulative impacts, would remain significant and unavoidable. Those conclusions

would apply as well to the R&D Variant. At five locations, the R&D Variant would have significant project-level or cumulative effects on intersection conditions that would not occur with the Project. As discussed below, at three of the five intersections, the R&D Variant impacts would be significant and unavoidable, and at two of the five intersections, the impacts would be less than significant with mitigation.

The intersection of Crisp/Palou is currently un-signalized, but would be signalized with implementation of the R&D Variant (and the Project). With the R&D Variant, the intersection of Crisp/Palou would worsen in the AM and PM peak hours from LOS E with 2030 No Project conditions to LOS F with the R&D Variant.

Striping the southbound approach to provide a dedicated left-turn lane and a shared through/right-turn lane, and prohibiting on-street parking on Griffith Street between Palou Avenue and Oakdale Avenue would result in an LOS D at the intersection. Implementation of this improvement would be the responsibility of SFMTA and DPW, the Project Applicant shall contribute its fair-share toward construction of this mitigation measure. Prior to payment of the contribution, the City shall create a mechanism to determine and receive fair share contributions from the Project Applicant. The SFMTA and DPW shall design and implement the measure as necessary.

With implementation of this measure, the Crisp/Palou intersection would operate at acceptable LOS D or better in the AM and PM peak hours, and therefore R&D Variant and cumulative impacts at this intersection would be less than significant.

The intersection of Ingalls/Carroll is un-signalized, but would be signalized with implementation of the R&D Variant. The intersection of Ingalls/Carroll would worsen in the PM peak hour from LOS C under year 2030 No Project conditions to LOS E with the R&D Variant. The degradation in level of service at this intersection would primarily be due to heavy increases in traffic on Ingalls Street, particularly in the southbound direction in the PM peak hour. Ingalls Street would serve as the most direct auto traffic route for traffic from the Hunters Point Shipyard site destined for Candlestick Point and US-101. Therefore, it would experience substantial traffic increases as part of the R&D Variant.

To accommodate additional right-of-way needed for additional lanes on southbound Ingalls, Ingalls Street would need to be widened to the east and west. This would require prohibition of on-street parking, which the industrial businesses on this section of Ingalls Street use for loading and unloading, or would require substantial narrowing of the sidewalks. Narrowing of sidewalks would create longer pedestrian crossing distances, and would require more pedestrian crossing time as part of a signal phasing plan. Because widening Ingalls Street would worsen pedestrian conditions, this mitigation was considered infeasible. Alternatively, a mitigation measure that reduced travel demand on Ingalls Street by providing an alternate route, such as the Yosemite Slough bridge, would improve operations at this intersection. The proposed new bridge across Yosemite Slough would accommodate four lanes of traffic on game days only plus two transit-only lanes, open at all times, under the Project scenario. However, allowing traffic on the Yosemite Slough bridge at all times would have potential secondary impacts to Yosemite Slough associated with noise, air quality, and visual impacts, and would be inconsistent with the overall character of the Yosemite Slough restoration. Therefore, opening the Yosemite Slough bridge to regular traffic was not considered further.

Since widening Ingalls Street and providing an alternate traffic route via the Yosemite Slough bridge would not be feasible, R&D Variant-related and cumulative impacts at this intersection would be significant and unavoidable.

At the signalized intersection of Bayshore/Oakdale, the intersection operating conditions would worsen in the PM peak hour from LOS C under 2030 No Project conditions to LOS E with the R&D Variant. The degradation in level of service would primarily be due to forecasted substantial traffic volume increases on Bayshore Boulevard. Mitigation for this impact would involve increasing capacity on Bayshore Boulevard. There is inadequate right-of-way to provide additional lanes on Bayshore Boulevard without widening the roadway. Roadway widening would require major right-of-way acquisition along the entire Bayshore Boulevard corridor, at substantial cost and displacement of existing homes and businesses. R&D Variant and cumulative impacts at this intersection would be significant and unavoidable.

At the un-signalized intersection of Innes/Earl, operating conditions would worsen in the PM peak hour from LOS C under 2030 No Project conditions to LOS E with the R&D Variant, and traffic signal warrants would be met. The intersection is proposed as a side street STOP sign controlled intersection, with movements along Innes Avenue uncontrolled and movements on southbound Earl Street controlled by a STOP sign. The degradation in level of service would be primarily due to large increases in traffic along Innes Avenue. The high traffic volumes on Innes Avenue would cause additional delay for traffic attempting to exit Earl Street, which is assumed to provide a single lane to accommodate both southbound right-turns and southbound left-turns onto Innes. The R&D Variant would result in higher volumes of traffic along Innes Avenue than the Project, therefore creating higher delays for southbound traffic on Earl Street.

Installing a traffic signal at the intersection of Innes/Earl would improve intersection operations to LOS D or better conditions. This intersection would be close to meeting peak-hour traffic signal warrants with build-out of the R&D Variant. The Project Applicant, in collaboration with the City, shall monitor traffic volumes as the Project builds out to determine whether the intersection volumes would actually warrant a traffic signal. Based on the monitoring, if the City determines a traffic signal is warranted, the Project Applicant shall be required to install a traffic signal as part of later development phases.

Implementation of this improvement would be the responsibility of SFMTA, and should be implemented when traffic conditions worsen to unacceptable levels. Since this mitigation has also been identified as needed for 2030 No Project conditions, the Project Applicant shall contribute its fair-share toward construction of this mitigation measure. Prior to payment of the contribution, the City shall create a mechanism to determine and receive fair share contributions from the Project Applicant. The SFMTA and DPW shall design and implement the measure as necessary.

With implementation of the signalization, R&D Variant and cumulative impacts at the Innes/Earl intersection would be less than significant.

With the R&D Variant, the Evans/Jennings intersection would be signalized and restriped to accommodate the future travel patterns, and the intersection would operate at LOS E in the AM peak hour, and the R&D Variant would contribute considerably to the poor operating conditions. Additional

capacity would be required in the eastbound and southbound directions to accommodate the additional vehicles generated by the R&D Variant. Additional lanes would require substantial right-of-way acquisition to the north or south of Evans Avenue, and on Jennings Street. Right-of-way acquisition is not considered feasible, and therefore, R&D Variant-related and cumulative impacts at Evans/Jennings would be significant and unavoidable.

Traffic spillover effects with the R&D Variant would be significant and unavoidable, as with the Project.

Freeway Conditions

The R&D Variant effects on freeway mainline sections would be similar to the Project, although the magnitude of impacts may be greater with the R&D Variant due to increased traffic generation compared to the Project. The R&D Variant would cause the mainline section of US-101 northbound from Sierra Point to Alana/Harney/Geneva to deteriorate from LOS E to LOS F in the AM peak hour. This would be an additional significant impact associated with the R&D Variant. However, no feasible mitigation measures have been identified for the freeway segments expected to experience significant impacts with 2030 No Project conditions or with the Project. Therefore, the R&D Variant-related and cumulative effects freeway operating conditions on this segment would be considered significant and unavoidable.

The R&D Variant effects on freeway ramp junctions would be similar to the Project, although the magnitude of impacts may be greater with the R&D Variant due to increased traffic generation compared to the Project. As described for Project impacts, no feasible mitigation measures have been identified for future freeway ramp junction conditions. Therefore, the R&D Variant contribution to freeway ramp operating conditions would be considered significant and unavoidable.

The R&D Variant ramp queuing effects would be similar to Project effects. The R&D Variant would result in significant impacts with respect to ramp queuing at the same off-ramp locations as the Project, with one exception. With the R&D Variant, the US-101 northbound off-ramp to Harney Way would not be likely to experience queues extending back to the mainline in the PM peak hour. However, the R&D Variant's contribution to other impacts associated with queuing would be the same as the Project. As described for Project impacts, no feasible mitigation measures have been identified for the freeway off-ramps expected to experience significant impacts. Therefore, the R&D Variant's contribution to freeway segments operating at LOS E or LOS F conditions would be considered significant and unavoidable.

Transit Impacts

The R&D Variant, as with the Project, would include extended and new transit services; transit trips with the R&D Variant would be accommodated within the capacity of these services. The R&D Variant, as with the Project, would have a less than significant impact with mitigation on local and regional transit capacity. However, as with the Project, transit impacts would occur from traffic congestion delay. Overall, those transit delay conditions with the R&D Variant would affect the same lines as with the Project as presented in Section III.D, Impact TR-21 to Impact TR-30. Project mitigation measures MM TR-21 to MM TR-30 would also apply to the R&D Variant, but as concluded in Section III.D, the feasibility or implementation of the measures is uncertain, and the transit delay effects would remain significant and unavoidable.

The R&D Variant would require additional vehicles on the same routes as the Project. During the PM peak hour, the R&D Variant would require additional vehicles on the same routes as the Project; the R&D Variant would require additional vehicles on the 48-Quintara. Impacts associated with the R&D Variant would be more extensive than those for the Project, and would be significant and unavoidable.

Bicycle Impacts

The R&D Variant bicycle trips would be accommodated within the proposed street and network, and impacts on bicycle circulation would be less than significant.

Pedestrian Impacts

The R&D Variant would be accommodated within the proposed sidewalk and pedestrian network, and impacts on pedestrian circulation would be less than significant.

Parking Impacts

The R&D Variant would result in a demand for about 25,165 spaces, compared with a maximum permitted supply of about 19,874 spaces; therefore, the maximum off-street parking supply would be about 5,290 spaces fewer than the estimated peak demand. The Project would have a demand for 21,233 spaces and maximum supply of 16,874 spaces, about 4,360 spaces fewer than estimated peak demand. Due to parking supply constraints and accessibility to transit, future R&D Variant parking demand may be somewhat lower than estimated, and therefore the parking space shortfall would also be less than the number of spaces that would be required in order to accommodate all the vehicles anticipated if the proposed parking supply was unconstrained. Since the parking supply would be constrained, the actual parking demand would be expected to be less. As discussed in Section III.D, peak parking demand would not represent do not occur simultaneously; public parking facilities, such as the one proposed in Candlestick Point, and on-street parking spaces can usually be shared efficiently among many destinations; and the R&D Variant would include a Travel Demand Management program that includes a number of parking strategies to make auto use and ownership less attractive, as well as strategies to encourage alternative modes.

As noted for the Project, it is possible that some drivers may seek available parking in adjacent Bayview residential areas to the west. The potential increase in parking demand in adjacent neighborhoods would likely spill over to streets with existing industrial uses in the vicinity, which could, in turn, increase demand for parking in nearby Bayview residential areas. Parking supply is not considered a permanent physical condition, and changes in the parking supply would not be a significant environmental impact under CEQA, but rather a social effect. The loss of parking may cause potential secondary effects, which would include cars circling and looking for a parking space in neighboring streets. The secondary effects of drivers searching for parking is typically offset by a reduction in vehicle trips due to some drivers, who are aware of constrained parking conditions in a given area, shifting to other modes. Hence, any secondary environmental impacts that may result from a shortfall in parking would be minor. Therefore, the parking shortfall would not result in significant parking impacts, and R&D Variants impacts on parking would be less than significant.

The R&D Variant would have less than significant effects on other transportation conditions (loading, air traffic, emergency access).

Aesthetics

As shown in Figure IV-1, the R&D Variant would replace the 49ers stadium proposed with the Project with an additional 2,500,000 gsf of R&D space. Construction impacts would be substantially similar to the Project. Operational impacts would be similar but less than those identified with the Project, as the proposed R&D buildings would be lower in height than the stadium. All other urban design and building forms with the R&D Variant, and resulting effects, would be similar to conditions with the Project.

Construction

As noted above, construction impacts of the R&D Variant on the visual character of the area would be similar to the Project, except that the R&D uses would be constructed by 2021, later than the 2017 construction of the Project stadium. This would not change the significance of impacts. Construction activities would occur throughout the 702-acre R&D Variant site over the approximately 19-year build-out period, ending in 2029. Visual impacts associated with construction activities would include exposed pads and staging areas for grading, excavation, and construction equipment. In addition, temporary structures could be located on the site during various stages of demolition or construction, within materials storage areas, or associated with construction debris piles on and off site. Exposed trenches, roadway bedding (soil and gravel), spoils/debris piles, and possibly steel plates would be visible for the proposed utilities and infrastructure improvements, as well as for roadway improvements. Although these activities would take place primarily within the R&D Variant site, they would be visible to surrounding land uses. However, these visual conditions would be temporary visual distractions typically associated with construction activities and commonly encountered in developed areas. Further, temporary conditions (e.g., bulldozers, trenching equipment, generators, trucks, etc.) associated with construction would not result in obstruction of a scenic vista, as construction equipment is not tall enough to interfere with views of the Bay, the East Bay hills, or the San Francisco downtown skyline. The R&D Variant site is not located within a state scenic highway. The only scenic resources on or near the site are the CPSRA, the Re-gunning crane, Yosemite Slough, the shoreline, the Bay, San Bruno Mountain, and Bayview Hill. There are no rock outcroppings or major areas of landscaping on the site, although some ruderal vegetation would be removed. Construction of the R&D Variant would not affect the Re-gunning crane, which would remain intact after implementation of the R&D Variant. Therefore, construction activities would have a less-than-significant impact on scenic vistas and scenic resources, similar to the Project. Mitigation measure MM AE-2 (Mitigation for Visual Character/Quality Impacts during Construction) would further reduce potential impacts to the visual character of the area.

Construction impacts of the R&D Variant to light and glare would be similar to the Project. Construction would occur during daylight hours, generally between 7:00 A.M. and 8:00 P.M. or as otherwise allowed by the City. A minimal amount of glare could result from reflection of sunlight off windows of trucks, but this would be negligible and would not affect daytime views in the area. Security lighting would be provided after hours on all construction sites, but this lighting would be minimal, restricted to the R&D Variant site, and would not exceed the level of existing night lighting levels in urban areas. In addition, construction lighting would comply with any City of San Francisco lighting

requirements. Therefore, construction activities would have a less-than-significant impact due to light and glare.

Operation

Operational impacts to views would be substantially similar to the impacts of the Project. Development at Candlestick Point would remain the same as with the Project and impacts would be the same as identified with the Project. With the R&D Variant, the football stadium proposed with the Project would be replaced with 2,500,000 square feet of additional R&D space at the HPS Phase II site (Figure IV-5 [R&D Variant Northeast from CPSRA]). The proposed 69,000-seat 49ers football stadium would be approximately 156 feet tall (about 15 stories) above the adjacent playing field. In contrast, buildings constructed as part of the R&D development would range in height from 40 feet to 65 feet, a minimum of approximately 90 feet below the heights proposed with the Project. The area surrounding the additional R&D space would be developed with new open space to the west, south, and east, and by new R&D uses to the north. With respect to adjacent neighborhoods, the HPS Phase II North district would be south of the India Basin neighborhood (Figure IV-6 [R&D Variant South from Hilltop Open Space]). Therefore, development with the R&D Variant would result in a less-than-significant impact due to obstruction of a view or scenic vista, similar to the Project.

Development of the R&D Variant would have substantially similar impacts to the Project regarding the potential for damaging scenic resources, including, but not limited to, trees, rock outcroppings, and other features of the built or natural environment that contribute to a scenic public setting because design of the proposed R&D buildings would be of appropriate height, massing, and architectural treatment. The R&D Variant would replace the development program of the football stadium proposed with the Project with 2,500,000 square feet of additional R&D space. Development at Candlestick Point would remain the same as with the Project and impacts would be the same as identified with the Project. At the HPS Phase II site, the R&D Variant would continue to remove old, deteriorating structures associated with ship repair, piers, dry-docks, storage, and administrative uses and replace these structures with new development. Currently, HPS Phase II contains limited landscaping and is primarily a degraded industrial setting. Bayview Hill is a prominent scenic resource on the site and would remain intact with the R&D Variant development with the exception of close-in vantage points, which may be altered. The R&D Variant site is not located within a state scenic highway. The R&D Variant would retain structures at the potential HPS Drydock Historic District, as well as the Re-gunning crane, a highly visible visual reference point. Development of the HPS Phase II site with the R&D Variant would also include about 327 acres of new and renovated parkland, open space, and sports fields, with improved public access, thereby improving the scenic quality of the area (this is 9.4 fewer acres than the Project would provide). Therefore, development at the HPS Phase II site would not have significant adverse impacts on scenic resources or other features that contribute to a scenic public setting, and the impact would be less than significant. Additionally, the R&D Variant development would not substantially degrade the visual quality or character of the R&D Variant site or its surroundings and the impact would be less than significant.

Existing

Proposed

SOURCE: Lennar Urban, 2009.

PBS&J 10.31.09 08068 | JCS | 09

FIGURE IV-5

Candlestick Point — Hunters Point Shipyard Phase II EIR

R&D VARIANT NORTHEAST FROM CPSRA

SOURCE: Lennar Urban, 2009.

PBS&J 10.31.09 08068 | JCS | 09

FIGURE IV-6

Candlestick Point — Hunters Point Shipyard Phase II EIR

R&D VARIANT SOUTH FROM HILLTOP OPEN SPACE

The R&D Variant would not include the field lighting and other nighttime lighting associated with the 49ers stadium. The Variant would have way-finding, security, and street lighting associated with R&D uses and other development at HPS Phase II. The R&D Variant would not interfere with any existing views of the night sky from across the Bay, nor would glare affect these views, similar to the Project. New sources of light associated with neighborhood retail use during the evening and residential uses at night could result from the R&D Variant, similar to the Project. Impacts of the R&D Variant would be slightly less than the Project due to the elimination of the stadium, and would result in a less-than-significant impact with incorporation of mitigation measures MM AE-7a.1 (parking lot lighting), MM AE-7a.2 (landscape and sign illumination), MM AE-7a.3 (lighting plan), and MM AE-7a.4 (nonreflective materials).

Shadows

As shown in Figure IV-1 (R&D Variant Land Use Plan), the R&D Variant would replace the football stadium proposed under the Project with an additional 2,500,000 square feet of R&D space. Operational impacts would be similar to those identified under the Project, although shade impacts would be slightly less, as the proposed R&D buildings would be lower in height than the stadium.

Construction

As with the Project, construction activities of the R&D Variant would not result in shadow effects on open space.

Operation

For the R&D Variant, development at Candlestick Point would be the same as the Project. Thus although development at Candlestick Point would result in new structures with the potential to cast shadows on existing or proposed parks and open space, shadows would not substantially affect outdoor recreation facilities or other public areas and impacts would be less than significant, same as the Project.

As shown in Figure IV-2, the R&D Variant would develop buildings up to 65 feet high in the Hunters Point Shipyard South district, compared to the 49ers stadium up to 156 feet high with the Project. All other land use and building heights in the Hunters Point Shipyard North, Hunters Point Shipyard Village Center, and the R&D districts would be the same as with the Project. Overall, shadow effects of the R&D Variant at HPS Phase II would be similar to effects with the Project.

HPS Phase II would include new open space at Grasslands Ecology Park, Sports Fields, and Multi-Use Lawn at Hunters Point Shipyard South, the Waterfront Recreation Pier, the Waterfront Promenade, Heritage Park, and Northside Park. The R&D Variant would have a different configuration of open space at Hunters Point Shipyard South than the Project. Refer to Figure IV-1.

As the building heights and land uses at Hunters Point Shipyard North, Hunters Point Shipyard Village Center, and the R&D districts would be the same for the R&D Variant as the Project, development at those locations would not add shade year round to existing public open space, including India Basin Shoreline Park and India Basin Open Space.

During morning and mid-day periods from September through March, the R&D Variant would have similar shading effects as the Project, on Grasslands Ecology Park near Crisp Road, Heritage Park, and Hillside Parks and Open Space. In mid-afternoon, the Variant would shade the Waterfront Promenade. During summer months, the R&D Variant Shade effects would be similar to the Project, with shade on Grasslands Ecology Park near Crisp Road, Heritage Park, and Hillside Open Space. Although the R&D Variant would cast shadows on recreational and open space, it would not substantially affect outdoor recreation facilities or other public areas or have an adverse effect on the use of the open space and impacts would be less than significant, similar to the Project.

Wind

As shown in Figure IV-2, the R&D Variant would replace the 156-foot tall football stadium with 40- and 65-foot-tall R&D buildings, substantially less than the 100-foot height threshold at which wind impacts are anticipated.

Construction

Construction activities of the R&D Variant would not result in additional wind impacts, similar to the Project. Impacts such as fugitive dust emissions and erosion from wind are addressed in Section III.H (Air Quality) and Section III.M (Hydrology and Water Quality).

Operation

Building structures near or greater than 100 feet in height could have effects on pedestrian-level conditions such that the wind hazard criteria of 26 mph equivalent wind speed for a single hour of the year would be exceeded. There is no threshold height that triggers the need for wind tunnel testing to determine whether the building design would result in street-level winds that exceed the standard. It is generally understood, however, from wind tunnel testing on a variety of projects in San Francisco, that most, if not all, buildings under 100 feet do not result in adverse wind effects at street level barring unusual circumstances.

For the R&D Variant, development at Candlestick Point would be the same as the Project. Thus development at Candlestick Point would result in new structures with the potential generate winds that could affect ground-level pedestrian spaces. Implementation of mitigation measure MM W-1a (Building Design Wind Analysis), which would require a design review process for buildings greater than 100 feet in height, and if determined to be necessary, inclusion of a design criteria to reduce pedestrian-level impacts, would reduce impacts to a less than significant level, similar to the project.

Development at HPS Phase II would replace the 156 high football stadium with R&D buildings with heights of 65 and 40 feet, which is less than the 100 foot height threshold at which buildings could generate winds that could affect ground-level pedestrian spaces. Thus, with the reduction in building heights, impacts at HPS Phase II would be less than significant. As the additional R&D uses would not exceed 100 feet in height and would not result in adverse wind effects, impacts would be less than the Project.

Air Quality

As shown in Table IV-1, the R&D Variant would replace the 49ers stadium proposed with the Project with an additional 2,500,000 gsf of R&D space (total R&D uses would equal 5,000,000 gsf). Construction impacts would be substantially similar to the Project. Operational impacts would be similar but greater than those identified under the Project as the proposed additional R&D development would result in greater daily criteria pollutant emissions than the stadium.

Construction

As stated above, overall construction impacts of the R&D Variant with respect to air quality would be similar to the Project. Construction activities would occur throughout the 702-acre R&D Variant site over the approximately 20-year build-out period ending in 2029, with the construction of the additional R&D facilities occurring between 2017 and 2021. Similar to the Project, construction activities under the R&D Variant would include site preparation, grading, placement of infrastructure, placement of foundations for structures, and fabrication of structures. Demolition, excavation and construction activities would require the use of heavy trucks, excavating and grading equipment, concrete breakers, concrete mixers, and other mobile and stationary construction equipment. Emissions during construction would be caused by material handling, traffic on unpaved or unimproved surfaces, demolition of structures, use of paving materials and architectural coatings, exhaust from construction worker vehicle trips, and exhaust from diesel-powered construction equipment.

With respect to construction emissions, construction-related emissions are generally short-term in duration, but may still cause adverse air quality impacts. However, the BAAQMD does not recommend any significance thresholds for the emissions during construction. Instead, the BAAQMD bases the criteria on a consideration of the mitigation measures to be implemented. If all appropriate emissions mitigation measures recommended by the BAAQMD CEQA Guidelines are implemented for a project, construction emissions are not considered adverse. Fine particulate matter (PM_{10}) is the pollutant of greatest concern with respect to construction activities.[1183] Any project within the City of San Francisco, including the R&D Variant, would be required to comply with *San Francisco Health Code* Article 22B, Construction Dust Control, which requires the preparation of a site-specific dust control plan, (with mandatory mitigation measures similar to the BAAQMD's) for construction projects within 1,000 feet of sensitive receptors (residence, school, childcare center, hospital or other health-care facility or group-living quarters). As such, with implementation of mitigation MM HZ-15, which identifies specific mitigation measures that would be used to reduce emissions associated with construction, impacts would be less than significant, similar to the Project.

With respect to airborne human health risks, construction activities associated with the R&D Variant would increase the levels of two potential human health risks: (1) diesel particulate matter (DPM) and (2) dust or particulate matter (PM_{10}) bound to certain metals and/or organic compounds from on-site soils. MM AQ-2.1 (Implement Accelerated Emission Control Device Installation on Construction Equipment) and MM AQ-2.2 (Implement Accelerated Emission Control Device Installation on Construction Equipment Used for Alice Griffith Parcels) would address construction sources of DPM

[1183] BAAQMD. 1999. *BAAQMD CEQA Guidelines – Assessing the Air Quality Impacts of Projects and Plans*. December.

including off-road construction equipment such as lifts, loaders, excavators, dozers, and graders. In addition, the delivery of equipment and construction materials, spoils and debris hauling, and employee commute traffic could contribute to construction-related DPM emissions. In terms of DPM, ENVIRON prepared a human health risk assessment (HRA)[1184] that evaluated potential human health risks associated with construction and operation of the Project quantitatively and the proposed variants qualitatively, including the R&D Variant. As construction emissions associated with the R&D Variant are expected to be lower than those associated with construction of a stadium in the same location (e.g., Project), the R&D Variant would have lower impacts than the Project.

The HRA evaluated potential impacts to numerous receptors (off-site residents, off-site workers, off-site students, and on-site residents) in and around the Project. BAAQMD CEQA Guidelines have an established threshold of 10 in one million for carcinogenic health risks; the HRA concluded that the inhalation cancer risk at the MEI would be 4.5 in one million. This represents the maximum level of DPM experienced by all off-site and on-site (i.e., Alice Griffith) sensitive receptors during Project construction activities. Exposure to DPM from construction activities associated with the Project would not exceed the threshold. The R&D Variant is not anticipated to exceed Project impacts and therefore would not exceed the BAAQMD CEQA threshold. In addition, the HRA concluded the maximum chronic noncancer HI to be 0.01, which is below the BAAQMD's significance threshold of 1.0.

As the carcinogenic and non-carcinogenic health risks posed by DPM emissions during construction activities associated with development of the R&D Variant have been determined to be below established thresholds, this impact is less than significant with MM AQ-2.1 and MM AQ-2.2, similar to the Project.

Similar to the Project, construction activities at both Candlestick Point and HPS Phase II for the R&D Variant have the potential to generate TACs associated with soil-PM_{10} and an HRA evaluated the potential concentrations of the airborne soil-PM_{10} at numerous receptors on site (residents at the Alice Griffith Public Housing units) and off site (adult and child residents, workers, and schoolchildren) in the Project vicinity. As the carcinogenic and noncarcinogenic health risks posed by soil-PM_{10} emissions during construction activities associated with development of the Project have been determined to be below established thresholds, the same impacts would be expected from the R&D Variant. This impact is less than significant with MM HZ-15, similar to the Project.

Operation

Operational impacts to regional and local air quality would be substantially similar to the Project. Development at Candlestick Point would remain the same as under the Project and impacts would be the same as identified under the Project. Under the R&D Variant, the football stadium proposed under the Project would be replaced with 2,500,000 square feet of additional R&D space at the HPS Phase II site. Due to the additional vehicular trips associated with the increased amount of R&D uses under this variant, the level of emissions anticipated under the R&D Variant would be greater than the Project, as shown in Table IV-7. The difference in daily criteria pollutants would increase under the R&D Variant compared to the Project by 6 to 12 percent.

[1184] Environ. 2009. Ambient Air Quality Human Health Risk Assessment: Candlestick Point – Hunters Point Shipyard Phase II Development Plan. September 28. Appendices I & II of the report.

However, both the R&D Variant and the Project would result in fewer emissions during the operation of their respective land uses compared to a similar level of development without the energy and transportation considerations discussed in this EIR. The R&D Variant, similar to the Project, would incorporate features intended to reduce motor vehicle trips, designed as a dense, compact development with a mix of land uses that would facilitate pedestrian, bicycle, and transit travel. The R&D Variant's transportation analysis estimates that a similar R&D development that did not include the trip reduction features of the R&D Variant would generate 147,682 daily external motor vehicle trips (about 71 percent more than the R&D Variant's daily external motor vehicle trips). The comparison of the R&D Variant to a similar level of development under "business as usual" conditions is also shown in Table IV-7.

Table IV-7 R&D Variant Operational Criteria Pollutant Emissions (Year 2030)

Scenario/Emission Source	*ROG (lbs/day)*	*NO_X (lbs/day)*	*CO (lbs/day)*	*PM_{10} (lbs/day)*	*$PM_{2.5}$ (lbs/day)*
Hunters Point Shipyard					
Area[a]	182	55	44	1	1
Motor Vehicles (External)	119	109	1,247	576	108
Subtotal	*302*	*164*	*1,291*	*578*	*110*
Candlestick Point					
Area[a]	449	70	53	4	4
Motor Vehicles (External)	216	195	2,221	1,025	193
Subtotal	*665*	*265*	*2,274*	*1,028*	*196*
All Development Sites					
Area[a]	631	125	97	5	5
Motor Vehicles (External)	335	304	3,468	1,601	301
Motor Vehicles (Internal)	30	13	228	45	9
All Sources (R&D Variant)	***997***	***442***	***3,793***	***1,650***	***315***
Comparison to Proposed Project	***106%***	***112%***	***111%***	***111%***	***111%***
Change from Proposed Project	*6%*	*12%*	*11%*	*11%*	*11%*
Comparison to Business as Usual	***89%***	***74%***	***70%***	***64%***	***65%***
Reduction from Business as Usual	*-11%*	*-26%*	*-30%*	*-36%*	*-35%*
All Development Sites (Business as Usual)					
Area[a]	631	125	97	5	5
Motor Vehicles	485	476	5,292	2,561	481
All Sources (Business as Usual)	***1,117***	***601***	***5,389***	***2,566***	***486***
Comparison to R&D Variant	***112%***	***136%***	***142%***	***155%***	***154%***

SOURCE: PBS&J, 2009. Based on URBEMIS 2007 Version 9.2.4.

Daily emissions of ROG and NO_X were calculated under Summer conditions when ambient ozone concentrations are highest. Daily emissions of CO, PM_{10}, and $PM_{2.5}$ were calculated under winter conditions when associated ambient concentrations are highest.

* Area emissions are from sources located on the project site, such as natural gas combustion for heating/cooling, maintenance equipment, consumer product use, etc.

Nonetheless, criteria pollutant emissions of ROG, NO_X, PM_{10} and $PM_{2.5}$ associated with land uses anticipated under the R&D Variant would exceed existing BAAQMD thresholds. Under BAAQMD's current thresholds, impacts are considered significant if daily emissions of criteria pollutants exceed 80 lbs/day of ROG, NO_X, and PM_{10}. Similar to the Project, no additional feasible mitigation measures are available to reduce the R&D Variant's operational criteria emissions below the BAAQMD thresholds. This would be a significant and unavoidable impact. It should be noted that, as stated above, although the significance under this variant would be similar to the Project, criteria pollutant emissions associated with the operation of uses under the R&D Variant would be greater than the Project, as stated in Table IV-7.

With respect to airborne human health risks, emissions associated with operation activities under the R&D Variant would increase the levels of two potential human health risks: (1) toxic air contaminants (TACs) and (2) certain vehicle emissions ($PM_{2.5}$). Under the R&D Variant, additional R&D facilities would be constructed and operated within the HPS Phase II area.

The Project would include R&D facilities at HPS Phase II, which are situated on a peninsula extending to the East of the proposed stadium and south of the proposed residential areas. As the predominant winds are out of the west, on-site receptors will generally be upwind from these R&D areas. As such, the Project is designed to minimize potential adverse impacts between TAC sources in R&D areas and both on-site and off-site receptors.

Based on the type of uses permitted under the Project, the potential for TACs to be emitted by the Project and affect nearby receptors would likely only occur within areas designated for R&D uses, which would be restricted to HPS Phase II. Because the Project land use designations provide that a wide range of development can operate in the R&D areas within the HPS Phase II site, the exact type of stationary sources and quantity of the emissions from those sources are not known. As a result, a conservative scenario was established so that the impact of the potential aggregate emissions from all future TAC emission sources in these R&D areas could be evaluated at surrounding receptor locations. However, for the purposes of this analysis, a conservative scenario of potential TAC emissions from each potential future source of TACs was modeled to estimate the potential health impact on nearby receptor locations. It was assumed that each allowable location for TAC emissions would emit chemicals at the maximum allowable rate, when, in fact, the TAC emissions at some of these locations within the R&D area would be below the maximum rate (for example, office building emissions for TAC would be zero or close to zero).Details regarding this assessment can be found in Appendix H1 (Ambient Air Quality Human Health Risk Assessment), Attachment III.[1185]

For this prospective screening-level analysis, a series of conservative assumptions was made:

- A wide range of stationary sources could operate in the R&D area; thus, the identity and amounts of the TACs emitted from these sources cannot be determined at this time.
- In order to approximate the maximum potential number of facilities with TAC emitting sources, the area designated for proposed R&D development would be divided into one-acre plots, which

[1185] ENVIRON, *Ambient Air Quality Human Health Risk Assessment: Candlestick Point–Hunters Point Shipyard Phase II Development Plan*, Attachment III, September 28, 2009.

is consistent with the minimum size of a parcel based on the expected land uses within the R&D parcels.

- A single R&D facility (or a stationary source such as a collection of emitting sources like boilers, emergency generators, etc) would be constructed on the one-acre plot.
- The cancer risk at the boundary of each one-acre plot was set not to exceed a designated cancer risk level or chronic noncancer HI threshold (in this case a residential cancer risk of 10 in one million and a chronic noncancer HI of 1.0, in accordance with BAAQMD thresholds of significance).
- It was conservatively assumed that all receptor locations surrounding the R&D area were residential.

Potential health impacts of this scenario were evaluated at receptor locations within approximately 500 meters (about a third of a mile) of the R&D areas. Impacts would be lower beyond this distance. In addition, the TAC analysis conservatively used a total of 5 million square feet of R&D uses, the amount proposed in this Variant. For this screening evaluation, all surrounding receptors were conservatively evaluated as residential receptors (i.e., potential exposures/risks for other populations would be less, as the exposure frequency and duration would be less than a residential scenario).

Although excess lifetime cancer risk and chronic noncancer HIs were explicitly evaluated, acute risks were not evaluated, as it would be highly unlikely that all emissions sources would be operating at their maximum emission rate at the same time (e.g., for any single hour).

The HRA[1186] estimated the excess lifetime cancer risk and chronic noncancer HI due to the combined TAC emissions from the R&D areas at any surrounding receptor location. All receptors were initially evaluated as residential receptors. The estimated excess lifetime cancer risks and HIs within areas designated for residential use were found not to exceed the BAAQMD's significance thresholds for carcinogenic and noncarcinogenic health risks.

The estimated cancer risks for long-term residential exposure would be above 10 in one million in an area designated as open space or stadium that would extend slightly south beyond the R&D boundary. The maximum estimated cancer risk for a residential receptor in this location would be 26 in one million; the noncarcinogenic health risks would have an HI of 2.6. However, as noted above, this receptor location would be in an area designated as open space or stadium use, and would not be a residential location. If cancer risks were estimated based on exposure assumptions consistent with recreational use of the open space, the risks would be reduced well below the threshold of 10 in one million. Due to the decrease in the frequency and duration of potential exposures, the chronic HI would also be reduced below the HI threshold of 1.0

The estimated health risks would be below BAAQMD thresholds for all residential receptor locations as a result of implementation of the Project. As such, impacts would be less than significant with implementation of mitigation measures MM AQ-6.1 and MM AQ-6.2.

[1186] ENVIRON, *Ambient Air Quality Human Health Risk Assessment: Candlestick Point–Hunters Point Shipyard Phase II Development Plan*, Attachment III, September 28, 2009.

In terms of human health risks associated with vehicle emissions, vehicle trips and thereby vehicle emissions along local roadways would increase with development of the R&D Variant, similar to the Project. The prolonged exposure of receptors to increased vehicle emissions could affect human health. Potential $PM_{2.5}$ concentrations at select roadways with the addition of future traffic volumes, including the traffic associated with the R&D Variant (which were assumed to be similar to Project traffic), were estimated compared against SFDPH thresholds to determine the potential health risks attributed to vehicle emissions. Several roadway segments were chosen based on whether Project-related traffic would use these streets to access neighboring freeways and other areas of San Francisco and/or currently or would experience significant truck traffic. The roadways chosen include:

- Third Street
- Innes Avenue/Hunters Point Boulevard/Evans Avenue
- Palou Avenue
- Gilman Avenue/Paul Avenue
- Harney Way
- Jamestown Avenue
- Ingerson Avenue

With the addition of Project-related traffic, no receptors along the streets listed above would experience $PM_{2.5}$ concentrations in excess of SFDPH's 0.2 $\mu g/m^3$ threshold.[1187] As concentrations would not exceed SFDPH's threshold, and as such, impacts would be less than significant, similar to the Project.

Noise and Vibration

As shown in Figure IV-1, the R&D Variant would replace the football stadium proposed under the Project with an additional 2,500,000 square feet of R&D space. Other than the stadium site, land uses provided with a R&D Variant would be the same as the Project. As land uses would remain the same, the potential noise impacts would be the same as the Project with the exception that the noise impact from operation of the stadium would not occur under the R&D Variant.

Construction activities for a R&D Variant would create a substantial temporary increase in ambient noise levels on the site and in existing residential neighborhoods adjacent to the site. Construction activities would need to comply with the San Francisco Noise Ordinance, which prohibits construction between 8:00 P.M. and 7:00 A.M. and limits noise from any individual piece of construction equipment (except impact tools) to 80 dBA at 100 feet. Implementation of mitigation measures MM NO-1a.1 and MM NO-1a.2, which would require implementation of construction best management practices to reduce construction noise and the use of noise-reducing pile driving techniques, would reduce any potentially significant impacts to less-than-significant levels.

Construction activities could also create excessive ground-borne vibration levels in existing residential neighborhoods adjacent to the site and at proposed on-site residential uses, should the latter be occupied before construction activity on adjacent parcels is complete. Implementation of mitigation measures MM NO-1a.1, MM NO-1a.2, and MM NO-2a would require implementation of construction best

[1187] ENVIRON, *Ambient Air Quality Human Health Risk Assessment: Candlestick Point–Hunters Point Shipyard Phase II Development Plan*, Appendix IV, September 28, 2009.

management practices, noise-reducing pile driving techniques as feasible, and monitoring of buildings within 50 feet of pile driving activities. Implementation of these measures would reduce vibration impacts under the R&D Variant, but not to a less-than-significant level as vibration levels from pile driving activities could be as high as 103 VdB for the residential uses within the HPS North District, the CP Center, and South Districts when occupied; therefore, this impact would remain significant and unavoidable, similar to the Project.

Daily operation of a R&D Variant, such as mechanical equipment and delivery of goods, would not expose noise-sensitive land uses on- or off- site to noise levels that exceed the standards established by the City of San Francisco. This impact would be less than significant, similar to the Project. Operation activities associated with a R&D Variant, such as delivery trucks, would not generate or expose persons on or off site to excessive groundborne vibration. This impact would also be less than significant, similar to the Project.

Operation of a R&D Variant would generate increased local traffic volumes that would cause a substantial permanent increase in ambient noise levels in existing residential areas along the major Project site access routes. Noise level increases associated with the R&D Variant are shown in Table IV-8 (R&D Variant Modeled Traffic Noise Levels along Major Project Site Access Roads). Impacts would be significant, similar to the Project. However, in addition to Carroll Avenue, Gilman Avenue, and Jamestown Avenue, which were identified as being significantly impacted by the Project, the R&D Variant would also include significant noise level increases along 3rd Street and Ingalls Street as shown in the table. Measures available to address significant traffic noise increases in these residential areas are limited. The ultimate feasibility and implementation of the noise insulation measures that would be required to reduce roadway noise levels to below the threshold of significance would be dependent on factors that would be beyond the control of the City as the lead agency or the Project Applicant to guarantee. Therefore, this impact would remain significant and unavoidable.

Table IV-8 R&D Variant Modeled Traffic Noise Levels along Major Project Site Access Roads

Roadway	*Land Use*	*Existing Noise Level*	*2030 Without Project*	*2030 With Project*	*2030 With R&D Variant*	*Variant-Related Increase*	*Allowable Increase*	*Significant Impact?*
Innes north of Carroll Avenue	Residential	53.3	60.9	60.9	60.9	0	2	No
3rd Street south of Carroll Avenue	Residential	**62.8**	**67.3**	**68.3**	**68.5**	**1.2**	**1**	**Yes**
Cesar Chavez Boulevard west of 3rd Street	Residential	59	63.5	63.5	63.6	0.1	2	No
Palou Avenue east of 3rd Street	Residential	56.8	61.6	62.1	62.9	1.3	2	No
Ingalls Street north of Carroll Avenue	Residential	**56.7**	**61.7**	**63.1**	**63.8**	**2.1**	**2**	**Yes**
Carroll Avenue east of 3rd Street	Residential	**52.6**	**53.8**	**58.1**	**58.1**	**4.3**	**3**	**Yes**
Gilman Avenue east of 3rd Street	Residential	**57.7**	**60.6**	**64.6**	**64.6**	**4.0**	**2**	**Yes**
Jamestown Avenue north of Harney Way	Residential	**51.4**	**55.5**	**61.2**	**61.2**	**5.7**	**5**	**Yes**
Harney Way west of Jamestown Avenue	Residential	52.6	59	59.6	59.6	0.6	3	No
Bayshore Boulevard north of Visitacion	Residential	65.1	68.5	68.6	68.7	0.2	1	No

SOURCE: PBS&J 2009

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

Because the R&D Variant would not include a football stadium, noise impacts identified for the Project from football games and concerts would not occur with implementation of the R&D Variant.

The R&D Variant site is not located within an airport land use plan area or near a private airstrip. Furthermore, the R&D Variant does not include an aviation component. Therefore, an R&D Variant will not result in the exposure of people to excessive aircraft noise levels. Impacts would be less than significant, similar to the Project.

Cultural Resources and Paleontological Resources

As shown in Figure IV-1, the R&D Variant would replace the football stadium proposed with the Project with an additional 2,500,000 square feet of R&D space. Both construction and operational impacts would be substantially similar to the Project because construction activities as well as the area and type of land disturbance would be similar. Additionally, the types of land use and associated activities are similar and were all analyzed in the initial land program.

Potential impacts to paleontological resources with the R&D Variant would be substantially similar to the Project and less than significant with mitigation because the amount and type of land disturbance activities (including subterranean development) would be similar. Although no fossils have been reported at the HPS Phase II site, the presence of Franciscan sedimentary rocks (shanstone, shale, chert, and greenstone) on the flanks of Hunters Point indicates the possibility of fossils being discovered during construction-related excavation. Additionally, the presence of Bay mud under the fill around Hunters Point indicates the possibility of fossils being discovered during construction-related excavation. However, mitigation measure MM CP-3a (paleontological resources) would reduce the effects of construction-related activities to paleontological resources to a less-than-significant level by mitigating for the permanent loss of the adversely affected resources through implementation of a *Paleontological Resources Monitoring and Mitigation Program*. Therefore, the R&D Variant would result in a less-than-significant impact to paleontological resources during construction activities, similar to the Project.

Potential impacts to archaeological resources with the R&D Variant would be substantially similar to the Project and less than significant with mitigation because the amount and type of land disturbance activities (including subterranean development) would be similar. Records indicate that prehistoric archaeological sites are located within the HPS Phase II site, including CA-SFR-9, CA-SFR-11, CA-SFR-12, CA-SFR-13, and CA-SFR-14. Previous archaeological investigations have shown that prehistoric archaeological sites in the HPS Phase II site tend to be located along the original shoreline. Hunters Point had numerous maritime-related industries, including dry docks and boarding houses. In addition, there were several historically documented large offshore "rocks" that presented navigational hazards. Therefore, it is possible that buried shipwrecks may occur within the HPS Phase II site and construction activities may encounter previously unknown archaeological resources. Mitigation measure MM CP-2a (archaeological resources) would reduce the effects of construction-related activities to the archaeological resources in the HPS Phase II site to a less-than-significant level by mitigating for the permanent loss of the adversely affected archaeological resources through implementation of the *Archaeological Research Design and Treatment Plan for the Bayview Waterfront Project, San Francisco, California*. Therefore, the R&D Variant would result in a less-than-significant impact to archaeological resources during construction activities, similar to the Project.

Historical resources at HPS Phase II include the potential Hunters Point Commercial Dry Dock and Naval Shipyard Historic District, with buildings, structures, and objects associated with the area's "transition from early commercial dry dock operation to high tech naval repair and Radiological research and waste treatment facility."[1188] Contributing resources in the Hunters Point Historic District include Drydock 2, Drydock 3, and Buildings 140, 204, 205, 207, 208, 211, 224, 231, and 253.

As with the Project, development at HPS Phase II with the R&D Variant would result in the demolition of Buildings 208, 211, 224, 231, and 253, which have been determined eligible as contributors to the California Register of Historic Resources (CRHR)–eligible Hunters Point Commercial Dry Dock and Naval Shipyard Historic District. While the land use changes with the R&D Variant would not affect the HPS Phase II area within that potential historic district, the implementation of the Variant as a whole would materially alter in an adverse manner those physical characteristics of an historical resource that convey its historical significance and that justify its eligibility for inclusion in the CRHR. Implementation of mitigation measure MM CP-1b.1 and MM CP-1b.2 (historical resources) would reduce but not avoid the significant adverse impact. As with the Project, the impact on historical resources with the R&D Variant would remain significant and unavoidable.

Operational activities anticipated with the R&D uses would not differ substantially from the Project because neither would include ground-disturbing activities that would accelerate the potential deterioration of cultural resource. No changes would be made to the land use program within Candlestick Point. These activities would not have the potential to adversely disturb paleontological, archaeological, or historical resources. Therefore, the R&D Variant would result in no impact to these resources, similar to the Project.

Hazards and Hazardous Materials

The building footprint of the R&D Variant would be somewhat greater than the Project, as more structures would be constructed. Construction activities associated with the R&D Variant would: disturb soil and/or groundwater; result in the handling, stockpiling, and transport of soil; involve demolition or renovation of existing structures that could include asbestos-containing materials, lead-based paint, PCBs, or fluorescent lights containing mercury; expose construction workers to hazardous materials; be a source of hazardous air emissions within one-quarter mile of an existing or planned school; and encounter soils or groundwater that contains contaminants from historic uses that could pose a human health or environmental risk if not properly managed. Each of these impacts for the R&D Variant would be slightly greater than for the Project, but, similar to the Project, and would be reduced to a less-than-significant level with implementation of the identified mitigation measures (MM HY-1a.2, MM HZ-1a, MM HZ-1b, MM HZ-2a.1, MM HZ-2a.2, MM HZ-5a, MM HZ-9, MM HZ-10b, MM HZ-12, MM HZ-15, MM HY-1a.1, MM HY-1a.3, MM BI-4a.1, MM BI-4a.2, and MM BI-5b.4).

Construction of the R&D Variant would require improvements to existing utility infrastructure and installation of new underground utilities, which could expose construction workers, the public, or the environment to hazardous materials. However, with the implementation of mitigation measures

[1188] Circa Historic Property Development, *Hunters Point Commercial Dry Dock and Naval Shipyard Historic District DPR form*, October 31, 2008.

MM HZ-1a, MM HZ-1b, and MM HZ-2a.1, which require remediation of any contaminated soils, the hazards risk from potential exposure to contaminated soil or groundwater during construction would be reduced to a less-than-significant level, similar to the Project. In addition, mitigation measure MM HZ-2a.2 requires the preparation of a site-specific health and safety plan, which would further ensure that all risks to workers, residents, or the public would be reduced to less than significant, the same as for the Project.

The R&D Variant would require pile supports for the residential towers, the same as the Project. This construction activity could result in groundwater contamination from disturbed soils. Mitigation measure MM HZ-5a would reduce this impact by requiring a foundation support piles installation plan, which would verify that pilot boreholes for each pile would be drilled through the artificial fill materials so the piles can be installed without damage or misalignment and to prevent potentially contaminated fill materials from being pushed into the underlying sediments or groundwater. With implementation of this mitigation measure, the impact from potential groundwater contamination would be reduced to a less-than-significant level, the same as for the Project.

Shoreline improvements would occur under the R&D Variant the same as for the Project. Shoreline improvements would require concurrence of BCDC, San Francisco RWQCB, and USACE. That permit would contain numerous conditions to ensure that the construction activities are conducted in a manner that is protective of aquatic resources. Mitigation measure MM HZ-10b requires that all shoreline activities that could affect sediment (or in the case of the Navy-installed cover and riprap at Parcel E/E-2) be conducted in accordance with agency-approved remedial design documents, applicable health and safety plans, DCPs, or any other documents or plans required under applicable law or laws, including but not limited to applicable requirements shown in Table III.K-2 (Remedial Actions, Potential Environmental Effects, and Methods to Reduce Effects). In addition, mitigation measures MM HY-1a.1, MM HY-1a.2, MM BI-4a.1, MM BI-4a.2, and MM BI-5b.4 would reduce water quality and biological resources impacts. For Candlestick Point, impacts would be mitigated through mitigation measures MM HY-1a.1 and MM HY-1a.2. With implementation of these mitigation measures, along with applicable regulations and permits, potential impacts related to exposure to hazardous materials releases from contaminated sediments that could be disturbed during proposed shoreline improvements would be reduced to a less-than-significant level for the R&D Variant, the same as for the Project.

Similar to the Project, remediation activities conducted on behalf of the City or developer in conjunction with development activities at HPS Phase II parcels transferred prior to completion of remediation in an "early transfer" would disturb soil and/or groundwater that may contain contaminants from historic uses. The identified mitigation measure (MM HZ-12) would require the SFDPH to ensure that before development occurs, the Agency or the developer and their contractors have incorporated all applicable requirements into remedial design documents, work plans, health and safety plans, DCPs and any other document or plan required under the AOC or other applicable law, as a condition of development. As a result of these controls and mitigation measure, the potential impact of exposure to hazardous materials during remediation activities conducted on behalf of the Agency or the developer in conjunction with development of HPS Phase II under the R&D variant would be reduced to less-than-significant levels.

In addition to uncovering hazardous materials within the existing buildings, construction and grading activities associated with the R&D Variant could disturb soil or rock that is a source of naturally

occurring asbestos, which could present a human health hazard. As discussed, above, the R&D Variant includes a greater amount of excavation and construction than that anticipated under the Project. However, with the implementation of mitigation measure MM HZ-15, which requires preparation of an asbestos dust mitigation plan, this impact would be reduced to a less-than-significant level, similar to the Project.

As with the Project, the Bret Harte and Muhammad University of Islam elementary schools are located within one-quarter mile of the development area of the R&D Variant. Consistent with the discussion above, the R&D Variant could uncover asbestos-containing materials (naturally or in existing building materials) or other hazardous materials during construction, consistent with the Project. However, with incorporation of mitigation MM HZ-1a, MM HZ-1b, MM HZ-2a.1, and MM HZ-15, any impacts to these schools would be reduced to a less-than-significant level, similar to the Project.

After development of the R&D Variant, periodic maintenance could require excavation of site soils to maintain or replace utilities, repair foundations, or make other subsurface repairs which could expose hazardous materials. Implementation of mitigation measures MM HZ-1a and MM HZ-1b would require remediation of any contaminated soils pursuant to the appropriate regulations. MM HZ-2a.1 would require the development of an unknown contaminant contingency plan to describe procedures to follow in the event unexpected contamination is encountered during construction activities, including procedures for ensuring compliance with the above laws and regulations. Additionally, mitigation measure MM HZ-2a.2, would require the preparation and implementation of a site-specific HASP in compliance with federal and state OSHA regulations and other applicable laws. The general requirement of mitigation measure MM HZ-9 would require that the Agency or its contractor or Project Applicant shall comply with all requirements incorporated into remedial design documents, work plans, health and safety plans, dust control plans, and any other document or plan required under the Administrative Order of Consent for any properties subject to early transfer (prior to full Navy remediation). To reduce this impact related to exposure to hazardous materials releases that have not been fully remediated at HPS Phase II, mitigation measure MM HZ-9 requires that all work on the Yosemite Slough bridge would comply with Navy work plans for construction and remediation on Navy-owned property. Implementation of these mitigation measures would reduce this impact to a less-than-significant level, same as for the Project.

The R&D Variant would replace the proposed stadium at HPS Phase II with R&D uses. This could result in a greater amount of hazardous materials being used compared to a stadium use, depending on the tenants that would occupy the R&D Variant. After construction, land uses anticipated under the R&D Variant would involve the routine use, storage, transportation, and disposal of hazardous materials to a greater extent than under the Project, depending on the tenants of the R&D area. The R&D Variant would not introduce large-scale manufacturing or processing facilities that would store and use large quantities of hazardous materials that would present a substantial risk to people. However, there would be numerous locations where smaller quantities of hazardous materials would be present, the same as for the Project. Products containing hazardous materials used in additional square footage anticipated under the R&D Variant would be incrementally small, and would not substantially increase the risk from handling these materials. The potential risks associated with hazardous materials handling and storage would generally be limited to the immediate area where the materials would be located, because this is

where exposure would be most likely. The Project would comply with all applicable laws and regulations that require the implementation of established safety practices, procedures, and reporting requirements pertaining to proper handling, use, storage, transportation, and disposal of hazardous materials. Impacts would be less than significant, similar to the Project.

Hazardous materials would routinely be transported to, from, and within the Project, and small amounts of hazardous waste would be removed and transported off site to licensed disposal facilities. The precise amount of hazardous materials that would be transported to or from the site under the R&D Variant is difficult to predict accurately at the current time due to the pending selection of tenants for the future retail-commercial stores. However, it is understood that these uses would be consistent with those uses analyzed for the Project and therefore, potential impacts would be similar under this variant to the Project's impacts.

Daily operations under the R&D Variant could result in reasonably foreseeable upset and accident conditions involving the release of hazardous materials into the environment, but it would not pose a human health risk and/or result in an adverse effect on the environment. With potentially increased routine use of hazardous materials compared to existing conditions, exposure of future occupants, visitors, and employees to hazardous materials could occur by improper handling or use of hazardous materials or hazardous wastes during operation of the R&D Variant. Accidents involving the transportation of hazardous materials to, from, or within the area, although rare, could occur. In general, the types and amounts of hazardous materials would not pose any greater risk of upset or accident compared to other similar development elsewhere in the City. Impacts would be less than significant, similar to the Project.

The R&D Variant site is not located within the San Francisco Airport Land Use Policy Plan Area and the R&D Variant would not result in a safety hazard from airport operations for people residing or working in the area. The site is not located within any other airport land use plan area. The R&D Variant site is also not located within the vicinity of a private airstrip and would not result in a safety hazard for people residing or working at the Project site.

Similar to the Project, operation of the R&D Variant would not expose people or structures to a significant risk of loss, injury, or death involving fires or conflict with emergency response or evacuation plans.

Geology and Soils

As shown in Figure IV-1, the R&D Variant would replace the football stadium proposed with the Project with an additional 2,500,000 square feet of R&D space. Both construction and operational impacts to geology and soils would be substantially similar to the Project, as discussed below, because the type of development and associated construction activities are substantially the same. Additionally, operational activities are the same as those under the Project, with the exception of the football stadium due to its removal.

Construction

As with the Project, construction activities, such as grading and excavation, could remove stabilizing vegetation and expose areas of loose soil that, if not properly stabilized, could be subject to soil loss and erosion by wind and stormwater runoff. Newly constructed and compacted engineered slopes could undergo substantial erosion through dispersed sheet flow runoff, and more concentrated runoff can result in the formation of erosional channels and larger gullies, each compromising the integrity of the slope and resulting in significant soil loss. The erosion hazard rating for the local soils in the Project site is slight to severe. Requirements to control surface soil erosion during and after construction with the R&D Variant would be implemented through the requirements of mitigation measure MM HY-1a.1 (SWPPP) and adverse effects on the soil, such as soil loss from wind erosion and stormwater runoff, would be avoided or reduced to a less-than-significant level, similar to the Project.

In addition to the potential for soil erosion, construction activities would have the potential to affect groundwater levels. With implementation of the dewatering techniques, groundwater level monitoring, and subsurface controls as specified in the SFBC and required by mitigation measure MM GE-2a (dewatering), groundwater levels in the area would not be lowered such that unacceptable settlement at adjacent or nearby properties would occur. Consequently, the R&D Variant would result in a less-than-significant impact, similar to the Project.

At the Alice Griffith Public Housing site and the Jamestown area, the removal of bedrock through heavy equipment methods or controlled rock fragmentation activities would have the potential to fracture rock adjacent to the excavation, thereby destabilizing it and possibly causing settlement of structures above it. With implementation of those techniques, ground surface and building damage monitoring, as specified in the SFBC and required by mitigation measure MM GE-3, vibration from controlled rock fragmentation in the area would not cause unacceptable settlement or damage at adjacent or nearby properties would occur. Consequently, settlement hazards related to controlled rock fragmentation would be less than significant, similar to the Project.

Operation

Impacts with respect to geology and soils conditions with the R&D Variant would be substantially similar to those of the Project.

The potential for exposure to adverse affects caused by seismic groundshaking exists at the Project site. Mitigation measures MM GE-4a.1, MM GE-4a.2, and MM GE-4a.3 would require design-level geotechnical investigations that would include site-specific seismic analyses to evaluate the peak ground accelerations for design of Variant structures and the Yosemite Slough bridge, as required by the SFBC. Implementation of these mitigation measures would ensure that potential impacts from groundshaking would be less than significant, similar to the Project.

The potential for adverse affects caused by seismically induced ground failure such as liquefaction, lateral spreading, and settlement exists at the Project site. Mitigation measures MM GE-4a.1, MM GE-4a.2, MM GE-4a.3, and MM GE-5a would require design-level geotechnical investigations must include site-specific seismic analyses to evaluate the peak ground accelerations for design of Variant structures, as required by the SFBC through review by DBI. It is anticipated that DBI would employ a third-party

engineering geologist and/or civil engineer to form a GPRC. The GPRC would complete the technical review of proposed site-specific structural designs prior to building permit approval. The structural design review would ensure that all necessary mitigation methods and techniques were incorporated in the design for Variant foundations and structures to reduce potential impacts from ground failure or liquefaction a less-than-significant level, similar to the Project.

With the R&D Variant, the potential for adverse affects due to seismically induced landslides exists at the Project site. Implementation of mitigation measures MM GE-6a and MM GE-4a.2 would ensure compliance with the SFBC and any special requirements of the HUD for compliance documentation and would reduce potential impacts from landslides a less-than-significant level, similar to the Project.

With the R&D Variant, 2,500,000 square feet of additional R&D space would replace the football stadium that is programmed for development with the Project. This specific area is not located adjacent to the shoreline such that the R&D Variant could result in impacts greater than those discussed with the Project. Therefore, the R&D Variant would result in a less-than-significant impact due to shoreline stability, similar to the Project.

The potential for adverse affects caused by landslides exists at the Project site. Site-specific, design-level geotechnical investigations would be required to be submitted to DBI in connection with permit applications for individual Variant elements, as specified in mitigation measure MM GE-6a. The site-specific analyses must assess these conditions and prescribe the requirements for foundations on slopes in accordance with the SFBC. All geotechnical investigations and permits must be approved by DBI. With implementation of this mitigation, the Variant's impact with regard to landslides would be less than significant, similar to the Project.

The potential for adverse affects due to settlement exists at the Project site. However, design-level geotechnical investigations must evaluate the structural design, as required by the SFBC through review by DBI. Implementation of mitigation measures MM GE-5a, MM GE-4a.2, and MM GE-4a.3 would ensure compliance with the provisions of the SFBC and would reduce the impact a less-than-significant level, similar to the Project.

The potential for adverse effects caused by expansive soils exists at the Project site. Design-level geotechnical investigations must evaluate the structural design, as required by the SFBC through review by DBI. Implementation of mitigation measures MM GE-10a, MM GE-4a.1, MM GE-4a.2, and MM GE-4a.3 would avoid or reduce the impact to Project structures from expansive soils a less-than-significant level, similar to the Project.

With the R&D Variant, the potential for adverse effects caused by corrosive soils exists at the Project site. Design-level geotechnical investigations must evaluate the structural design, as required by the SFBC through review by DBI. Implementation of mitigation measures MM GE-11a, MM GE-4a.2, and MM GE-4a.3 would avoid or reduce the impact to Project structures from corrosive soils a less-than-significant level, similar to the Project.

Fault rupture hazards are unlikely. Ground rupture occurs most commonly along preexisting faults. No known active faults cross the Hunters Point shear zone, making hazards from fault rupture unlikely with

the R&D Variant.[1189] Therefore, there would be no impact caused by surface fault rupture, similar to the Project.

All development with the R&D Variant would be connected to the City's existing wastewater treatment and disposal system and would not involve the use of septic tanks or alternative wastewater disposal systems. No impact would occur, similar to the Project.

The R&D Variant would not substantially change site topography or affect unique geologic features, and would have no impact on such features, similar to the Project.

Hydrology and Water Quality

Construction

The footprint of development for the R&D Variant would be the same as for the Project, although the construction of additional R&D space would slightly increase the extent of excavation for the foundation of buildings. As such, impacts from construction of the R&D Variant would be similar to the Project. With additional R&D buildings replacing the stadium and associated parking lots, the total amount of development would increase, as would the extent of impervious surfaces. Thus, operational impacts to hydrology and water quality would generally be greater than the Project.

With adherence to applicable regulatory requirements, construction activities associated with a R&D Variant would not violate water quality standards, cause an exceedance of water quality standards or contribute to or cause a violation of waste discharge requirements due to sediment-laden runoff, contaminated groundwater from dewatering activities, or the incidental or accidental release of construction materials. With additional excavation for building foundations, impacts would be greater than the Project. With implementation of mitigation measures MM HY-1a.1 (preparation of a Storm Water Pollution Prevention Plan—SWPPP—for discharges to the combined sewer system), MM HY-1a.2 (SWPPP preparation for separate storm sewer systems), and MM HY-1a.3 (construction dewatering plan) impacts would be less than significant, similar to the Project.

Construction activities associated with the R&D Variant would include excavation for building foundations and underground utilities which could require short-term and/or long-term dewatering of the affected areas. As no extensive underground space is proposed for the R&D Variant, the installation of underground building elements and utilities would not substantially alter groundwater levels, similar to the Project. As such, the R&D Variant would not substantially deplete groundwater supplies and would result in a less than significant impact, similar to the Project. As the total amount of open space under the R&D Variant would remain the same as under the Project, the amount of permeable surface would also remain the same. Therefore, the R&D Variant would not interfere substantially with groundwater recharge such that there would be a net deficit in aquifer volume or a lowering of the local groundwater table level. This impact would be less than significant, similar to the Project.

No streams or rivers are currently located within the R&D Variant site and thus no streams or rivers would be altered by construction activities. Under existing conditions, stormwater typically drains to

[1189] GTC, 2005.

storm drains (which include both combined and separate systems) or directly to the Bay via surface runoff (generally only along portions of the shoreline). During construction of the R&D Variant, the existing drainage patterns within the area would generally be preserved. Construction activities associated with the R&D Variant would not substantially alter the existing drainage pattern of the site or alter the course of a stream or river in ways that would result in substantial erosion, siltation, or flooding on-site or off-site. Impacts would be less than significant, similar to the Project.

Construction activities associated the R&D Variant, including site clearance, grading, and excavation, would not create or contribute runoff water that would exceed the capacity of existing or planned storm sewer systems or provide substantial additional sources of polluted runoff. During construction, existing stormwater drainage facilities would be replaced by a new storm sewer system that would collect and treat on-site stormwater flows and would be sized to accommodate projected flows from upstream contributing areas. With compliance with regulatory requirements, as required by mitigation measures MM HY-1a.1 and MM HY-1a.2 (preparation of an SWPPP) impacts would be less than significant, similar to the Project.

Operation

Operation of the R&D Variant would not contribute to violations of water quality standards or waste discharge requirements or otherwise degrade water quality. Compliance with the requirements of the Municipal Stormwater General Permit, the Recycled Water General Permit, and the Industrial General Permit would reduce potential water quality impacts associated with implementation of the R&D Variant. In addition, the R&D Variant would be required to comply with the San Francisco SWMP, the Draft San Francisco Stormwater Design Guidelines, and the San Francisco Green Building Ordinance. Compliance with these requirements would be demonstrated in the SDMP or SCP for the project site, as required by mitigation measure MM HY-6a.1. Compliance with the Recycled Water General Permit would be required by implementation of mitigation measure MM HY-6a.2. To reduce the potential for stormwater infiltration to mobilize historic soil contaminants at HPS Phase II, the use of infiltration BMPs would be prohibited by mitigation measure MM HY-6b.1. To reduce stormwater runoff impacts associated with industrial activities at HPS Phase II, compliance with the Industrial General Permit would be required by implementation of mitigation measure MM HY-6b.2. To reduce stormwater impacts associated with maintenance dredging of the marina, compliance with the DMMO regulatory requirements would be required by implementation of mitigation measure MM HY-6b.3. Compliance with the Clean Marinas California Program would be required by implementation of mitigation measure MM HY-6b.4. As extent of impervious surfaces for the R&D Variant would be greater than the Project, impacts would be greater than the Project.

Development under the R&D Variant would also not utilize groundwater as a source of water supply nor interfere substantially with groundwater recharge. Thus, there would be no net deficit in aquifer volume or a lowering of the local groundwater table level and no impact would occur, similar to the Project.

Operation of the R&D Variant could alter the existing drainage pattern of the site, but would not alter the course of a stream or river, as none exist at or near the site currently, or result in substantial erosion, siltation, or flooding on-site or off-site similar to the project. Implementation of the R&D Variant would not contribute runoff water that would exceed the capacity of existing or planned storm sewer systems or

provide substantial additional sources of polluted runoff, as development would include a separate stormwater system that would be sized to accommodate estimated runoff flows and treat runoff prior to discharge to the Bay. Compliance with regulatory requirements, including the submission of a Stormwater Drainage Master Plan (SDMP) and Stormwater Control Plan (SCP) to the SFPUC for approval, as required by mitigation measure MM HY-6a.1, would ensure that this impact would be less than significant, similar to the Project.

Implementation of the R&D Variant would not place housing and other structures within a 100-year flood zone or otherwise include development that would impede or redirect flood flows. Implementation of mitigation measures MM HY-12a.1 (Finished Grade Elevations above Base Flood Elevation) and MM HY-12a.2 (Shoreline Improvements for Future Sea-Level Rise) would reduce this impact to a less-than-significant level, similar to the Project.

Implementation of the R&D Variant would not expose people or structures to a significant risk of loss, injury, or death involving flooding, including flooding as a result of the failure of a levee or dam. Implementation of mitigation measure MM HY-14 (Shoreline Improvements to Reduce Flood Risk) would reduce impacts to a less-than-significant level. Based on historical records and the location of development, the R&D Variant would not expose people or structures to inundation by seiche, tsunami, or mudflow. These impacts would be less than significant, similar to the Project.

Biological Resources

The R&D Variant would replace the football stadium proposed under the Project with an additional 2,500,000 square feet of R&D space. Both construction and operational impacts to biological resources would be similar to the Project, as discussed below, because the type of development and associated construction activities are generally the same.

Construction

Development of the R&D Variant would not conflict with the provisions of an adopted Habitat Conservation Plan, Natural Community Conservation Plan, or other approved local, regional, or State habitat conservation plan, and no impact would occur, similar to the Project.

The R&D Variant would include additional parks and would reconfigure the design and sizes of parks and open space areas at HPS Phase II compared to the Project. The Sports Field Complex proposed with the R&D Variant would be 40.7 acres, which is 19 acres less than the Sports Field Complex proposed under the Project. Approximately 9.4 acres of new parks and plaza spaces are proposed to be located adjacent to the R&D uses, which would provide additional habitat for common plant and wildlife species. Impacts to common species or habitats would be less than the Project, and remain less than significant, similar to the Project.

Development of the R&D Variant could have a substantial adverse effect, either directly or through habitat modifications, on sensitive natural communities or species identified as a candidate, sensitive, or special status in local or regional plans, policies, or regulations, or by the CDFG or USFWS. Mitigation measures MM BI-5b.1 through MM BI-5b.4 would reduce the effects on eelgrass, and the sensitive or special-status fish species that could occupy these areas by surveying for and avoiding this habitat.

Mitigation measures MM BI-6a.1, MM BI-6a.2, and MM BI-6b would require surveys for special-status and nesting avian species and implement impact-avoidance measures such as construction buffers to ensure that the loss or take of these species would not occur. Similar to the Project, the R&D Variant's Draft Parks, Open Space, and Habitat Concept Plan would identify ecological enhancement measures that would include the restoration and management of suitable raptor foraging habitat. To provide a mechanism by which implementation of these enhancements would be ensured, mitigation measure MM BI-7b would be implemented to ensure that specific standards related to the enhancement of raptor foraging habitat would occur. Therefore, a net increase in the quality of raptor foraging habitat would result, similar to the Project and, with mitigation, the overall effect on raptors is expected to be beneficial. Mitigation measure MM BI-9b would reduce the effects of pile driving-related activities to fish and marine mammals by recommending the type of piles to use to minimize sound impacts; providing for an alternative method of installation to minimize sound impacts; requiring installation during an agency-approved construction window when fish are least likely to be present to avoid the bulk of potential impacts; and requiring a construction monitor to ensure compliance with all measures, including sound monitoring. Construction activities could impact designated critical habitat for green sturgeon and Central California Coast steelhead; however, compensatory mitigation for lost aquatic habitat as described in mitigation measures MM BI-4a.1 and MM BI-4a.2 would be implemented to minimize impacts to wetlands, aquatic habitats, and water quality during construction. Overall adverse effects would be less than significant, similar to the Project. Mitigation measures MM BI-4a.1, MM BI-4a.2, MM BI-5b.1 through MM BI-5b.4, MM BI-12a.1, MM BI-12a.2, MM BI-12b.1, and MM BI-12b.2 would reduce potentially significant impacts to Essential Fish Habitat to less-than-significant levels, similar to the Project. Ecological design features described in the Draft Parks, Open Space, and Habitat Concept Plan would result in increased habitat for western red bats, and impacts to this species would be less than significant.

Development of the R&D Variant could have a substantial adverse effect on federally protected wetlands and other waters as defined by Section 404 of the *Clean Water Act* (CWA) (including, but not limited to, marsh, vernal pool, coastal, etc.) through direct removal, filling, hydrological interruption, or other means. With implementation of mitigation measures MM BI-4a.1 and MM BI-4a.2, potential adverse effects of the Project to federally protected wetlands and other waters as defined by Section 404 of the CWA would be reduced to a less-than-significant level, similar to the Project.

Development of the R&D Variant would not conflict with the natural resource protection policies of the General Plan; however, it could result in the disturbance or loss of trees that are protected by the City's Urban Forestry Ordinance and Section 143 of the *Planning Code*. Mitigation measure MM BI-14a would ensure that development does not result in conflicts with these policies by requiring preservation of street trees, trees that meet the size specification of significant trees, replacement of large trees that are removed, and the planting of street trees, consistent with *Planning Code* Section 143. In addition, mitigation measure MM BI-7b includes the planting of approximately 10,000 net new trees. With implementation of mitigation measures MM BI-14a and MM BI-7b, the R&D Variant would not result in a conflict with City policies designed to protect urban streetscape through the planting of street trees, similar to the Project, and overall impacts would be beneficial.

Operation

Impacts to native oysters and EFH would be less than significant as removed hard structures would be replaced with approximately equal amounts of suitable habitat along the shoreline or the new breakwater. Implementation of mitigation measure MM BI-18b.1 would reduce the effects of marina operational activities to oysters, and mitigation measure MM BI-18b.2 would mandate the application of BMPs to control the distribution of sediments disturbed by the dredging activities to reduce water quality impacts to oysters. Mitigation measures MM BI-19b.1 and MM BI-19b.2 would reduce dredging and contamination impacts to EFH. With implementation of the identified mitigation measures, impacts would be reduced to a less-than-significant level, similar to the Project.

Development of the R&D Variant could interfere substantially with the movement of native resident or migratory fish or wildlife species or with established native resident or migratory wildlife corridors, or impede the use of native wildlife nursery site (eelgrass beds). Mitigation measures MM BI-5b.1 through MM BI-5b.4 would reduce effects on eelgrass by surveying for and avoiding this habitat. Mitigation measures MM BI-20a.1 and MM BI-20a.2 would reduce the effects of operational activities related to tall structures and increased lighting to migrating species to less-than-significant levels by incorporating design features that would help minimize bird strikes, including using operational methods to reduce the effects of new lighting towers. With implementation of the identified mitigation measures, impacts would be reduced to a less-than-significant level, similar to the Project.

Implementation of the R&D Variant would be consistent with the biological resources protection policies of the *City of San Francisco General Plan*, and with implementation of mitigation measure MM BI-14a, development would be constructed in a manner consistent with policies of the Urban Forestry Ordinance and *Planning Code* Section 143. Consequently, the operation of the R&D Variant would not conflict with any local policies or ordinances protecting biological resources, and there would be no impact.

■ Public Services

Construction

Police and Fire Services

Similar to the Project, access to the R&D Variant site during construction would be maintained by implementation of a construction management traffic plan (CMTP) MM TR-1. The CMTP would provide necessary information to various contractors and agencies as to how to maximize the opportunities for complementing construction management measures and to minimize the possibility of conflicting impacts on the roadway system, while safely accommodating the traveling public in the area. A cohesive program of operational and demand management strategies designed to maintain acceptable levels of traffic flow during periods of construction activities in the area would be implemented.

Similar to the Project, construction of the R&D Variant would not result in increased demand on police protection services, as demands on the SFPD during construction would be supplemented by private security (as required by mitigation measure MM PS-1 [site security measures during construction]), and construction areas would be secured through the installation of fencing and gates.

Therefore, the R&D Variant would result in a less-than-significant impact to police protection and fire services during construction. As construction of the R&D Variant would not impact SFPD or SFFD response times upon implementation of a CMTP. These impacts would be similar to the Project.

Schools and Library Facilities

Construction of the Project would not result in impacts to the SFUSD or the San Francisco Public Library System. SFUSD or library facilities are not located on the Project site. All area school and library services would be available to the community throughout the duration of Project construction. As such, since construction of the R&D Variant would be similar to construction of the Project, no impact to school or library services during construction of the Variant would occur. These impacts are the same as those identified for the Project.

Operation

Police Protection Services

Operational impacts to police services would be similar to the Project in as much as they would be considered less than significant. However, compared to the Project, the R&D Variant would result in a more substantial long-term daytime only population of employees as a result of the R&D uses. Therefore, impacts to police protection services could be greater than the Project, although still less than significant.

The R&D Variant would replace the football stadium proposed with the Project with an additional 2,500,000 square feet of R&D space. The R&D Variant would not increase the permanent resident population above that anticipated with the Project. However, as shown in Table IV-6, the R&D Variant is anticipated to generate a total of 16,635 jobs, approximately 5,905 more jobs than with the Project. As such, the resident and worker population in the area at full build-out with the R&D Variant would be 41,101.[1190] Patrolling this area and responding to calls would require at least a redeployment of police services within the Bayview District, or within a wider area given the current recommendations for redistricting. Additional police resources that would be required to patrol the football stadium on game days with the Project would not be required with the R&D Variant, thereby reducing that potential impact.

Impacts on police protection services are considered significant if an increase in population or development levels result in inadequate staffing levels (as measured by the ability of the SFPD to respond to call loads) and/or increased demand for services that would require the construction or expansion of new or altered facilities that might have an adverse physical effect on the environment. The demand for additional police personnel alone would not be considered a physical environmental impact under the provisions of CEQA.

To estimate personnel requirements for new projects, the SFPD considers the size of the incoming residential population and the expected or actual experience with calls for service from other potential

[1190] Calculated as the combined total of a residential population of 24,465 plus a worker population of 16,635. This is a conservative estimate since it is not likely that the entire resident population and daytime population would be on site at the same time.

uses of the site. Any potential increase in staffing at the SFPD Bayview Station would be expected to take place throughout the R&D Variant development period with the incremental addition of new housing and new non-residential building space and their occupancy.[1191]

Although the City has no adopted staffing ratio, the existing "level of service" at the SFPD can be determined by comparing citywide police force staffing[1192] to total City population (including both residents and workers). As shown in Table IV-9 (Citywide Number of Police Officers and Estimated R&D Variant Demand), using a total City population for San Francisco of 1,351,469 and a police department staffing level of 2,033 in 2005, a citywide ratio of 1 officer per 665 people was calculated.[1193] This ratio when applied to the total projected resident and employee population of the R&D Variant at build-out results in the need for an additional 62 police personnel to provide a comparable level of service.

Table IV-9 Citywide Number of Police Officers and Estimated R&D Variant Demand

		Population	*Police Officers*
Citywide (2005)			
Residents		799,302	
Employees		552,167	
	Total	***1,351,469***	***2,033***
Ratio (officer to population)		1:665	
Project (2029)			
Residents		24,465	
Employees		16,635	
	Total	***41,100***	***62[a]***
Ratio (officer to population)		1:663	
	Project Total		***53***

SOURCES: The population and households data reported for San Francisco is 2005 data provided in a Memorandum from John Rahaim, Director of Planning, San Francisco Planning Department to Michael Carlin, Deputy General Manager, San Francisco Public Utilities Commissions, *Projections of Growth by 2030*, July 9, 2009; SFPD 2005 total staffing: PSSG District Station *Boundaries Analysis*, 2008; Proposed population and employment: Section III.C.

a. The projected number of police officers for the R&D Variant is rounded up, and most closely reflects the 1:665 ratio of the Project.

The SFPD evaluates the need for additional officers by sector, and not station or district needs. The area with the R&D Variant covers two of the five sectors within the Bayview District, both of which have been identified as high demand areas. While it is unlikely that 62 new officers would be needed, some redistribution of the police presence in the southeastern portion of the City would be warranted by development with the R&D Variant.

[1191] PBSJ Meeting with SFPD on April 22, 2008.

[1192] Using a Citywide police force staffing number accounts for the mixed-use nature of the Project, which would include a substantial daytime and resident or nighttime population.

[1193] City population was calculated as a 2005 population of 799,302 plus 2005 employment of 552,167; refer to Table III.C-1 (Existing Population [2005]) and Table III.C-3 (Existing Employment [2005]) of Section III.C (Population, Housing, and Employment).

Staffing increases, in and of itself, would not constitute a significant environmental impact; however, the construction of new facilities to serve the additional 62 police officers could create an environmental effect. Additional SFPD personnel needed to serve the R&D Variant would require a station from which to operate. The exact amount of space that would be needed has not yet been determined. However, using an estimate of 110 square feet per person,[1194] the additional 62 police officers would require approximately 6,800 square feet of interior building space. Additional space would be required for staff and visitor parking. According to the SFPD, there is limited excess capacity at the existing Bayview Station, and the station would not be able to accommodate all 62 additional police officers without the reconfiguration and expansion of the existing station or the construction of a new facility.[1195] In addition, the current surface parking lot is not adequate for existing personnel. Structured parking could be provided on the existing parking site.

Currently, the SFPD has no plans for expansion of its Bayview Station. According to the *Boundaries Analysis*, the Bayview Station is not among the priorities for replacement, expansion, improvement, or correction of current deficiencies. However, according to Public Safety Strategies Group (PSSG), there is a considerable amount of wasted or unused space at the Bayview Station that could be reconfigured to accommodate additional officers.[1196] If the SFPD determines that the reconfiguration of the Bayview Station would not be sufficient to accommodate additional officers, a new station or facility of approximately 6,800 square feet (approximately 800 square feet larger than with the Project) could be constructed within the R&D Variant area, on land designated for community serving uses. As part of the R&D Variant, up to 100,000 gross square feet (gsf) of land divided equally between Candlestick Point and HPS Phase II would be designated for community-serving uses, such as fire, police, healthcare, day-care, places of worship, senior centers, library, recreation center, community center, and/or performance center uses. With the construction of a new facility or a suitable retrofitting or expansion of the Bayview Station, the SFPD would have ample space to accommodate the additional police officers needed to maintain the SFPD's existing level of service. Therefore, while the development of the Project may require new or physically altered police facilities in order to maintain acceptable police services, the potential impacts associated with the construction of a new facility have been addressed in this EIR and would not require further environmental review. Therefore, the anticipated development would not require new or physically altered police facilities beyond the scope of the R&D Variant in order to maintain acceptable police protection services, and, therefore, operational impacts to police protection services would be less than significant, similar to the Project.

Fire Protection Services

Operational impacts to fire protection and emergency medical services would be similar to the Project in as much as they would be considered less than significant. However, compared to the Project, the R&D Variant would result in a more substantial long-term daytime only population of employees at the R&D uses. Therefore, impacts on fire protection services and emergency medical could be greater than the Project, although still less than significant.

[1194] The Bayview Station is approximately 16,000 gsf, and the capacity is about 140 officers, resulting in about 114 sf per officer.
[1195] Personal communication, John Loftus, Captain, Bayview District Station to Allison Wax, PBS&J, August 31, 2009.
[1196] PBSJ Meeting with SFPD on April 22, 2008.

The R&D Variant would not increase the permanent resident population above that anticipated with the Project. However, as shown in Table IV-6, the R&D Variant is anticipated to generate a total of 16,635 jobs, approximately 5,905 more jobs than the Project. As such, the resident and worker population in the area at full build-out with the R&D Variant would be 41,100.[1197] The increase in the (overall) residential and (R&D Variant-specific) daytime population, combined with an increase in the intensity of physical development in the R&D Variant area, would result in new demand for fire protection and emergency medical services. Additional fire protections resources that would be required to patrol the football stadium on game days with the Project would not be required with the R&D Variant, thereby reducing that potential impact.

Building Safety

Similar to the Project all new buildings must meet standards for emergency access, sprinkler, and other water systems, as well as all other requirements specified in the *San Francisco Fire Code*, which would help to minimize the demand for future fire protection services. The R&D Variant would include an additional 2,500,000 square feet of R&D uses. These uses would be provided primarily in buildings that would have a maximum allowable height of 65 feet, although some buildings would be restricted to a maximum of 40 feet as shown on Figure IV-2. Therefore, the R&D Variant would not result in building heights greater than the Project, and impacts would be similar to the Project. Plan review for all structures for compliance with *San Francisco Fire Code* requirements would minimize the potential for fire-related emergencies by providing on-site protective features, reducing the demand for fire protection services. In addition, development of the R&D Variant would include expansion of the AWSS to provide water infrastructure for firefighting activities. Therefore, the R&D Variant would result in a less-than-significant operational impact to fire services due to building safety.

Response Time

As discussed with the Project, existing SFFD facilities in the Bayview neighborhood would provide adequate response times to most points within Candlestick Point and no new or physically altered fire or emergency medical facilities would be required in order to maintain an acceptable level of service. However, portions of HPS Phase II would be distant from existing fire stations including those most proximate to the site (Stations 44 and 17), which could result in the SFFD taking anywhere from 8 minutes to 14 minutes to access the HPS Phase II site in the event of an emergency. The SFFD strives to maintain a Code 3 emergency response time of 4.5 minutes, which may not be accommodated due to the distance of the nearest station from the HPS Phase II site. As such, a new fire station located in closer proximity to the HPS Phase II site would be needed to ensure adequate response times for HPS Phase II. The SFFD does not consider response time to the furthest point of the HPS Phase II site to be acceptable, given the density of proposed development and the distance from the nearest fire station.[1198] Additionally, the R&D Variant would increase the daytime population in this area by approximately 5,905 people, which would further affect the existing SFFD resources. SFFD staff concluded that a fire station would be needed at a site that would offer more rapid response to the HPS Phase II site. Initial SFFD

[1197] Calculated as the combined total of a resident population of 24,465 and a worker population of 16,635. This is a conservative estimate since it is not likely that the entire resident population and daytime population would be on site at the same time.
[1198] PBSJ Meeting with San Francisco Fire Department on July 8, 2008.

recommendations for such a station included providing one engine (four staff), one truck (five staff), and one ambulance (staff requirements not indicated). Both Station 9 and Station 17 include one engine and one truck, and their approximate building size is 6,100 gsf and 6,000 gsf, respectively. Neither station includes an ambulance. A new approximately 6,000-gsf SFFD station could be accommodated within the R&D Variant site, on land designated for community serving uses. As part of the R&D Variant, up to 100,000 gsf of land divided equally between Candlestick Point and HPS Phase II would be designated for community serving uses, such as fire, police, healthcare, day-care, places of worship, senior centers, library, recreation center, community center, and/or performance center uses. The Applicant has designated 5.3 acres of community-serving uses in HPS Phase II, including 0.5 acre of which have been designated for a new SFFD facility.

These uses have been anticipated as part of the R&D Variant and the impacts of their construction are evaluated in this EIR. Construction activities associated with proposed public facilities are considered part of the overall Project. A discussion of project-related construction impacts, including those associated with the construction of public facilities, is provided in the applicable sections of this EIR, including Section III.D (Transportation and Circulation), Section III.H, Section III.I (Noise and Vibration), Section III.J (Cultural Resources and Paleontological Resources), Section III.K (Hazards and Hazardous Materials), and Section III.M. Construction impacts would be temporary. While it is likely that construction of the various public facilities would not result in significant impacts (either individually or combined), construction of the entire development program, of which the public facilities are a part, would result in significant and unavoidable impacts related to construction noise and demolition of an historic resource; all other construction-related impacts would be less than significant (in some cases, with implementation of identified mitigation). Refer to Section III.D, Section III.H, Section III.I, Section III.J, Section III.K, and Section III.M for the specific significance conclusions for construction-related effects.[1199] As such, the construction impacts associated with a new SFFD facility on the Project site have been addressed in this EIR. Therefore, the anticipated development would not require new or physically altered fire facilities. No changes to the land use program at Candlestick Point would occur, beyond the scope of the R&D Variant in order to maintain acceptable fire protection services and operational impacts to fire protection services would be less than significant, similar to the Project.

Schools

Operational impacts to schools would be similar to the Project. The R&D Variant does not include a residential component in addition to what was considered with the Project. No changes to the land use program at Candlestick Point would occur. The additional R&D uses would not generate school-aged children at the R&D Variant site, and, therefore, impacts would be less than significant, similar to the Project.

[1199] The impact statements provided in each technical section of the EIR differentiate between construction impacts and operational or development impacts, and all identified mitigation measures are contained in the impact analysis. In addition, Table ES-2 in the Executive Summary of this EIR also summarizes all impact statements, the level of significance before mitigation, any identified mitigation measures, and the level of significance after mitigation.

Library Facilities

Operational impacts to libraries would be similar to the Project. While the R&D Variant does not include a residential component that would result in the generation of additional permanent residents, the R&D Variant would result in the generation of approximately 5,905 additional employees at the HPS Phase II site. Although the R&D Variant would result in a substantial indirect population increase within the area, library branches that currently serve the area, including the new Portola branch (opened in 2009), the Visitacion Valley branch currently under construction (opening in 2010), and the Bayview branch to be expanded beginning in 2010 (opening in late 2011), would continue to meet the demands of the community. No changes to the land use program at Candlestick Point would occur. Therefore, the R&D Variant would result in a less-than-significant operational impact to library services, similar to the Project.

Recreation

The R&D Variant would include the construction and improvement of new parks, recreational facilities, and open space. At buildout of this Variant, approximately 327 acres of parks, open space, and recreational uses would be provided, as described in Table IV-3, which is about 9.4 acres less than proposed with the Project. The Sports Field Complex with the R&D Variant would be 69.8 acres, about 21.8 acres less than the Sports Field Complex proposed with the Project, and a total of 160.5 acres of parkland would be provided, about 12.4 acres more than proposed with the Project.

Construction impacts related to recreational facilities would be the substantially the same as those identified with the Project because the construction activities would be substantially similar, with the R&D Variant requiring slightly less construction due to the provision of about 9.4 acres less of parkland.

The R&D Variant would have the same number of housing units as proposed with the Project, thereby resulting in the same residential population of 24,465, although 9.4 acres less of parkland would be provided. Operational impacts are determined based on a ratio of acres of parkland per resident. Currently, the City provides approximately 7.1 acres of parkland per thousand residents, and the standard used in Section III.P (Recreation) assumes a ratio of 5.5 acres of parkland per 1,000 population is sufficient to meet the demand for recreational facilities without causing or accelerating substantial physical deterioration of facilities or requiring the construction of further facilities. The parkland-to-population ratio associated with the R&D Variant would be 13.4, which is 0.3 less than with the Project. While this ratio is less than proposed with the Project, the R&D Variant ratio would be considerably higher than the ratio of 5.5 acres of parkland per thousand residents, which is considered sufficient to meet demand for recreational facilities without causing or accelerating substantial physical deterioration of facilities or requiring the construction of further facilities. Impacts would be less than significant.

Park Phasing

The timing of R&D Variant development could result in a temporary increase in the use of parks, recreational facilities, and open space in a manner that would cause or accelerate the substantial physical deterioration or degradation of facilities if the development of residential and/or employment-generating uses were to occur in advance of the development of park and recreational facilities.

The conceptual development plan for this Variant would result in the development of residential units and parks during all of four stages of development. Table IV-10 (R&D Variant Residential Units and Park Acreage Provided during Each Stage of Development) outlines the number of residential units and the acreage of parkland provided during each stage of development, as well as the resulting park-to-population ratio for residents of the Project site (even if developed under the R&D Variant). As this table indicates, the park-to-population ratio would not drop below 12.3 acres per 1,000 population at any time during the four stages of development, which exceeds the benchmark of 5.5 acres of parkland per 1,000 population. Table IV-10 demonstrates that adequate parkland would be provided during each stage of development. However, during a given phase, park construction could lag behind residential development, leading the parkland-to-population ratio to drop below an acceptable level. Moreover, the development plan is conceptual and could be modified during the entitlement and development process. Mitigation measure MM RE-2 would ensure that the parks and recreational amenities are constructed as residential and employment-generating uses are developed, and a less-than-significant impact would result.

Table IV-10 R&D Variant Residential Units and Park Acreage Provided during Each Stage of Development

Stage of Development	*Residential Units*	*Population*	*Total Parkland (ac)*	*Park-to-Population Ratio (acres per 1,000 Residents)*
Existing	256	1,113[a]	120.2	108
Phase 1	3,120	7,270[b]	163.6	22.5
Phase 2	6,125	14,271[b]	175.9	12.3
Phase 3	9,345	21,774[b]	326.2	15.0
Phase 4	10,500	24,465[b]	327.0	13.4

a. Refer to Table III.C-1 (Existing Population [2005]) in Section III.C (Population, Employment, and Housing). This population correlates to the total number of households in the Traffic Analysis Zone, which includes more than the 256 households located in the Candlestick portion of the Project site (e.g., 292). It is likely, therefore, that the population within the Candlestick portion of the Project site is less than 1,113, which would only increase the existing park-to-population ratio.

b. Calculated as 2.33 people per residential unit.

Senate Bill 792 (SB 792) (refer to Appendix P2 [SB 792]) was signed by the Governor on October 11, 2009, and is codified as Chapter 203 of the Statutes of 2009. SB 792 repeals the *Hunters Point Shipyard Conversion Act of 2002,* the *Hunters Point Shipyard Public Trust Exchange Act,* and *Public Resources Code* Section 5006.8, and consolidates the key provisions of those statutes into a statute covering both the Candlestick Point area and HPS. The statute authorizes a reconfiguration of CPSRA coupled with improvements within the park and the provision of an ongoing source of park operation and maintenance funding. The proposed reconfiguration would remove about 29.2 acres from the current boundaries of CPSRA to be used for urban development, but would add about 5.7 acres not currently included in the CPSRA to The Neck, The Heart of the Park, and The Last Port areas of the CPSRA. These additional acres would widen the park at in an area where the CPSRA boundary currently runs very close to the shoreline, creating a very narrow "pinch point" in the park. The additional acreage would thus create a buffer between development and the shoreline and improve the recreational value of this section of the park. In total, the area of the CPSRA (excluding the Yosemite Slough) would decrease

by about 23.5 acres at the Candlestick Point site, from 120.2 acres to 96.7 acres, which is the same as the Project.

While the reconfiguration of CPSRA would remove a net of 29.2 acres from the park, all of that acreage is degraded or unimproved (and not maintained) and does not provide substantial recreation opportunities to the community. Most of the land that would be removed from CPSRA is either currently used for stadium parking or is directly adjacent to Harney Way. The reconfiguration would add 5.7 acres of new parkland in The Last Port, The Neck, and The Heart of the Park, all areas that are currently developed and actively used that have high value as recreational resources. This additional acreage would widen the park at this important point, increasing its capacity for new users. Although there would be a net decrease in the total area of the CPSRA, that portion of the CPSRA that is currently developed and used for recreational purposes would be further expanded (by 5.7 acres) and improved.

Moreover, the R&D Variant would provide substantial improvements throughout the CPSRA. These improvements, which are described at length in the discussion of Impact RE-2, include revegetation and landscaping, shoreline restoration and stabilization, infrastructure improvements (such as trails, pathways, and visitor facilities), the provision of habitat and opportunities for environmental education, "Eco-Gardens," and salt-marsh restoration. Figure III.P-8 shows the existing unimproved and improved areas of the CPSRA and indicates where land would be removed or added relative to the existing CPSRA uses. These improvements would turn portions of the Park that are used for Candlestick Park stadium parking or are undeveloped and underutilized into vibrant parts of the CPSRA and of the overall network of parks. Currently improved parts of the CPSRA, such as The Heart of the Park, The Point, The Neck, and The Last Port, would also be improved. Overall, the reconfiguration and improvements would enhance park aesthetics and landscape ecology; provide connections throughout the CPSRA and the other parks; and provide direct access to the Bay and the Bay shoreline for walking, swimming, fishing, kayaking, and windsurfing. The Variant's proposed reconfiguration of the CPSRA, therefore, would not adversely affect the park's existing recreational facilities and opportunities.

The improvement and development of the CPSRA is expected to increase usage of CPSRA by visitors. While the number of additional visitors cannot be accurately predicted at this time, the Project's improvement will increase the amount of land at CPSRA that provides recreational opportunities (as discussed above), and will thus enable the park to accommodate the new demand. Moreover, the agreement between CDPR and the City or the Agency, providing for the reconfiguration of CPSRA, would also provide at least $10 million in funding for operation and maintenance of the park, further enabling the park to accommodate increased demand.

A Technical Memorandum was prepared to study wind conditions at a launch site at CPSRA (in The Neck area) and in a 55-acre portion of the Bay south of the launch site. The study found that development in the cumulative scenario, which includes development at the Project site (even if under the R&D Variant), generally results in wind speed changes near the shoreline (generally within 300 feet) ranging from no change to a 10 to 20 percent decrease in wind speed. Approximately 7 acres near the shoreline would experience a decrease of 10 to 20 percent in wind speed; approximately 36 acres of the Bay would experience a decrease of five to 10 percent; and approximately 12 acres of the Bay would experience a decrease of less than five percent. The majority of the windsurfing test area (as identified in the Technical Memorandum) would not be substantially affected (e.g., a 10 percent decrease or less in

wind speed). The Variant would not significantly and adversely affect existing windsurfing opportunities at the CPSRA. A less-than-significant impact would occur, and no mitigation is required.

In summary, impacts resulting from the R&D Variant would be substantially similar to the Project.

Utilities

Water

The operational activities of the R&D Variant would be similar to those of the Project in as much as there would be temporary, daytime populations at the R&D Variant site and full-time residential populations that generate retail water demand from San Francisco Public Utilities Commission (SFPUC).

With the R&D Variant, the football stadium proposed with the Project for the HPS Phase II site would be replaced by 2,500,000 square feet of additional R&D space. The R&D Variant would have the same number of residential units as the Project, but would increase the temporary, daytime population of employees. As shown in Table IV-11 (R&D Variant Water Demands Adjusted for Plumbing Codes and SF Green Building Ordinance [mgd]), the R&D Variant would consume approximately 1.99 million gallons per day (mgd) of water. With existing water use at the CP-HPS Phase II site of 0.3 mgd, the net change in water demand with the R&D Variant would be an increase of 1.69 mgd, an increase of 0.32 mgd over the Project.

Table IV-11 R&D Variant Water Demands Adjusted for Plumbing Codes and SF Green Building Ordinance (mgd)

Land Use	*Candlestick Point*	*Hunters Bay Shipyard*	*Total*
Residential	0.61	0.22	0.83
Hotel	0.05	0.00	0.05
Office	0.04	0.02	0.06
R&D	0.00	0.71	0.71
Neighborhood Retail	0.02	0.02	0.03[a]
Regional Retail	0.08	0.00	0.08
Community Uses	0.01	0.01	0.02
Football Stadium	0.00	0.00	0.00
Performance Venue	0.01	0.00	0.01
Subtotal	*0.82*	*0.98*	*1.80*[a]
Parks and Open Space	0.05	0.14	0.19
Total Demand	***0.88***[a]	***1.13***[a]	***1.99***[a]
Existing Demand			0.30
Net Change in Demand			***1.69***

SOURCE: PBS&J, Candlestick Point–Hunters Point Shipyard Phase II Water Supply Assessment, October 2009.

a. Numbers are rounded according to standard rounding practices and may not add up due to hidden decimals used in this table. These entries are correct and consistent with Table 4-2 of the Water Supply Assessment.

As with the Project, sufficient treatment capacity would continue to be available to meet the likely future water treatment needs of the entire Regional Water System, and thereby meet retail demand for water treatment, including the net increase of 1.69 mgd for the R&D Variant. As the current and planned treatment capacity of existing RWS water treatment facilities is sufficient to serve the R&D Variant, implementation of this variant would not require or result in the construction of new or expanded water treatment facilities, and this impact would be less than significant, similar to the Project.

As with the Project, beginning in 2025, during multiple dry-year periods, the total retail water supply would be slightly less than estimated total demand, including demand associated with the R&D Variant. With the implementation of the WSAP and RWSAP during multiple dry-year periods, which could include voluntary rationing or other water conservation strategies, existing and projected future water supplies could accommodate estimated future water demand, including the Project-related demand. As discussed in the WSA, the SFPUC has approved and has made substantial progress towards the implementation of the water facility improvement projects identified in the WSIP. The SFPUC has received voter approval to fund the Phased WSIP program and has initiated bond sales to fund implementation of individual projects, which are in various stages of implementation, including subsequent environmental review, design, or construction.[1200] Thus, there is substantial evidence that the SFPUC would implement the Phased WSIP facility projects described above, including the local water supply projects.

The San Francisco Recycled Water Program currently includes the Westside, Harding Park, and Eastside Recycled Water Projects, and various conservation efforts. The proposed projects would provide up to 4 mgd of recycled water to a variety of users in San Francisco.[1201,1202] Recycled water will primarily be used for landscape irrigation, toilet flushing, and industrial purposes. The Harding Park Project has completed environmental review, and the Westside Project is expected to begin environmental review in late 2009 or early 2010. The WSIP contains funding for planning, design, and environmental review for the San Francisco Eastside Recycled Water Project. The local water supply improvement projects were approved as part of the Phased WSIP and are included in the WSIP funding program. The SFPUC has initiated planning, environmental review, and design of several recycled water and groundwater projects and conservation programs are in place. Thus, there is substantial evidence that the additional water provided by those projects would be available to supplement retail water supplies.

As noted above, the SFPUC adopted the Phased WSIP, which phased implementation of the water supply program to provide an additional 20 mgd of supply to meet projected demand through 2018 and requires the SFPUC to re-evaluate water demands and water supply options by December 31, 2018, through 2030 to meet projected demand. The R&D Variant would not require water supplies in excess of

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[1200] Per the *Water System Improvement Program Quarterly Report, Q4, FY 2008/2009* (dated August 20, 2009), (prepared by the SFPUC), as of July 1, 2009, two (2) projects are in the Planning Phase, eleven (11) projects are in the Design Phase, six (6) projects are in the Bid and Award Phase, five (5) projects are in the Construction Phase, two (2) projects in the Close-Out Phase, eight (8) projects are completed, one (1) project has not been initiated, and eleven (11) projects have multiple active phases. Available at: http://sfwater.org/Files/Reports/01_RW_Program_Summary.pdf Accessed September 28, 2009.

[1201] San Francisco Planning Department, Final Program Environmental Impact Report, Water Supply Improvement Program, October, 2008.

[1202] SFPUC, Urban Water Management Plan, 2005.

existing entitlements or result in the need for new or expanded entitlements, and this impact is less than significant, similar to the Project.

Wastewater

The construction impacts of the R&D Variant would be substantially similar to the Project because the construction activities required with both would be similar.

The operational activities of the R&D Variant would be similar to those of the Project in as much as there would be temporary, daytime populations at the R&D Variant site that require wastewater utilities that are connected to the City's systems. The R&D Variant would replace or upgrade existing wastewater infrastructure within the R&D Variant site.

With the R&D Variant, the football stadium proposed with the Project for the HPS Phase II site would be replaced by 2,500,000 square feet of additional R&D space. The R&D Variant would have the same number of residential units as the Project, but would increase the temporary, daytime population of employees. As shown in Table IV-12 (R&D Variant Wastewater Generation), the R&D Variant would result in the generation of approximately 1.35 mgd of wastewater, an increase of 0.17 mgd of wastewater over the Project.

Table IV-12 R&D Variant Wastewater Generation

Land Use	*Estimated Wastewater Generation Expressed as % of Water Demand (or as otherwise specified)*	*Candlestick Point (mgd)*	*Hunters Point (mgd)*	*Total R&D Variant (mgd)*
Residential	95%	0.58	0.21	0.79
Regional Retail	57%	0.05	0	0.05
Neighborhood Retail	57%	0.01	0.01	0.02
Office	57%	0.02	0.01	0.03
Community Uses	57%	0.01	0.01	0.02
Research and Development	57%	0	0.40	0.40
Hotel	57%	0.03	0	0.03
Football Stadium	95%	0	0	0
Performance Venue	95%	0.01	0	0.01
Total		***0.71***	***0.64***	***1.35***

SOURCE: Arup, October 15, 2009.

The 1.35 mgd of wastewater projected for operation of the R&D Variant would be transported via new or expanded conveyance systems within the R&D Variant site and existing mains to the Southeast Water Pollution Control Plant (SWPCP).[1203] The existing wastewater/stormwater conveyance lines between the HPS Phase II site and the SWPCP are sized to accommodate both dry- and wet-weather flows. Wastewater from the R&D Variant site would flow into the Hunters Point tunnel sewer (from the HPS

[1203] *Candlestick Point/ Hunters Point Shipyard Infrastructure Concept Report* (October 26, 2009) prepared by Winzler & Kelly Consulting Engineers.

Phase II site) and the Candlestick and Hunters Point tunnel sewers (from the Candlestick Point site). The] Hunters Point tunnel sewer has an average dry-weather flow of 6 mgd (4,167 gallons per minute [gpm]) and a design capacity of 120 mgd (83,333 gpm) (refer to Table IV-13 [Sewer Trunk Capacity and R&D Variant Maximum Peak Flows]).[1204] Peak dry-weather flow capacities can be calculated by multiplying the average gallons-per-minute flow by a peaking factor. For purposes of this analysis, a conservative peak factor of 3.0 was used, which yields a maximum flow capacity of 12,501 gpm for the Hunters Point tunnel sewer. Projected maximum peak flows from the HPS Phase II development with the R&D Variant, based on a peaking factor of 3.0, would be approximately 1,333 gpm.[1205] The remaining capacity of the Hunters Point tunnel sewer is 69,499 gpm. Therefore, the addition of approximately 1,333 gpm of peak flow from HPS Phase II with the R&D Variant would be accommodated within the remaining capacity (69,499 gpm) of the Hunters Point tunnel sewer. Stormwater flowing from the Candlestick Point Development (2,500 gpm maximum) would be the same with the R&D Variant as the Project as the land use program would not change. Therefore, the R&D Variant would result in a less-than-significant impact to wastewater conveyance, similar to the Project.

Table IV-13 Sewer Trunk Capacity and R&D Variant Maximum Peak Flows

Sewer Trunk	*Design Capacity (gpm)*	*Existing Average Dry-Weather Flow[a] (gpm)*	*Existing Maximum Peak Dry-Weather Flow[b] (gpm)*	*Variant Contribution—Maximum Peak Dry-Weather Flow[c] (gpm)*	*Remaining Peak Flow Capacity (gpm) With R&D Variant*
Candlestick tunnel sewer	34,722	1,736	5,208	1,479	28,035[e]
Hunters Point tunnel sewer	83,333	4,167[d]	12,501[d]	1,333	69,499[f]

SOURCE: Bayside Operations Plan, 2002.

a. Calculated as existing average dry-weather flow in mgd/24 hours/60 minutes 1,000,000.
b. Calculated as existing average flow in gpm x peaking factor of 3.0.
c. Calculated as proposed average dry-weather flow in mgd/24 hours/60 minutes X 1,000,000 X peaking factor of 3.0.
d. These flows are *inclusive* of flows from the Candlestick tunnel sewer.
e. Calculated as design capacity less existing maximum peak flow less Project maximum peak flow, all in gpm. This calculation does NOT take credit for the existing uses at Candlestick Point (including Alice Griffith Public Housing, the RV park, and the stadium) that will be demolished on site and that currently contribute to the Candlestick tunnel sewer. Therefore, the actual remaining peak flow capacity of the Candlestick tunnel sewer with the Project will be somewhat greater than 28,035 gpm.
f. Calculated as design capacity less existing maximum peak flow less Project maximum peak flow, all in gpm. This calculation does NOT take credit for the existing uses on the HPS Phase II site that will be demolished that currently contribute wastewater flows to the Hunters Point tunnel sewer. Therefore, the actual remaining peak flow capacity of the Hunters Point tunnel sewer with the Project will be somewhat greater than 69,853 gpm.

Because the existing conveyance infrastructure could accommodate the additional flows from the HPS Phase II development in addition to existing flows even during periods of peak flows, no expansion of the off-site wastewater conveyance lines would be required as a result of the R&D Variant development.

The contribution of the R&D Variant to the Bayside system represents a small percentage of its available capacity and would be accommodated by the existing infrastructure. Although development of the R&D Variant would increase wastewater flows (as intermittent flows from Candlestick Park stadium would be replaced by year-round flows from mixed-use development), the provision of separate stormwater and sewer systems would reduce overall wet-weather volumes to the Combined Sewer System.

[1204] San Francisco Public Utilities Commission, Bayside Operations Plan, 2002.
[1205] Calculated as 0.64 MGD/24 hours/60 minutes * 3.0*1,000,000.

The land use program and associated stormwater flows from the Candlestick Point site would be the same with the R&D Variant as with the Project. Therefore, treatment of stormwater would also be the same as with the Project. Stormwater from the HPS Phase II site is collected and discharged to the Bay via a separate stormwater system, which does not contribute any flows to the Combined Sewer System during wet weather. With the R&D Variant, stormwater would continue to be collected and treated in a separate stormwater system, and no stormwater runoff would be contributed to the Combined Sewer System during wet weather. Although development with the R&D Variant at the HPS Phase II site would result in a net increase in wastewater flows of 1.35 mgd, the additional flows would represent less than 0.1 percent of the remaining treatment capacity of the SWPCP. The increase in wastewater generation with the R&D Variant would incrementally contribute to the total amount of wet-weather flows that are collected and treated at the SWPCP, the North Point Wet Weather Facilities (NPWWF), and the Bayside Wet Weather Facilities. When the combined storage and treatment capacity of those facilities are exceeded, wastewater from the R&D Variant development could be discharged, along with other wet-weather flows from the combined system, via the CSOs located around the perimeter of San Francisco. Mitigation measure MM UT-3a would ensure that there would be no net increase in wet-weather flows in the Combined Sewer System as a result of the Project that could result in a temporary increase in CSO volume. During wet weather, the temporary retention or detention of wastewater on site during wet weather or completion of the separate stormwater and wastewater systems for the Project would ensure that there would be no increase in the likelihood of a CSO event as a result of the Project. The impact would be less than significant, similar to the Project.

The NPDES permit system requires that all existing and future municipal and industrial discharges to surface waters within the City be subject to specific discharge requirements. Wastewater from the R&D Variant would be treated at the SWPCP wastewater treatment plant and the SFPUC, who operates the SWPCP wastewater treatment plant, is required to comply with waste discharge requirements (WDRs) set by the RWQCB, which specify the allowable levels of pollutants in discharges from the facility. Compliance with any applicable WDRs, as monitored and enforced by the SFPUC, would ensure that the R&D Variant does not exceed the applicable wastewater treatment requirements of the RWQCB, and this impact would be less than significant, similar to the Project.

Solid Waste

Construction wastes with the R&D Variant, including demolition and hazardous wastes, would be similar to that generated with the Project because the materials used for construction would be substantially similar for both. Construction waste would be sorted, prior to disposal, to ensure that all recyclable materials are salvaged from the waste that is ultimately taken to a landfill. Incorporation of mitigation measure MM UT-5a (Construction Waste Diversion Plan) would ensure that impacts to solid waste during construction are reduced to a less-than-significant level.

Operational

Operational impacts of the R&D Variant would be substantially similar to the Project because the amount and type of solid waste generated would be similar, recycling activities would be implemented with both projects, and neither project would result in the exceedance of current landfill capacities. As shown in Table IV-14 (R&D Variant Solid Waste Generation), the R&D Variant would result in

approximately 9,143.3 tons of waste at full build-out of the HPS Phase II site, an increase of approximately 1,723 tons over the Project, for a total R&D Variant annual waste generation of 22,225 tons. This total waste stream would constitute approximately 3.6 percent of the City's total waste stream.[1206] The increase in solid waste generation associated with the R&D Variant development would not be substantial in the context of citywide solid waste infrastructure demand.

Landfill capacity is a dynamic metric dependent on the amount of solid waste that requires disposal (and the effectiveness of source reduction and recycling methods), the permitted capacity of the landfills, and the number of landfills that can accommodate solid waste. The City has a contract with Altamont Landfill to accept the City's waste through 2014. In 1988, the City of San Francisco entered into an agreement with what is now Waste Management of Alameda for the disposal of 15 million tons of solid waste. Through August 1, 2009, the City has used 12,579,318 tons of this capacity. The City projects that the remaining capacity would be reached no sooner than August 2014 (assuming an average of 467,000 tons a year disposal).[1207]

The City has issued a Request for Qualifications to solicit bids for a new contract to accommodate the City's disposal capacity beyond the expiry of the current agreement. The City has selected three landfills that have the capacity to meet the City's future needs and is in the final stages of the selection process that will result in an agreement for ratification by the Board of Supervisors no later than early 2010. The agreement will be for an additional 5 million tons of capacity, which could represent 20 or more years of capacity for San Francisco's waste. Future agreements will be negotiated as needed for San Francisco's waste disposal needs As noted, at current disposal rates, the Altamont Landfill would be expected to reach capacity in January 2032; however, its permit expires three years earlier, in January 2029.[1208] Demolition activities, which generate construction debris, are expected to conclude in 2024 at Candlestick Point and in 2021 at HPS Phase II, a minimum of five years before the landfill is expected to close. Further, the City requires the diversion of at least 75 percent of construction waste for new construction, as also required by MM UT-5a, which would reduce the amount of waste interred at the landfill. Further, the City continues to actively explore various waste-reduction strategies with the goal of moving towards zero waste. If the City achieves this goal, the impact of construction of the R&D Variant on solid waste would be further reduced. The impact of the construction waste generated by the R&D Variant on the capacity of the Altamont Landfill would be less than significant.

Typical municipal solid waste has a landfill density of 739 pounds per cubic yard.[1209] Using this density factor, 45.7 million cubic yards of remaining capacity at the Altamont Landfill would be equivalent to 33.7 million tons of remaining capacity. The contribution of 22,472 tons annually with the R&D Variant

[1206] California Integrated Waste Management Board, 2008. *Jurisdiction Profile for City of San Francisco.* Accessed online at: <http://www.ciwmb.ca.gov/Profiles/Juris/JurProfile1.asp?RG=C&JURID= 438&JUR=San+Francisco>, Accessed: November 5, 2008. 627,157 total tons of solid waste in 2007.
[1207] E-mail communication with David Assman, City of San Francisco, Department of the Environment, October 19, 2009.
[1208] CIWMB, 2009.
[1209] http://wasteage.com/mag/waste_municipal_solid_waste/. Accessed September 29, 2009.

Table IV-14 R&D Variant Solid Waste Generation

Use	Generation Factor (per day)	Candlestick Point			HPS Phase II			Total		
		Area or Units	Tons per Day or Event	Tons per Year	Area or Units	Tons per Day or Event	Tons per Year	Area or Units	Tons per Day or Event	Tons per Year or per Total Number of Events[a]
Residential	5.653 lbs/unit	7,850 units	22.2	8,103	2,650 units	7.5	2,737.5	10,500 sf	29.7	10,840.5
Retail	0.02600411 lbs/sf	760,000 sf	9.9	3,613.5	125,000 sf	1.6	584.0	885,000 sf	11.5	4,197.5
Office	0.006 lbs/sf	150,000 sf	0.5	182.5	0	0	0	150,000 sf	0.5	182.5
Hotel	0.0108 lbs/sf	150,000 sf	0.8	292.0	0	0	0	150,000 sf	0.8	292.0
R&D	0.006 lbs/sf	0	0	0	5,000,000 sf	15	5,475	5,000,000 sf	15	5,475
Performance Venue	2.23 lbs/seat	10,000 seats	5.6[b]	836.3[c]	0	0	0	10,000 seats	5.6	836.3[c]
Stadium	2.23 lbs/seat	0	0	0	0	0	0	0	0	0
Art Center	0.006 lbs/sf	0	0	0	255,000 sf	0.8	292	255,000 sf	0.8	292.0
Community Facilities	0.006 lbs/sf	50,000 sf	0.15	54.8	50,000 sf	0.15	54.8	100,000 sf	0.3	109.6
Total				***13,082***			***9143***			***22,225***

SOURCE: PBS&J 2009; Generation Factors from Arup, *Carbon Footprint Report*, March 24, 2009.

a. Calculated by adding the horizontal columns, rather than calculating total number of units by the generation rate.
b. The Performance venue is projected to be 50 percent attendance.
c. Assumes 150 events per year at 50 percent attendance. Attendance estimate is based on CABER, Towson University & Sage Policy Group, Inc., *The Economic Feasibility of a Montgomery County, MD Arena*, June 2007.
d. Assumes a sold-out event with a 5 percent "no-show" rate.
e. Assumes 12 sold-out games and 20 other sold-out stadium events per year.

would represent 0.06 percent of the remaining capacity of the Altamont Landfill. Additionally, approximately 72 percent of the City's total waste stream, by volume, was diverted in 2008.[1210] Of the wastes that were not diverted, the City estimates that up to 65 percent of the total volume consists of readily recyclable or compostable materials, such as paper and food scraps.[1211] The remainder of the wastes consists of materials such as disposed household items and furniture, hazardous wastes, and construction wastes. The City has prepared a number of strategies to divert additional solid waste and achieve citywide diversion goals. These strategies would be utilized to achieve the City's overall waste reductions goals. The City's contribution to landfills is anticipated to diminish over time as the City implements more aggressive waste diversion strategies. Increasing solid waste diversions would extend the life of the landfills utilized by the City, lengthening the time horizon before the remaining disposal capacity is filled.

All residents and businesses with the R&D Variant would be expected to comply with the City's waste and recycling ordinances. On the basis of the landfill capacity and diversion strategies noted above, and with implementation of mitigation measure MM UT-7a (Site Waste Management Plan), the R&D Variant would result in a less-than-significant impact to solid waste, similar to the Project.

Electricity, Natural Gas, and Telecommunications

The proposed improvements within the Project site include the construction of a joint trench for electrical, natural gas, cable TV, and telecommunications. The power supplier may service the project via new extensions of the 12KV distribution and or 115KV transmission lines into the Project site. This could include a new substation within the project site. Impacts of construction activities associated with the Project, including demolition and installation of new utility infrastructure, are discussed in Section III.D, Section III.H, Section III.I, Section III.J, Section III.K, Section III.L, Section III.M, Section III.O, and Section III.S of this EIR. No new construction impacts beyond those identified in those sections would occur with construction of utility infrastructure associated with the R&D Variant, similar to the Project. Telecommunications providers are "on-demand" services, generally expanding their systems in response to demand, and would be anticipated to provide extensions of existing infrastructure to the Project site as required. Such extensions would require minimal trenching, if any, and would not be anticipated to result in significant environmental impacts beyond those previously analyzed in this EIR. The subdivision process would include submittal of detailed infrastructure plans to the Department of Public Works identifying how they would meet the infrastructure needs of the Project. Implementation of these plans would be a condition of subdivision approval. The subdivision process would ensure that adequate infrastructure is provided to accommodate the demands of the Project such that the capacity of the service providers to provide such utilities would not be exceeded. Therefore, the impact would be less than significant for the R&D Variant, similar to the Project.

[1210] This figure is a preliminary estimate and represents the most recent data available. California Integrated Waste Management Board, 2008. *Jurisdiction Profile for City of San Francisco.* Available online at: <http://www.ciwmb.ca.gov/Profiles/Juris/JurProfile1.asp?RG=C&JURID= 438&JUR=San+Francisco>, Accessed: November 5, 2008.

[1211] San Francisco, *Waste Characterization Study: Final Report.* 2008.

Energy

Construction

Construction activities of the R&D Variant would be similar to the Project as the construction equipment usage, types of energy resources needed, type of construction activities, and construction timeline would be similar.

The construction activities proposed with the R&D Variant do not include unusual or atypical activities that would result in a higher than average demand for fuels. Construction would consist of temporary activities that would not generate a prolonged demand for energy. Thus, construction activities would not be large in comparison to a project of a similar size and with similar land uses, and the R&D Variant would result in a less-than-significant impact, similar to the Project.

Operation

Electricity

The operational impacts of the R&D Variant would be similar to the Project because the types of energy required and the proposed uses would be similar to that considered with the program for the Project. However, the R&D Variant would result in the demand for more electricity than the Project; therefore, impacts would be greater (about 25 percent greater). As discussed in Section III.R (Energy), the operational impacts of a project are considered significant if it encourages activities that result in the use of large amounts of energy or uses such resources in a wasteful manner. The criterion for this impact considers whether the R&D Variant would result in a large increase in electricity consumption. As shown below in Table IV-15 (R&D Variant Electricity Demand from Building Envelopes [MWh]), the R&D Variant would be expected to result in an electricity demand of approximately 41,945 Megawatt hours (MWh). While about 4 percent more than the Project, this would not be a large overall increase in consumption over the existing conditions of 9,990 MWh; however, two uses (residential and R&D) would account for 90 percent of the increase in demand for electricity at the site. R&D uses would be the largest source of electricity consumption at HPS Phase II, while residential units would be the largest source of electricity consumption at Candlestick Point. Because R&D uses result in heavy electricity consumption during peak daytime hours (largely due to HVAC, lighting, and the operation of office equipment), the R&D Variant could generate high levels of peak demand, similar to the Project.[1212]

Taking the R&D Variant's compliance with the Green Building Ordinance and its voluntary implementation of energy-saving design features into consideration, as well as the level of development proposed, the electricity increase associated with the R&D Variant would not be considered large.

[1212] Although the R&D Variant would include on-site electricity infrastructure, local delivery infrastructure is supplied by larger transmission lines, substations, and generation facilities owned by PG&E and other entities. Adding new connections to the overall power grid, thereby increasing demand on the grid, contributes to the need for periodic infrastructure upgrades. More importantly, because electricity cannot be stored once generated, the need for development of additional electricity generation sources is largely dependent on the peak level of conveyance. Designing electricity infrastructure is similar to designing highways, which are sized to convey rush-hour demand.

Table IV-15 R&D Variant Electricity Demand from Building Envelopes (MWh)

Type of Use	Electricity Use Factor, 2008 Title 24 Standards (MWh/gsf or unit)[a]	Candlestick Point			HPS Phase II			Project Site Total			
		Development Program[b]	MWh Consumed Annually, 2008 Title 24 Standards[c]	MWh Consumed Annually, with 15% Reduction	Development Program[b]	MWh Consumed Annually, Title 24 Standards[c]	MWh Consumed Annually, with 15% Reduction	Development Program	MWh Consumed Annually, Title 24 Standards	MWh Consumed Annually, with 15% Reduction	Percent of Total Electricity by Land Use
Residential Units	1.7350[d]	7,850	13,620	11,577	2,650	4,598	3,908	10,500	18,218	15,485	37%
Retail	0.0027	635,000	1,715	1,457	—	0	0	635,000	1,715	1,457	3%
Neighborhood Retail	0.0027	125,000	338	287	125,000	338	287	250,000	675	574	1%
Office	0.0052	150,000	780	663	—	0	0	150,000	780	663	2%
R&D	0.0052	—	0	0	5,000,000	26,000	22,100	5,000,000	26,000	22,100	53%
Hotel	0.0027	220	1	1	—	0	0	220	1	1	0%
Artist Studios/ Center	0.0052	—	0	0	255,000	1,326	1,127	255,000	1,326	1,127	3%
Community Space	0.0052	50,000	260	221	50,000	260	221	100,000	520	442	1%
Arena	0.0015	75,000	113	96	—	0	0	75,000	113	96	0%
Total			***16,825***	***14,301***		***32,522***	***27,643***		***49,348***	***41,945***	***100%***

SOURCES:

R&D Variant electricity demand was estimated based on the Applicant's commitment to achieve 15 percent energy reductions below Title 24 standards and use ENERGY STAR appliances in all residential units.

a. The energy use factor cited for residential units is from: ENVIRON International Corporation, *Climate Change Technical Report: Candlestick Point–Hunters Point Shipyard Phase II Development Plan*, October 2009, Table 3-8 (Appendix S to this EIR). The factor was derived by subtracting the "Plug-in" factor from the "Electricity Delivered, Total" column (in the "15 percent Better than Title 24 2008 and ENERGY STAR Appliances" row). The factor was converted from kWh to MWh (1 MWh = 1,000 kWh).

b. Based on buildout floor areas provided in Table IV-3 of this EIR.

c. Calculated by multiplying energy use factor by number of units or gsf.

d. The electricity factors cited for non-residential uses are from: ENVIRON International Corporation, *Climate Change Technical Report: Candlestick Point–Hunters Point Shipyard Phase II Development Plan*, October 2009, Table 3-16 (Appendix S to this EIR). The factors are in the "Non-Title 24" column. The factors were converted from kWh to MWh.

e. Numbers are rounded according to standard rounding practices and may not add up due to hidden decimals.

The City's threshold also considers whether the R&D Variant's energy consumption would be wasteful. The efficiency measures proposed under the R&D Variant would result in building envelope consumption of at least 15 percent less electricity than a project that would not implement such measures. Further electricity savings would be anticipated as a result of the R&D Variant's compliance with the Green Building Ordinance, installation of ENERGY STAR appliances, and the R&D Variant's voluntary implementation of LEED® ND standards. However, because the R&D Variant Applicant's commitment to implement energy reductions and voluntary green building practices (beyond the measures required in the City's Green Building Ordinance) is preliminary and not based on actual building designs, mitigation is necessary to reduce potential electricity use impacts to a less-than-significant level. Mitigation measure MM GC-2, which requires the R&D Variant Applicant to exceed the 2008 Title 24 energy efficiency standards for homes and businesses by at least 15 percent, mitigation measure MM GC-3, which would require installation of ENERGY STAR appliances for builder-supplied appliances, and MM GC-4, which would require installation of energy efficient lighting, would reduce electricity consumption impacts to less than significant. The City's significance criterion also considers whether a project's energy consumption would be wasteful. The efficiency measures proposed with the R&D Variant would result in less electricity consumption than a project that would not implement such measures. These measures include installation of ENERGY STAR appliances, a measure aimed at reducing residential electricity consumption, which as discussed in the preceding paragraph, is a land use with correspondingly high energy consumption. Therefore, the R&D Variant has demonstrated a good faith effort to avoid wasteful consumption of energy for residential uses. In addition, as discussed in the preceding paragraph, the R&D Variant Applicant would be required to comply with the City's Green Building Ordinance and has committed to pursuing LEED® credits.[1213] Thus, electricity consumption with the R&D Variant development would be considered efficient and not wasteful. Operational electricity impacts would be less than significant, similar to the Project.

Natural Gas

The operational impacts of the R&D Variant would be similar to the Project as the types of energy required and the proposed uses would be similar to that considered with the program for the Project. However, the R&D Variant would result in the demand for almost twice the natural gas demand of the Project.

Table IV-16 (R&D Variant Natural Gas Demand, Baseline [MBtu]) presents the annual natural gas use for the R&D Variant, estimate based on land use and minimal compliance with Title 24 standards as well as the R&D Variant Applicant's preliminary commitment to reduce energy use to 15 percent below Title 24 standards. The natural gas demand associated with the R&D Variant would be approximately 98,563 MBtu, in comparison to a similarly sized project that would not include the 15 percent reduction below 2008 Title 24 standards and which would result in consumption of approximately 116,670 MBtu of natural gas use annually.

However, this is approximately 35,300 MBtu more than the Project.

[1213] Savings associated with these features cannot be calculated until the designs of individual buildings have been completed.

Table IV-16 R&D Variant Natural Gas Demand, Baseline (MBtu)

Type of Use	Natural Gas Use Factor, 2008 Title 24 Standards (MWh/gsf or unit)[a]	Candlestick Point			HPS Phase II			Project Site Total			
		Development Program[b]	MBtu Consumed Annually, 2008 Title 24 Standards[c]	MBtu Consumed Annually, with 15% Reduction	Development Program[b]	MBtu Consumed Annually, 2008 Title 24 Standards[c]	MBtu Consumed Annually, with 15% Reduction	Development Program	MBtu Consumed Annually, 2008 Title 24 Standards[c]	MBtu Consumed Annually, with 15% Reduction	Percent of Total by Land Use
Residential Units	0.0360[d]	7,850	283	240	2,650	95	81	10,500	378	321	0%
Retail	0.0048	635,000	3,048	2,591	—	—	—	635,000	3,048	2,591	3%
Neighborhood Retail	0.0048	125,000	600	510	125,000	600	510	250,000	1,200	1,020	1%
Office	0.0200	150,000	3,000	2,550	—	—	—	150,000	3,000	2,550	3%
R&D	0.0200	—	—	—	5,000,000	100,000	85,000	—	100,000	85,000	86%
Hotel	0.0345	220	8	6	—	—	—	220	8	6	0%
Artist Studios/ Center	0.0200	—	—	—	225,000	4,500	3,825	225,000	4,500	3,825	4%
Community Space	0.0200	50,000	1,000	850	50,000	1,000	850	100,000	2,000	1,700	2%
Arena	0.0243	75,000	1,823	1,549	—	—	—	75,000	1,823	1,549	2%
Total			***9,761***	***8,297***		***106,909***	***90,266***		***116,670***	***98,563***	***100%***
Percent of Total			***8%***			***92%***			***100%***		

SOURCES:

Baseline R&D Variant natural gas demand was estimated based on land use and basic compliance with 2008 Title 24 standards.

a. The natural gas factors cited for non-residential uses are from: ENVIRON International Corporation, *Climate Change Technical Report: Candlestick Point–Hunters Point Shipyard Phase II Development Plan*, October 2009, Table 3-16 (Appendix S to this EIR). The factors are in the "Overall Based on 2008 Title 24" column. The factors were converted from kBtu to MBtu.

b. Based on buildout floor areas provided in Table IV-3 of this EIR.

c. Calculated by multiplying energy use factor by number of units or gsf.

d. The natural gas factor cited for residential units is from: ENVIRON International Corporation, *Climate Change Technical Report: Candlestick Point–Hunters Point Shipyard Phase II Development Plan*, October 2009, Table 3-8 (Appendix S to this EIR). The factor is in the "Natural Gas Delivered, Total" column and the "Minimally Title 24 Compliant (2008)" row. The factor was converted from kBtu to MBtu (1 MBtu = 1,000 kBtu).

e. Numbers are rounded according to standard rounding practices and may not add up due to hidden decimals.

The natural gas use at the Project site would represent less than 1 percent of the City's overall natural gas consumption of 28,918,000 million Btus, and overall natural gas demand would be over four times higher than under existing conditions, largely attributable to R&D uses at HPS Phase II. Natural gas use would be roughly five times higher at HPS Phase II than at Candlestick Point due to peak daytime demand from R&D uses. However, on a per-square-foot basis, the R&D Variant would result in 15 percent less electricity use than projects that comply with minimum Title 24 requirements only.

However, because the R&D Variant Applicant's commitment to implement energy reductions and voluntary green building practices (beyond the measures required in the City's Green Building Ordinance) is preliminary and not based on actual building designs, mitigation is necessary to reduce potential electricity use impacts to a less-than-significant level. Mitigation measure MM GC-2, which requires the R&D Variant Applicant to exceed the 2008 Title 24 energy efficiency standards for homes and businesses by at least 15 percent, and mitigation measure MM GC-3, which would require installation of ENERGY STAR appliances for builder-supplied appliances, would reduce natural gas consumption impacts to less than significant.

All natural gas impacts would be less than significant, similar to the Project.

Similar to the Project, the R&D Variant would increase trips to and from the site, increasing the use of petroleum fuels. However, this consumption would not be wasteful because (1) the R&D Variant proposes to minimize transportation-related fuel use by implementing a number of transit, bicycle, and pedestrian improvements, (2) the R&D Variant would include a transportation demand management (TDM) program designed to reduce the remaining vehicle trips, and (3) the R&D Variant would result in dense development within an urbanized area with a mixture of neighborhood-serving uses, which would reduce the total number of trips to and from the site, as well as the overall trip lengths. Therefore, the R&D Variant would result in a less-than-significant impact due to the wasteful use of transportation-related fuels, similar to the Project.

Greenhouse Gas Emissions

As shown in Table IV-3, the R&D Variant would replace the 49ers stadium proposed with the Project with an additional 2,500,000 gsf of R&D space (total R&D uses would equal 5,000,000 gsf). Construction impacts would be substantially similar to the Project. Operational impacts would be similar but greater than those identified under the Project as the proposed additional R&D development would result in greater annual GHG emissions than the stadium. The methodologies used to estimate GHG emission for the R&D Variant are the same as described in Section III.S (Greenhouse Gas Emissions) for Project GHG emissions.

Construction

As stated above, overall construction impacts of the R&D Variant with respect to climate change and GHG emissions would be similar to the Project. Construction activities would occur from the use of construction equipment, workers commuting, and soil hauling activities. The GHG emissions associated with the construction activities are short-term in duration and will be a total of 105,587 tonnes CO_2e. When this is distributed over an anticipated time schedule of 16 years, approximately 6,600 tonnes per

year will be emitted. Since these emissions are short in duration and small in comparison to the overall construction and mining emissions for the San Francisco Bay Area Air Basin GHG emission inventory, the R&D Variant GHG emissions for construction would be less than significant similar to the Project.

Operation

Operational impacts to climate change and GHG emissions would be substantially similar to the Project. Under the R&D Variant, the football stadium proposed under the Project would be replaced with 2,500,000 square feet of additional R&D space at the HPS Phase II site. Development of Candlestick Point would be similar to the Project except for a slight increase in emissions associated with mobile sources. Table IV-17 (R&D Variant Annual GHG Emissions) shows the emissions for Candlestick Point under the R&D Variant. Due to the additional building space and additional traffic associated with the R&D space added, the GHG emissions at HPS Phase II site would be slightly higher. The breakdown in operational GHG emissions for HPS Phase II is shown in Table IV-17.

Table IV-17 R&D Variant Annual GHG Emissions

Source	*Candlestick Point (tonnes CO_2e/year)*	*Hunters Point Shipyard Phase II (tonnes CO_2e/year)*	*Total (tonnes CO_2e/year)*
Residential	19,035	6,642	25,677
Non-Residential	4,263	23,155	27,418
Mobile	77,586	42,332	119,918
Municipal	1,793	860	2,653
Area	161	56	217
Waste	532	506	1,038
Transit Area	865	865	1,730
Total (annual emissions)	***104,234***	***74,416***	***178,651***

SOURCE: ENVIRON, 2009.

The operational emissions were compared to ARB Scoping Plan No Action Taken Scenario which assumes the site would be developed without implementation of conceptual design features and using regulations in place at the time of the Scoping Plan development. The R&D Variant shows large reductions in GHG emissions due to the mitigation measures that will be implemented. The comparison of the R&D Variant GHG emissions to the ARB Scoping Plan No Action Taken scenario is shown in Table IV-18 (Annual GHG Emissions Comparison of R&D Variant and ARB Scoping Plan No Action Taken Scenario). This shows that due to the improvement in electricity carbon intensity and energy efficiency of the buildings residential GHG emissions would have a 20 percent reduction in emissions and non-residential buildings would have a 17 percent reduction in emissions. Municipal sources are anticipated to be 7 percent lower than the ARB Scoping Plan No Action Taken as a result of reductions in electricity carbon intensity. Mobile source emissions associated with the R&D variant are a result of trip reductions in automobiles and vehicle emission efficiency regulations resulting in 57 percent reductions compared to the ARB Scoping Plan No Action Taken scenario.

Table IV-18	Annual GHG Emissions Comparison of R&D Variant and ARB Scoping Plan No Action Taken Scenario (tonnes CO_2e/year)			
Source	*No Action Taken*	*R&D Variant*	*Difference*	*Percent Difference*
Residential	32,286	25,677	6,609	20%
Non-Residential	33,025	27,418	5,607	17%
Mobile	277,459	119,918	157,541	57%
Municipal	2,860	2,653	207	7%
Area	217	217	0	0%
Waste	1,038	1,038	0	0%
Transit Service	2,884	1,730	1,154	40%

SOURCE: ENVIRON October 2009. Climate Change Technical Report Candlestick Point-Hunters Point Shipyard Phase II Redevelopment Plan. Table 4-9 (Appendix S to this EIR)

Emissions associated with new public transportation added to the development would have a 40 percent reduction due to the use of diesel-hybrid buses. Since transportation is one of the largest emissions categories in both the statewide and local GHG emissions inventory, the amount of reduction is substantial in the overall reductions anticipated for the R&D Variant. Furthermore, most of the other larger categories also result in substantial reductions in emissions. This indicates that the R&D Variant would not impede the achievement of San Francisco's GHG emission reduction ordinance nor the statewide emission reductions required under AB 32. Therefore, the R&D Variant is less than significant with respect to the cumulative impacts of climate change and GHG emissions.

BAAQMD Draft GHG Thresholds

BAAQMD is considering the future adoption of quantitative CEQA thresholds of significance for operational-related GHG emission impacts. At present, two options relevant to the Project are under consideration for operational GHG emission thresholds; the lead agency can choose either option. Option 1 is based on a project's total operational GHG emissions of 1,100 metric tonnes CO_2e per year. The Project's total operational emissions would exceed this level, which means that if this was used, the Project would be significant. Option 2 is based on the amount of a project's operational GHG emissions per service population, set at 4.6 metric tonnes CO2e per year. In anticipation of proposed new BAAQMD CEQA thresholds of significance for GHG emissions, this EIR provides an analysis of the Variant's operational GHG emissions under the proposed thresholds of significance identified above. The BAAQMD thresholds stated above are still in draft form and may undergo additional changes before being finalized; a revised version is expected Monday, November 2. The methodologies presented in this EIR for quantification of GHG operational emissions is based on using more refined data sources than indicated in the BAAQMD guidance and are the most appropriate to use for the Variant and Project.

With mitigation, the R&D Variant-related operational emissions of 178,651 tonnes per year result in 4.4 tonnes CO2e per service population per year based on a service population of 40,507 (this accounts for 23,869 net new residents and all 16,638 jobs). Therefore, the Project-related operational emissions would

be less than 4.6 tonnes CO_2e per service population per year and would result in a less-than-significant impact on climate change.

IV.C VARIANT 2: HOUSING VARIANT (NO STADIUM—RELOCATION OF HOUSING)

IV.C.1 Overview

The Housing Variant assumes that the 49ers Stadium would not be constructed, and instead, housing would be relocated to the HPS Phase II site. Residential development would be reduced at Candlestick Point and increased at HPS Phase II in comparison to the Project, and the total 10,500 housing units would be the same as with the Project. All other uses on Candlestick Point and HPS Phase II would be constructed at the same locations and at the same intensities proposed with the Project. Neighborhood retail would be distributed differently than the Project to serve residential uses on HPS South district; however, the total amount of neighborhood retail is the same as the Project. Parks and sports field areas at HPS Phase II would be increased compared to the Project because the total development area for residential uses would be reduced.

Table IV-19 (Housing Variant Land Use Summary) presents the land use summary for the Housing Variant. Figure IV-7 (Housing Variant Land Use Plan) illustrates the proposed Housing Variant land uses.

Table IV-19 Housing Variant Land Use Summary

Land Use		*Candlestick Point*	*HPS Phase II*	*Total*
Residential				
Residential Density Range I (15 to 75 units per acre)		970	1,540	2,510
Residential Density Range II (50 to 125 units per acre)		3,670	1.905	5,575
Residential Density Range III (100 to 175 units per acre)		1,220	265	1,485
Residential Density Range IV (175 to 285 units per acre)		640	290	930
	Total (units)	***6,500[a]***	***4,000[b]***	***10,500***
Retail				
Regional Retail (gsf)		635,000	N/A	635,000
Neighborhood Retail (gsf)		125,000	125,000	250,000
	Total (gsf)	***760,000***	***125,000***	***885,000***
Office (gsf)		150,000	N/A	150,000
Research & Development		***N/A***	***2,500,000***	***2,500,000***
Hotel (gsf)		150,000	N/A	150,000
Rooms		220	N/A	220

Table IV-19 Housing Variant Land Use Summary

Land Use	*Candlestick Point*	*HPS Phase II*	*Total*
Artists' Studios/Art Center (gsf)	N/A	255,000	255,000
Community Services (gsf)[c]	50,000	50,000	100,000
Parks & Open Space			
New Parks (acres)	8.1	149.9	158.0
New Dual-Use Sports Fields/Multi-Use Lawn and Stadium Parking and Waterfront Recreation (acres)	N/A	94.7	94.7
Existing State Parkland Improved (acres)	91.0	N/A	91.0
New State Parkland (acres)	5.7	N/A	5.7
Total (acres)	***104.8***	***244.6[d]***	***349.4***
Marina (slips)	N/A	300	300
Performance Venue/Arena (gsf)	75,000	N/A	75,000
Seats	10,000	N/A	10,000
Parking (spaces)			
Residential (structured)	6,500	4,000[e]	10,500
Commercial (structured)	2,346	3,778	6,124
General and Commercial (on-street)	1,360	1,298	2,658

SOURCE: Lennar Urban, 2009.

a. 1,350 units less than the Project (moved to HPS Phase II).

b. 1,350 units more than the Project (moved from Candlestick Point).

c. . Community facilities parcels are intended to provide the existing BVHP community and the future Project community with dedicated land for uses designed to provide, preserve, and leverage such critical local resources as social services, education, the arts, other community services (including public safety facilities such as fire and police stations), and facilities for the benefit of senior citizens. Additional uses proposed for the community facilities parcels such as retail, services, offices, and R&D space, beyond the 100,000 proposed for community facilities, would be absorbed within the retail or R&D program proposed in HPS Phase II. Total uses would not exceed those amounts identified in this table.

d. Parks and sports field areas at HPS Phase II would be increased compared to the Project because the total development area for residential uses would be reduced.

e. Residential parking at HPS Phase II would be increased compared to the Project to provide parking for the additional residential units.

IV.C.2 Project Objectives

The objectives for the Housing Variant would be the same as for the Project. In particular, the Housing Variant was prepared to address the following portion of Objective 1:

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

A full list of Project objectives is provided in Section II.D of this EIR.

SOURCE: Lennar Urban, 2009.

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FIGURE IV-7 Candlestick Point — Hunters Point Shipyard Phase II EIR

HOUSING VARIANT LAND USE PLAN

IV.C.3 Characteristics

Section II.E outlines the Project's land use plan, parks and open space plan, transportation improvements, infrastructure plan, community benefits, and green building concepts. While many of these components of the Project would also apply to this variant, the discussion below outlines the principal differences.

Candlestick Point

The land use program outlined in the Chapter II for Candlestick Point would be the same for this Housing Variant, with fewer housing units. The discussion below is focused on the changes that would occur at HPS Phase II.

Districts

As discussed in Chapter II, the HPS Phase II land use plan would consist of four districts: the HPS Village Center, HPS North, R&D, and HPS South. The changes proposed with the Housing Variant compared to the Project include residential and neighborhood commercial land uses for the HPS South district and a small reduction in neighborhood commercial uses in other HPS Phase II districts. All other land uses within the HPS Phase II districts would be the same as the Project, as described in detail in Chapter II. Land uses on the Candlestick Point site would be the same as with the Project, however the density of residential uses would be lower. A summary of the development in HPS Phase II proposed with the Housing Variant is provided in Table IV-20 (Housing Variant HPS Phase II Land Use Summary). Figure IV-8 (Housing Variant Maximum Building Heights) illustrates the maximum building heights for the Housing Variant.

The Hunters Point Shipyard South

With the Housing Variant, the 69,000-seat National Football League stadium proposed with the Project would not be constructed. Instead, the Housing Variant would result in construction of 1,350 dwelling units at Density Range I and II in the HPS South district. The Project includes no residential uses in this district. In addition, with Variant 2, the HPS South district would develop 25,000 gsf of neighborhood retail, while the Project would not develop any neighborhood retail adjacent to the stadium. As presented in Table IV-21 (Housing Variant HPS Phase II Parks and Open Space), the Sports Field Complex proposed with the Housing Variant would be 65.9 acres, 6.2 acres more than the Project.

Hunters Point Shipyard North

Other than the amount of neighborhood retail that would be developed, the land uses proposed in the HPS North district are the same as the Project. Development in this area would include 18,000 gsf of neighborhood retail uses, which is 7,000 gsf less than what is proposed for the Project.

Table IV-20 Housing Variant HPS Phase II Land Use Summary

District	*Net Acres*[a]	*Dwelling Units*[b]	*Density*	*Neighborhood Retail (gsf)*	*Artist Space (gsf)*	*R&D (gsf)*	*Community Services (gsf)*	*Total Commercial (gsf)*	*City Parks (acres)*
Hunters Point Shipyard North	27.30	2,085	I, II, III, IV	18,000[c]	0	0	0	18,000	19.9
Hunters Point Shipyard Village Center	7.55	125	I	20,000[d]	255,000	0	0	275,000	15.6
Research & Development	26.22	440	I, II	62,000[e]	0	2,000,000	0	2,062,000	25.3
Hunters Point Shipyard South	47.06[f]	1,350[g]	I, II	25,000[h]	0	500,000	50,000	575,000	183.8
Total	***108.13***	***4,000***[g]	***N/A***	***125,000***	***255,000***	***2,500,000***	***50,000***	***2,930,000***	***244.6***[i]

SOURCE: Lennar Urban, 2009.

a. Net Acreage excludes the street network.

b. 1,540 Residential Density Range I (15 to 75 units per net acre)
1,905 Residential Density Range II (50 to 125 units per net acre)
265 Residential Density Range III (100 to 175 units per net acre)
290 Residential Density Range IV (175 to 285 units per net acre)
4,000 Total units

c. 7,000 gsf less than the Project.

d. 5,000 gsf less than the Project.

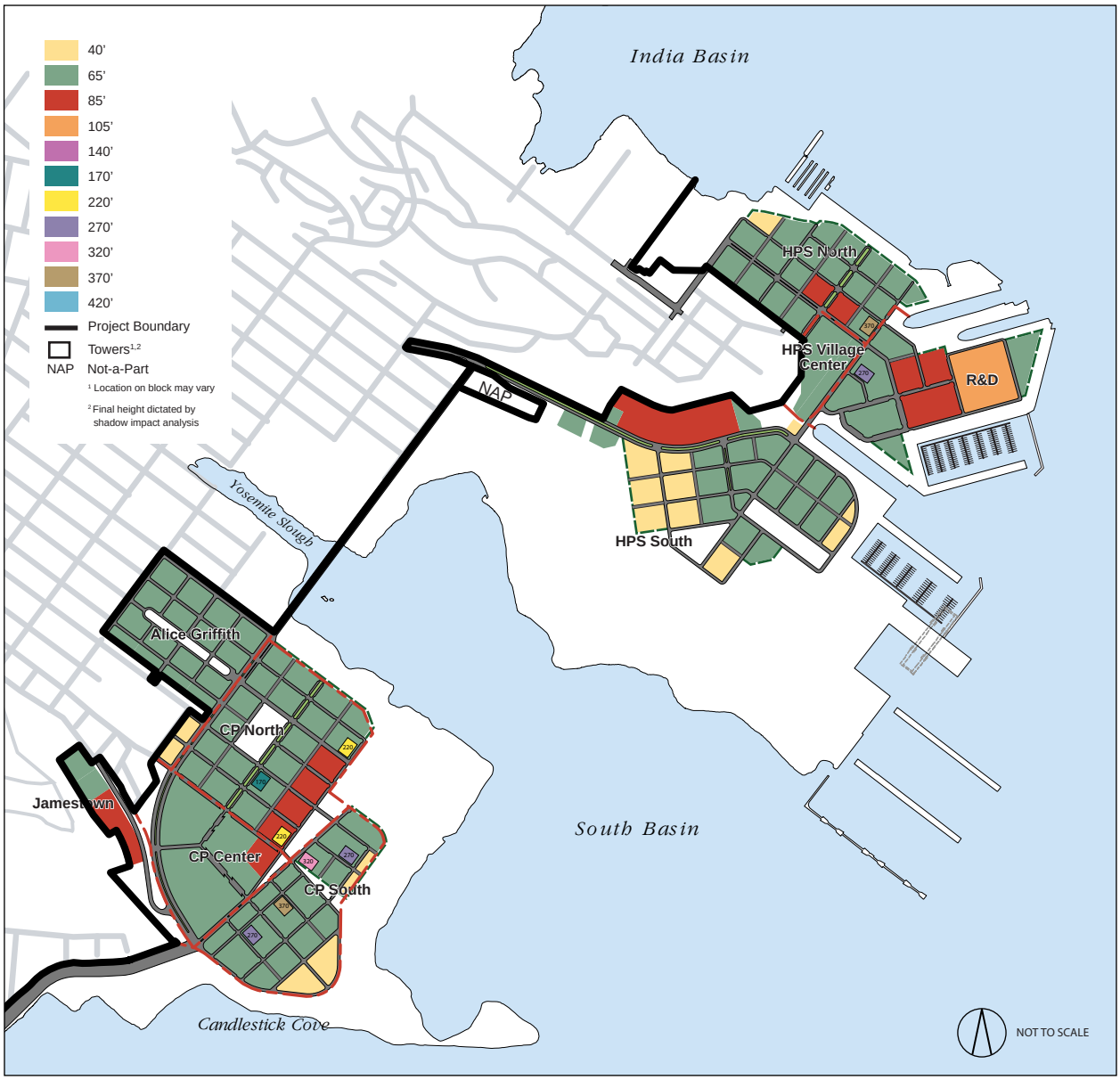
e. 13,000 gsf less than the Project.

f. The net acreage of the HPS South district would be increased compared to the Project (32.26 acres with stadium).

g. 1,350 units more than the Project.

h. 25,000 more than the Project.

i. Parks and sports field areas at HPS Phase II would be increased compared to the Project because the total development area for residential uses would be reduced.



SOURCE: Lennar Urban, 2009.

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Candlestick Point — Hunters Point Shipyard Phase II EIR

HOUSING VARIANT MAXIMUM BUILDING HEIGHTS

FIGURE IV-8

Table IV-21 Housing Variant HPS Phase II Parks and Open Space

Park/Open Space		*Acres*
New Parks		
Northside Park		12.8
Waterfront Promenade		32.4
Heritage Park		15.6
Grasslands Ecology Park at Parcel E		44.9
Grasslands Ecology Park at Parcel E-2		37.7
Hunters Point South Park		3.7
	Subtotal	*2.8*
New Sports Fields and Active Urban Recreation		***149.9***
Sports Field Complex		
Multi-Use Lawn		65.9
Waterfront Recreation & Event Pier		22.1
	Subtotal	*6.7*
	Total	***94.7***
	Project Total	***244.6***

SOURCE: Lennar Urban 2009.

Hunters Point Shipyard Village Center

Other than the amount of neighborhood retail that would be developed, the land uses proposed in the HPS Village Center district would be the same as the Project. Development in this area would include 20,000 gsf of neighborhood retail uses, this is 5,000 gsf less than what is proposed for the Project.

Research & Development

Other than the amount of neighborhood retail that would be developed, the land uses proposed in the R&D district are the same as the Project. The R&D district would include 62,000 gsf of neighborhood retail uses, 13,000 gsf less than what is proposed with the Project.

■ Parks and Open Space at HPS Phase II

The Housing Variant parks and open space on Candlestick Point would be the same as the Project; this discussion focuses on HPS Phase II changes. The Housing Variant would include additional parks and would reconfigure the design and sizes of parks and open space areas at HPS Phase II compared to the Project. HPS Phase II would have 244.6 acres (13 acres more than the Project) of parks and open space. The Sports Field Complex proposed with the Housing Variant would be 65.9 acres, which is 6.2 acres more than proposed with the Project. An additional 6.5 acres of parks not included in the Project would be constructed in the HPS South The 4.4-acre Hunters Point South Park would be constructed in the HPS South district, which is not included in the Project. Table IV-21 presents the proposed park and

open space at HPS Phase II in the Housing Variant. Figure IV-9 (Housing Variant Parks and Open Space) illustrates the location of the proposed parks and open space.

Transportation and Circulation

A new Yosemite Slough bridge serving transit, bike, and pedestrian traffic only would extend Arelious Walker Drive from Candlestick Point to HPS Phase II. The additional four auto lanes on the bridge to serve game-day traffic, proposed with the Project, are not included in this variant. The bridge would be approximately 40 feet wide and would cross the Slough at the same location as the Project. The bridge and its approach streets would have two dedicated transit lanes and a separate Class I bicycle and pedestrian lane, which would be open at all times.

The primary roadway connection for automobiles and other vehicular traffic between Candlestick Point and HPS Phase II would be west on Carroll Avenue to Ingalls Street, north along Ingalls Street to Thomas Avenue, and east on Thomas Avenue to Griffith Street. Ingalls Street would remain an industrial mixed-use street with two auto lanes and parking and loading zones on its northern and southern sides. The width of sidewalks on that portion of Ingalls Street from Carroll Avenue to Yosemite Avenue would be decreased from 16 feet to 11 feet to create a uniform street width to accommodate the auto lanes, parking, and loading.

At HPS Phase II, additional roadways to serve the residential uses on HPS South would be included and residential parking would be increased to serve the additional residential units, compared to the Project.

Infrastructure

The location of major infrastructure improvements would be very similar to that which is proposed for the Project but rather than terminating at the stadium site, the improvements would be sited under the roadways of HPS South. Stormwater treatment methods are designed for site-specific conditions and have been identified for the Housing Variant and are discussed below.[1214]

Implementation

Residential development at HPS Phase II would begin in 2017 with completion in 2021. Figure IV-10 (Housing Variant Building and Parks Construction Schedule) illustrates the overall phasing for the Housing Variant.

[1214] Arup, *Candlestick Point/Hunters Point Shipyard LID Stormwater Opportunities Study*, August 2009.

SOURCE: Lennar Urban, RHAA, 2009.

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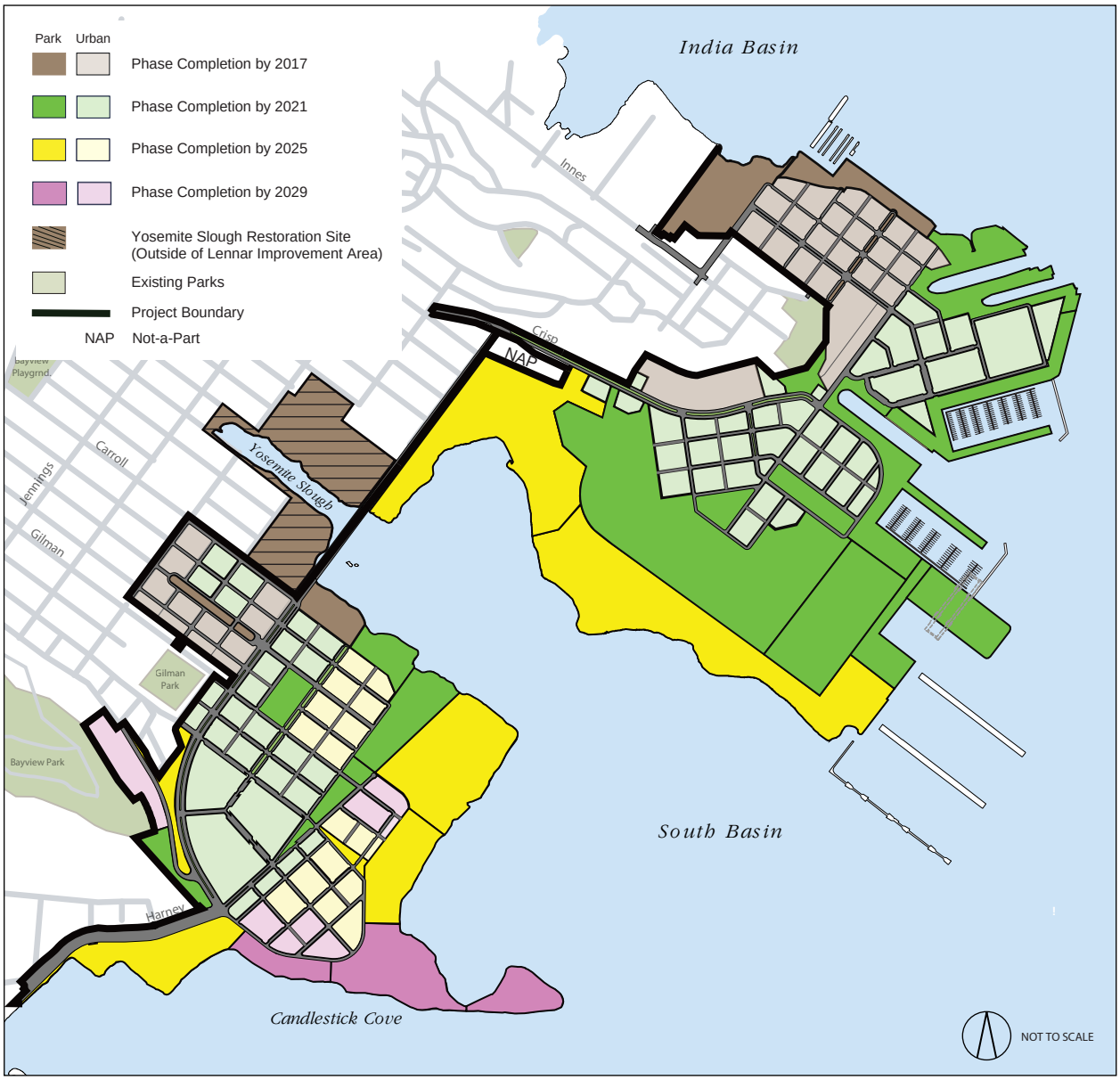
Candlestick Point — Hunters Point Shipyard Phase II EIR

HOUSING VARIANT PARKS AND OPEN SPACE

FIGURE IV-9



SOURCE: Lennar Urban, 2009.

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Candlestick Point — Hunters Point Shipyard Phase II EIR

FIGURE IV-10

HOUSING VARIANT BUILDING AND PARKS CONSTRUCTION SCHEDULE

IV.C.4 Potential Environmental Effects

Overall, the Housing Variant would not increase the total amount of development as compared to the Project but rather would remove the 69,000-seat football stadium from the development plan and relocate 1,350 housing units from the Candlestick Point site to the HPS Phase II site. As such, in a general context, the Housing Variant includes all uses proposed with the Project with the exception of the stadium area, which would be replaced by the relocated housing units. With the exception of the fewer housing units at Candlestick Point, all characteristics of Candlestick Point would be the same as the Project. This analysis focuses on the changes that would occur at HPS Phase II. Thus, potential construction-related environmental effects of the Housing Variant would be substantially similar to the Project because the development programs are substantially similar, with the exception of the removal of the football stadium, and construction activities would, in general be the same. Potential operational effects of the Housing Variant would be substantially similar to the Project because the football stadium proposed with the Project was only proposed to be used for 12 games, and 20 other events, a year. Further, operational impacts would be primarily related to the day-to-day activities of residential dwelling units, not because there would be an increased number but rather because their location would be different.

Land Use and Plans

As shown in Figure IV-7, the Housing Variant would remove the stadium proposed with the Project and relocate 1,350 residential dwelling units from Candlestick Point to HPS Phase II. This would have the potential to increase land use impacts at the site as removal of the stadium from the land use program could conflict with existing applicable land use plans.

Division of an Established Community

The Project site generally includes underutilized and vacant parcels with limited access to the Bay shoreline and CPSRA. Connectivity between the Bayview Hunters Point neighborhood, Candlestick Point and HPS Phase II is limited. Large parking lots and vacant parcels at Candlestick Point separate the Bayview Hunters Point neighborhood from the Bay shoreline, and primary access roads do not include pedestrian, transit or bicycle features. Access to HPS Phase II is restricted to certain areas (those areas used for artist studios), and the area remains isolated from surrounding neighborhoods. The Housing Variant would maintain residential communities at Alice Griffith public housing and at Jamestown Avenue, similar to the Project.

The Housing Variant proposes infill development, centered on nodes of commercial and retail activity at Candlestick Point and HPS Phase II with no physical divisions. Residential and non-residential infill around these nodes of activity would provide a more continuous land use pattern and street grid, provide new services and community amenities in the Bayview Hunters Point neighborhood, allow better access to parks and recreational facilities (which would be improved under the Housing Variant), and remove existing barriers to circulation and access. The Housing Variant would not divide an established community; therefore, no impact would occur, similar to the Project.

Consistency with Plans and Policies

Applicable plans that direct or regulate development on the Project site include the San Francisco General Plan, Candlestick Point State Recreation Area General Plan, San Francisco Bay Plan, San Francisco Bay Trail Plan, Bay Area Seaport Plan, Bayview Hunters Point Area Plan, Bayview Hunters Point Redevelopment Plan, Hunters Point Shipyard Redevelopment Plan, and San Francisco Planning Code. San Francisco's Sustainability Plan also applies to the Housing Variant. While the Housing Variant is generally consistent with goals and objectives of most plans, the Housing Variant would be inconsistent with land use designations that reflect former economic realities or former plans for the site. These inconsistencies would require amendments to the relevant plans, but do not reflect any impacts to the environment that the plans and policies seek to avoid. As described in connection with the Bay Plan and Seaport Plan, the designation of industrial uses along the waterfront is not a policy adopted to protect the environment, and the Housing Variant's proposals for this land represent an environmental improvement. Inconsistencies regarding the development pattern at HPS and the uses on Candlestick Point simply reflect the shifting locations of proposed uses within the site. The Housing Variant's proposed changes in the arrangement of land uses would not implicate any environmental protection objectives of the current land use designations in the redevelopment plans and other applicable land use plans; thus, the inconsistencies do not give rise to a significant impact on the environment, similar to the Project.

Change to the Land Use Character

The Housing Variant would alter the land use character at the Project site with new development of residential uses, R&D uses, regional and neighborhood retail uses, an arena, and public open space in the same proportions as the Project and without the stadium use. The Housing Variant's would extend the existing street grid and block pattern into HPS Phase II. The open space network would connect to the shoreline to the north and south.

This development would be considered to improve the existing land use conditions, and would not have an adverse effect on land use character of the Project site itself.

The Housing Variant would result in a substantially different built environment compared to the existing character of the site and vicinity. With the transition in scale and uses, the extension of the existing street grid, and with the connectivity of new open space with existing shoreline open space, the Housing Variant would be compatible with surrounding land uses. The Housing Variant would not result in a substantial adverse change in the existing land use character at the Project site or vicinity, and overall density would be less than the Project. The impact would be less than significant, similar to the Project.

Population, Housing, and Employment

In general, impacts from the Housing Variant would be similar to the Project because land uses and densities are substantially the same, with the exception of removal of the football stadium.

As shown in Figure IV-7, the Housing Variant would remove the football stadium from the development plan and relocate 1,350 housing units from the Candlestick Point site to the HPS Phase II site. However, the Housing Variant would not increase the number of residential units, nor other land uses. As such, the

Housing Variant would have the potential to reduce the number of employment opportunities (both construction and operational) at the site over levels anticipated with the Project, as discussed below. However, the permanent residential population would not change.

Direct Impacts

With the Housing Variant, construction is scheduled for completion beginning in the Year 2017, extending through the Year 2029, a period of approximately 12 years. This is similar to the construction schedule proposed at the HPS Phase II site for the Project, and, therefore, the number of construction personnel required at any given time at the HPS Phase II site would be similar to the total projected to be required for the Project. Construction employment opportunities are temporary in nature and would not result in a substantial increase in the number of employees in the area. Therefore, the Housing Variant would result in a less-than-significant impact to population during construction.

Direct population growth with the Housing Variant would include residents and employees who would occupy new homes and the employment space(s), respectively. With the Housing Variant, the football stadium proposed with the Project would be removed from the development plan and 1,350 housing units would be relocated from Candlestick Point to HPS Phase II. There would be no change to the number of proposed housing units; therefore, the permanent resident population with the Housing Variant would be the same as with the Project. However, the Housing Variant would reduce the number of jobs compared to the Project due to the removal of the stadium and no additional employment opportunities would be created. The Housing Variant would result in approximately 10,378 jobs. Total employment with the Housing Variant would represent approximately 1.4 percent of the 748,100 jobs anticipated Citywide in 2030. Overall, development with the Housing Variant would be less intensive than the Project.

Although the Housing Variant would result in a decrease in employment at the HPS Phase II site, growth in this area has long been the subject of many planning activities. The Housing Variant would provide all on-site infrastructure for connections to City mains, and would include on-site treatment of stormwater runoff. Therefore, the relocation of the housing units would not encourage growth where appropriate infrastructure would not be available.

Employment growth at HPS Phase II would be considered substantial if it resulted in housing demand that would exceed planned regional housing development. The Housing Variant would not alter the number of housing units proposed with the Project although it would relocate 1,350 housing units from Candlestick Point to HPS Phase II. Additionally, there would be a net decrease in jobs, which would mean that the Housing Variant would result in a less-than-significant impact than the Project. Total demand for housing with the Housing Variant would represent 3.7 percent of the total Bay Area housing need of 214,500 units (based on the Regional Housing Needs Assessment (RHNA) targets; refer to Section III.C.3 projected by ABAG through 2014.[1215] Based on the total employment available with the Housing Variant (10,378 jobs), total housing demand would be 7,990 units.[1216] As discussed above, the

[1215] The RHNP is updated every five years and does not extend through 2030.
[1216] Calculated as the projected employment divided by 1.36, plus 4.7% additional housing units to account for vacancy rate, times 55% total demand in San Francisco.

Table IV-22 Housing Variant Employment by Land Use

Land Use	Employment Factor[a]	Development Program, Candlestick Point[b]	Employment, Candlestick Point (jobs)	Development Program, HPS Phase II[b]	Employment, HPS Phase II (jobs)	Total Employment (jobs)
Residential	25 units/job	6,500 units	260	4,000 units	160	420
Regional Retail	350 gsf/job	635,000 gsf	1,814	0 gsf	—	1,814
Neighborhood Retail	270 gsf/job	125,000 gsf	463	125,000 gsf	463	926
Office	276 gsf/job	150,000 gsf	543	0 gsf	—	543
Research and Development	400 gsf/job	0 gsf	—	2,500,000 gsf	6,250	6,250
Hotel	700 gsf/job	150,000 gsf	214	0 gsf	—	214
Arena/Performance Venue	300 jobs/event[c]	150 events/year[c]	87	0 events	—	87
Public Parking	270 spaces/job[e]	3,706[e]	14	5,076[e]	19	33
Parks and Open Space	0.26 jobs/acre[f]	104.8[g]	27	244.6[g]	64	91
Total			***3,422***		***7,008***	***10,378***[h]
Project Total						***10,730***

SOURCES: Economic and Planning Systems, Inc., *Fiscal Analysis of the Candlestick Point/Hunters Point Shipyard Redevelopment Project*, 2009.

a. Employment factors are from City and County of San Francisco, *Transportation Impact Analysis Guidelines*, October 2002.
b. Based on buildout floor areas provided in Table II-2 of this EIR, Chapter II for Candlestick Point, and on Table IV-19 for HPS Phase II.
c. Lennar Urban, LLC estimates that there would be approximately 150 events at the arena annually and that employees would work 4-hour shifts.
d. Employment factors for public parking facilities provided by Economic and Planning Systems, Inc., 2009.
e. Parking based on Table IV-19 of this EIR, Chapter II. Includes Commercial (structured) and General and Commercial (on street). Residential parking at HPS Phase II would be increased compared to the Project to provide parking for the relocated Residential space.
f. Employment factors for parks and open space provided by Economic and Planning Systems, Inc., 2009.
g. Open space acreages based on Table II-2 of this EIR, Chapter II for Candlestick Point, and on Table IV-21 for HPS Phase II.
h. While Project employment includes 359 stadium jobs, the Housing Variant also includes 1 net new job related to public parking, and six net new jobs related to parks; therefore, the difference between the Project and the Housing Variant is 359 - 1 - 6 = 352 net jobs.

Housing Variant would provide approximately 10,500 dwelling units. This would exceed the approximately 7,990 dwelling unit demand anticipated with the Housing Variant. Therefore, the population increase associated with employment with the Housing Variant could be entirely accommodated. However, it is likely that some employees with the Housing Variant would elect to live elsewhere in the City or within surrounding Bay Area communities.

Based on existing commuting patterns, the Housing Variant would generate a demand for about 3,596 units in surrounding Bay Area communities. This housing demand would be dispersed throughout the nine-county Bay Area, which would result in negligible potential increases in housing demand within the Bay Area.

It is not anticipated that the increase in employment with the Housing Variant would create a substantial demand for housing in the immediate neighborhood, in San Francisco, or in the region in excess of the housing provided as part of the Housing Variant or housing otherwise available in the Bay Area. Necessary improvements to infrastructure, public services, and housing associated with direct population growth proposed as part of the Housing Variant has been anticipated in ongoing local and regional planning activities. All impacts associated with direct population growth are considered less than significant, similar to the Project.

Indirect Impacts

As infrastructure, public services, roads, and other services and communities amenities are expanded, there would also be potential for development with the Housing Variant to generate indirect population growth. Indirect growth is often defined as "leapfrog" development, development that occurs as infrastructure is expanded to previously un-served areas. Such development patterns usually occur in suburban areas adjacent to undeveloped lands. Areas surrounding the Housing Variant site are built out, except for sites such as Executive Park or India Basin that are currently undergoing development or are the subject of planned future development. Thus, the surrounding lands are not vulnerable to leapfrog-type development.

Infrastructure and services would be expanded to serve both the Candlestick Point and HPS Phase II sites, without significant excess capacity that might encourage additional local growth beyond that already anticipated under Proposition G and with the redevelopment plans. Development with the Housing Variant would not expand infrastructure to geographic areas that were not previously served, nor would it create new transportation access to a previously inaccessible area. All impacts associated with indirect population growth are considered less than significant, similar to the Project.

The potential for impacts due to housing displacement would be substantially similar to the Project. The Housing Variant would not increase residential units proposed with the Project. However, any dwelling units removed with the Housing Variant would be replaced on site by the proposed development and no residents would be displaced, necessitating the construction of replacement housing elsewhere. There would be no impact, similar to the Project.

Transportation and Circulation

Overall, the Housing Variant would not increase the total amount of development compared to the Project but would relocate approximately 1,350 housing units from Candlestick Point to HPS Phase II. Therefore, 4,000 residential units (rather than 2,650 residential units) would be developed at HPS Phase II. The Housing Variant would include all uses proposed with the Project with the exception of the stadium, which would be replaced by the relocated housing units. There would be no football stadium. Therefore, the Housing Variant would not have game day or other stadium event transportation impacts associated with the Project. The Housing Variant would have the same arena-related transportation effects as with the Project. The Housing Variant would have the same roadway, transit, bikeway, and Bay Trail improvements proposed with the Project, including the Yosemite Slough bridge. However, the bridge would be narrower than the bridge with the Project, with a 39-foot-wide right-of-way to accommodate two 11-foot-wide BRT lanes, a sidewalk, and a Class I bicycle path.

The Housing Variant would include a Transportation System Management plan and would develop and implement a Transportation Demand Management plan, as with the Project.

The Transportation Study analyzed the Housing Variant and conclusions from the Transportation Study have been presented below.

Construction Impacts

Construction activities associated with the Housing Variant would be similar to the Project. Depending on the phasing of the additional development, the Housing Variant may result in fewer construction traffic impacts between future years 2012 and 2017 when the new stadium would be constructed, and somewhat greater impacts in the years the housing would be constructed. Implementation of a Construction Traffic Management Program (the same as described for the Project) would help minimize the Housing Variant's contribution to cumulative construction-related traffic impacts. However, localized construction-related traffic impacts would therefore remain significant and unavoidable.

The Housing Variant would have 218,989 total daily person trips, fewer than the trips generated with the Project (219,651). Similarly, the Housing Variant would generate fewer peak hour person trips during both the AM and PM peak hours (13,489 weekday AM trips, 20,359 weekday PM trips, and 18,121 Sunday PM trips).

Intersection LOS

The Housing Variant would have similar project and cumulative effects at most study intersections as would occur with the Project. Section III.D, discusses traffic effects those intersections, and the feasibility of mitigation measures. As noted in Impact TR-3, Impact TR-4, Impact TR-5, Impact TR-6, and Impact TR-8, Project intersection impacts would be significant and unavoidable. Those conclusions would apply as well to the Housing Variant.

Traffic spillover effects with the Housing Variant would be significant and unavoidable, as with the Project.

Freeway Conditions

The Housing Variant effects on freeway mainline sections would be similar to the Project, although the magnitude of impacts may be greater with the Housing Variant due to increased traffic generation compared to the Project. Therefore, the Housing Variant-related and cumulative effects freeway operating conditions on this segment would be considered significant and unavoidable.

The Housing Variant effects on freeway ramp junctions would be similar to the Project, although the magnitude of impacts may be greater with the Housing Variant due to increased traffic generation compared to the Project. As described for Project impacts, no feasible mitigation measures have been identified for future freeway ramp junction conditions. Therefore, the Housing Variant contribution to freeway ramp operating conditions would be considered significant and unavoidable.

The Housing Variant ramp queuing effects would be similar to Project effects. The Housing Variant would result in significant impacts with respect to ramp queuing at the same off-ramp locations as the Project, with one exception. With the Housing Variant, the US-101 northbound off-ramp to Harney Way would not be likely to experience queues extending back to the mainline in the PM peak hour. However, the Housing Variant's contribution to other off-ramps expected to experience significant traffic impacts associated with queuing under Project conditions would be the same as the Project. As described for Project impacts, no feasible mitigation measures have been identified for the freeway off-ramps expected to experience significant impacts. Therefore, the Housing Variant's contribution to freeway segments operating at LOS E or LOS F conditions would be considered significant and unavoidable.

Transit Impacts

The Housing Variant, as with the Project, would include extended and new transit services; transit trips with the Housing Variant would be accommodated within the capacity of these services. The Housing Variant, as with the Project, would have a less than significant impact with mitigation on local and regional transit capacity. However, as with the Project, transit impacts would occur from traffic congestion delay. Overall, those transit delay conditions with the Housing Variant would affect the same lines as with the Project as presented in Section III.D, Impact TR-21 to Impact TR-30. Project mitigation measures MM TR-21 to MM TR-30 would also apply to the Housing Variant, but as concluded in Section III.D, the feasibility or implementation of the measures is uncertain, and the transit delay effects would remain significant and unavoidable.

The Housing Variant would require a similar number of additional vehicles on the same routes as the Project to mitigate transit congestion delays.

Bicycle Impacts

The Housing Variant bicycle trips would be accommodated within the proposed street and network, and impacts on bicycle circulation would be less than significant.

Pedestrian Impacts

The Housing Variant would be accommodated within the proposed sidewalk and pedestrian network, and impacts on pedestrian circulation would be less than significant.

Parking Impacts

The Housing Variant would result in a demand for about 21,310 spaces, compared with a maximum permitted supply of about 16,624 spaces; therefore, the maximum off-street parking supply would be about 4,686 spaces fewer than the estimated peak demand. The Project would have a demand for 21,233 spaces and maximum supply of 16,874 spaces, about 4,360 spaces fewer than estimated peak demand. Due to parking supply constraints and accessibility to transit, future Housing Variant parking demand may be somewhat lower than estimated, and therefore the parking space shortfall would also be less than represent the number of spaces that would be required in order to accommodate all the vehicles anticipated if the proposed parking supply was unconstrained. Since the parking supply would be constrained, the actual parking demand would be expected to be less. As discussed in Section III.D, peak parking demand would not represent do not occur simultaneously; public parking facilities, such as the one proposed in Candlestick Point, and on-street parking spaces can usually be shared efficiently among many destinations; and the Housing Variant would include a Travel Demand Management program that includes a number of parking strategies to make auto use and ownership less attractive, as well as strategies to encourage alternative modes.

As noted for the Project, it is possible that some drivers may seek available parking in adjacent Bayview residential areas to the west. The potential increase in parking demand in adjacent neighborhoods would likely spill over to streets with existing industrial uses in the vicinity, which could, in turn, increase demand for parking in nearby Bayview residential areas. Parking supply is not considered a permanent physical condition, and changes in the parking supply would not be a significant environmental impact under CEQA, but rather a social effect. The loss of parking may cause potential secondary effects, which would include cars circling and looking for a parking space in neighboring streets. The secondary effects of drivers searching for parking is typically offset by a reduction in vehicle trips due to some drivers, who are aware of constrained parking conditions in a given area, shifting to other modes. Hence, any secondary environmental impacts that may result from a shortfall in parking would be minor. Therefore, the parking shortfall would not result in significant parking impacts, and Housing Variant impacts on parking would be less than significant.

The Housing Variant would have less than significant effects on other transportation conditions (loading, air traffic, emergency access).

Aesthetics

In general, impacts from the Housing Variant would be similar to the Project because land uses and densities are substantially the same, with the exception of elimination of the proposed football stadium.

The Housing Variant would not increase the number of residential units or other land uses. Construction impacts would be substantially similar to the Project because the overall proposed uses and necessary activities would be the same as with the Project. Operational impacts would be similar but less than those identified with the Project, as the proposed residential buildings would be lower in height than the proposed stadium. All other urban design and building forms with the Housing Variant, and resulting effects, would be similar to conditions with the Project. Furthermore, the density of the residential areas across both the Candlestick Point and HPS Phase II sites would be lowered.

Construction

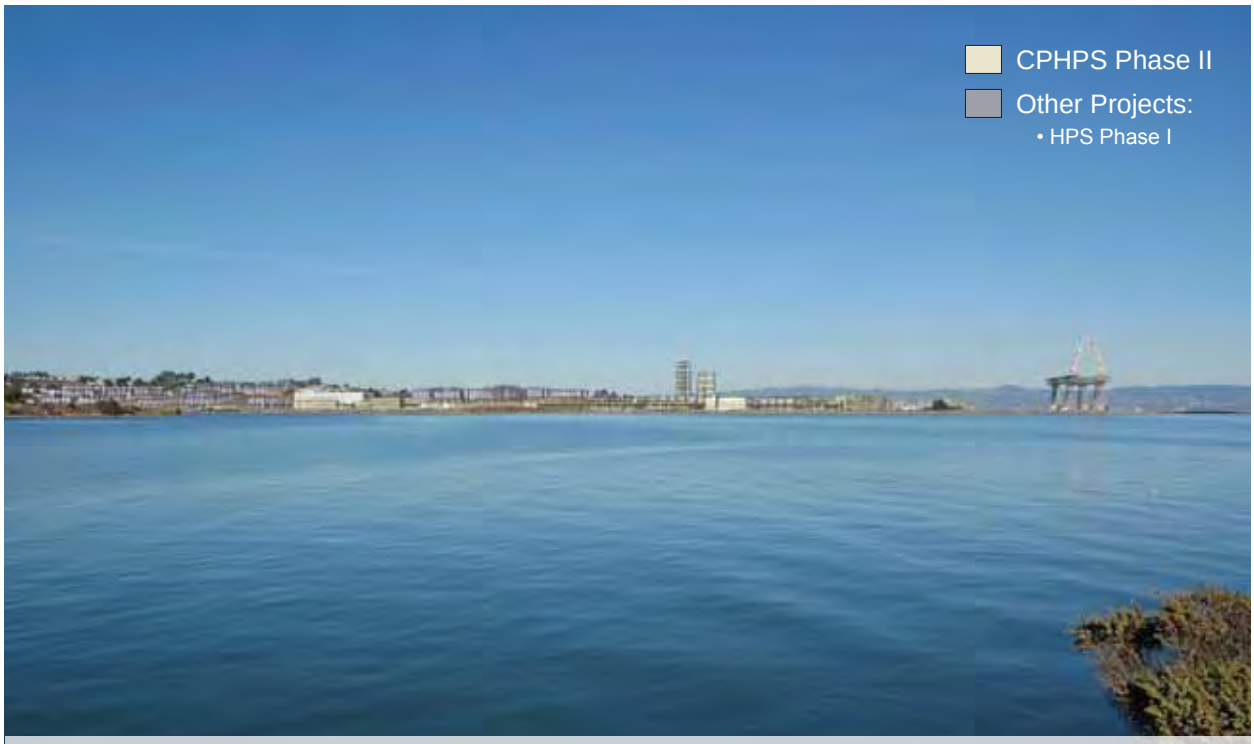
As noted above, construction impacts of the Housing Variant on the visual character of the area would be similar to the Project because construction practices and activities would be similar for similar types of construction. Construction of the housing on the proposed stadium site would occur later in the 19-year building period than construction of the stadium under the Project. Construction activities would occur throughout the 702-acre Housing Variant site over the build-out period, ending in 2029. Visual impacts associated with construction activities would include exposed pads and staging areas for grading, excavation, and construction equipment. In addition, temporary structures could be located on the site during various stages of demolition or construction, within materials storage areas, or associated with construction debris piles on and off site. Exposed trenches, roadway bedding (soil and gravel), spoils/debris piles, and possibly steel plates would be visible for the proposed utilities and infrastructure improvements, as well as for roadway improvements. Although these activities would take place primarily within the Housing Variant site, they would be visible to surrounding land uses. However, these visual conditions would be temporary visual distractions typically associated with construction activities and commonly encountered in developed areas. Further, temporary conditions (e.g., bulldozers, trenching equipment, generators, trucks, etc.) associated with construction would not result in obstruction of a scenic vista, as construction equipment is not tall enough to interfere with views of the Bay, the East Bay hills, or the San Francisco downtown skyline. The Housing Variant site is not located within a state scenic highway. The only scenic resources on or near the site are the CPSRA, the Re-gunning crane, Yosemite Slough, the shoreline, the Bay, San Bruno Mountain, and Bayview Hill. There are no rock outcroppings or major areas of landscaping on the site, although some ruderal vegetation would be removed. Construction of the Housing Variant would not affect the Re-gunning crane, which would remain intact after implementation of the Housing Variant. Therefore, construction activities would have a less-than-significant impact on scenic vistas and scenic resources, similar to the Project. Mitigation measure MM AE-2 (Mitigation for Visual Character/Quality Impacts during Construction) would further reduce potential impacts to the visual character of the area.

Construction impacts of the Housing Variant to light and glare would be similar to the Project because proposed uses and materials would be the same. Construction would occur during daylight hours, generally between 7:00 A.M. and 8:00 P.M. or as otherwise allowed by the City. A minimal amount of glare could result from reflection of sunlight off windows of trucks, but this would be negligible and would not affect daytime views in the area. Security lighting would be provided after hours on all construction sites, but this lighting would be minimal, restricted to the Housing Variant site, and would not exceed the level of existing night lighting levels in urban areas. In addition, construction lighting would comply with any City of San Francisco lighting requirements. Therefore, construction activities would have a less-than-significant impact due to light and glare, similar to the Project.

Operation

Operational impacts to views would be substantially similar to, if not less than, the Project because the residential buildings would have heights lower than the average height of the football stadium and would have the benefit of architectural treatment (Figure IV-11 [Housing Variant Northeast from CPSRA]).

Existing



Proposed

SOURCE: Lennar Urban, 2009.

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FIGURE IV-11

Candlestick Point — Hunters Point Shipyard Phase II EIR

HOUSING VARIANT NORTHEAST FROM CPSRA

With the Housing Variant, the stadium proposed with the Project would be removed from the development plan and 1,350 dwelling units would be relocated from the Candlestick Point site to the HPS Phase II site. On the HPS Phase II site, the proposed 69,000-seat 49ers stadium was to be 156 feet tall (about 15 stories) above the adjacent playing field. Residential buildings proposed with the Housing Variant at HPS South would vary in height from 40 to 65 feet, depending on location with buildings immediately adjacent to the proposed recreational facilities (primarily the multi-use field) being 40 feet tall. Even at the maximum 65 feet tall, the residential building would be a minimum of approximately 90 feet below the heights proposed with the Project. Although the Project would not substantially obstruct any views into the area, views would be less obstructed than with the Project. The area surrounding the additional new residential uses would be developed with new open space to the west, south, and east, and by new R&D uses to the north. With respect to adjacent neighborhoods, the HPS Phase II North district would be south of the India Basin neighborhood (Figure IV-12 [Housing Variant South from Hilltop Open Space]). Therefore, development with the Housing Variant would result in a less-than-significant impact due to obstruction of a view or scenic vista, similar to the Project. Even though relocation of 1,350 dwelling units out of Candlestick Point would take place with the Housing Variant, the majority of buildings in Candlestick Point would remain 65 feet. However, the number and location of towers would be reduced. For example in the CP North area, the Housing Variant includes two, 220-foot towers as opposed to five towers ranging from 170 feet to 270 feet. Similarly, in CP South, the Housing Variant proposes six towers (four, 270-foot towers; one 320-foot tower; and one 370-foot tower) compared to the six with the Project (two residential towers up to 370 feet, one tower up to 420 feet, one tower up to 270 feet, and two with maximum heights up to 320 feet). Building heights within the blocks along the eastern side of CP North would be reduced from a maximum of 140 feet to 85 feet. Additionally, as in HPS Phase II, these buildings constructed with the Housing Variant would have the benefit of architectural treatment. As such, views into the area would be less obstructed than with the Project and the Housing Variant would result in a less-than-significant impact due to obstruction of a view or scenic resource.

Development of the Housing Variant would have substantially similar impacts to the Project regarding the potential for damaging scenic resources, including, but not limited to, trees, rock outcroppings, and other features of the built or natural environment that contribute to a scenic public setting because design of the proposed residential buildings would be of appropriate height, massing, and architectural treatment. With the Housing Variant, the football stadium proposed with the Project would be removed from the development plan and 1,350 dwelling units would be relocated from Candlestick Point to HPS Phase II. At the HPS Phase II site, the Housing Variant would continue to remove old, deteriorating structures associated with ship repair, piers, dry-docks, storage, and administrative uses and replace these structures with new development. Currently, the HPS Phase II site contains limited landscaping and is primarily a degraded industrial setting. Bayview Hill, located on the Candlestick Point site, is a prominent scenic resource for HPS Phase II and would remain intact with the Housing Variant development with the exception of close-in vantage points, which may be altered. However, with the Housing Variant, proposed heights in the area of the former stadium would range from 40 to 65 feet, substantially lower than the proposed 156 foot maximum height of the football stadium. Furthermore, the Housing Variant

SOURCE: Lennar Urban, 2009.

PBS&J 10.31.09 08068 | JCS | 09

FIGURE IV-12

Candlestick Point — Hunters Point Shipyard Phase II EIR

HOUSING VARIANT SOUTH FROM HILLTOP OPEN SPACE

would retain structures at the potential HPS Drydock Historic District, as well as the Re-gunning crane, a highly visible landmark. Development of the HPS Phase II site with the Housing Variant would also include about 349 acres of new and renovated parkland, open space, and sports fields, with improved public access, thereby improving the scenic quality of the area (13 acres more than the Project would provide). The Housing Variant site is not located within a state scenic highway. Therefore, development at the HPS Phase II site would not have significant adverse impacts on scenic resources or other features that contribute to a scenic public setting, and the impact would be less than significant. Additionally, the Housing Variant would not substantially degrade the visual quality or character of the Housing Variant site or its surroundings and the impact would be less than significant, similar to the Project.

The Housing Variant would not include the field lighting and other night-time lighting associated with the 49ers stadium. The Housing Variant would have way-finding, security, and street lighting associated with similar residential uses and the adjacent R&D uses to the north of the HPS South area as well as other development at HPS Phase II. The Housing Variant would not interfere with any existing views of the night sky from across the Bay, nor would glare affect those viewers, similar to the Project. New sources of light associated residential uses during the evening could result from the Housing Variant, which would provide lesser impacts than the football stadium proposed with the Project. Impacts of the Housing Variant would be substantially similar to or less than the Project and would result in a less-than-significant impact. Incorporation of mitigation measures MM AE-7a.1 (parking lot lighting), MM AE-7a.2 (landscape and sign illumination), MM AE-7a.3 (lighting plan), and MM AE-7a.4 (non-reflective materials) would further reduce potential impacts.

Shadows

As shown in Figure IV-7, the Housing Variant would replace the 156-foot-high football stadium proposed under the Project with 1,350 housing units relocated from Candlestick Point in 40- and 65-foot-high structures. As the proposed new residential buildings at HPS Phase II would be lower in height than the stadium, and as the height of residential towers at Candlestick Point would be reduced, shade impacts would be less than the project.

Construction

As with the Project, construction activities of the Housing Variant would not result in shadow effects on open space.

Operation

As shown in Figure IV-8, the Housing Variant would replace the 49ers stadium (up to 156 feet high) with housing buildings of 40 and 65 feet high in the Hunters Point Shipyard South district. As a result of the relocation of housing units from Candlestick Point to the Hunters Point Shipyard South district, several of the residential towers at Candlestick Point would be reduced in height.

All other land use and building heights in the Hunters Point Shipyard North, Hunters Point Shipyard Village Center, and the R&D districts would be the same as with the Project. HPS Phase II would include new open space at Grasslands Ecology Park, Sports Fields, and Multi-Use Lawn at Hunters Point Shipyard South, the Waterfront Recreation Pier, the Waterfront Promenade, Heritage Park, and

Northside Park. However, the Housing Variant would have a different configuration of open space at Hunters Point Shipyard South than the Project. Refer to Figure IV-7.

For this variant, development at Candlestick Point would result in new structures with the potential to cast shadows on existing or proposed parks and open space. However, these shadows would not substantially affect outdoor recreation facilities or other public areas and impacts would be less than significant. As the height of some residential towers at Candlestick Point would be reduced compared to the Project, shade impacts at Candlestick Point would be less than the Project.

As the building heights and land uses at Hunters Point Shipyard North, Hunters Point Shipyard Village Center, and the R&D districts would be the same for the Housing Variant as the Project, development at those locations would not add shade year round to existing public open space, including India Basin Shoreline Park and India Basin Open Space.

During morning and mid-day periods from September through March, the Housing Variant would have similar shading effects as the Project, on Grasslands Ecology Park near Crisp Road, Heritage Park, and Hillside Parks and Open Space. In mid-afternoon, the Housing Variant would shade the Waterfront Promenade. During summer months, the Housing Variant would result in shade on Grasslands Ecology Park near Crisp Road, Heritage Park, and Hillside Open Space.

All other shadow effects at HPS Phase II, including Northside Park, would be the same as with the Project. Shadow effects would be the same at Candlestick Point.

Although the Housing Variant would cast shadows on recreational and open space, it would not substantially affect outdoor recreation facilities or other public areas or have an adverse effect on the use of the open space and impacts would be less than significant. As the height of structures would be reduced in the Hunters Point Shipyard South district, shade impacts would be slightly less than Project.

Wind

As shown in Figure IV-8, the Housing Variant would replace the 156-foot-tall football stadium with 40- and 65-foot-tall residential units in HPS South. Additionally, the number and height of towers in Candlestick Point would be reduced thereby reducing the potential for wind impacts.

Construction

Construction activities of the Housing Variant would not result in additional wind impacts, similar to the Project. Impacts such as fugitive dust emissions and erosion from wind are addressed in Section III.H and Section III.M.

Operation

Building structures near or greater than 100 feet in height could have effects on pedestrian-level conditions such that the wind hazard criteria of 26 mph equivalent wind speed for a single hour of the year would be exceeded. There is no threshold height that triggers the need for wind-tunnel testing to determine whether the building design would result in street-level winds that exceed the standard. It is generally understood, however, from wind-tunnel testing on a variety of projects in San Francisco, that

most, if not all, buildings under 100 feet do not result in adverse wind effects at street level barring unusual circumstances.

For the Housing Variant, the height of some residential towers at Candlestick Point would be reduced, however most are likely to exceed 100 feet in height. Thus development at Candlestick Point would result in new structures with the potential generate winds that could affect ground-level pedestrian spaces. Implementation of mitigation measure MM W-1a (Building Design Wind Analysis), which would require a design review process for buildings greater than 100 feet in height, and if determined to be necessary, inclusion of a design criteria to reduce pedestrian-level impacts, would reduce impacts to a less than significant level. As the height of towers would be reduced, impacts would be less than the project.

As shown in Figure IV-8, residential buildings in the Housing Variant would replace the 156-foot-high stadium with residential buildings ranging from 40 to 65 feet. As such, the residential uses at HPS Phase II would not exceed 100 feet in height and would not result in adverse wind effects. As the Housing Variant would not include any structures exceeding 100 feet in height at HPS Phase II, impacts would be less than the Project.

Air Quality

As shown in Figure IV-7, the Housing Variant removes the stadium proposed under the Project and relocated 1,350 residential dwelling units from Candlestick Point to HPS Phase II. Other than the stadium site, land uses provided with a Housing Variant would be the same as the Project. As land uses would remain the same, the potential air quality impacts would be the virtually same as the Project; however, as the construction housing in place of the stadium would require fewer equipment, impacts from emissions associated with construction activities would reduced. Operational impacts would be similar but greater than those identified under the Project as the proposed additional residential development would result in greater daily criteria pollutant emissions than the stadium.

Construction

As stated above, overall construction impacts of the Housing Variant with respect to air quality would be similar to the Project. Construction activities would occur throughout the 702-acre Housing Variant site over the approximately 20-year build-out period ending in 2029, with the construction of the additional dwelling units occurring between 2017 and 2021. Similar to the Project, construction activities under the Housing Variant would include site preparation, grading, placement of infrastructure, placement of foundations for structures, and fabrication of structures. Demolition, excavation and construction activities would require the use of heavy trucks, excavating and grading equipment, concrete breakers, concrete mixers, and other mobile and stationary construction equipment. Emissions during construction would be caused by material handling, traffic on unpaved or unimproved surfaces, demolition of structures, use of paving materials and architectural coatings, exhaust from construction worker vehicle trips, and exhaust from diesel-powered construction equipment.

With respect to construction emissions, construction-related emissions are generally short-term in duration, but may still cause adverse air quality impacts. However, the BAAQMD does not recommend any significance thresholds for the emissions during construction. Instead, the BAAQMD bases the criteria on a consideration of the mitigation measures to be implemented. If all appropriate emissions

mitigation measures recommended by the BAAQMD CEQA Guidelines are implemented for a project, construction emissions are not considered adverse. Fine particulate matter (PM_{10}) is the pollutant of greatest concern with respect to construction activities.[1217] Any project within the City of San Francisco, including the Housing Variant, would be required to comply with *San Francisco Health Code* Article 22B, Construction Dust Control, which requires the preparation of a site-specific dust control plan, (with mandatory mitigation measures similar to the BAAQMD's) for construction projects within 1,000 feet of sensitive receptors (residence, school, childcare center, hospital or other health-care facility or group-living quarters). As such, with implementation of mitigation MM HZ-15, which identifies specific mitigation measures that would be used to reduce emissions associated with construction, impacts would be less than significant, similar to the Project.

With respect to airborne human health risks, construction activities associated with the Housing Variant would increase the levels of two potential human health risks: (1) diesel particulate matter (DPM) and (2) dust or particulate matter (PM_{10}) bound to certain metals and/or organic compounds from on-site soils. MM AQ-2.1 (Implement Accelerated Emission Control Device Installation on Construction Equipment) and MM AQ-2.2 (Implement Accelerated Emission Control Device Installation on Construction Equipment Used for Alice Griffith Parcels) would address construction sources of DPM including off-road construction equipment such as lifts, loaders, excavators, dozers, and graders. In addition, the delivery of equipment and construction materials, spoils and debris hauling, and employee commute traffic could contribute to construction-related DPM emissions. In terms of DPM, ENVIRON prepared a human health risk assessment (HRA)[1218] that evaluated potential human health risks associated with construction and operation of the Project quantitatively and the proposed variants qualitatively, including the Housing Variant. As construction emissions associated with the Housing Variant are expected to be lower than those associated with construction of a stadium in the same location (e.g., Project), the Housing Variant would have lower impacts than the Project.

The HRA evaluated potential impacts to numerous receptors (off-site residents, off-site workers, off-site students, and on-site residents) in and around the Project. BAAQMD CEQA Guidelines have an established threshold of 10 in one million for carcinogenic health risks; the HRA concluded that the inhalation cancer risk at the MEI would be 4.5 in one million. This represents the maximum level of DPM experienced by all off-site and on-site (i.e., Alice Griffith) sensitive receptors during Project construction activities. Exposure to DPM from construction activities associated with the Project would not exceed the threshold. The Housing Variant is not anticipated to exceed Project impacts and therefore would not exceed the BAAQMD CEQA threshold. In addition, the HRA concluded the maximum chronic noncancer HI to be 0.01, which is below the BAAQMD's significance threshold of 1.0.

As the carcinogenic and non-carcinogenic health risks posed by DPM emissions during construction activities associated with development of the Housing Variant have been determined to be below established thresholds, this impact is less than significant with MM AQ-2.1 and MM AQ-2.2, similar to the Project.

[1217] BAAQMD. 1999. *BAAQMD CEQA Guidelines – Assessing the Air Quality Impacts of Projects and Plans*. December.
[1218] Environ. 2009. Ambient Air Quality Human Health Risk Assessment: Candlestick Point – Hunters Point Shipyard Phase II Development Plan. October. Appendices I & II. (Appendix S to this EIR)

Construction activities at both Candlestick Point and HPS Phase II have the potential to generate TACs associated with soil-PM_{10} and an HRA evaluated the potential concentrations of the airborne soil-PM_{10} at numerous receptors on site (residents at the Alice Griffith Public Housing units) and off site (adult and child residents, workers, and schoolchildren) in the Project vicinity.

As noted above, BAAQMD has an established threshold of 10 in 1 million for carcinogenic health risks; the inhalation cancer risk at the point of maximum impact or MEI as a result of construction activities at the Project would be 0.04 in one million. This represents the maximum level of PM_{10} experienced by all sensitive receptors in and around the Project during construction activities. Exposure to soil-PM_{10} from construction activities associated with Candlestick Point would not exceed the threshold. The Housing Variant is not anticipated to exceed Project impacts and therefore would not exceed the BAAQMD CEQA threshold. In addition, the HRA concluded the maximum non-cancer HI to be 0.03, which would be below the BAAQMD's significance threshold of 1.0.

As the carcinogenic and noncarcinogenic health risks posed by soil-PM_{10} emissions during construction activities associated with development of HPS Phase II have been determined to be below established thresholds, this impact is less than significant with MM HZ-15, similar to the Project.

Operation

Operational impacts to regional and local air quality would be substantially similar to the Project. Development at Candlestick Point would remain the same as under the Project and impacts would be the same as identified under the Project. Under the Housing Variant, the football stadium proposed under the Project would be replaced with 1,350 residential units redistributed from Candlestick Point to HPS Phase II. Due to the redistribution of uses under this variant, approximately 908 additional vehicle trips over that of the Project would occur and thereby result in a higher level of daily VMT than the Project. As such, the level of emissions anticipated under the Housing Variant would be greater than the Project, as shown in Table IV-23 (Housing Variant Operational Criteria Pollutant Emissions [Year 2030]). The difference in daily criteria pollutants would increase under this variant compared to the Project by 1 to 2 percent, depending on the criteria pollutant evaluated.

However, both this variant and the Project would result in fewer emissions during the operation of their respective land uses compared to a similar level of development without the energy and transportation considerations discussed in this EIR. The Housing Variant, similar to the Project, would incorporate features intended to reduce motor vehicle trips, designed as a dense, compact development with a mix of land uses that would facilitate pedestrian, bicycle, and transit travel. The Housing Variant's transportation analysis estimates that a similar Housing development that did not include the trip reduction features of the Housing Variant would generate 136,868 daily external motor vehicle trips (about 73 percent more than the Housing Variant's daily external motor vehicle trips). The comparison of the Housing Variant to a similar level of development under "business as usual" conditions is also shown in Table IV-23.

Nonetheless, criteria pollutant emissions of ROG, NO_X, PM_{10} and $PM_{2.5}$ associated with land uses anticipated under the Housing Variant would exceed existing BAAQMD thresholds. Under BAAQMD's current thresholds, impacts are considered significant if daily emissions of criteria pollutants exceed 80 lbs/day of ROG, NO_X, and PM_{10}. Similar to the Project, no additional feasible mitigation measures

Table IV-23 Housing Variant Operational Criteria Pollutant Emissions (Year 2030)

Scenario/Emission Source	*ROG (lbs/day)*	*NO_X (lbs/day)*	*CO (lbs/day)*	*PM_{10} (lbs/day)*	*$PM_{2.5}$ (lbs/day)*
Hunters Point Shipyard					
Area[a]	242	49	38	2	2
Motor Vehicles (External)	98	88	1,002	462	87
Subtotal	*340*	*136*	*1,040*	*464*	*89*
Candlestick Point					
Area[a]	373	60	45	3	3
Motor Vehicles (External)	210	191	2,174	1,004	189
Subtotal	*583*	*250*	*2,219*	*1,007*	*192*
All Development Sites					
Area[a]	616	108	83	5	5
Motor Vehicles (External)	308	278	3,177	1,466	276
Motor Vehicles (Internal)	30	13	229	45	9
All Sources (Variant 1)	***953***	***400***	***3,489***	***1,516***	***290***
Comparison to Proposed Project	***101%***	***102%***	***102%***	***102%***	***102%***
Change from Proposed Project	*1%*	*2%*	*2%*	*2%*	*2%*
Comparison to Business as Usual	***87%***	***68%***	***65%***	***59%***	***60%***
Reduction from Business as Usual	*-13%*	*-32%*	*-35%*	*-41%*	*-40%*
All Development Sites (Business as Usual)					
Area[a]	616	108	83	5	5
Motor Vehicles	485	476	5,292	2,561	481
All Sources (Business as Usual)	***1,101***	***585***	***5,375***	***2,566***	***486***
Comparison to Variant 1	***115%***	***146%***	***154%***	***169%***	***168%***

SOURCE: PBS&J, 2009. Based on URBEMIS 2007 Version 9.2.4.

Daily emissions of ROG and NO_X were calculated under Summer conditions when ambient ozone concentrations are highest. Daily emissions of CO, PM_{10}, and $PM_{2.5}$ were calculated under winter conditions when associated ambient concentrations are highest.

* Area emissions are from sources located on the project site, such as natural gas combustion for heating/cooling, maintenance equipment, consumer product use, etc.

are available to would reduce the Housing Variant's operational criteria emissions below the BAAQMD thresholds. This would be a significant and unavoidable impact. It should be noted that, as stated above, although the significance under this variant would be similar to the Project, criteria pollutant emissions associated with the operation of uses under the Housing Variant would be greater than the Project, as stated in Table IV-23.

With respect to airborne human health risks, emissions associated with operation activities under the Housing Variant would increase the levels of two potential human health risks: (1) TACs and (2) vehicle emissions ($PM_{2.5}$). Under the Housing Variant, dwelling units would be relocated from CP to the HPS Phase II area.

This Housing Variant continues to include R&D facilities at HPS Phase II, which are situated on a peninsula extending to the east of the proposed additional housing and south of other proposed residential areas. As the predominant winds are out of the west, on-site receptors will generally be upwind from these R&D areas. As such, the Project is designed to minimize potential adverse impacts between TAC sources in R&D areas and both on-site and off-site receptors. As discussed for the R&D Variant, an analysis was conducted to determine the potential impacts from a variety of TAC sources in the R&D areas. Details regarding this assessment can be found in Appendix H1, Attachment III.[1219]

The HRA estimated the excess lifetime cancer risk and chronic noncancer HI due to the combined TAC emissions from the R&D areas at any surrounding receptor location. As the Housing Variant has the same configuration as the Project, the estimated cancer risks for long-term residential exposure would be above 10 in one million in an area designated as open space that would extend slightly south beyond the R&D boundary. The maximum estimated cancer risk for a residential receptor in this location would be 17 in one million; the noncarcinogenic health risks would have an HI of 1.7. However, as noted above, this receptor location would be in an area designated as open space, and would not be a residential location. If cancer risks were estimated based on exposure assumptions consistent with recreational use of the open space, the risks would be reduced well below the threshold of 10 in one million. Due to the decrease in the frequency and duration of potential exposures, the chronic HI would also be reduced below the HI threshold of 1.0.

The estimated health risks would be below BAAQMD thresholds for all residential receptor locations as a result of implementation of the Project. As such, impacts would be less than significant with implementation of MM AQ-6.1 and MM AQ-6.2 developed for the Project and also required for the Housing Variant.

In terms of human health risks associated with vehicle emissions, vehicle emissions along local roadways would shift location with development of the Housing Variant, as some residential units will be relocated from Candlestick Point to HPS Phase II. The prolonged exposure of receptors to increased vehicle emissions could affect human health. Potential $PM_{2.5}$ concentrations at select roadways with the addition of future traffic volumes, including the traffic associated with the Housing Variant (which were assumed to be similar to Project traffic), were estimated compared against SFDPH thresholds to determine the potential health risks attributed to vehicle emissions. Several roadway segments were chosen based on whether Project-related traffic would use these streets to access neighboring freeways and other areas of San Francisco and/or currently or would experience significant truck traffic. The roadways chosen include:

- Third Street
- Innes Avenue/Hunters Point Boulevard/Evans Avenue
- Palou Avenue
- Gilman Avenue/Paul Avenue
- Harney Way
- Jamestown Avenue
- Ingerson Avenue

[1219] ENVIRON, *Ambient Air Quality Human Health Risk Assessment: Candlestick Point–Hunters Point Shipyard Phase II Development Plan*, Attachment III, September 28, 2009.

With the addition of Project-related traffic, no receptors along the streets listed above would experience $PM_{2.5}$ concentrations in excess of SFDPH's 0.2 $\mu g/m^3$ threshold.[1220] As concentrations would not exceed SFDPH's threshold, and as such, impacts would be less than significant, similar to the Project.

Noise and Vibration

As shown in Figure IV-7, the Housing Variant remove the stadium proposed under the Project and relocated 1,350 residential dwelling units from Candlestick Point to HPS Phase II. Other than the stadium site, land uses provided with a Housing Variant would be the same as the Project. As land uses would remain the same, the potential noise impacts would be the same as the Project with the exception that the noise impact from operation of the stadium would not occur under the Housing Variant.

Construction activities for a Housing Variant would create a substantial temporary increase in ambient noise levels on the site and in existing residential neighborhoods adjacent to the site. Construction activities would need to comply with the San Francisco Noise Ordinance, which prohibits construction between 8:00 P.M. and 7:00 A.M. and limits noise from any individual piece of construction equipment (except impact tools) to 80 dBA at 100 feet. Implementation of mitigation measures MM NO-1a.1 and MM NO-1a, which would require implementation of construction best management practices to reduce construction noise and the use of noise-reducing pile driving techniques, would reduce any potentially significant impacts to less-than-significant levels.

Construction activities could also create excessive ground-borne vibration levels in existing residential neighborhoods adjacent to the site and at proposed on-site residential uses, should the latter be occupied before construction activity on adjacent parcels is complete. Implementation of MM NO-1a.1, MM NO-1a.2, and MM NO-2a would require implementation of construction best management practices, noise-reducing pile driving techniques as feasible, and monitoring of buildings within 50 feet of pile driving activities. Implementation of these measures would reduce vibration impacts under the Housing Variant, but not to a less-than-significant level as vibration levels from pile driving activities could be as high as 103 VdB for the residential uses within the HPS North District, the CP Center, and South Districts when occupied; therefore, this impact would remain significant and unavoidable, similar to the Project.

Daily operation of a Housing Variant, such as mechanical equipment and delivery of goods, would not expose noise-sensitive land uses on or off site to noise levels that exceed the standards established by the City of San Francisco. This impact would be less than significant, similar to the Project. Operation activities associated with a Housing Variant, such as delivery trucks, would not generate or expose persons on or off site to excessive groundborne vibration. This impact would also be less than significant, similar to the Project.

Operation of a Housing Variant would generate increased local traffic volumes that would cause a substantial permanent increase in ambient noise levels in existing residential areas along the major Project site access routes. Noise level increases associated with the Housing Variant are shown in Table IV-24 (Housing Variant Modeled Traffic Noise Levels along Major Project Site Access Roads). Impacts would

[1220] ENVIRON, *Ambient Air Quality Human Health Risk Assessment: Candlestick Point–Hunters Point Shipyard Phase II Development Plan*, Appendix IV, September 28, 2009.

be significant along Carroll Avenue, Gilman Avenue, and Jamestown Avenue, similar to the Project. However, the Housing Variant would have slightly lower noise levels than the Project along Carroll Avenue, Gilman Avenue, and Jamestown Avenue, but would still be significant, as shown in the table. Measures available to address significant traffic noise increases in these residential areas are limited. As the ultimate feasibility and implementation of the noise insulation measures that would be required to reduce roadway noise levels to below the threshold of significance would be dependent on factors that would be beyond the control of the City as the lead agency or the Project Applicant to guarantee. Therefore, this impact would remain significant and unavoidable.

Table IV-24 Housing Variant Modeled Traffic Noise Levels along Major Project Site Access Roads

Roadway	*Land Use*	*Existing Noise Level*	*2030 Without Project*	*2030 With Project*	*2030 With Housing Variant*	*Variant-Related Increase*	*Allowable Increase*	*Significant Impact?*
Innes north of Carroll Avenue	Residential	53.3	60.9	60.9	60.9	0	2	No
3rd Street south of Carroll Avenue	Residential	62.8	67.3	68.3	68.3	1.0	1	No
Cesar Chavez Boulevard west of 3rd Street	Residential	59	63.5	63.5	63.5	0	2	No
Palou Avenue east of 3rd Street	Residential	56.8	61.6	62.1	62.1	0.5	2	No
Ingalls Street north of Carroll Avenue	Residential	56.7	61.7	63.1	63.1	1.4	2	No
Carroll Avenue east of 3rd Street	Residential	**52.6**	**53.8**	**58.1**	**57.9**	**4.1**	**3**	**Yes**
Gilman Avenue east of 3rd Street	Residential	**57.7**	**60.6**	**64.6**	**64.5**	**3.9**	**2**	**Yes**
Jamestown Avenue north of Harney Way	Residential	**51.4**	**55.5**	**61.2**	**61.0**	**5.5**	**5**	**Yes**
Harney Way west of Jamestown Avenue	Residential	52.6	59	59.6	59.6	0.6	3	No
Bayshore Boulevard north of Visitacion	Residential	65.1	68.5	68.6	68.7	0.2	1	No

SOURCE: PBS&J, 2009. Based on URBEMIS 2007 Version 9.2.4.

Daily emissions of ROG and NO_x were calculated under Summer conditions when ambient ozone concentrations are highest. Daily emissions of CO, PM_{10}, and $PM_{2.5}$ were calculated under winter conditions when associated ambient concentrations are highest.

* Area emissions are from sources located on the project site, such as natural gas combustion for heating/cooling, maintenance equipment, consumer product use, etc.

Because the Housing Variant would not include a football stadium, noise impacts identified for the Project from football games and concerts would not occur with implementation of the Housing Variant.

The Housing Variant site is not located within an airport land use plan area or near a private airstrip. Furthermore, the Housing Variant does not include an aviation component. Therefore, a Housing Variant will not result in the exposure of people to excessive aircraft noise levels. Impacts would be less than significant, similar to the Project.

Cultural Resources and Paleontological Resources

As shown in Figure IV-7, the Housing Variant would remove the football stadium from the land use program of the Project and 1,350 dwelling units would be relocated from Candlestick Point to HPS Phase II. Both construction and operational impacts would be substantially similar to the Project because

construction activities as well as the area and type of land disturbance would be similar. Additionally, the types of land use and associated activities are similar and were all analyzed in the initial land program.

Potential impacts to paleontological resources with the Housing Variant would be substantially similar to the Project and less than significant with mitigation because the amount and type of land disturbance activities (including subterranean development) would be similar. Although no fossils have been reported at the Candlestick Point or HPS Phase II sites, the presence of Franciscan sedimentary rocks (shanstone, shale, chert, and greenstone) on the flanks of Hunters Point indicates the possibility of fossils being discovered during construction-related excavation. Additionally, the presence of Bay mud under the fill around Hunters Point indicates the possibility of fossils being discovered during construction-related excavation. However, mitigation measure MM CP-3a (paleontological resources) would reduce the effects of construction-related activities to paleontological resources to a less-than-significant level by mitigating for the permanent loss of the adversely affected resources through implementation of a *Paleontological Resources Monitoring and Mitigation Program*. Therefore, the Housing Variant would result in a less-than-significant impact to paleontological resources during construction activities, similar to the Project.

Potential impacts to archaeological resources with the Housing Variant would be substantially similar to the Project and less than significant with mitigation because the amount and type of land disturbance activities (including subterranean development) would be similar. Records indicate that prehistoric archaeological sites are located within the HPS Phase II site, including CA-SFR-9, CA-SFR-11, CA-SFR-12, CA-SFR-13, and CA-SFR-14. Previous archaeological investigations have shown that prehistoric archaeological sites in the HPS Phase II site tend to be located along the original shoreline. Hunters Point had numerous maritime-related industries, including dry docks and boarding houses. In addition, there were several historically documented large offshore "rocks" that presented navigational hazards. Therefore, it is possible that buried shipwrecks may occur within the HPS Phase II site and construction activities may encounter previously unknown archaeological resources. Mitigation measure MM CP-2a (archaeological resources) would reduce the effects of construction-related activities to the archaeological resources in the HPS Phase II site to a less-than-significant level by mitigating for the permanent loss of the adversely affected archaeological resources through implementation of the *Archaeological Research Design and Treatment Plan for the Bayview Waterfront Project, San Francisco, California*. Therefore, the Housing Variant would result in a less-than-significant impact to archaeological resources during construction activities, similar to the Project.

At Candlestick Point, potential archaeological resources expected to be found could have important research value and would, therefore, be legally significant under CEQA. Examples of research themes that have been proposed to which expected archaeological resources could contribute significant data include: the spatial organization and historical development of Chinese fishing camps; effects, adaptations; and resistance of the fishing camps to anti-Chinese fishing legislation (1885–1930s); spatial organization of shipyards, development of local traditions of boat building technology, including that of the scow schooner and Chinese junks; the development; changing function; and inter-settlement relationships of prehistoric shell mounds; comparative spatial organization of shell mound sites; changes in prehistoric faunal and biotic exploitation practices; prehistoric changes in social stratification; relationship between Hunters Point-Bayview and South of Market area prehistoric settlements. Any

potential archeological resources, e.g., fishing camps, that are covered by existing development would remain covered and unavailable unless the site is redeveloped. While the development footprint at Candlestick Point is not proposed to change from what was analyzed for the Project, in the event that archaeological resources are discovered at Candlestick Point, MM CP-2 (archaeological resources, Candlestick Point) would reduce potential impacts to a less-than-significant level.

Historical resources at HPS Phase II include the potential Hunters Point Commercial Dry Dock and Naval Shipyard Historic District, with buildings, structures, and objects associated with the area's "transition from early commercial dry dock operation to high tech naval repair and Radiological research and waste treatment facility."[1221] Contributing resources in the Hunters Point Historic District include Drydock 2, Drydock 3, and Buildings 140, 204, 205, 207, 208, 211, 224, 231, and 253.

As with the Project, development at HPS Phase II with the Housing Variant would result in the demolition of Buildings 208, 211, 224, 231, and 253, which have been determined eligible as contributors to the CRHR-eligible Hunters Point Commercial Dry Dock and Naval Shipyard Historic District. While the land use changes with the Housing Variant would not affect the HPS Phase II area within that potential historic district, implementation of the Housing Variant as a whole would materially alter in an adverse manner those physical characteristics of an historical resource that convey its historical significance and that justify its eligibility for inclusion in the CRHR. Implementation of mitigation measure MM CP-1b.1 and MM CP-1b.2 (historical resources) would reduce but not avoid the significant adverse impact. As with the Project, the impact on historical resources with the Housing Variant would remain significant and unavoidable.

Operational activities anticipated with the Housing Variant would not differ substantially from the Project because neither would include ground-disturbing activities that would accelerate the potential deterioration of cultural resources. While 1,350 residential dwelling units at Candlestick Point would be relocated to HPS Phase II and the density of residential uses at Candlestick Point overall would be reduce, no comprehensive changes to the land use program within Candlestick Point would be made. These activities would not have the potential to adversely disturb paleontological, archaeological, or historical resources. Therefore, the Housing Variant would result in no impact to these resources, similar to the Project.

Hazards and Hazardous Materials

The building footprint of the Housing Variant would be less than the Project, as the same number of dwelling units would be constructed and the stadium would be eliminated. Construction activities associated with the Housing Variant would: disturb soil and/or groundwater; result in the handling, stockpiling, and transport of soil; involve demolition or renovation of existing structures that could include asbestos-containing materials, lead-based paint, PCBs, or fluorescent lights containing mercury; expose construction workers to hazardous materials; be a source of hazardous air emissions within one-quarter mile of an existing or planned school; and encounter soils or groundwater that contains contaminants from historic uses that could pose a human health or environmental risk if not properly

[1221] Circa Historic Property Development, *Hunters Point Commercial Dry Dock and Naval Shipyard Historic District DPR form*, October 31, 2008.

managed. Each of these impacts for the Housing Variant would be slightly less than for the Project, and, similar to the Project, would be reduced to a less-than-significant level with implementation of the identified mitigation measures (MM HY-1a.2, MM HZ-1a, MM HZ-1b, MM HZ-2a.1, MM HZ-2a.2, MM HZ-5a, MM HZ-9, MM HZ-10b, MM HZ-12, MM HZ-15, MM HY-1a.1, MM HY-1a.3, MM BI-4a.1, MM BI-4a.2, and MM BI-5b.4).

Construction of the Housing Variant would require improvements to existing utility infrastructure and installation of new underground utilities, which could expose construction workers, the public, or the environment to hazardous materials. However, with the implementation of mitigation measures MM HZ-1a, MM HZ-1b, and MM HZ-2a.1, which require remediation of any contaminated soils, the hazards risk from potential exposure to contaminated soil or groundwater during construction would be reduced to a less-than-significant level, similar to the Project. In addition, mitigation measure MM HZ-2a.2 requires the preparation of a site-specific health and safety plan, which would further ensure that all risks to workers, residents, or the public would be reduced to less than significant, the same as for the Project.

The Housing Variant would require pile supports for the residential towers, the same as the Project. This construction activity could result in groundwater contamination from disturbed soils. Mitigation measure MM HZ-5a would reduce this impact by requiring a foundation support piles installation plan, which would verify that pilot boreholes for each pile would be drilled through the artificial fill materials so the piles can be installed without damage or misalignment and to prevent potentially contaminated fill materials from being pushed into the underlying sediments or groundwater. With implementation of this mitigation measure, the impact from potential groundwater contamination would be reduced to a less-than-significant level, the same as for the Project.

Shoreline improvements would occur under the Housing Variant the same as for the Project. Shoreline improvements would require concurrence of BCDC, San Francisco RWQCB, and USACE. That permit would contain numerous conditions to ensure that the construction activities are conducted in a manner that is protective of aquatic resources. Mitigation measure MM HZ-10b requires that all shoreline activities that could affect sediment (or in the case of the Navy-installed cover and riprap at Parcel E/E-2) be conducted in accordance with agency-approved remedial design documents, applicable health and safety plans, DCPs, or any other documents or plans required under applicable law or laws, including but not limited to applicable requirements shown in Table III.K-2. In addition, mitigation measures MM HY-1a.1, MM HY-1a.2, MM BI-4a.1, MM BI-4a.2, and MM BI-5b.4 would reduce water quality and biological resources impacts. For Candlestick Point, impacts would be mitigated through mitigation measures MM HY-1a.1 and MM HY-1a.2. With implementation of these mitigation measures, along with applicable regulations and permits, potential impacts related to exposure to hazardous materials releases from contaminated sediments that could be disturbed during proposed shoreline improvements would be reduced to a less-than-significant level for the Housing Variant, the same as for the Project.

Similar to the Project, remediation activities conducted on behalf of the City or developer in conjunction with development activities at HPS Phase II parcels transferred prior to completion of remediation in an "early transfer" would disturb soil and/or groundwater that may contain contaminants from historic uses. The identified mitigation measure (MM HZ-12) would require the SFDPH to ensure that before

development occurs, the Agency or the developer and their contractors have incorporated all applicable requirements into remedial design documents, work plans, health and safety plans, DCPs and any other document or plan required under the AOC or other applicable law, as a condition of development. As a result of these controls and mitigation measure, the potential impact of exposure to hazardous materials during remediation activities conducted on behalf of the Agency or the developer in conjunction with development of HPS Phase II under the Housing Variant would be reduced to less-than-significant levels.

The Housing Variant would place housing on the HPS Phase II site. The Navy's cleanup plan is designed to remediate the HPS site to levels acceptable for the planned uses in the existing HPS Redevelopment Plan. To the extent that the Housing Variant proposes to place housing in areas not designated for residential use in the existing HPS Redevelopment Plan, additional hazardous materials remedial work could be required, which could result in some increased risk to workers, the public and environment from exposure to hazardous materials during the construction process. Any property that has not been remediated for unrestricted use at the time of transfer will have use restrictions placed on the property in compliance with the federal clean-up process. For use restrictions to be removed, the Project Applicant would be required by the transfer documents to obtain approval from the regulatory agencies overseeing the clean-up process before residential uses could be placed on these portions of the site. Any remedial activities undertaken as part of the construction process would be subject to the requirements in MM HZ-1b, which requires construction activities at HPS Phase II to be done in accordance with all restrictions imposed on the site by the federal regulatory clean-up process and these impacts would be less than significant, the same as for the Project.

In addition to uncovering hazardous materials within the existing buildings, construction and grading activities associated with the Housing Variant could disturb soil or rock that is a source of naturally occurring asbestos, which could present a human health hazard. As discussed, above, the Housing Variant includes somewhat less excavation and construction than that anticipated under the Project. Similar to the Project, with the implementation of mitigation measure MM HZ-15, which requires preparation of an asbestos dust mitigation plan, this impact would be reduced to a less-than-significant level.

As with the Project, the Bret Harte Elementary School and Muhammad University of Islam elementary schools are located within one-quarter mile of the development area of the Housing Variant. Consistent with the discussion above, the Housing Variant could uncover asbestos-containing materials (naturally or in existing building materials) or other hazardous materials during construction, consistent with the Project. However, with incorporation of mitigation measures MM HZ-1a, MM HZ-1b, MM HZ-2a.1, and MM HZ-15, any impacts to these schools would be reduced to a less-than-significant level, similar to the Project.

After development of the Housing Variant, periodic maintenance could require excavation of site soils to maintain or replace utilities, repair foundations, or make other subsurface repairs which could expose hazardous materials. Implementation of mitigation measures MM HZ-1a and HZ-1b would require remediation of any contaminated soils pursuant to the appropriate regulations. MM HZ-2a.1 would require the development of an unknown contaminant contingency plan to describe procedures to follow in the event unexpected contamination is encountered during construction activities, including

procedures for ensuring compliance with the above laws and regulations. Additionally, mitigation measure MM HZ-2a.2 would require the preparation and implementation of a site-specific HASP in compliance with federal and state OSHA regulations and other applicable laws. The general requirements of mitigation measure MM HZ-9 would require that the Agency or its contractor or Project Applicant shall comply with all requirements incorporated into remedial design documents, work plans, health and safety plans, dust control plans, and any other document or plan required under the Administrative Order of Consent for any properties subject to early transfer (prior to full Navy remediation). To reduce this impact related to exposure to hazardous materials releases that have not been fully remediated at HPS Phase II. Mitigation measure MM HZ-9 further requires that all work on the Yosemite Slough bridge would comply with Navy work plans for construction and remediation on Navy-owned property. Implementation of these mitigation measures would reduce this impact to a less-than-significant level, same as for the Project.

The Housing Variant would replace the proposed stadium at HPS Phase II with housing. This would result in a similar amount of hazardous materials being used compared to a stadium use. The Housing Variant would not introduce large-scale manufacturing or processing facilities that would store and use large quantities of hazardous materials that would present a substantial risk to people. However, there would be numerous locations where smaller quantities of hazardous materials would be present, the same as for the Project. Maintenance products used under the Housing Variant would be incrementally small, and would not increase the risk from handling these materials. The potential risks associated with hazardous materials handling and storage would generally be limited to the immediate area where the materials would be located, because this is where exposure would be most likely. The Housing Variant would comply with applicable laws and regulations that require the implementation of established safety practices, procedures, and reporting requirements pertaining to proper handling, use, storage, transportation, and disposal of hazardous materials in accordance with applicable federal and State laws and impacts would be less than significant.

Hazardous materials would routinely be transported to, from, and within the Project, and small amounts of hazardous waste would be removed and transported off site to licensed disposal facilities. Compliance with federal, State, and local regulations would ensure that the impact would be less than significant, the same as for the Project.

Daily operations under the Housing Variant could result in reasonably foreseeable upset and accident conditions involving the release of hazardous materials into the environment, but it would not pose a human health risk and/or result in an adverse effect on the environment. Accidents involving the transportation of hazardous materials to, from, or within the area, although rare, could occur. In general, the types and amounts of hazardous materials would not pose any greater risk of upset or accident compared to other similar development elsewhere in the City. Impacts would be less than significant, similar to the Project.

The Housing Variant site is not located within the San Francisco Airport Land Use Policy Plan Area and the Housing Variant would not result in a safety hazard from airport operations for people residing or working in the area. The site is not located within any other airport land use plan area. The Housing Variant site is also not located within the vicinity of a private airstrip and would not result in a safety hazard for people residing or working at the Project site. Similar to the Project, operation of the Housing

Variant would not expose people or structures to a significant risk of loss, injury, or death involving fires or conflict with emergency response or evacuation plans.

Geology and Soils

As shown in Figure IV-7, the Housing Variant would remove the football stadium from the development plan and relocate 1,350 dwelling units from Candlestick Point to HPS Phase II. Both construction and operational impacts to geology and soils would be substantially similar to the Project, as discussed below, because the type of development and associated construction activities are substantially the same. Additionally, operational activities are the same as those with the Project, with the exception of the football stadium due to its removal.

Construction

As with the Project, construction activities, such as grading and excavation, could remove stabilizing vegetation and expose areas of loose soil that, if not properly stabilized, could be subject to soil loss and erosion by wind and stormwater runoff. Newly constructed and compacted engineered slopes could undergo substantial erosion through dispersed sheet flow runoff, and more concentrated runoff can result in the formation of erosional channels and larger gullies, each compromising the integrity of the slope and resulting in significant soil loss. The erosion hazard rating for the local soils in the Project site is slight to severe. Requirements to control surface soil erosion during and after construction with the Housing Variant would be implemented through the requirements of mitigation measure MM HY-1a.1 (SWPPP) and adverse effects on the soil, such as soil loss from wind erosion and stormwater runoff, would be avoided or reduced to a less-than-significant level, similar to the Project.

In addition to the potential for soil erosion, construction activities would have the potential to affect groundwater levels. With implementation of the dewatering techniques, groundwater level monitoring, and subsurface controls as specified in the SFBC and required by mitigation measure MM GE-2a (dewatering), groundwater levels in the area would not be lowered such that unacceptable settlement at adjacent or nearby properties would occur. Consequently, the Housing Variant would result in a less-than-significant impact, similar to the Project.

At the Alice Griffith Public Housing site and the Jamestown area, the removal of bedrock through heavy equipment methods or controlled rock fragmentation activities would have the potential to fracture rock adjacent to the excavation, thereby destabilizing it and possibly causing settlement of structures above it. With implementation of those techniques, ground surface and building damage monitoring, as specified in the SFBC and required by mitigation measure MM GE-3, vibration from controlled rock fragmentation in the area would not cause unacceptable settlement or damage at adjacent or nearby properties would occur. Consequently, settlement hazards related to controlled rock fragmentation would be less than significant, similar to the Project.

Operation

Impacts with respect to geology and soils conditions with the Housing Variant would be substantially similar to those of the Project.

The potential for exposure to adverse affects caused by seismic groundshaking exists at the Project site. Mitigation measures MM GE-4a.1, MM GE-4a.2, and MM GE-4a.3 would require design-level geotechnical investigations that would include site-specific seismic analyses to evaluate the peak ground accelerations for design of Housing Variant structures and the Yosemite Slough bridge, as required by the SFBC. Implementation of these mitigation measures would ensure that potential impacts from groundshaking would be less than significant, similar to the Project.

The potential for adverse affects caused by seismically induced ground failure such as liquefaction, lateral spreading, and settlement exists at the Project site. Mitigation measures MM GE-4a.1, MM GE-4a.2, MM GE-4a.3, and MM GE-5a would require design-level geotechnical investigations must include site-specific seismic analyses to evaluate the peak ground accelerations for design of Variant structures, as required by the SFBC through review by DBI. It is anticipated that DBI would employ a third-party engineering geologist and/or civil engineer to form a GPRC. The GPRC would complete the technical review of proposed site-specific structural designs prior to building permit approval. The structural design review would ensure that all necessary mitigation methods and techniques were incorporated in the design for Housing Variant foundations and structures to reduce potential impacts from ground failure or liquefaction a less-than-significant level, similar to the Project.

With the Housing Variant, the potential for adverse affects due to seismically induced landslides exists at the Project site. Implementation of mitigation measures MM GE-6a and MM GE-4a.2 would ensure compliance with the SFBC and any special requirements of the HUD for compliance documentation and would reduce potential impacts from landslides a less-than-significant level, similar to the Project.

With the Housing Variant, 1,350 dwelling units would replace the football stadium that is programmed for development with the Project. This specific area is not located adjacent to the shoreline such that the Housing Variant could result in impacts greater than those discussed with the Project. Therefore, the Housing Variant would result in a less-than-significant impact due to shoreline stability, similar to the Project.

The potential for adverse affects caused by landslides exists at the Project site. Site-specific, design-level geotechnical investigations would be required to be submitted to DBI in connection with permit applications for individual Housing Variant elements, as specified in mitigation measure MM GE-6a. The site-specific analyses must assess these conditions and prescribe the requirements for foundations on slopes in accordance with the SFBC. All geotechnical investigations and permits must be approved by DBI. With implementation of this mitigation, the Housing Variant's impact with regard to landslides would be less than significant, similar to the Project.

The potential for adverse affects due to settlement exists at the Project site. However, design-level geotechnical investigations must evaluate the structural design, as required by the SFBC through review by DBI. Implementation of mitigation measures MM GE-5a, MM GE-4a.2, and MM GE-4a.3 would ensure compliance with the provisions of the SFBC and would reduce the impact a less-than-significant level, similar to the Project.

The potential for adverse effects caused by expansive soils exists at the Project site. Design-level geotechnical investigations must evaluate the structural design, as required by the SFBC through review by DBI. Implementation of mitigation measures MM GE-10a, MM GE-4a.1, MM GE-4a.2, and

MM GE-4a.3 would avoid or reduce the impact to Project structures from expansive soils a less-than-significant level, similar to the Project.

With the Housing Variant, the potential for adverse effects caused by corrosive soils exists at the Project site. Design-level geotechnical investigations must evaluate the structural design, as required by the SFBC through review by DBI. Implementation of mitigation measures MM GE-11a, MM GE-4a.2, and MM GE-4a.3 would avoid or reduce the impact to Housing Variant structures from corrosive soils a less-than-significant level, similar to the Project.

Fault rupture hazards are unlikely. Ground rupture occurs most commonly along preexisting faults. No known active faults cross the Hunters Point shear zone, making hazards from fault rupture unlikely with the Housing Variant.[1222] Therefore, there would be no impact caused by surface fault rupture, similar to the Project.

All development with the Housing Variant would be connected to the City's existing wastewater treatment and disposal system and would not involve the use of septic tanks or alternative wastewater disposal systems. No impact would occur, similar to the Project.

The Housing Variant would not substantially change site topography or affect unique geologic features, and would have no impact on such features, similar to the Project.

Hydrology and Water Quality

The footprint of development for the Housing Variant would be the same as for the Project, although the construction of the residential space would slightly decrease the extent of excavation for the foundation of buildings. As such, impacts from construction of the Housing Variant would be similar to the Project. With additional residential buildings replacing the stadium and associated parking lots, the total amount of development would be similar, as would the extent of impervious surfaces. Thus, operational impacts to hydrology and water quality would generally be similar to the Project.

Construction

With adherence to applicable regulatory requirements, construction activities associated with a Housing Variant would not violate water quality standards, cause an exceedance of water quality standards or contribute to or cause a violation of waste discharge requirements due to sediment-laden runoff, contaminated groundwater from dewatering activities, or the incidental or accidental release of construction materials. With less excavation for building foundations, impacts would be less than and similar to the Project. With implementation of mitigation measures MM HY-1a.1 (preparation of a SWPPP for discharges to the combined sewer system), MM HY-1a.2 (SWPPP preparation for separate storm sewer systems), and MM HY-1a.3 (construction dewatering plan) impacts would be less than significant, similar to the Project. Groundwater would not be used for any construction activities such as dust control or irrigation of vegetated erosion control features; no groundwater wells would be developed as part of the Project or and no on-site groundwater wells would be used for water supplies. Short-term construction groundwater dewatering may be necessary at certain locations (e.g., for

[1222] GTC, 2005.

installation of building foundations or underground utilities), but dewatering would have only a minor temporary effect on the groundwater surface table elevation in the immediate vicinity, and would not measurably affect groundwater supplies. The extent of impervious surfaces under the Housing Variant would be less than the Project, the Housing Variant would not interfere substantially with groundwater recharge such that there would be a net deficit in aquifer volume or a lowering of the local groundwater table level. This impact would be less than significant, similar to the Project.

No streams or rivers are currently located within the Housing Variant site and thus no streams or rivers would be altered by construction activities. Under existing conditions, stormwater typically drains to storm drains (which include both combined and separate systems) or directly to the Bay via surface runoff (generally only along portions of the shoreline). During construction of the Housing Variant, the existing drainage patterns within the area would generally be preserved. Construction activities associated with the Housing Variant would not substantially alter the existing drainage pattern of the site or alter the course of a stream or river in ways that would result in substantial erosion, siltation, or flooding on-site or off-site. Impacts would be less than significant, similar to the Project.

Construction activities associated the Housing Variant, including site clearance, grading, and excavation, would not create or contribute runoff water that would exceed the capacity of existing or planned storm sewer systems or provide substantial additional sources of polluted runoff. During construction, existing stormwater drainage facilities would be replaced by a new storm sewer system that would collect and treat on-site stormwater flows and would be sized to accommodate projected flows from upstream contributing areas. With compliance with regulatory requirements, as required by mitigation measures MM HY-1a.1 and MM HY-1a.2 (preparation of a SWPPP), impacts would be less than significant, similar to the Project.

Operation

Operation of the Housing Variant would not contribute to violations of water quality standards or waste discharge requirements or otherwise degrade water quality. Compliance with the requirements of the Municipal Stormwater General Permit, the Recycled Water General Permit, and the Industrial General Permit would reduce potential water quality impacts associated with implementation of the R&D Variant. In addition, this variant would be required to comply with the San Francisco SWMP, the Draft San Francisco Stormwater Design Guidelines, and the San Francisco Green Building Ordinance. Compliance with these requirements would be demonstrated in the SDMP or SCP for the project site, as required by mitigation measure MM HY-6a.1. Compliance with the Recycled Water General Permit would be required by implementation of mitigation measure MM HY-a.2. To reduce the potential for stormwater infiltration to mobilize historic soil contaminants at HPS Phase II, the use of infiltration BMPs would be prohibited by mitigation measure MM HY-6b.1. To reduce stormwater runoff impacts associated with industrial activities at HPS Phase II, compliance with the Industrial General Permit would be required by implementation of mitigation measure MM HY-6b.2. To reduce stormwater impacts associated with maintenance dredging of the marina, compliance with the DMMO regulatory requirements would be required by implementation of mitigation measure MM HY-6b.3. Compliance with the Clean Marinas California Program would be required by implementation of mitigation measure MM HY-6b.4. As extent of impervious surfaces for the Housing Variant would be less than the Project, impacts would be similar and slightly less than the Project. Development of the Housing Variant would

not utilize groundwater as a source of water supply nor interfere substantially with groundwater recharge. Thus, there would be no net deficit in aquifer volume or a lowering of the local groundwater table level and no impact would occur, similar to the Project.

Operation of the Housing Variant could alter the existing drainage pattern of the site, but would not alter the course of a stream or river, as none exist at or near the site currently, or result in substantial erosion, siltation, or flooding on-site or off-site, similar to the project. Implementation of the Housing Variant would not contribute runoff water that would exceed the capacity of existing or planned storm sewer systems or provide substantial additional sources of polluted runoff, as development would include a separate stormwater system that would be sized to accommodate estimated runoff flows and treat runoff prior to discharge to the Bay. Compliance with regulatory requirements, including the submission of a SDMP and SCP to the SFPUC for approval, as required by mitigation measure MM HY-6a.1, would ensure that this impact would be less than significant, similar to the Project.

Implementation of the Housing Variant would not place housing and other structures within a 100-year flood zone or otherwise include development that would impede or redirect flood flows. Implementation of mitigation measures MM HY-12a.1 (Finished Grade Elevations above Base Flood Elevation) and MM HY-12a.2 (Shoreline Improvements for Future Sea-Level Rise) would reduce this impact to a less-than-significant level, similar to the Project.

Implementation of the Housing Variant would not expose people or structures to a significant risk of loss, injury, or death involving flooding, including flooding as a result of the failure of a levee or dam. Implementation of mitigation measure MM HY-14 (Shoreline Improvements to Reduce Flood Risk) would reduce impacts to a less-than-significant level. Based on historical records and the location of development, the Housing Variant would not expose people or structures to inundation by seiche, tsunami, or mudflow. These impacts would be less than significant, similar to the Project.

Biological Resources

The Housing Variant would remove the football stadium from the development plan and relocate 1,350 dwelling units from Candlestick Point to HPS Phase II. Both construction and operational impacts to biological resources would be substantially similar to the Project, as discussed below, because the type of development and associated construction activities are substantially the same. Additionally, operational activities are the same as those under the Project, with the exception of the football stadium due to its removal.

Construction

Development of the Housing Variant would not conflict with the provisions of an adopted Habitat Conservation Plan, Natural Community Conservation Plan, or other approved local, regional, or State habitat conservation plan, and no impact would occur, similar to the Project.

The Housing Variant would provide 96.7 of State parkland, the same amount of parkland that would be provided under the Project. However, the Housing Variant would include additional parks and would reconfigure the design and sizes of parks and open space areas at HPS Phase II compared to the Project. HPS Phase II would have 244.6 acres (13 acres more than the Project) of parks and open space. The

Sports Field Complex proposed with the Housing Variant would be 65.9 acres, which is 6.2 acres more than proposed under the Project. The 3.7-acre Hunters Point South Park would be constructed in the HPS South district, which is not included in the Project. These additional open space areas would provide additional habitat for common plant and wildlife species. Impacts to common species or habitats would be less than the Project, and remain less than significant, similar to the Project.

Development of the Housing Variant could have a substantial adverse effect, either directly or through habitat modifications, on sensitive natural communities or species identified as a candidate, sensitive, or special status in local or regional plans, policies, or regulations, or by the CDFG or USFWS. Mitigation measures MM BI-5b.1 through MM BI-5b.4 would reduce the effects on eelgrass, and the sensitive or special-status fish species that could occupy these areas by surveying for and avoiding this habitat. Mitigation measures MM BI-6a.1, MM BI-6a.2, and MM BI-6b would require surveys for special-status and nesting avian species and implement impact-avoidance measures such as construction buffers to ensure that the loss or take of these species would not occur. Similar to the Project, the Housing Variant's Draft Parks, Open Space, and Habitat Concept Plan would identify ecological enhancement measures that would include the restoration and management of suitable raptor foraging habitat. To provide a mechanism by which implementation of these enhancements would be ensured, mitigation measure MM BI-7b would be implemented to ensure that specific standards related to the enhancement of raptor foraging habitat would occur. Therefore, a net increase in the quality of raptor foraging habitat would result, similar to the Project, and, with mitigation, the overall effect on raptors is expected to be beneficial. Mitigation measure MM BI-9b would reduce the effects of pile driving-related activities to fish and marine mammals by recommending the type of piles to use to minimize sound impacts; providing for an alternative method of installation to minimize sound impacts; requiring installation during an agency-approved construction window when fish are least likely to be present to avoid the bulk of potential impacts; and requiring a construction monitor to ensure compliance with all measures, including sound monitoring.

Construction activities could impact designated critical habitat for green sturgeon and Central California Coast steelhead; however, compensatory mitigation for lost aquatic habitat as described in mitigation measures MM BI-4a.1 and MM BI-4a.2 would be implemented to minimize impacts to wetlands, aquatic habitats, and water quality during construction. Overall adverse effects would be less than significant, similar to the Project. Mitigation measures MM BI-4a.1, MM BI-4a.2, MM BI-5b.1 through MM BI-5b.4, MM BI-12a.1, MM BI-12a.2, MM BI-12b.1, and MM BI-12b.2 would reduce potentially significant impacts to Essential Fish Habitat to less-than-significant levels, similar to the Project. Ecological design features described in the Draft Parks, Open Space, and Habitat Concept Plan would result in increased habitat for western red bats, and impacts to this species would be less than significant.

Development of the Housing Variant could have a substantial adverse effect on federally protected wetlands and other waters as defined by Section 404 of the CWA (including, but not limited to, marsh, vernal pool, coastal, etc.) through direct removal, filling, hydrological interruption, or other means. With implementation of mitigation measures MM BI-4a.1 and MM BI-4a.2, potential adverse effects of the Project to federally protected wetlands and other waters as defined by Section 404 of the CWA would be reduced to a less-than-significant level, similar to the Project.

Development of the Housing Variant would not conflict with the natural resource protection policies of the General Plan; however, it could result in the disturbance or loss of trees that are protected by the City's Urban Forestry Ordinance and Section 143 of the *Planning Code*. Mitigation measure MM BI-14a would ensure that development does not result in conflicts with these policies by requiring preservation of street trees, trees that meet the size specification of significant trees, replacement of large trees that are removed, and the planting of street trees, consistent with *Planning Code* Section 143. In addition, mitigation measure MM BI-7b includes the planting of approximately 10,000 net new trees. With implementation of mitigation measures MM BI-14a and MM BI-7b, the Housing Variant would not result in a conflict with City policies designed to protect urban streetscape through the planting of street trees, similar to the Project, and overall impacts would be beneficial.

Operation

Impacts to native oysters and EFH would be less than significant as removed hard structures would be replaced with approximately equal amounts of suitable habitat along the shoreline or the new breakwater. Implementation of mitigation measure MM BI-18b.1 would reduce the effects of marina operational activities to oysters, and mitigation measure MM BI-18b.2 would mandate the application of BMPs to control the distribution of sediments disturbed by the dredging activities to reduce water quality impacts to oysters. Mitigation measures MM BI-19b.1 and MM BI-19b.2 would reduce dredging and contamination impacts to EFH. With implementation of the identified mitigation measures, impacts would be reduced to a less-than-significant level, similar to the Project.

Development of the Housing Variant could interfere substantially with the movement of native resident or migratory fish or wildlife species or with established native resident or migratory wildlife corridors, or impede the use of native wildlife nursery site (eelgrass beds). Mitigation measures MM BI-5b.1 through MM BI-5b.4 would reduce effects on eelgrass by surveying for and avoiding this habitat. Mitigation measures MM BI-20a.1 and MM BI-20a.2 would reduce the effects of operational activities related to tall structures and increased lighting to migrating species to less-than-significant levels by incorporating design features that would help minimize bird strikes, including using operational methods to reduce the effects of new lighting towers. With implementation of the identified mitigation measures, impacts would be reduced to a less-than-significant level, similar to the Project.

Implementation of the Housing Variant would be consistent with the biological resources protection policies of the *City of San Francisco General Plan*, and with implementation of mitigation measure MM BI-14a, development would be constructed in a manner consistent with policies of the Urban Forestry Ordinance and *Planning Code* Section 143. Consequently, the operation of the Housing Variant would not conflict with any local policies or ordinances protecting biological resources, and there would be no impact.

Public Services

Construction

Police and Fire Services

Similar to the Project, access to the Housing Variant site during construction would be maintained by implementation of a CMTP as required in MM TR-1. The CMTP would provide necessary information to various contractors and agencies as to how to maximize the opportunities for complementing construction management measures and to minimize the possibility of conflicting impacts on the roadway system, while safely accommodating the traveling public in the area. A cohesive program of operational and demand management strategies designed to maintain acceptable levels of traffic flow during periods of construction activities in the area would be implemented.

Similar to the Project, construction of the Housing Variant would not result in increased demand on police protection services, as demands on the SFPD during construction would be supplemented by private security (as required by mitigation measure MM PS-1 [site security measures during construction]), and construction areas would be secured through the installation of fencing and gates.

Therefore, the Housing Variant would result in a less-than-significant impact to police protection and fire services during construction. As construction of the Housing Variant would not impact SFPD or SFFD response times upon implementation of a CMTP,. These impacts would be similar to the Project.

Schools and Library Facilities

Construction of the Project would not result in impacts to the SFUSD or the San Francisco Public Library System. SFUSD or library facilities are not located on the Project site. All area school and library services would be available to the community throughout the duration of Project construction. As such, since construction of the Housing Variant would be similar to construction of the Project, no impact to school or library services during construction of the Housing Variant would occur. These impacts are the same as those identified for the Project.

Operation

Police

Operational impacts to police services would be similar to the Project in as much as they would be considered less than significant. However, the Housing Variant would result in the removal of the previously programmed football stadium, which would relieve the police department of events at which their presence would be required (approximately 12 game day and 20 other events annually). Therefore, impacts to police protection services would be less than the Project, and still less than significant.

The Housing Variant would remove the football stadium from the development program and relocate 1,350 dwelling units from the Candlestick Point site to the HPS Phase II site. As the Housing Variant would not increase the number of residential units developed, the permanent resident population would not be increased above that anticipated with the Project. Therefore, all impacts anticipated with the Project would be anticipated for the Housing Variant. However, due to the removal of the football

stadium, the number of employees anticipated in the area at full build-out with the Housing Variant would be reduced by 359 thereby reducing the temporary, daytime population requiring police services. Furthermore, police presence and services would no longer be needed at the maximum twelve home game day events anticipated by the NFL for the football stadium. Patrolling this area and responding to calls would require at the least a redeployment of police services within the Bayview District, or within a wider area given the current recommendations for redistricting due to the increase in population from the underlying development program, as with the Project.

Impacts on police protection services are considered significant if an increase in population or development levels result in inadequate staffing levels (as measured by the ability of the SFPD to respond to call loads) and/or increased demand for services that would require the construction or expansion of new or altered facilities that might have an adverse physical effect on the environment. The demand for additional police personnel alone would not be considered a physical environmental impact under the provisions of CEQA.

To estimate personnel requirements for new projects, the SFPD considers the size of the incoming residential population and the expected or actual experience with calls for service from other potential uses of the site. Any potential increase in staffing at the SFPD Bayview Station would be expected to take place throughout the Housing Variant development period with the incremental addition of new housing and new non-residential building space and their occupancy.[1223]

Although the City has no adopted staffing ratio, the existing "level of service" at the SFPD can be determined by comparing citywide police force staffing[1224] to total City population (including both residents and workers). As shown in Table IV-25 (Citywide Number of Police Officers and Estimated Housing Variant Demand), using a total City population for San Francisco of 1,351,469 and a police department staffing level of 2,033 in 2005, a Citywide ratio of 1 officer per 665 people was calculated.[1225] This ratio when applied to the total projected resident and employee population of the Housing Variant at build-out results in the need for an additional 52 police personnel to provide a comparable level of service, the same as the Project.

The SFPD evaluates the need for additional officers by sector, and not station or district needs. The area with the Housing Variant covers two of the five sectors within the Bayview District, both of which have been identified as high demand areas. While it is unlikely that 52 new officers would be needed, some redistribution of the police presence in the southeastern portion of the City would be warranted by development with the Housing Variant.

Staffing increases, in and of itself, would not constitute a significant environmental impact; however, the construction of new facilities to serve the additional 52 police officers could create an environmental effect. Additional SFPD personnel needed to serve the Housing Variant would require a station from

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[1223] PBSJ Meeting with SFPD on April 22, 2008.

[1224] Using a Citywide police force staffing number accounts for the mixed-use nature of the Project, which would include a substantial daytime and resident or nighttime population.

[1225] City population was calculated as a 2005 population of 799,302 plus 2005 employment of 552,167; refer to Table III.C-1 (Existing Population [2005]) and Table III.C-3 (Existing Employment [2005]) of Section III.C (Population, Housing, and Employment).

Table IV-25 Citywide Number of Police Officers and Estimated Housing Variant Demand

		Population	*Police Officers*
Citywide (2005)			
Residents		799,302	
Employees		552,167	
	Total	***1,351,469***	***2,033***
Ratio (officer to population)		1:665	
Project (2029)			
Residents		24,465	
Employees		10,378	
	Total	***34,843***	***52[a]***
Ratio (officer to population)		1:665	

SOURCE: The population and households data reported for San Francisco is 2005 data provided in a Memorandum from John Rahaim, Director of Planning, San Francisco Planning Department to Michael Carlin, Deputy General Manager, San Francisco Public Utilities Commissions, *Projections of Growth by 2030*, July 9, 2009; SFPD 2005 total staffing: PSSG District Station *Boundaries Analysis*, 2008; Proposed population and employment: Section III.C.

a. The projected number of police officers for the R&D Variant is rounded up, and most closely reflects the 1:665 ratio of the Project.

which to operate. The exact amount of space that would be needed has not yet been determined. However, using an estimate of 110 square feet per person,[1226] the additional 52 police officers would require approximately 6,000 square feet of interior building space. Additional space would be required for staff and visitor parking. According to the SFPD, there is limited excess capacity at the existing Bayview Station, and the station would not be able to accommodate all 52 of the additional police officers without the reconfiguration and expansion of the existing station or the construction of a new facility.[1227] In addition, the current surface parking lot is not adequate for existing personnel. Structured parking could be provided on the existing parking site.

Currently, the SFPD has no plans for expansion of its Bayview Station. According to the *Boundaries Analysis*, the Bayview Station is not among the priorities for replacement, expansion, improvement, or correction of current deficiencies. However, according to Public Safety Strategies Group (PSSG), there is a considerable amount of wasted or unused space at the Bayview Station that could be reconfigured to accommodate additional officers.[1228] If the SFPD determines that the reconfiguration of the Bayview Station would not be sufficient to accommodate additional officers, a new station or facility of approximately 6,000 square feet (the same as the Project) could be constructed within the Housing Variant area, on land designated for community serving uses. As part of the Housing Variant, up to 100,000 gross square feet (gsf) of land divided equally between Candlestick Point and HPS Phase II would be designated for community serving uses, such as fire, police, healthcare, day-care, places of worship, senior centers, library, recreation center, community center, and/or performance center uses.

[1226] The Bayview Station is approximately 16,000 gsf, and the capacity is about 140 officers, resulting in about 114 sf per officer.
[1227] Personal communication, John Loftus, Captain, Bayview District Station to Allison Wax, PBS&J, August 31, 2009.
[1228] PBSJ Meeting with SFPD on April 22, 2008.

With the construction of a new facility or a suitable retrofitting or expansion of the Bayview Station, the SFPD would have ample space to accommodate the additional police officers needed to maintain the SFPD's existing level of service. Therefore, while the development of the Project may require new or physically altered police facilities in order to maintain acceptable police services, the potential impacts associated with the construction of a new facility have been addressed in this EIR and would not require further environmental review. Therefore, the anticipated development would not require new or physically altered police facilities beyond the scope of the Housing Variant in order to maintain acceptable police protection services and therefore, operational impacts to police protection services would be less than significant, similar to the Project.

Fire Protection Services

Operational impacts to fire protection and emergency medical services would be similar to the Project in as much as they would be considered less than significant. The Housing Variant would remove the football stadium from the development plan and would relocate 1,350 housing units from Candlestick Point to HPS Phase II. This would result in the potential for lower buildings, both at Candlestick Point and HPS Phase II, which could reduce potential impacts to fire services. Additionally, the Housing Variant would result in a smaller, daytime population because the number of employees at the site would be reduced by 359 as a result of removal of the football stadium development. Additional fire protection resources that would be required to patrol the football stadium on game days with the Project would not be required with the Housing Variant, thereby reducing that potential impact. Therefore, impacts to fire would be similar to the Project.

The number of housing units would not be increased with the Housing Variant, and the permanent resident population would not be increased above that anticipated with the Project. Buildings on the HPS Phase II site would be 40 to 65 feet high, similar to proposed adjacent development. This would be lower than the 156-foot maximum height anticipated with the football stadium. On the Candlestick Point site, the majority of buildings would remain 65 feet. However, the number and location of towers would be reduced. The reduction in building height would reduce potential impacts to fire protection services.

Building Safety

Similar to the Project all new buildings must meet standards for emergency access, sprinkler, and other water systems, as well as all other requirements specified in the *San Francisco Fire Code*, which would help to minimize the demand for future fire protection services. The Housing Variant development plan differs from the Project in that the football stadium programmed for the Project would be removed and 1,350 dwelling units would be relocated from Candlestick Point to HPS Phase II. These uses would be provided primarily in buildings that would have a maximum allowable height ranging between 40 feet and 65 feet at both Candlestick Point and HPS Phase II, as shown on Figure IV-8. At Candlestick Point, the number and location of towers would be reduced. Plan review for all structures for compliance with *San Francisco Fire Code* requirements would minimize the potential for fire-related emergencies by providing on-site protective features, reducing the demand for fire protection services. In addition, development of the Housing Variant would include expansion of the AWSS to provide water infrastructure for firefighting activities. Therefore, the Housing Variant would result in a less than significant operational impact to fire services due to building safety.

Response Time

As discussed with the Project, existing SFFD facilities in the Bayview neighborhood would provide adequate response times to most points within Candlestick Point and no new or physically altered fire or emergency medical facilities would be required in order to maintain an acceptable level of service. However, portions of the proposed development at HPS Phase II would be at a distance from existing fire stations including those most proximate to the site (Stations 44 and 17), which could result in the SFFD taking anywhere from 8 minutes to 14 minutes to access the HPS Phase II site in the event of an emergency. The SFFD strives to maintain a Code 3 emergency response time of 4.5 minutes, which may not be accommodated due to the distance of the nearest station from the HPS Phase II site. As such, a new fire station located in closer proximity to the HPS Phase II site would be needed to ensure adequate response times for HPS Phase II. The SFFD does not consider response time to the furthest point of the HPS Phase II site to be acceptable, given the density of proposed development and the distance from the nearest fire station.[1229] However, the Housing Variant would decrease the daytime population in this area by 359 people, which would reduce the potential impact to the existing SFFD resources. SFFD staff concluded that a fire station would be needed at a site that would offer more rapid response to the HPS Phase II site. Initial SFFD recommendations for such a station included providing one engine (four staff), one truck (five staff), and one ambulance (staff requirements not indicated). Both Station 9 and Station 17 include one engine and one truck, and their approximate building size is 6,100 gsf and 6,000 gsf, respectively. Neither station includes an ambulance. A new approximately 6,000-gsf SFFD station could be accommodated within the Housing Variant site, on land designated for community serving uses. As part of the Housing Variant, up to 100,000 gsf of land divided equally between Candlestick Point and HPS Phase II would be designated for community serving uses, such as fire, police, healthcare, day-care, places of worship, senior centers, library, recreation center, community center, and/or performance center uses. The Applicant has designated a total of 5.3acres of community-serving uses in HPS Phase II, including 0.5 acre of which have been designated for a new SFFD facility.

These uses have been anticipated as part of the Housing Variant and the impacts of their construction are evaluated in this EIR. Construction activities associated with proposed public facilities are considered part of the overall Project. A discussion of project-related construction impacts, including those associated with the construction of public facilities, is provided in the applicable sections of this EIR, including Section III.D, Section III.H, Section III.I, Section III.J, Section III.K, and Section III.M. Construction impacts would be temporary. While it is likely that construction of the various public facilities would not result in significant impacts (either individually or combined), construction of the entire development program, of which the public facilities are a part, would result in significant and unavoidable impacts related to construction noise and demolition of an historic resource; all other construction-related impacts would be less than significant (in some cases, with implementation of identified mitigation). Refer to Section III.D, Section III.H, Section III.I, Section III.J, Section III.K, and Section III.M for the specific significance conclusions for construction-related effects.[1230] As such, the

[1229] PBSJ Meeting with San Francisco Fire Department on July 8, 2008.
[1230] The impact statements provided in each technical section of the EIR differentiate between construction impacts and operational or development impacts, and all identified mitigation measures are contained in the impact analysis. In addition, Table ES-2 in the Executive Summary of this EIR also summarizes all impact statements, the level of significance before mitigation, any identified mitigation measures, and the level of significance after mitigation.

construction impacts associated with a new SFFD facility on the Project site have been addressed in this EIR. Therefore, the anticipated development would not require new or physically altered fire facilities in order to maintain acceptable fire protection services and operational impacts to fire protection services would be less than significant, similar to but potentially less than the Project.

Schools

Operational impacts to schools would be similar to the Project because the number of dwelling units anticipated would be the same. Therefore, the number of school aged children that would require adequate school services would be approximately similar to the Project. Impacts from the Housing Variant on schools would be less than significant, similar to the Project.

Library Facilities

Operational impacts to libraries would be similar to the Project because the same number of dwelling units anticipated would be the same. Additionally, the Housing Variant would result in 359 less employees due to the loss of the football stadium. Therefore, the service population for the existing library facilities would be the same, if not less, than the Project. Similar to the Project, library branches that currently serve the area including the new Portola branch (opened in 2009), the Visitacion Valley branch currently under construction (opening in 2010), and the Bayview branch to be expanded beginning in 2010 (opening in late 2011), would continue to meet the demands of the community. Therefore, the Housing Variant would result in a less than significant operational impact to library services, similar to the Project.

■ Recreation

The Housing Variant would include the construction and improvement of new parks, recreational facilities, and open space. At buildout of this Variant, approximately 349.4 acres of parks, open space, and recreational uses would be provided, as described in Table IV-21, which is about 13 acres more than proposed with the Project. The Sports Field Complex with the Housing Variant would be 94.7 acres, about 3.1 acres more than the Sports Field Complex proposed with the Project, and a total of 158 acres of parkland would be provided, about 9.9 acres more than proposed with the Project.

Construction impacts related to recreational facilities would be the substantially the same as those identified with the Project because the construction activities would be substantially similar, with the Housing Variant requiring slightly more construction due to the provision of about 13 acres more of parkland.

The Housing Variant would have the same number of housing units as proposed with the Project, thereby resulting in the same residential population of 24,465, although 13 acres more of parkland would be provided. Operational impacts are determined based on a ratio of acres of parkland per resident. Currently, the City provides approximately 7.1 acres of parkland per thousand residents, and the standard used in Section III.P assumes a ratio of 5.5 acres of parkland per 1,000 population is sufficient to meet the demand for recreational facilities without causing or accelerating substantial physical deterioration of facilities or requiring the construction of further facilities. The parkland-to-population ratio associated with the Housing Variant would be 14.2, which is 0.5 more than with the Project. The Housing Variant

ratio would be considerably higher than the ratio of 5.5 acres of parkland per thousand residents, which is considered sufficient to meet demand for recreational facilities without causing or accelerating substantial physical deterioration of facilities or requiring the construction of further facilities. Impacts would be less than significant.

Park Phasing

The timing of Housing Variant development could result in a temporary increase in the use of parks, recreational facilities, and open space in a manner that would cause or accelerate the substantial physical deterioration or degradation of facilities if the development of residential and/or employment-generating uses were to occur in advance of the development of park and recreational facilities.

The conceptual development plan for this Variant would result in the development of residential units and parks during all of four stages of development. Table IV-26 (Housing Variant Residential Units and Park Acreage Provided during Each Stage of Development) outlines the number of residential units and the acreage of parkland provided during each stage of development, as well as the resulting park-to-population ratio for residents of the Project site (even if developed under the Housing Variant). As this table indicates, the park-to-population ratio would not drop below 14.3 acres per 1,000 population at any time during the four stages of development, which exceeds the benchmark of 5.5 acres of parkland per 1,000 population. Table IV-26 demonstrates that adequate parkland would be provided during each stage of development. However, during a given phase, park construction could lag behind residential development, leading the parkland-to-population ratio to drop below an acceptable level. Moreover, the development plan is conceptual and could be modified during the entitlement and development process. Mitigation measure MM RE-2 would ensure that the parks and recreational amenities are constructed as residential and employment-generating uses are developed, and a less-than-significant impact would result.

Table IV-26 Housing Variant Residential Units and Park Acreage Provided during Each Stage of Development

Stage of Development	*Residential Units*	*Population*	*Total Parkland (ac)*	*Park-to-Population Ratio (acres per 1,000 Residents)*
Existing	256	1,113[a]	120.2	108
Phase 1	3,005	7,002[b]	137.1	19.6
Phase 2	7,185	16,741[b]	275.6	16.5
Phase 3	9,400	21,902[b]	348.6	15.9
Phase 4	10,500	24,465[b]	349.4	14.3

a. Refer to Table III.C-1 (Existing Population [2005]) in Section III.C (Population, Employment, and Housing). This population correlates to the total number of households in the Traffic Analysis Zone, which includes more than the 256 households located in the Candlestick portion of the Project site (e.g., 292). It is likely, therefore, that the population within the Candlestick portion of the Project site is less than 1,113, which would only increase the existing park-to-population ratio.
b. Calculated as 2.33 people per residential unit.

Senate Bill 792 (SB 792) (refer to Appendix P2) was signed by the Governor on October 11, 2009, and is codified as Chapter 203 of the Statutes of 2009. SB 792 repeals the *Hunters Point Shipyard Conversion Act of 2002,* the *Hunters Point Shipyard Public Trust Exchange Act,* and *Public Resources Code* Section 5006.8, and

consolidates the key provisions of those statutes into a statute covering both the Candlestick Point area and HPS. The statute authorizes a reconfiguration of CPSRA coupled with improvements within the park and the provision of an ongoing source of park operation and maintenance funding. The proposed reconfiguration would remove about 29.2 acres from the current boundaries of CPSRA to be used for urban development, but would add about 5.7 acres not currently included in the CPSRA to The Neck, The Heart of the Park, and The Last Port areas of the CPSRA. These additional acres would widen the park at in an area where the CPSRA boundary currently runs very close to the shoreline, creating a very narrow "pinch point" in the park. The additional acreage would thus create a buffer between development and the shoreline and improve the recreational value of this section of the park. In total, the area of the CPSRA (excluding the Yosemite Slough) would decrease by about 23.5 acres at the Candlestick Point site, from 120.2 acres to 96.7 acres, which is the same as the Project.

While the reconfiguration of CPSRA would remove a net of 29.2 acres from the park, all of that acreage is degraded or unimproved (and not maintained) and does not provide substantial recreation opportunities to the community. Most of the land that would be removed from CPSRA is either currently used for stadium parking or is directly adjacent to Harney Way. The reconfiguration would add 5.7 acres of new parkland in The Last Port, The Neck, and The Heart of the Park, all areas that are currently developed and actively used that have high value as recreational resources. This additional acreage would widen the park at this important point, increasing its capacity for new users. Although there would be a net decrease in the total area of the CPSRA, that portion of the CPSRA that is currently developed and used for recreational purposes would be further expanded (by 5.7 acres) and improved.

Moreover, the Housing Variant would provide substantial improvements throughout the CPSRA. These improvements, which are described at length in the discussion of Impact RE-2, include revegetation and landscaping, shoreline restoration and stabilization, infrastructure improvements (such as trails, pathways, and visitor facilities), the provision of habitat and opportunities for environmental education, "Eco-Gardens," and salt-marsh restoration. Figure III.P-8 shows the existing unimproved and improved areas of the CPSRA and indicates where land would be removed or added relative to the existing CPSRA uses. These improvements would turn portions of the Park that are used for Candlestick Park stadium parking or are undeveloped and underutilized into vibrant parts of the CPSRA and of the overall network of parks. Currently improved parts of the CPSRA, such as The Heart of the Park, The Point, The Neck, and The Last Port, would also be improved. Overall, the reconfiguration and improvements would enhance park aesthetics and landscape ecology; provide connections throughout the CPSRA and the other parks; and provide direct access to the Bay and the Bay shoreline for walking, swimming, fishing, kayaking, and windsurfing. The Variant's proposed reconfiguration of the CPSRA, therefore, would not adversely affect the park's existing recreational facilities and opportunities.

The improvement and development of the CPSRA is expected to increase usage of CPSRA by visitors. While the number of additional visitors cannot be accurately predicted at this time, the Project's improvement will increase the amount of land at CPSRA that provides recreational opportunities (as discussed above), and will thus enable the park to accommodate the new demand. Moreover, the agreement between CDPR and the City or the Agency, providing for the reconfiguration of CPSRA, would also provide at least $10 million in funding for operation and maintenance of the park, further enabling the park to accommodate increased demand.

A Technical Memorandum was prepared to study wind conditions at a launch site at CPSRA (in The Neck area) and in a 55-acre portion of the Bay south of the launch site. The study found that development in the cumulative scenario, which includes development at the Project site (even if under the Housing Variant), generally results in wind speed changes near the shoreline (generally within 300 feet) ranging from no change to a 10 to 20 percent decrease in wind speed. Approximately 7 acres near the shoreline would experience a decrease of 10 to 20 percent in wind speed; approximately 36 acres of the Bay would experience a decrease of five to 10 percent; and approximately 12 acres of the Bay would experience a decrease of less than five percent. The majority of the windsurfing test area (as identified in the Technical Memorandum) would not be substantially affected (e.g., a 10 percent decrease or less in wind speed). The Variant would not significantly and adversely affect existing windsurfing opportunities at the CPSRA. A less-than-significant impact would occur, and no mitigation is required.

In summary, impacts resulting from the Housing Variant would be substantially similar to the Project.

Utilities

Water

The operational activities of the Housing Variant would be similar to those of the Project, inasmuch as there would be temporary, daytime populations at the Housing Variant site and full-time residential populations that generate retail water demand from SFPUC.

With the Housing Variant, the football stadium proposed with the Project for the HPS Phase II site would be removed and 1,350 housing units would be relocated from the Candlestick Point site to the HPS Phase II site. The Housing Variant would not generate additional permanent residents over that of the Project. Additionally, the Housing Variant would result in the loss of 359 jobs due to removal of the football stadium. This would decrease the potential water consumption from the site. As shown in Table IV-27 (Housing Variant Water Demands Adjusted for Plumbing Codes and SF Green Building Ordinance [mgd]), the Housing Variant would consume approximately 1.66 mgd of water. With existing water use at the CP-HPS Phase II site of 0.3 mgd, the net change in water demand with the Housing Variant would be an increase of 1.36 mgd, a decrease of 0.01 mgd compared to Project.

As with the Project, sufficient treatment capacity would continue to be available to meet the likely future water treatment needs of the entire Regional Water System, and thereby meet retail demand for water treatment, including the net increase of 1.36 mgd for the Housing Variant. As the current and planned treatment capacity of existing RWS water treatment facilities is sufficient to serve the Housing Variant, implementation of this variant would not require or result in the construction of new or expanded water treatment facilities, and this impact would be less than significant, similar to the Project.

As with the Project, beginning in 2025, during multiple dry-year periods, the total retail water supply would be slightly less than estimated total demand, including demand associated with the Housing Variant. With the implementation of the WSAP and RWSAP during multiple dry-year periods, which could include voluntary rationing or other water conservation strategies, existing and projected future water supplies could accommodate estimated future water demand, including the Project-related demand. As discussed in the WSA, the SFPUC has approved and has made substantial progress towards the implementation of the water facility improvement projects identified in the WSIP. The SFPUC has

received voter approval to fund the Phased WSIP program and has initiated bond sales to fund implementation of individual projects, which are in various stages of implementation, including subsequent environmental review, design, or construction.[1231] Thus, there is substantial evidence that the SFPUC would implement the Phased WSIP facility projects described above, including the local water supply projects.

Table IV-27 Housing Variant Water Demands Adjusted for Plumbing Codes and SF Green Building Ordinance (mgd)

Land Use	*Candlestick Point*	*Hunters Bay Shipyard*	*Total*
Residential	0.51	0.33	0.83[a]
Hotel	0.05	0.00	0.05
Office	0.04	0.02	0.04
Artists Studios	0.00	0.01	0.01
R&D	0.00	0.36	0.36
Neighborhood Retail	0.02	0.02	0.03[a]
Regional Retail	0.08	0.00	0.08
Community Uses	0.01	0.01	0.02
Football Stadium	0.00	0.00	0.00
Performance Venue	0.01	0.00	0.01
Subtotal	*0.71[a]*	*0.73[a]*	*1.45[a]*
Parks and Open Space	0.06	0.15	0.22
Total Demand	***0.77[a]***	***0.88[a]***	***1.66***

SOURCE: Arup, Candlestick Point–Hunters Point Shipyard Phase II Water Demand Memorandum, October 15, 2009.

a. Numbers are rounded according to standard rounding practices and may not add up due to hidden decimals used in this table. These entries are correct and are consistent with Table 13 of the Water Demand Memorandum.

The San Francisco Recycled Water Program currently includes the Westside, Harding Park, and Eastside Recycled Water Projects, and various conservation efforts. The proposed projects would provide up to 4 mgd of recycled water to a variety of users in San Francisco.[1232,1233] Recycled water will primarily be used for landscape irrigation, toilet flushing, and industrial purposes. The Harding Park Project has completed environmental review, and the Westside Project is expected to begin environmental review in late 2009 or early 2010. The WSIP contains funding for planning, design, and environmental review for the San Francisco Eastside Recycled Water Project. The local water supply improvement projects were approved as part of the Phased WSIP and are included in the WSIP funding program. The SFPUC has initiated

[1231] Per the *Water System Improvement Program Quarterly Report, Q4, FY 2008/2009* (dated August 20, 2009), (prepared by the SFPUC), as of July 1, 2009, two (2) projects are in the Planning Phase, eleven (11) projects are in the Design Phase, six (6) projects are in the Bid and Award Phase, five (5) projects are in the Construction Phase, two (2) projects in the Close-Out Phase, eight (8) projects are completed, one (1) project has not been initiated, and eleven (11) projects have multiple active phases. Available at: http://sfwater.org/Files/Reports/01_RW_Program_Summary.pdf Accessed September 28, 2009.

[1232] San Francisco Planning Department, Final Program Environmental Impact Report, Water Supply Improvement Program, October, 2008.

[1233] SFPUC, Urban Water Management Plan, 2005.

planning, environmental review, and design of several recycled water and groundwater projects and conservation programs are in place. Thus, there is substantial evidence that the additional water provided by those projects would be available to supplement retail water supplies.

As noted above, the SFPUC adopted the Phased WSIP, which phased implementation of the water supply program to provide an additional 20 mgd of supply to meet projected demand through 2018 and requires the SFPUC to re-evaluate water demands and water supply options by December 31, 2018 through 2030 to meet projected demand. The Housing Variant would not require water supplies in excess of existing entitlements or result in the need for new or expanded entitlements, and this impact is less than significant, similar to the Project.

Wastewater

The construction impacts of the Housing Variant would be substantially similar to the Project because the types of land uses and construction activities required with both would be similar.

The operational activities of the Housing Variant would be similar in nature to those of the Project as the land uses and quantities of these land uses would be approximately similar. The Housing Variant would replace existing wastewater conveyance infrastructure within the site to adequately serve the Housing Variant.

With the Housing Variant, the football stadium proposed with the Project for the HPS Phase II site would be removed and 1,350 housing units would be relocated from the Candlestick Point site to the HPS Phase II site. The Housing Variant would not generate additional permanent residents over that of the Project. Additionally, the Housing Variant would result in the loss of 359 jobs due to removal of the football stadium. This would decrease the potential wastewater generation from the site. As shown in Table IV-28 (Housing Variant Wastewater Generation), the Housing Variant would result in the generation of 1.16 mgd of wastewater, a decrease of 0.02 mgd of wastewater from the Project.

Table IV-28 Housing Variant Wastewater Generation

Land Use	*Estimated Wastewater Generation Expressed as % of Water Demand (or as otherwise specified)*	*Candlestick Point (mgd)*	*Hunters Point (mgd)*	*Total Housing Variant (mgd)*
Residential	95%	0.48	0.31	0.79
Regional Retail	57%	0.05	0	0.05
Neighborhood Retail	57%	0.01	0.01	0.02
Office	57%	0.02	0.01	0.03
Community Uses	57%	0.01	0.01	0.02
Research and Development	57%	0	0.21	0.21
Hotel	57%	0.03	0	0.03
Football Stadium	95%	0	0	0
Performance Venue	95%	0.01	0	0.01
Total		***0.61***	***0.55***	***1.16***

SOURCE: Arup, October 15, 2009.

The 1.16 mgd of wastewater projected for operation of the Housing Variant would be transported via new or expanded conveyance systems within the Housing Variant site and existing mains to the SWPCP.[1234] The existing wastewater/stormwater conveyance lines between the HPS Phase II site and the SWPCP are sized to accommodate both dry- and wet-weather flows. Wastewater from the Housing Variant would flow into the Hunters Point Tunnel (from the HPS Phase II site) and the Candlestick and Hunters Point tunnel sewer (from the Candlestick Point site). The Hunters Point tunnel sewer has an average dry-weather flow of 6 mgd (4,167 gpm) and a design capacity of 120 mgd (83,333 gpm) (refer to Table IV-29 [Sewer Trunk Capacity and Housing Variant Maximum Peak Flows]).[1235] Peak dry-weather flow capacities can be calculated by multiplying the average gallons-per-minute flow by a peaking factor. For purposes of this analysis, a conservative peaking factor of 3.0 was used, which yields a maximum flow capacity of 12,501 gpm for the Hunters Point tunnel sewer. Projected maximum peak flows from the HPS Phase II development with the Housing Variant, based on a peaking factor of 3.0, would be 1,146 gpm[1236]. The remaining capacity of the Hunters Point tunnel sewer is 83,333 gpm. Therefore, the addition of 1,146 gpm peak flow from the HPS Phase II development with the Housing Variant would be accommodated within the remaining capacity of the Hunters Point tunnel sewer (83,333 gpm).

Table IV-29 Sewer Trunk Capacity and Housing Variant Maximum Peak Flows

Sewer Trunk	*Design Capacity (gpm)*	*Existing Average Dry-Weather Flow[a] (gpm)*	*Existing Maximum Peak Dry-Weather Flow[b] (gpm)*	*Variant Contribution—Maximum Peak Dry-Weather Flow[c] (gpm)*	*Remaining Peak Flow Capacity (gpm) With Housing Variant*
Candlestick tunnel sewer	34,722	1,736	5,208	1,270	28,244[e]
Hunters Point tunnel sewer	83,333	4,167[d]	12,501[d]	1,145	69,687[f]

SOURCE: Bayside Operations Plan, 2002.

a. Calculated as existing average dry-weather flow in mgd/24 hours/60 minutes 1,000,000.
b. Calculated as existing average flow in gpm x peaking factor of 3.0.
c. Calculated as proposed average dry-weather flow in mgd/24 hours/60 minutes X 1,000,000 X peaking factor of 3.0.
d. These flows are *inclusive* of flows from the Candlestick tunnel sewer.
e. Calculated as design capacity less existing maximum peak flow less Project maximum peak flow, all in gpm. This calculation does NOT take credit for the existing uses at Candlestick Point (including Alice Griffith Public Housing, the RV park, and the stadium) that will be demolished on site and that currently contribute to the Candlestick tunnel sewer. Therefore, the actual remaining peak flow capacity of the Candlestick tunnel sewer with the Project will be somewhat greater than 28,035 gpm.
f. Calculated as design capacity less existing maximum peak flow less Project maximum peak flow, all in gpm. This calculation does NOT take credit for the existing uses on the HPS Phase II site that will be demolished that currently contribute wastewater flows to the Hunters Point tunnel sewer. Therefore, the actual remaining peak flow capacity of the Hunters Point tunnel sewer with the Project will be somewhat greater than 69,853 gpm.

The Candlestick Point development would discharge a maximum peak flow of 1,271 gpm of wastewater into the off-site Combined Sewer System.[1237] During wet-weather conditions, the off-site Combined Sewer System would accommodate both wastewater and stormwater flows, as it does currently. The Combined Sewer System is designed to accommodate wet-weather flows, and the Candlestick tunnel sewer has a maximum flow capacity of 34,722 gpm and the Hunters Point tunnel sewer (into which

1234 *Candlestick Point/ Hunters Point Shipyard Infrastructure Concept Report* (October 26, 2009) prepared by Winzler & Kelly Consulting Engineers.
1235 San Francisco Public Utilities Commission, Bayside Operations Plan, 2002.
1236 Calculated as 0.55 MGD/24 hours/60 minutes * 3.0*1,000,000.
1237 Calculated as 0.61 MGD/24 hours/60 minutes * 3.0*1,000,000.

discharges in the Candlestick tunnel sewer flow) has a maximum flow capacity of 83,333 gpm. The contribution of 1,271 gpm maximum peak flow from Candlestick Point represents only 3.7 percent of the total design capacity of the Candlestick tunnel sewer. Therefore, the Housing Variant would result in a less-than-significant impact to wastewater conveyance, similar to the Project.

Because the existing conveyance infrastructure could accommodate the additional flows from the Housing Variant development in addition to existing flows even during periods of peak flows, no expansion of the off-site wastewater conveyance lines would be required as a result of the Housing Variant development, similar to the Project.

The contribution of the Housing Variant to the Bayside system represents a small percentage of its available capacity and would be accommodated by the existing infrastructure. Although development of the Housing Variant would increase wastewater flows (as intermittent flows from Candlestick Park stadium would be replaced by year-round flows from mixed-use development), the provision of separate stormwater and sewer systems would reduce overall wet-weather volumes to the Combined Sewer System.

The land use program and associated stormwater flows from the Candlestick Point site would be the same with the Housing Variant as with the Project. Therefore, treatment of stormwater would also be the same as with the Project. Stormwater from the HPS Phase II site is collected and discharged to the Bay via a separate stormwater system, which does not contribute any flows to the Combined Sewer System during wet weather. With the Housing Variant, stormwater would continue to be collected and treated in a separate stormwater system, and no stormwater runoff would be contributed to the Combined Sewer System during wet weather. Although development with the Housing Variant at the HPS Phase II site would result in a net increase in wastewater flows, the additional flows would represent less than 0.1 percent of the remaining treatment capacity of the SWPCP.

The increase in wastewater generation with the Housing Variant would incrementally contribute to the total amount of wet-weather flows that are collected and treated at the SWPCP, the North Point Wet Weather Facilities (NPWWF), and the Bayside Wet Weather Facilities. When the combined storage and treatment capacity of those facilities are exceeded, wastewater from the Housing Variant development could be discharged, along with other wet-weather flows from the combined system, via the CSOs located around the perimeter of San Francisco. Mitigation measure MM UT-3a would ensure that there would be no net increase in wet-weather flows in the Combined Sewer System as a result of the Project that could result in a temporary increase in CSO volume. During wet weather, the temporary retention or detention of wastewater on site during wet weather or completion of the separate stormwater and wastewater systems for the Project would ensure that there would be no increase in the likelihood of a CSO event as a result of the Project. The impact would be less than significant, similar to the Project.

The land use program and associated stormwater flows from the Housing Variant site would be the same with the Housing Variant as with the Project and would not increase, further being reduced by the removal of the football stadium. Therefore, treatment of this stormwater would also be the same as with the Project. Stormwater from the HPS Phase II site is collected and discharged to the Bay via a separate stormwater system, which does not contribute any flows to the Combined Sewer System during wet weather. With the Housing Variant, stormwater would continue to be collected and treated in a separate

stormwater system, and no stormwater runoff would be contributed to the Combined Sewer System during wet weather. Although development with the Housing Variant at the HPS Phase II site would result in a net increase in wastewater flows of 0.55 mgd, the additional flows would represent less than 0.1 percent of the remaining treatment capacity of the SWPCP. Stormwater from Candlestick Point would be reduced when compared to the Project and would be taken by the Combined Sewer System. This would not change with the Housing Variant.

The NPDES permit system requires that all existing and future municipal and industrial discharges to surface waters within the City be subject to specific discharge requirements. Wastewater from the Housing Variant would be treated at the SWPCP wastewater treatment plant and the SFPUC, who operates the SWPCP wastewater treatment plant, is required to comply with waste discharge requirements (WDRs) set by the RWQCB, which specify the allowable levels of pollutants in discharges from the facility. Compliance with any applicable WDRs, as monitored and enforced by the SFPUC, would ensure that the Housing Variant does not exceed the applicable wastewater treatment requirements of the RWQCB, and this impact would be less than significant, similar to the Project.

Solid Waste

Construction wastes with the Housing Variant, including demolition and hazardous wastes, would be similar to that generated with the Project because the materials used for construction would be substantially similar for both. Construction waste would be sorted, prior to disposal, to ensure that all recyclable materials are salvaged from the waste stream that is ultimately taken to a landfill. Incorporation of mitigation measure MM UT-5a (Construction Waste Diversion Plan) would ensure that impacts to solid waste during construction are reduced to a less-than-significant level.

Operation

Operational impacts of the Housing Variant would be substantially similar to the Project because the amount and type of solid waste generated would be similar based on similar land uses, recycling activities would be implemented with both projects, and neither project would result in the exceedance of current landfill capacities. With the Housing Variant, the football stadium proposed for the HPS Phase II site would be removed and 1,350 dwelling units would be relocated from the Candlestick Point site to the HPS Phase II site. As shown in Table IV-30 (Housing Variant Solid Waste Generation), the Housing Variant would result in 7,512 tons of waste at full build-out of the HPS Phase II site and 12,222 tons of solid waste at full build-out of the Candlestick Point site, for a total of 19,734 tons of waste annually. This is a decrease of 768 tons of waste annually due to removal of the football stadium. This total waste stream would constitute 3.1 percent of the City's total waste stream.[1238] The increase in solid waste generation associated with the Housing Variant development would not be substantial in the context of citywide solid waste infrastructure demand.

[1238] California Integrated Waste Management Board, 2008. *Jurisdiction Profile for City of San Francisco.* Accessed online at: <http://www.ciwmb.ca.gov/Profiles/Juris/JurProfile1.asp?RG=C&JURID= 438&JUR=San+Francisco>, Accessed: November 5, 2008. 627,157 total tons of solid waste in 2007.

Table IV-30 Housing Variant Solid Waste Generation

Use	Generation Factor (per day)	Candlestick Point			HPS Phase II			Total		
		Area or Units	Tons per Day or Event	Tons per Year	Area or Units	Tons per Day or Event	Tons per Year	Area or Units	Tons per Day or Event	Tons per Year or per Total Number of Events[a]
Residential	5.653 lbs/unit	6,500 units	18.4	6,716	4,000 units	11.3	4,124.5	10,500 sf	29.7	10,840.5
Retail	0.02600411 lbs/sf	760,000 sf	9.9	3,613.5	125,000 sf	1.6	584.0	885,000 sf	11.5	4,197.5
Office	0.006 lbs/sf	150,000 sf	0.5	182.5	0	0	0	150,000 sf	0.5	182.5
Hotel	0.0108 lbs/sf	150,000 sf	0.8	292.0	0	0	0	150,000 sf	0.8	292.0
R&D	0.006 lbs/sf	0	0	0	2,500,000 sf	7.5	2,737.5	2,500,000 sf	7.5	2,737.5
Performance Venue	2.23 lbs/seat	10,000 seats	5.6[b]	836.3[c]	0	0	0	10,000 seats	5.6	836.3[c]
Stadium	2.23 lbs/seat	0	0	0	0	0	0	0	0	0
Art Center	0.006 lbs/sf	0	0	0	255,000 sf	0.8	292	255,000 sf	0.8	292.0
Community Facilities	0.006 lbs/sf	50,000 sf	0.15	54.8	50,000 sf	0.15	54.8	100,000 sf	0.3	109.6
Total				***11,695.1***			***7,792.8***			***19,487.9***

SOURCE: PBS&J 2009; Generation Factors from Arup, *Carbon Footprint Report*, March 24, 2009.

a. Calculated by adding the horizontal columns, rather than calculating total number of units by the generation rate.
b. The Performance venue is projected to be 50 percent attendance.
c. Assumes 150 events per year at 50 percent attendance. Attendance estimate is based on CABER, Towson University & Sage Policy Group, Inc., *The Economic Feasibility of a Montgomery County, MD Arena*, June 2007.
d. Assumes a sold-out event with a 5 percent "no-show" rate.
e. Assumes 12 sold-out games and 20 other sold-out stadium events per year.

Landfill capacity is a dynamic metric dependent on the amount of solid waste that requires disposal (and the effectiveness of source reduction and recycling methods), the permitted capacity of the landfills, and the number of landfills that can accommodate solid waste. The City has a contract with Altamont Landfill to accept the City's waste through 2014. In 1988, the City of San Francisco entered into an agreement with what is now Waste Management of Alameda for the disposal of 15 million tons of solid waste. Through August 1, 2009, the City has used 12,579,318 tons of this capacity. The City projects that the remaining capacity would be reached no sooner than August 2014 (assuming an average of 467,000 tons a year disposal).[1239]

The City has issued a Request for Qualifications to solicit bids for a new contract to accommodate the City's disposal capacity beyond the expiry of the current agreement. The City has selected three landfills that have the capacity to meet the City's future needs and is in the final stages of the selection process that will result in an agreement for ratification by the Board of Supervisors no later than early 2010. The agreement will be for an additional 5 million tons of capacity, which could represent 20 or more years of capacity for San Francisco's waste. Future agreements will be negotiated as needed for San Francisco's waste disposal needs.

As noted, at current disposal rates, the Altamont Landfill would be expected to reach capacity in January 2032; however, it may close three years earlier, in January 2029.[1240] Demolition activities, which generate construction debris, are expected to conclude in 2024 at Candlestick Point and in 2021 at HPS Phase II, a minimum of five years before the landfill is expected to close. Further, the City requires the diversion of at least 75 percent of construction waste, as also required by MM UT-5a, which would reduce the amount of waste interred at the landfill. Further, the City continues to actively explore various waste-reduction strategies with the goal of moving towards zero waste. If the City achieves this goal, the impact of construction of the Housing Variant on solid waste would be further reduced. The impact of the construction waste generated by the Housing Variant on the capacity of the Altamont Landfill would be less than significant.

Typical municipal solid waste has a landfill density of 739 pounds per cubic yard.[1241] Using this density factor, 45.7 million cubic yards of remaining capacity at the Altamont Landfill would be equivalent to 33.7 million tons of remaining capacity. The contribution of 19,488 tons annually of solid waste with the Housing Variant development would represent only 0.02 percent of the remaining capacity of the identified landfills. Additionally, approximately 72 percent of the City's total waste stream, by volume, was diverted in 2008.[1242] Of the wastes that were not diverted, the City estimates that up to 65 percent of the total volume consists of readily recyclable or compostable materials, such as paper and food scraps.[1243] The remainder of the wastes consists of materials such as disposed household items and

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[1239] E-mail communication with David Assman, City of San Francisco, Department of the Environment, October 19, 2009.
[1240] CIWMB, 2009.
[1241] http://wasteage.com/mag/waste_municipal_solid_waste/ (accessed September 29, 2009).
[1242] This figure is a preliminary estimate and represents the most recent data available. California Integrated Waste Management Board, 2008. *Jurisdiction Profile for City of San Francisco.* http://www.ciwmb.ca.gov/Profiles/Juris/JurProfile1.asp?RG=C&JURID= 438&JUR=San+Francisco (accessed: November 5, 2008).
[1243] San Francisco, *Waste Characterization Study: Final Report.* 2008.

furniture, hazardous wastes, and construction wastes. The City has prepared a number of strategies to divert additional solid waste and achieve citywide diversion goals. These strategies would be utilized to achieve the City's overall waste reductions goals. The City's contribution to landfills is anticipated to diminish over time as the City implements more aggressive waste diversion strategies. Increasing solid waste diversions would extend the life of the landfills utilized by the City, lengthening the time horizon before the remaining disposal capacity is filled.

All residents and businesses with the Housing Variant would be expected to comply with the City's waste and recycling ordinances. On the basis of the landfill capacity and diversion strategies noted above, and with implementation of the comprehensive waste diversion strategies, as well as implementation of mitigation measure MM UT-71 (Site Waste Management Plan), the Housing Variant would result in a less-than-significant impact to solid waste, similar to the Project.

Electricity, Natural Gas, and Telecommunications

The proposed improvements within the Project site include the construction of a joint trench for electrical, natural gas, cable TV, and telecommunications. The power supplier may service the project via new extensions of the 12KV distribution and or 115KV transmission lines into the Project site. This could include a new substation within the project site. Impacts of construction activities associated with the Project, including demolition and installation of new utility infrastructure, are discussed in Section III.D, Section III.H, Section III.I, Section III.J, Section III.K, Section III.L, Section III.M, Section III.O, and Section III.S of this EIR. No new construction impacts beyond those identified in those sections would occur with construction of utility infrastructure associated with the Housing Variant, similar to the Project. Telecommunications providers are "on-demand" services, generally expanding their systems in response to demand, and would be anticipated to provide extensions of existing infrastructure to the Project site as required. Such extensions would require minimal trenching, if any, and would not be anticipated to result in significant environmental impacts beyond those previously analyzed in this EIR. The subdivision process would include submittal of detailed infrastructure plans to the Department of Public Works identifying how they would meet the infrastructure needs of the Project. Implementation of these plans would be a condition of subdivision approval. The subdivision process would ensure that adequate infrastructure is provided to accommodate the demands of the Project such that the capacity of the service providers to provide such utilities would not be exceeded. Therefore, the impact would be less than significant for the Housing Variant, similar to the Project.

Energy

Construction

Construction activities of the Housing Variant would be similar to the Project as the construction equipment usage, types of energy resources needed, type of construction activities, and construction timeline would be similar.

The construction activities proposed with the Housing Variant do not include unusual or atypical activities that would result in a higher than average demand for fuels. Construction would consist of temporary activities that would not generate a prolonged demand for energy. Thus, construction

activities would not be large in comparison to a project of a similar size and with similar land uses, and the Housing Variant would result in a less-than-significant impact, similar to the Project.

Operation

Electricity

The operational impacts of the Housing Variant would be similar to the Project because the types of energy required and the proposed uses would be similar to that considered with the program for the Project. However, the Housing Variant would result in the demand for less electricity than the Project; therefore, impacts would be less (about 12 percent less). As discussed in Section III.R, the operational impacts of a project are considered significant if it encourages activities that result in the use of large amounts of energy or uses such resources in a wasteful manner. The criterion for this impact considers whether the Housing Variant would result in a large increase in electricity consumption. As shown below in Table IV-31 (Housing Variant Electricity Demand from Building Envelopes [MWh]), the Housing Variant would be expected to result in an electricity demand of approximately 30,895 Megawatt hours (MWh). While about 12 percent less than the Project, this would not be a large overall increase in consumption over the existing conditions of 9,990 MWh; however, two uses (residential and R&D) would account for 86 percent of the increase in demand for electricity at the site. R&D uses would be the largest source of electricity consumption at HPS Phase II, while residential units would be the largest source of electricity consumption at Candlestick Point. Because R&D uses result in heavy electricity consumption during peak daytime hours (largely due to HVAC, lighting, and the operation of office equipment), the Housing Variant could generate high levels of peak demand, similar to the Project.[1244]

Taking the Housing Variant's compliance with the Green Building Ordinance and its voluntary implementation of energy-saving design features into consideration, as well as the level of development proposed, the electricity increase associated with the Housing Variant would not be considered large.

The City's threshold also considers whether the Housing Variant's energy consumption would be wasteful. The efficiency measures proposed under the Housing Variant would result in building envelope consumption of at least 15 percent less electricity than a project that would not implement such measures. Further electricity savings would be anticipated as a result of the Housing Variant's compliance with the Green Building Ordinance, installation of ENERGY STAR appliances, and the Housing Variant's voluntary implementation of LEED® for Neighborhood Development (LEED® ND) standards based on the Pilot Version of the rating system released in June 2007.[1245] However, because the Housing Variant Applicant's commitment to implement energy reductions and voluntary green

[1244] Although the Housing Variant would include on-site electricity infrastructure, local delivery infrastructure is supplied by larger transmission lines, substations, and generation facilities owned by PG&E and other entities. Adding new connections to the overall power grid, thereby increasing demand on the grid, contributes to the need for periodic infrastructure upgrades. More importantly, because electricity cannot be stored once it is generated, the need for development of additional electricity generation sources is largely dependent on the peak level of conveyance. Designing electricity infrastructure is similar to designing highways, which are sized to convey rush-hour demand.

[1245] Since the initial release of the ND standard, the rating system has undergone two public comment periods, and several credit requirements have changed. The LEED® ND rating system is currently being finalized for formal release by the USGBC.

Table IV-31 Housing Variant Electricity Demand from Building Envelopes (MWh)

		Candlestick Point			HPS Phase II			Project Site Total			
Type of Use	*Electricity Use Factor, 2008 Title 24 Standards (MWh/gsf or unit)[a]*	*Development Program[b]*	*MWh Consumed Annually, 2008 Title 24 Standards[c]*	*MWh Consumed Annually, with 15% Reduction*	*Development Program[b]*	*MWh Consumed Annually, Title 24 Standards[c]*	*MWh Consumed Annually, with 15% Reduction*	*Development Program*	*MWh Consumed Annually, Title 24 Standards*	*MWh Consumed Annually, with 15% Reduction*	*Percent of Total Electricity by Land Use*
Residential Units	1.7350[d]	7,850	13,620	11,577	2,650	4,598	3,908	10,500	18,218	15,485	50%
Retail	0.0027	635,000	1,715	1,457	—	0	0	635,000	1,715	1,457	8%
Neighborhood Retail	0.0027	125,000	338	287	125,000	338	287	250,000	675	574	2%
Office	0.0052	150,000	780	663	—	0	0	150,000	780	663	2%
R&D	0.0052	—	0	0	2,500,000	13,000	11,050	2,500,000	13,000	11,050	36%
Hotel	0.0027	220	1	1	—	0	0	220	1	1	0%
Artist Studios/ Center	0.0052	—	0	0	255,000	1,326	1,127	255,000	1,326	1,127	4%
Community Space	0.0052	50,000	260	221	50,000	260	221	100,000	520	442	1%
Arena	0.0015	75,000	113	96	—	0	0	75,000	113	96	0%
Total			***16,825***	***14,301***		***19,522***	***16,593***		***36,348***	***30,895***	***100%***

SOURCES:

Housing Variant electricity demand was estimated based on the Applicant's commitment to achieve 15 percent energy reductions below Title 24 standards and use ENERGY STAR appliances in all residential units.

a. The energy use factor cited for residential units is from: ENVIRON International Corporation, *Climate Change Technical Report: Candlestick Point–Hunters Point Shipyard Phase II Development Plan*, July 2009, Table 3-8. The factor was derived by subtracting the "Plug-in" factor from the "Electricity Delivered, Total" column (in the "15 percent Better than Title 24 2008 and ENERGY STAR Appliances" row). The factor was converted from kWh to MWh (1 MWh = 1,000 kWh).

b. Based on buildout floor areas provided in Table IV-19 of this EIR.

c. Calculated by multiplying energy use factor by number of units or gsf.

d. The electricity factors cited for non-residential uses are from: ENVIRON International Corporation, *Climate Change Technical Report: Candlestick Point–Hunters Point Shipyard Phase II Development Plan*, October 2009, Table 3-16. The factors are in the "Non-Title 24" column. The factors were converted from kWh to MWh.

e. Numbers are rounded according to standard rounding practices and may not add up due to hidden decimals.

building practices (beyond the measures required in the City's Green Building Ordinance) is preliminary and not based on actual building designs, mitigation is necessary to reduce potential electricity use impacts to a less-than-significant level. Mitigation measure MM GC-2, which requires the Housing Variant Applicant to exceed the 2008 Title 24 energy efficiency standards for homes and businesses by at least 15 percent, mitigation measure MM GC-3, which would require installation of ENERGY STAR appliances for builder-supplied appliances, and MM GC-4, which would require installation of energy efficient lighting, would reduce electricity consumption impacts to less than significant.

The City's significance criterion also considers whether a project's energy consumption would be wasteful. The efficiency measures proposed with the Housing Variant would result in less electricity consumption than a project that would not implement such measures. These measures include installation of ENERGY STAR appliances, a measure aimed at reducing residential electricity consumption, which as discussed in the preceding paragraph, is a land use with correspondingly high energy consumption. Therefore, the Housing Variant has demonstrated a good faith effort to avoid wasteful consumption of energy for residential uses. In addition, as discussed in the preceding paragraph, the Housing Variant Applicant would be required to comply with the City's Green Building Ordinance and has committed to pursuing LEED® ND credits.[1246] Thus, electricity consumption with the Housing Variant development would be considered efficient and not wasteful. Operational electricity impacts would be less than significant, similar to the Project.

Natural Gas

The operational impacts of the Housing Variant would be similar to the Project as the types of energy required and the proposed uses would be similar to that considered with the program for the Project. However, the Housing Variant would result in the demand for 11 percent less than the natural gas demand of the Project.

Table IV-32 (Housing Variant Natural Gas Demand, Baseline [MBtu]) presents the annual natural gas use for the Housing Variant, estimate based on land use and minimal compliance with Title 24 standards as well as the Housing Variant Applicant's preliminary commitment to reduce energy use to 15 percent below Title 24 standards. The natural gas demand associated with the Housing Variant would be approximately 56,063 MBtu, in comparison to a similarly sized project that would not include the 15 percent reduction below 2008 Title 24 standards and which would result in consumption of approximately 66,670 MBtu of natural gas use annually. However, this is approximately 7,200 MBtu less than the Project.

The natural gas use at the Project site would represent less than 1 percent of the City's overall natural gas consumption of 28,918,000 million Btus, and overall natural gas demand would be higher than under existing conditions, largely attributable to R&D uses at HPS Phase II. Natural gas use would be roughly five times higher at HPS Phase II than at Candlestick Point due to peak daytime demand from R&D uses. However, on a per-square-foot basis, the Housing Variant would result in 15 percent less electricity use than projects that comply with minimum Title 24 requirements only.

[1246] Savings associated with these features cannot be calculated until the designs of individual buildings have been completed.

Table IV-32 Housing Variant Natural Gas Demand, Baseline (MBtu)

Type of Use	Natural Gas Use Factor, 2008 Title 24 Standards (MWh/gsf or unit)[a]	Candlestick Point			HPS Phase II			Project Site Total			
		Development Program[b]	MBtu Consumed Annually, 2008 Title 24 Standards[c]	MBtu Consumed Annually, with 15% Reduction	Development Program[b]	MBtu Consumed Annually, 2008 Title 24 Standards[c]	MBtu Consumed Annually, with 15% Reduction	Development Program	MBtu Consumed Annually, 2008 Title 24 Standards[c]	MBtu Consumed Annually, with 15% Reduction	Percent of Total by Land Use
Residential Units	0.0360[d]	7,850	283	240	2,650	95	81	10,500	378	321	1%
Retail	0.0048	635,000	3,048	2,591	—	—	—	635,000	3,048	2,591	5%
Neighborhood Retail	0.0048	125,000	600	510	125,000	600	510	250,000	1,200	1,020	2%
Office	0.0200	150,000	3,000	2,550	—	—	—	150,000	3,000	2,550	5%
R&D	0.0200	—	—	—	2,500,000	50,000	42,500	—	50,000	42,500	76%
Hotel	0.0345	220	8	6	—	—	—	220	8	6	0%
Artist Studios/ Center	0.0200	—	—	—	225,000	4,500	3,825	225,000	4,500	3,825	7%
Community Space	0.0200	50,000	1,000	850	50,000	1,000	850	100,000	2,000	1,700	3%
Arena	0.0243	75,000	1,823	1,549	—	—	—	75,000	1,823	1,549	3%
Total			***9,761***	***8,297***		***56,909***	***47,766***		***66,670***	***56,063***	***100%***
Percent of Total			***15%***			***85%***			***100%***		

SOURCES:

Baseline Housing Variant natural gas demand was estimated based on land use and basic compliance with 2008 Title 24 standards.

a. The natural gas factors cited for non-residential uses are from: ENVIRON International Corporation, *Climate Change Technical Report: Candlestick Point–Hunters Point Shipyard Phase II Development Plan*, October 2009, Table 3-16. The factors are in the "Overall Based on 2008 Title 24" column. The factors were converted from kBtu to MBtu.

b. Based on buildout floor areas provided in Table IV-19 of this EIR.

c. Calculated by multiplying energy use factor by number of units or gsf.

d. The natural gas factor cited for residential units is from: ENVIRON International Corporation, *Climate Change Technical Report: Candlestick Point–Hunters Point Shipyard Phase II Development Plan*, July 2009, Table 3-8. The factor is in the "Natural Gas Delivered, Total" column and the "Minimally Title 24 Compliant (2008)" row. The factor was converted from kBtu to MBtu (1 MBtu = 1,000 kBtu).

e. Numbers are rounded according to standard rounding practices and may not add up due to hidden decimals.

However, because the Housing Variant Applicant's commitment to implement energy reductions and voluntary green building practices (beyond the measures required in the City's Green Building Ordinance) is preliminary and not based on actual building designs, mitigation is necessary to reduce potential electricity use impacts to a less-than-significant level. Mitigation measure MM GC-2, which requires the Housing Variant Applicant to exceed the 2008 Title 24 energy efficiency standards for homes and businesses by at least 15 percent, and mitigation measure MM GC-3, which would require installation of ENERGY STAR appliances for builder-supplied appliances, would reduce natural gas consumption impacts to less than significant.

All natural gas impacts would be less than significant, similar to the Project.

Similar to the Project, the Housing Variant would increase trips to and from the site, increasing the use of petroleum fuels. However, this consumption would not be wasteful because (1) the Housing Variant proposes to minimize transportation-related fuel use by implementing a number of transit, bicycle, and pedestrian improvements, (2) the Housing Variant would include a transportation demand management (TDM) program designed to reduce the remaining vehicle trips, and (3) the Housing Variant would result in dense development within an urbanized area with a mixture of neighborhood-serving uses, which would reduce the total number of trips to and from the site, as well as the overall trip lengths. Therefore, the Housing Variant would result in a less-than-significant impact due to the wasteful use of transportation-related fuels, similar to the Project.

Greenhouse Gas Emissions

As shown in Table IV-19, the Housing Variant would relocate housing from Candlestick Point to HPS Phase II and no stadium would be constructed. Overall, the level of residential development under this alternative would be the same as the Project. In addition, it should be noted that while the level of neighborhood retail would remain the same, it would be distributed differently throughout the project site. Construction impacts would be substantially similar to the Project. Operational impacts would be similar than those identified under the Project as the redistribution of land uses would result in similar GHG emissions.

Construction

As stated above, overall construction impacts of the Housing Variant with respect to climate change and GHG emissions would be similar to the Project. Construction activities would occur from the use of construction equipment, workers commuting, and soil hauling activities. The GHG emissions associated with the construction activities are short-term in duration and will be a total of 105,587 tonnes CO_2e. When this is distributed over an anticipated time schedule of 16 years, approximately 6,600 tonnes per year will be emitted. Since these emissions are short in duration and small in comparison to the overall construction and mining emissions for the San Francisco Bay Area Air Basin GHG emission inventory, the Housing Variant GHG emissions for construction would be less than significant, similar to the Project.

Operation

Operational impacts to climate change and GHG emissions would be substantially similar to the Project. Under the Housing Variant, the football stadium proposed under the Project would be replaced with relocated housing units at the HPS Phase II site that would decrease the housing units at Candlestick Point. This does not result in any additional units as compared to the Project, but rather redistribution between Candlestick Point and HPS Phase II site. The breakdown in operational GHG emissions for HPS Phase II is shown in Table IV-33 (Housing Variant Annual GHG Emissions).

Table IV-33 Housing Variant Annual GHG Emissions

Source	*Candlestick Point (tonnes CO_2e/year)*	*Hunters Point Shipyard Phase II (tonnes CO_2e/year)*	*Total (tonnes CO_2e/year)*
Residential	15,651	10,026	25,677
Non-Residential	4,263	11,963	16,226
Mobile	75,180	34,888	110,068
Municipal	1,066	1,488	2,553
Area	132	85	217
Waste	451	587	1,038
Transit Area	865	865	1,730
Total (annual emissions)	***97,608***	***59,901***	***157,509***

SOURCE: ENVIRON 2009.

The operational emissions were compared to ARB Scoping Plan No Action Taken Scenario which assumes the site would be developed without implementation of conceptual design features and using regulations in place at the time of the Scoping Plan development. The Housing Variant shows large reductions in GHG emissions due to the mitigation measures that would be implemented. The comparison of the Housing Variant GHG emissions to the ARB Scoping Plan No Action Taken scenario is shown in Table IV-34 (Annual GHG Emissions Comparison of Housing Variant and ARB Scoping Plan No Action Taken Scenario). This shows that due to the improvement in electricity carbon intensity and energy efficiency of the buildings residential GHG emissions would have a 20 percent reduction in emissions and non-residential buildings would have a 15 percent reduction in emissions. Municipal sources are anticipated to be 7 percent lower than the ARB Scoping Plan No Action Taken as a result of reductions in electricity carbon intensity. Mobile source emissions associated with the Housing Variant are a result of trip reductions in automobiles and vehicle emission efficiency regulations resulting in 57 percent reductions compared to the ARB Scoping Plan No Action Taken scenario.

Table IV-34 Annual GHG Emissions Comparison of Housing Variant and ARB Scoping Plan No Action Taken Scenario

Source	*No Action Taken*	*Housing Variant*	*Difference*	*Percent Difference*
Residential	32,286	25,677	6,609	20%
Non-Residential	19,186	16,226	2,960	15%
Mobile	257,568	110,068	147,500	57%
Municipal	2,750	2,553	197	7%
Area	217	217	0	0%
Waste	1,038	1,038	0	0%
Transit Area	2,884	1,730	1,154	40%

SOURCE: ENVIRON 2009. Climate Change Technical Report Candlestick Point-Hunters Point Shipyard Phase II Redevelopment Plan. Table 4-10.

Emissions associated with new public transportation added to the development would have a 40 percent reduction due to the use of diesel-hybrid buses. Since transportation is one of the largest emissions categories in both the statewide and local GHG emissions inventory, the amount of reduction is substantial in the overall reductions anticipated for the Housing Variant. Furthermore, most of the other larger categories also result in substantial reductions in emissions. This indicates that the Housing Variant would not impede the achievement of San Francisco's GHG emission reduction ordinance nor the statewide emission reductions required under AB 32. Therefore, the Housing Variant is less than significant with respect to the cumulative impacts of climate change and GHG emissions.

BAAQMD Draft GHG Thresholds

BAAQMD is considering the future adoption of quantitative CEQA thresholds of significance for operational-related GHG emission impacts. At present, two options relevant to the Project are under consideration for operational GHG emission thresholds; the lead agency can choose either option. Option 1 is based on a project's total operational GHG emissions of 1,100 metric tonnes CO_2e per year. The Project's total operational emissions would exceed this level, which means that if this was used, the Project would be significant. Option 2 is based on the amount of a project's operational GHG emissions per service population, set at 4.6 metric tonnes CO_2e per year. In anticipation of proposed new BAAQMD CEQA thresholds of significance for GHG emissions, this EIR provides an analysis of the Variant's operational GHG emissions under the proposed thresholds of significance identified above. The BAAQMD thresholds stated above are still in draft form and may undergo additional changes before being finalized; a revised version is expected Monday, November 2. The methodologies presented in this EIR for quantification of GHG operational emissions is based on using more refined data sources than indicated in the BAAQMD guidance and are the most appropriate to use for the Variant and Project.

With mitigation, the Housing Variant-related operational emissions of 157,509 tonnes per year result in 4.6 tonnes CO_2e per service population per year based on a service population of 34,248 (this accounts for 23,869 net new residents and all 10,379 jobs). Therefore, the Project-related operational emissions

would be equal to the 4.6 tonnes CO_2e per service population per year and would result in a less-than-significant impact on climate change.

IV.D VARIANT 3: CANDLESTICK POINT TOWER VARIANTS

IV.D.1 Overview

The Candlestick Point Tower Variants (Tower Variants) would have different locations and heights of residential towers at Candlestick Point. The three Candlestick Point Tower Variants (Tower Variants A, B, and C) would have the same overall land use program as the Project. While there would be different tower locations and heights with these variants, the total number of residential units, 10,500, would remain the same as the Project. Figure IV-13 (Project Towers at Candlestick Point) illustrates a perspective view of the 11 towers proposed at Candlestick Point with the Project to provide a comparison to the Tower Variants. The Tower Variants include the following:

- **Tower Variant A** would add ten stories to one of the 22-story residential towers at Candlestick Point North, resulting in a 32-story residential tower, as shown in Figure IV-14 (Tower Variant A). Three other residential towers at Candlestick Point South would have three to four fewer floors in order to maintain the overall residential floor area of the Project with this Variant. The variant would have 11 towers at Candlestick Point, as with the Project.
- **Tower Variant B** would have an additional 24-story residential tower at Candlestick Point Center. One 17-story tower at Candlestick Point North would be removed as shown in Figure IV-15 (Tower Variant B). Three other towers at Candlestick Point South would have would have two to four fewer floors in order to maintain the overall residential floor area of the Project with this Variant. The variant would have 11 towers at Candlestick Point, as with the Project.
- **Tower Variant C** would have an additional 24-story residential tower at Candlestick Point Center, as with Tower Variant B, as shown in Figure IV-16 (Tower Variant C). The variant would also add ten stories to one of the 22-story residential towers at Candlestick Point North, as with Tower Variant A, resulting in a 32-story residential tower. To maintain the overall residential floor area of the Project with this Variant, one 17-story tower and one 22-story at Candlestick Point North would be removed and at Candlestick Point South, one tower would have two fewer floors and one would have six fewer floors. The variant would have 10 towers at Candlestick Point, compared to 11 towers with the Project.

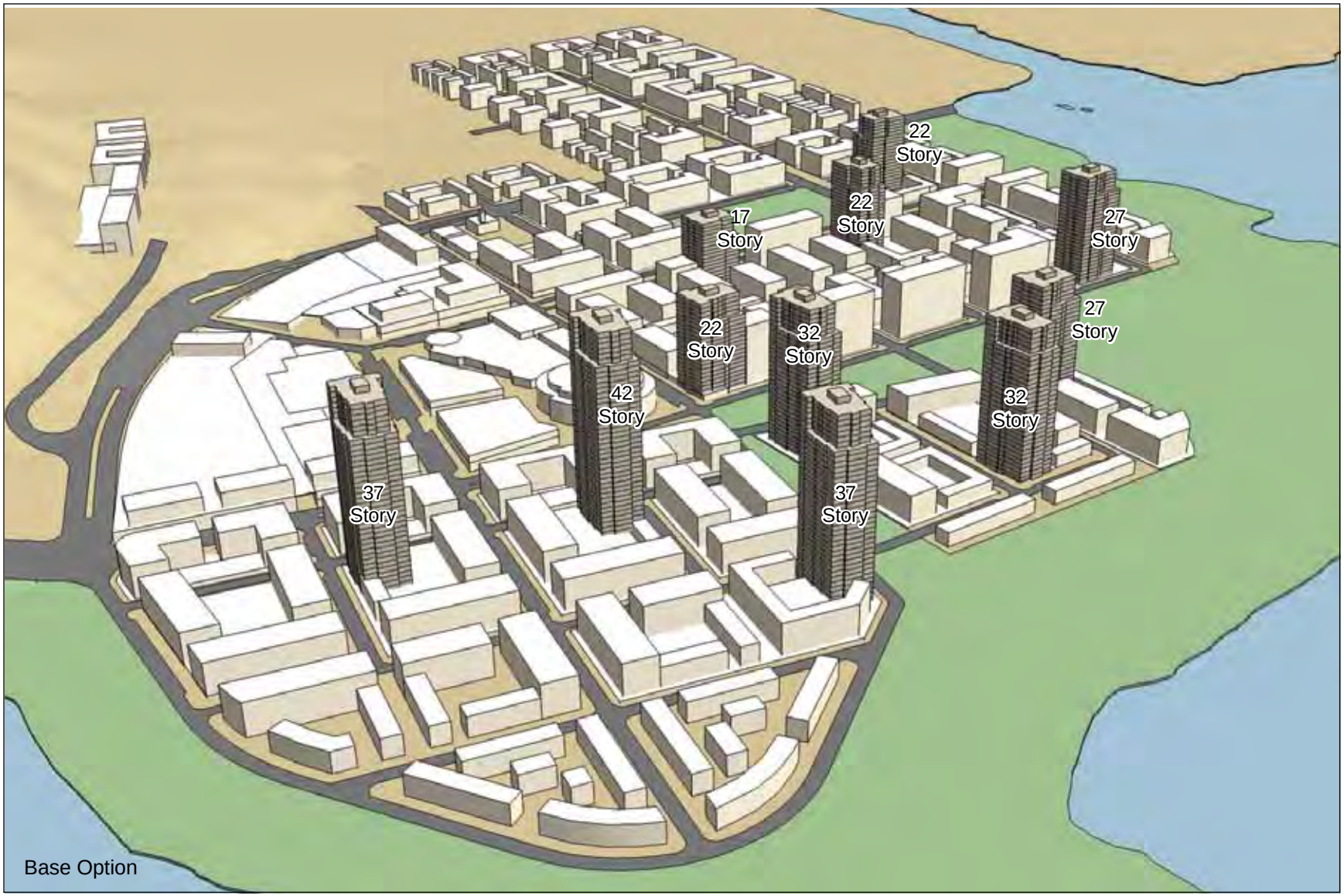
As shown in Figure IV-13 through Figure IV-16, the Tower Variants' overall street and block plan would be same as that of the Project. All other features of the Tower Variants would also be the same as the Project.

IV.D.2 Project Objectives

The objectives for the Tower Variants would be the same as for the Project. A full list of Project objectives is provided in Section II.D of this EIR.

IV.D.3 Characteristics

Section II.E outlines the Project's land use plan, parks and open space plan, transportation improvements, infrastructure plan, community benefits, and green building concepts. While each of these components of the Project would also apply to this variant, Figure II-5 (Proposed Maximum Building Heights) in Chapter II would be different for this variant.



SOURCE: Lennar Urban, IBI Group, 2009.

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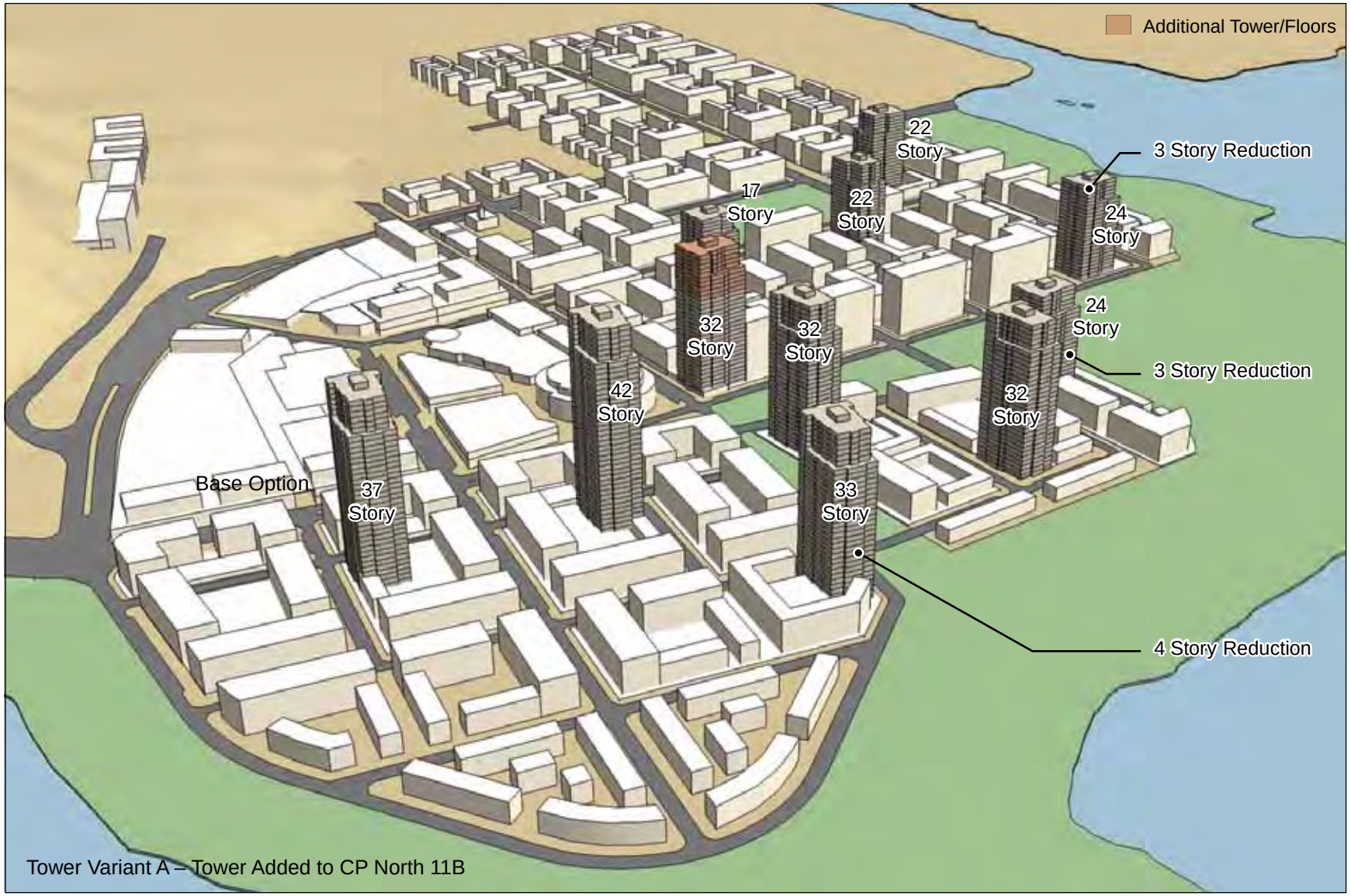
FIGURE IV-13

Candlestick Point — Hunters Point Shipyard Phase II EIR

PROJECT TOWERS AT CANDLESTICK POINT



SOURCE: Lennar Urban, IBI Group, 2009.

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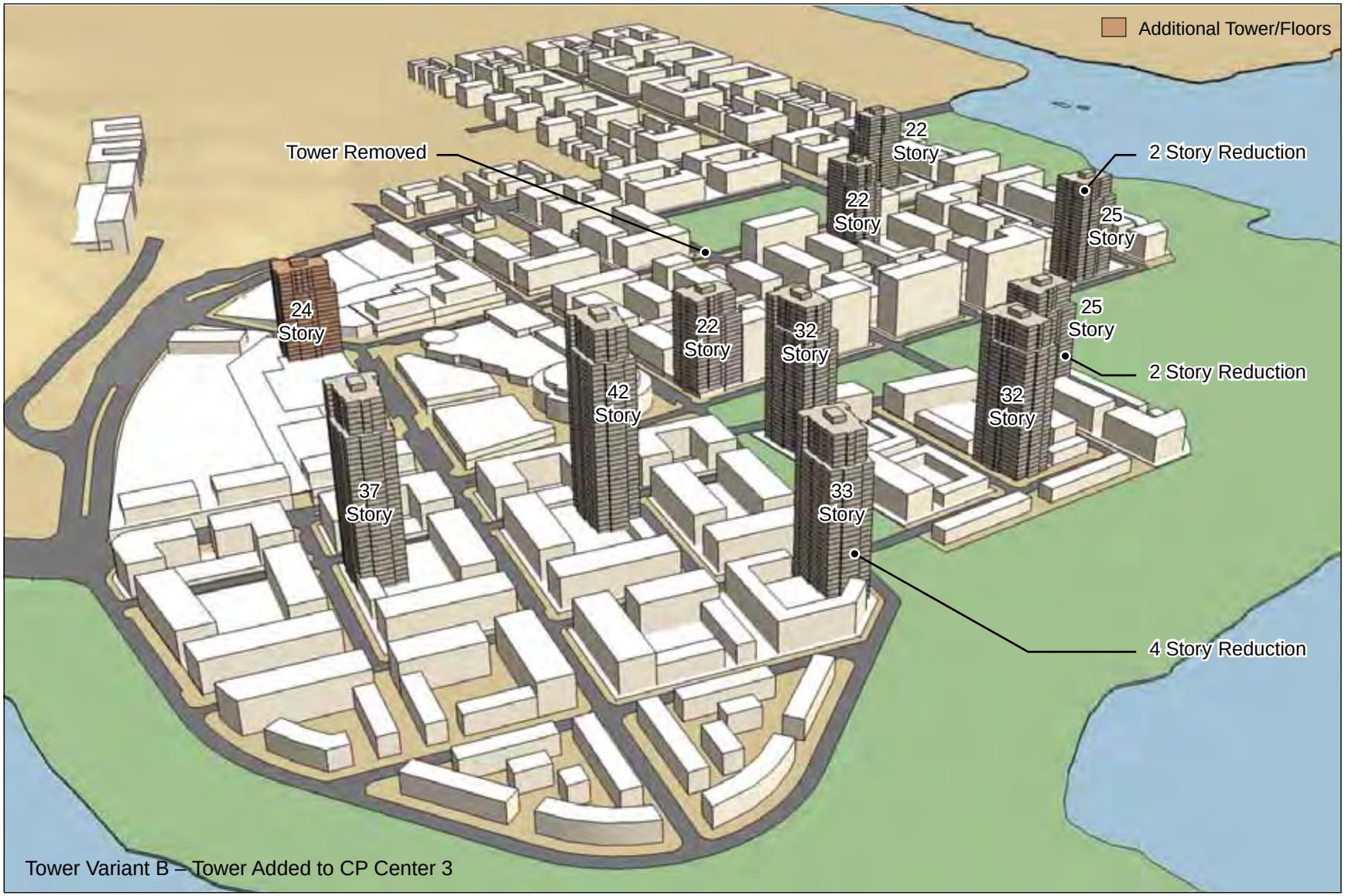
FIGURE IV-14

Candlestick Point — Hunters Point Shipyard Phase II EIR

TOWER VARIANT A



SOURCE: Lennar Urban, IBI Group, 2009.

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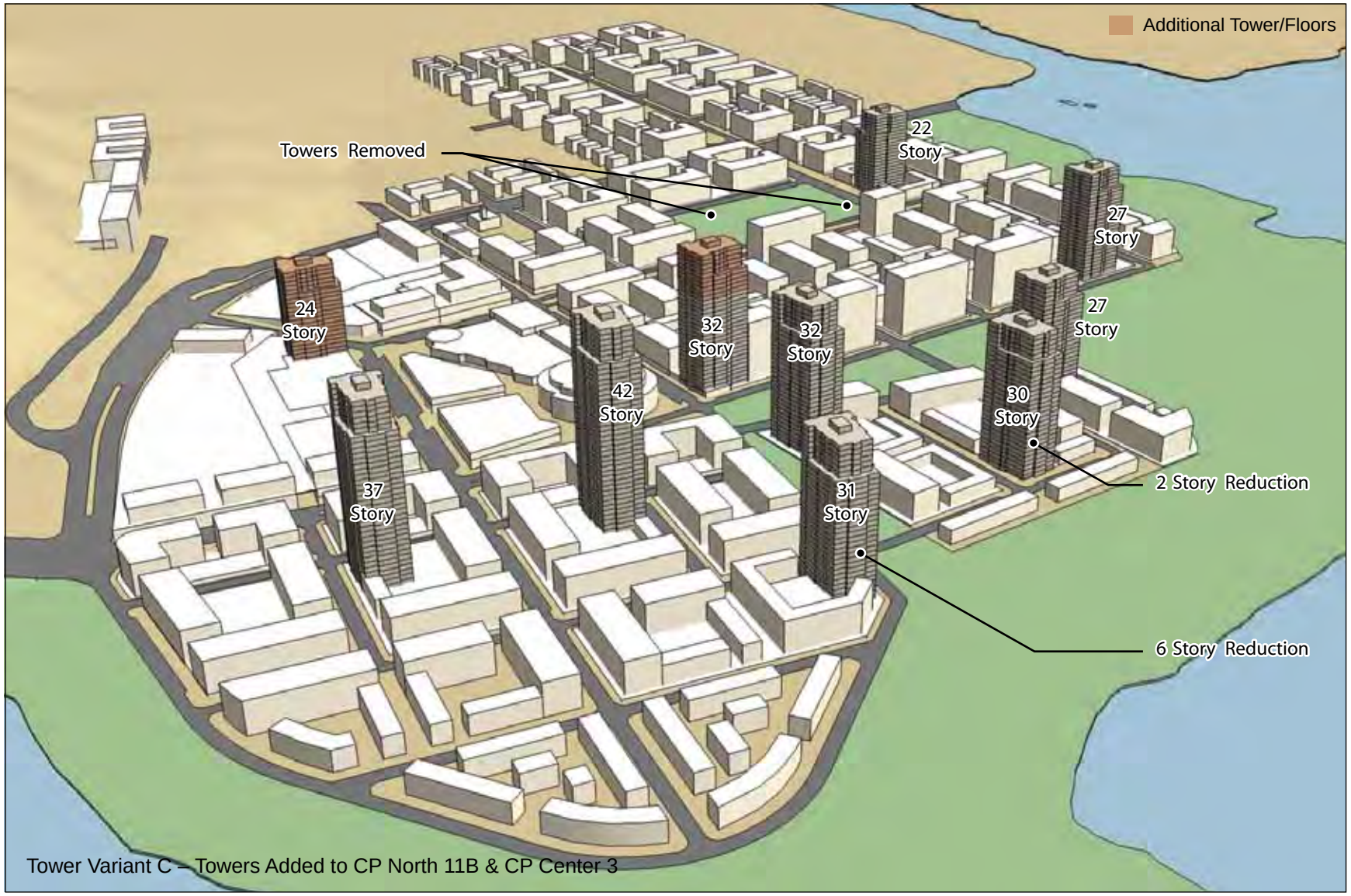
Candlestick Point — Hunters Point Shipyard Phase II EIR

TOWER VARIANT B

FIGURE IV-15



SOURCE: Lennar Urban, IBI Group, 2009.

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FIGURE IV-16

Candlestick Point — Hunters Point Shipyard Phase II EIR

TOWER VARIANT C

Tower Variant A

Tower Variant A would add ten stories to one of the 22-story residential towers at Candlestick Point North, resulting in a 32-story residential tower. Three other residential towers at Candlestick Point South would have three to four fewer floors in order to maintain the overall residential floor area of the Project with this Variant. The variant would have 11 towers at Candlestick Point, as with the Project.

All other features of Tower Variant A would be the same as the Project, with the same land uses, the same total amount of development, and the same development footprint.

Tower Variant B

Tower Variant B would have an additional 24-story residential tower at Candlestick Point Center. One 17-story tower at Candlestick Point North would be removed. Three other towers at Candlestick Point South would have would have two to four fewer floors in order to maintain the overall residential floor area of the Project with this Variant. The variant would have 11 towers at Candlestick Point, as with the Project. All other features of Tower Variant A would be the same as the Project, with the same land uses, the same total amount of development, and the same development footprint

Tower Variant C

Tower Variant C would have an additional 24-story residential tower at Candlestick Point Center, as with Tower Variant B. The variant would also add ten stories to one of the 22-story residential towers at Candlestick Point North, as with Tower Variant A, resulting in a 32-story residential tower. To maintain the overall residential floor area of the Project with this Variant, one 17-story tower and one 22-story at Candlestick Point North would be removed and at Candlestick Point South, one tower would have two fewer floors and one would have six fewer floors. The variant would have 10 towers at Candlestick Point, compared to 11 towers with the Project. All other features of Tower Variant C would be the same as the Project, with the same land uses, the same total amount of development, and the same development footprint.

IV.D.4 Potential Environmental Effects

Overall, the Tower Variants would not change the total amount of development compared to the Project, but the Tower Variants would change the location or height of residential towers, as described above.

Thus, changes in environmental effects of the Tower Variants, compared to the Project, would result from the location or height of residential towers. As the total amount of development and the development footprint would be the same as the Project, most of the construction-related and operational environmental effects of the Tower Variants would be the same as the Project, as discussed below. For most environmental topics, the effects of all three Tower Variants would be the same, except where noted below.

Land Use and Plans

As the total amount of development and the development footprint would be the same as the Project, development of a Tower Variant would not physically divide an established community or conflict with plans, policies, or regulations adopted to avoid or mitigate an environmental effect. Operation of a Tower Variant would alter the existing character of the vicinity, but the modified heights, number, and location of residential towers would be consistent with uses and building characteristics proposed with the Project. Therefore, the additional structures, change in location of some structures, and the increase in height of some structures would not result in an adverse change to the character of the site or the surrounding areas and each Tower Variant would result in a less-than-significant impact, similar to the Project.

Population, Housing, and Employment

As discussed above, a Tower Variant would include the same development proposed with the Project, including equivalent amounts of residential, commercial, and other land uses. Thus short-term employment opportunities during the construction period would be similar to the Project. Development and occupancy of a Tower Variant would result in the same population changes as with the Project. While operation of a Tower Variant could induce population growth directly and/or indirectly, this growth would not be substantial and a Tower Variant would result in a less-than-significant impact, similar to the Project. As with the Project, a Tower Variant would not displace existing housing units or residents at Candlestick Point (as replacement housing would be provided prior to removal of any existing units), and construction of replacement housing would not be necessitated elsewhere. Thus, potential population, employment, and housing impacts of a Tower Variant would be less than significant, similar to the Project.

Transportation and Circulation

As the footprint of development, the total amount of development, and the land uses provided under a Tower Variant would be similar to the Project, traffic impacts for a Tower Variant would also be similar to the Project. While there would be additional towers under the Tower Variant, the total number of residential units would remain the same as the Project. Transportation impacts associated with the Tower Variant would be the same as those identified for the Project,. The impacts identified would be the same and the mitigation measures would be the same, as those identified for the Project.

Although the Tower variant would increase the local traffic in the blocks where density increases, the Tower Variant would not result in an increase in traffic that is substantial in relation to the existing traffic load and capacity of the street system, and would be the same as analyzed for the Project. A Tower Variant would not exceed, either individually or cumulatively, a level of service standard established by the county congestion management plan (CMP) for roads or highways.

The Tower Variant site is not located within the San Francisco Airport Land Use Policy Plan Area or other airport land use plan, and a Tower Variant would not result in a safety hazard from airport operations for people residing or working in the area. The Tower Variant site is also not located within the vicinity of a private airstrip and would not result in a safety hazard for people residing or working at

the Project site. Therefore, the Tower Variants would result in a less than significant impact to aircraft activity and traffic levels, similar to the Project.

Development under a Tower Variant would not affect or increase hazards due to design features or incompatible uses aboveground. The new buildings would be designed consistent with the SFBC, which would reduce all potential design hazards to a less than significant level. The roadway network associated with a Tower Variant would be designed to meet all applicable codes, including design guidelines for emergency access, and would result in a less than significant impact associated with design hazards. As the same amount of development would result from a Tower Variant as the Project, and since the same design standards would apply for both, potential traffic impacts from design hazards would be similar to the Project.

Thus substantial additional parking, above that provided by the Project, would not be required, and impacts would be less than significant. As the same amount of development and the same land uses would occur under a Tower Variant as with the Project, parking impacts would be similar to the Project.

The Tower Variants would comply with adopted policies and plans regarding alternative transportation, and impacts would be less than significant, similar to the Project.

Aesthetics

Changes in effects on aesthetics and visual resources with the Tower Variants, compared to the Project, would result from the location or height of residential towers. A Tower Variant would include up to 11 towers, as with the Project, change the location of one or two towers, increase height of some towers and reduce the height of others, as described above under Characteristics.

Construction activities associated with a Tower Variant would not have a substantial adverse effect on a scenic vista or scenic resources, similar to the Project. Construction activities associated with a Tower Variant could result in temporary degradation of the visual character or quality of the site. With the implementation of mitigation measure MM AE-2 (Mitigation for Visual Character/Quality Impacts During Construction) to screen construction sites from public view and provide for appropriate staging and cleaning of construction equipment, impacts would be reduced to a less-than-significant level, similar to the Project. Construction activities associated with a Tower Variant would not create a new source of substantial light or glare that would adversely affect day or night views in the area, or that would substantially impact other people or properties, and impacts would be less than significant, similar to the Project.

The pattern and scale of buildings at Candlestick Point with the Tower Variants would be similar to the Project. All Tower Variants would have 10 or 11 towers, compared to 11 towers with the Project. As shown in Figure IV-14 to Figure IV-16, the Tower Variants would include at least nine of the 11 residential towers proposed with the Project in the identical location, with differences in the number floors of four of the towers (Tower Variant A); or would relocate a tower from Candlestick Point North to Candlestick Point Center and reduce the number floors of three other towers (Tower Variant B); or relocate a tower from Candlestick Point North to Candlestick Point Center, remove another tower from Candlestick Point North and reduce the number floors of two other towers, and add 10 floors at one tower (Tower Variant C).

Views of Candlestick Pont from long-range vantage points to the north and south or from nearby locations at CPSRA would be similar to views with the Project. Some the towers would have different heights compared to the Project, depending upon the Variant. Views of the relocated 24-story tower with Tower Variant B or C would be apparent from locations to the south, but Tower Variant B or C would also remove one or two towers from Candlestick Point North near Candlestick Point North Neighborhood Park, and views of residential towers from near that proposed park would vary from those with the Project.

Development of a Tower Variant would not have a substantial adverse effect on a scenic vista. The relocation of a residential tower would not substantially modify views of the Project vicinity, block views of scenic resources across the Project area, or substantially alter or degrade the scenic quality of a view. Impacts would be less than significant.

Development of a Tower Variant would not substantially damage scenic resources, including, but not limited to, trees, rock outcroppings, and other features of the built or natural environment that contribute to a scenic public setting. As the footprint of development would be the same as the Project, impacts would be less than significant, similar to the Project.

Development of a Tower Variant would not substantially degrade the existing visual character or quality of the site or its surroundings. Each of the Tower Variants would change the heights of some the towers or relocate or remove one or two towers residential tower, or would change the location of a tower. Thus, the Project area would still be developed with mixed land uses and buildings of various heights, including towers between 220 and 420 feet in height.

Thus, the overall change in visual effects compared to existing conditions with the Tower Variants would be as described for the Project effects in Section III.E (Aesthetics). The Tower Variants would have less-than-significant impacts on scenic vistas, scenic resources, and visual quality.

As with the Project, a Tower Variant would create new sources of light, including light emanating from parking areas and the 49ers stadium, which could be obtrusive in nearby residential areas. Each of the new residential towers would require appropriate operational and security lighting that could result in a greater overall number of lighting sources than the Project. These lighting sources would be consistent with those anticipated with the Project, as well as those existing in an urban, developed area. Mitigation measures MM AE-7a.1 through MM AE-7a.4, MM AE-7b.1, and MM AE-7b.2 would reduce lighting impacts to less than significant for this variant.

Shadows

A Tower Variant would include one additional residential tower and could change the location of one or two towers, depending on the Variant. The introduction of a new tower, the increased height of some towers, and the changed location of some towers would modify shadow impacts compared to the Project effects.

Construction

As with the Project, construction activities of the Housing Variant would not result in shadow effects on open space.

Operation

Development of a Tower Variant would result in new structures over 40 feet in height ranging up to 420 feet in height and would extend well above surrounding buildings and cast shadows on nearby public open spaces. Tower Variant A would add ten stories to one of the 22-story residential towers at Candlestick Point North, resulting in a 32-story residential tower, as shown in Figure IV-14. Three other residential towers at Candlestick Point South would have three to four fewer floors. Tower Variant B would have an additional 24-story residential tower at Candlestick Point Center. One 17-story tower at Candlestick Point North would be removed as shown in Figure IV-15. Three other towers at Candlestick Point South would have would have two to four fewer floors. Tower Variant C would have an additional 24-story residential tower at Candlestick Point Center, as with Tower Variant B, as shown in Figure IV-16. The variant would also add ten stories to one of the 22-story residential towers at Candlestick Point North, as with Tower Variant A, resulting in a 32-story residential tower; one 17-story tower and one 22-story at Candlestick Point North would be removed and at Candlestick Point South, one tower would have would have two fewer floors and one would have six fewer floors.

Project plans have identified the locations of towers, but tower designs are preliminary. The length and duration of shadows cast would be influenced by elements of building design, such as building height, shape, massing, and setbacks. Potential impacts to shade-sensitive locations, such as parks and open space, would be influenced by the location of shade-sensitive uses within the parks and open spaces. The increase in height of one residential tower, from 240 to 320 feet (per Variant A and Variant C) and the inclusion of one new residential tower (with a height of 240 feet) and the relocation of towers (per Variant B and Variant C), would increase potential shading impacts on existing parks and open spaces – Gilman Park – and proposed parks and open spaces—Candlestick Point Neighborhood Park; Bayview Gardens/Wedge Park; and Mini Wedge-Park—and in CPSRA areas near the additional towers. The Tower Variants would also remove one or two residential towers (per Variant B and Variant C), and would reduce the number of stories on up to three towers (all Tower Variants).

As discussed in Section III.F (Shadows), *Planning Code* Section 295 prohibits the issuance of building permits for structures over 40 feet in height that would cast shade or shadow on property with the jurisdiction of, or designated to be acquired by, the Recreation and Park Commission between one hour after sunrise to one hour before sunset at any time of year, unless the Planning Commission determines that the shade or shadow would have an insignificant adverse impact on the use of such property.

As required by *Planning Code* Section 295, the Recreation and Park Commission and the Planning Commission have adopted criteria for the review of shadow effects. For parks for which "shadow budgets" have not been adopted, the current criteria allow an additional new shadow budget of 0.1 percent for parks larger than 2 acres with annual shadow loads between 20 and 40 percent, expressed in available square-foot-hours of sunlight compared to square-foot-hours of shade. For larger parks with existing shadow loads less than 20 percent, an additional new shadow budget of 1.0 percent would be allowed. The increase is based on calculations of the "Annual Available Sunlight" (AAS) for that park,

expressed in square-foot-hours of sunlight (during each day an hour after sunrise to an hour before sunset summed over the course of a year, ignoring shadow from any surrounding structures, and from clouds, fog, and solar eclipses). The shadow impact of the Project is defined as the shadow in square-foot-hours cast by the Project divided by the AAS, expressed as a percentage.

To evaluate potential effects, a shadow modeling study of Tower Variant C was completed by CADP, Inc.[1247] Figure IV-17 (Candlestick Point: Tower Variant C Year-Round Shadow Trace) is a "shadow fan" or "shadow trace" identifying the maximum extent of all Project-related shadows from one hour after sunrise to one hour before sunset over an entire year, which is the time period specified in *Planning Code* Section 295. The year-round shadow trace is further over-inclusive in that it includes shadow from all buildings within the Project site, including those that would not exceed 40 feet in height and, therefore, would not be subject to the requirements of Section 295. The shadow trace shows that Tower Variant C, with an additional residential tower in Candlestick Point North, compared to the Project plans, would shade Gilman Park during the hours specified in Section 295. (As discussed in Section III.F, the Project would add shadows to Gilman Park, but those effects would be from potential 40-foot-high Project buildings south of the park, which are not considered to be adverse effects under Section 295.)

Gilman Park, at 4.4 acres, is a larger park without an adopted shadow budget, and an existing shadow load of less than 20 percent. Therefore, under Section 295, an annual increase of 1.0 percent would be permitted and would not be considered to create a significant effect on the park.

The CADP study also evaluated the Tower Variant C effects on Gilman Park with respect to AAS. CADP used computer models to calculate the net increase in square feet, and square-foot-hours, of shade on the park, from one hour after sunrise to one hour before sunset, at 15-minute intervals, at one-week increments, for six months of the year. The calculations are converted to a total annual increase in square-foot-hours of shade, compared to total theoretical square-foot-hours of sun in the park. Because the streets adjacent to the park are bounded by parking lots and low-rise buildings, the analysis conservatively assumed there is no existing shadow load on the park, and that the Tower Variant effects would be net new conditions. The analysis also does not account for existing shading from trees or the service building within the park. On the basis of available observations of Gilman Park, the park is used during mid-day and afternoon periods, by neighborhood residents, and students at adjacent Bret Harte Elementary School. The park is relatively less patronized in morning hours.

Tower Variant C would shade a portion of Gilman Park from morning to mid-day periods throughout the year, in the first 75 minutes to four hours after the sunrise plus one-hour cutoff specified by Section 295.[1248] There would be no new shadow from the Tower Variant after about 12:30 P.M. on any day of the year. The effects would vary by season. On June 21, new shadow would occur between about 6:45 A.M. PDT (1 hour after sunrise), and would cover about 21 percent of the park to about 9:45 A.M. on less than 1 percent of the park. On September 21 and March 21, new shadow would occur between

[1247] This shadow analysis evaluated Tower Variant C, which would include both a 24-story tower at a location near Gilman Park and the additional stories on a tower at Candlestick Point North. Variant C would have the greatest difference in increased shadow effects, compared to those with the Project.
[1248] The sunrise plus one hour cutoff on days when the Tower Variant would cast a shadow on the park would range from about 6:50 A.M. PDT on June 20 to about 8:15 A.M. PST on December 20.

SOURCE: Lennar Urban, RHAA, CADP, 2009.

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Candlestick Point — Hunters Point Shipyard Phase II EIR

CANDLESTICK POINT: TOWER VARIANT C YEAR ROUND SHADOW TRACE

FIGURE IV-17

about 8:00 A.M. PDT (one hour after sunrise), on about 32 percent of the park, to about 11:30 A.M., on less than 1 percent of the park. On December 21, new shadow would occur between about 8:15 A.M. PST (1 hour after sunrise), on about 54 percent of the park, to about 12:15 P.M. on less than 1 percent of the park. Overall, while those effects would occur for up to four hours after the sunrise plus one-hour cutoff time, in spring, summer, and fall months, the new shade would affect 10 percent or less of Gilman Park by 9:00 a.m. or earlier. In December, the new shade would affect 10 percent or less of Gilman Park by about 10:15 a.m.

Figure IV-18 (Gilman Park—Existing Conditions) is an aerial view showing existing features of Gilman Park. Figure IV-19 (Gilman Park: Tower Variant C Shadows—November 29 [8:05 A.M.]) and Figure IV-20 (Gilman Park: Tower Variant C Shadows—December 20 [8:20 A.M.]) illustrate the Tower Variant shadow at periods of maximum shadow impact, at one hour after sunrise in late fall and winter.

Gilman Park is 191,631 square feet (4.4 acres). The Tower Variant would add approximately 21,847,927 new annual square-foot-hours of shadow to the potential of approximately 696,493,920 square-foot-hours of sun, increasing shade square-foot-hours by 3.1 percent. This would be greater than the 1.0 percent permitted as new shadow on parks larger than two acres with existing shadow loads less than 20 percent, under current Planning Department criteria.

Therefore, the Tower Variant would add shadows to Gilman Park during the hours between one hour after sunrise and one hour before sunset, with a new shadow load greater than 1.0 percent. This new shadow could have an adverse effect on the use of park. While Tower Variant A would not add shade after late morning or midday periods at any time of year, and the park would not be affected in afternoon periods of use, the shadow effect is conservatively considered to be a significant and unavoidable impact of Tower Variant C.

Other shadow conditions with the Tower Variants would be as described for the Project in Section III.F. The Tower Variant effects on shadows on the CPSRA would be similar or slightly reduced compared to the Project, as towers near the CPSRA would be two to six stories shorter, depending upon the variant. With appropriate design of the proposed parks and open space, to minimize the installation of shade-sensitive uses at locations that would receive the greatest amount of shading, adverse shadow impacts would be minimized, and impacts to proposed new parks would be less than significant.

Wind

Each of the Tower Variants would change the location of a residential tower between 24 and 32 stories in height (depending on the Variant). As these towers would exceed 100 feet in height, these residential towers have the potential to result in pedestrian wind impacts, as discussed below. In addition, as the location and or height of residential towers would change, this would modify the location of pedestrian wind impacts.

SOURCE: PBS&J, 2009.

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Candlestick Point — Hunters Point Shipyard Phase II EIR

GILMAN PARK — EXISTING CONDITIONS

FIGURE IV-18

SOURCE: Lennar Urban, RHAA, CADP, 2009.

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Candlestick Point — Hunters Point Shipyard Phase II EIR

GILMAN PARK: TOWER VARIANT C SHADOWS—NOVEMBER 29 (8:05 AM)

FIGURE IV-19

SOURCE: Lennar Urban, RHAA, CADP, 2009.

PBS&J 10.31.09 08068 | JCS | 09

Candlestick Point — Hunters Point Shipyard Phase II EIR

GILMAN PARK: TOWER VARIANT C SHADOWS—DECEMBER 20 (8:20 AM)

FIGURE IV-20

Construction

Construction activities of the Tower Variants would not result in additional wind impacts, and would be similar to the Project. Impacts such as fugitive dust emissions and erosion from wind are addressed in Section III.H and Section III.M.

Operation

Because of their height, the residential towers would have the potential to accelerate winds in nearby pedestrian sidewalk areas or public open spaces. Similar to the Project, the street grid with a Tower Variant would not align directly with predominant west and west-northwest wind directions, which would reduce potentially significant pedestrian-level wind acceleration. Due to the location and height of the residential towers with all Tower Variants, a Tower Variant could affect pedestrian-level wind conditions in proposed parks—Candlestick Point Neighborhood Park; Bayview Gardens/Wedge Park; and Mini Wedge-Park—and in CPSRA areas near the towers. The potential pedestrian-level wind conditions would be influenced by building design, such as building height, shape, massing, setbacks, and location of pedestrian areas. However, although the Tower Variant plans have identified the potential locations of the additional towers, tower designs are preliminary, and thus a more detailed analysis of the potential for building design to generate pedestrian-level wind impacts is not feasible at this time.

As with the Project, all three Tower Variants would have the potential to create potentially significant pedestrian-level wind impacts that exceed the identified threshold of 26 miles per hour (mph) equivalent wind speed for a single hour of the year. Implementation of mitigation measure MM W-1a (wind modeling), which would require a design review process for buildings greater than 100 feet in height, and if determined to be necessary, would require inclusion of a design criteria to reduce pedestrian-level impacts below the threshold, would reduce impacts to a less-than-significant level, similar to the Project.

Air Quality

As the footprint of development, the total amount of development, and the land uses provided with a Tower Variant would be the same as the Project, air quality impacts of a Tower Variant would also be the same as the Project.

Construction

As stated above, overall construction impacts of the Tower Variant with respect to air quality would be similar to the Project. Construction activities would occur throughout the 702-acre Tower Variant site over the approximately 20-year build-out period ending in 2029, with the construction of the additional dwelling units occurring between 2017 and 2021. Similar to the Project, construction activities under the Housing Variant would include site preparation, grading, placement of infrastructure, placement of foundations for structures, and fabrication of structures. Demolition, excavation and construction activities would require the use of heavy trucks, excavating and grading equipment, concrete breakers, concrete mixers, and other mobile and stationary construction equipment. Emissions during construction would be caused by material handling, traffic on unpaved or unimproved surfaces, demolition of

structures, use of paving materials and architectural coatings, exhaust from construction worker vehicle trips, and exhaust from diesel-powered construction equipment.

With respect to construction emissions, construction-related emissions are generally short-term in duration, but may still cause adverse air quality impacts. However, the BAAQMD does not recommend any significance thresholds for the emissions during construction. Instead, the BAAQMD bases the criteria on a consideration of the mitigation measures to be implemented. If all appropriate emissions mitigation measures recommended by the BAAQMD CEQA Guidelines are implemented for a project, construction emissions are not considered adverse. Fine particulate matter (PM_{10}) is the pollutant of greatest concern with respect to construction activities.[1249] Any project within the City of San Francisco, including the Housing Variant, would be required to comply with *San Francisco Health Code* Article 22B, Construction Dust Control, which requires the preparation of a site-specific dust control plan, (with mandatory mitigation measures similar to the BAAQMD's) for construction projects within 1,000 feet of sensitive receptors (residence, school, childcare center, hospital or other health-care facility or group-living quarters). As such, with implementation of mitigation MM HZ-15, which identifies specific mitigation measures that would be used to reduce emissions associated with construction, impacts from the Tower Variant would be less than significant, similar to the Project.

With respect to airborne human health risks, construction activities associated with the Tower Variant would increase the levels of two potential human health risks: (1) diesel particulate matter (DPM) and (2) dust or particulate matter (PM_{10}) bound to certain metals and/or organic compounds from on-site soils. MM AQ-2.1 (Implement Accelerated Emission Control Device Installation on Construction Equipment) and MM AQ-2.2 (Implement Accelerated Emission Control Device Installation on Construction Equipment Used for Alice Griffith Parcels) would address construction sources of DPM including off-road construction equipment such as lifts, loaders, excavators, dozers, and graders. In addition, the delivery of equipment and construction materials, spoils and debris hauling, and employee commute traffic could contribute to construction-related DPM emissions. In terms of DPM, ENVIRON prepared a human health risk assessment (HRA)[1250] that evaluated potential human health risks associated with construction and operation of the Project. As construction emissions associated with the Tower Variant are expected to be the same as those associated with Project, the Tower Variant would have the same impacts than the Project, would not exceed the BAAQMD CEQA threshold. As the carcinogenic and non-carcinogenic health risks posed by DPM emissions during construction activities associated with development of the Tower Variant have been determined to be below established thresholds, this impact is less than significant with MM AQ-2.1 and MM AQ-2.2, similar to the Project.

Similar to the Project, construction activities at both Candlestick Point and HPS Phase II for the Tower Variant have the potential to generate TACs associated with soil-PM_{10} and an HRA evaluated the potential concentrations of the airborne soil-PM_{10} at numerous receptors on site (residents at the Alice Griffith Public Housing units) and off site (adult and child residents, workers, and schoolchildren) in the Project vicinity. As the carcinogenic and noncarcinogenic health risks posed by soil-PM_{10} emissions during construction activities associated with development of the Project have been determined to be

[1249] BAAQMD. 1999. *BAAQMD CEQA Guidelines – Assessing the Air Quality Impacts of Projects and Plans*. December.
[1250] Environ. 2009. Ambient Air Quality Human Health Risk Assessment: Candlestick Point – Hunters Point Shipyard Phase II Development Plan. September 28. Appendices I & II.

below established thresholds, the same impacts would be expected from the Tower Variant. This impact is less than significant with MM HZ-15, similar to the Project.

Operation

The level of emissions anticipated with Tower Variant would be the same as the Project; as such impacts to regional and local air quality would be substantially similar to the Project.

Both this variant and the Project would result in fewer emissions during the operation of their respective land uses compared to a similar level of development without the energy and transportation considerations discussed in this EIR. The Tower Variant, similar to the Project, would incorporate features intended to reduce motor vehicle trips, designed as a dense, compact development with a mix of land uses that would facilitate pedestrian, bicycle, and transit travel. Tower Variant's transportation analysis estimates that a similar development that did not include the trip reduction features of the Utilities Variant would generate 137,282 daily external motor vehicle trips (about 76 percent more than Utilities Variant's daily external motor vehicle trips). Refer to the discussion of Project-related emissions in Section III.H for further clarification.

Nonetheless, criteria pollutant emissions of ROG, NO_X, PM_{10}, and $PM_{2.5}$ associated with land uses anticipated with Tower Variant would be expected to exceed existing BAAQMD thresholds. Under BAAQMD's current thresholds, impacts are considered significant if daily emissions of criteria pollutants exceed 80 lbs/day of ROG, NO_X, and PM_{10}. Similar to the Project, no additional feasible mitigation measures are available to reduce Tower Variant's operational criteria emissions below the BAAQMD thresholds. This would be a significant and unavoidable impact.

With respect to airborne human health risks, emissions associated with operation activities under the Tower Variant would increase the levels of two potential human health risks: (1) TACs and (2) vehicle emissions ($PM_{2.5}$).

This Tower Variant continues to include R&D facilities at HPS Phase II, which are situated on a peninsula extending to the south of other proposed residential areas. As the predominant winds are out of the west, on-site receptors will generally be upwind from these R&D areas. As such, the Project is designed to minimize potential adverse impacts between TAC sources in R&D areas and both on-site and off-site receptors. As discussed for the R&D Variant, an analysis was conducted to determine the potential impacts from a variety of TAC sources in the R&D areas. Details regarding this assessment can be found in Appendix H1, Attachment III.[1251]

The HRA estimated the excess lifetime cancer risk and chronic noncancer HI due to the combined TAC emissions from the R&D areas at any surrounding receptor location. As the Tower Variant has the same configuration as the Project, the estimated cancer risks for long-term residential exposure would be above 10 in one million in an area designated as open space that would extend slightly south beyond the R&D boundary. The maximum estimated cancer risk for a residential receptor in this location would be 17 in one million; the noncarcinogenic health risks would have an HI of 1.7. However, as noted above,

[1251] ENVIRON, *Ambient Air Quality Human Health Risk Assessment: Candlestick Point–Hunters Point Shipyard Phase II Development Plan*, Attachment III, September 28, 2009.

this receptor location would be in an area designated as open space, and would not be a residential location. If cancer risks were estimated based on exposure assumptions consistent with recreational use of the open space, the risks would be reduced well below the threshold of 10 in one million. Due to the decrease in the frequency and duration of potential exposures, the chronic HI would also be reduced below the HI threshold of 1.0

The estimated health risks would be below BAAQMD thresholds for all residential receptor locations as a result of implementation of the Project. As such, impacts would be less than significant with implementation of MM AQ-6.1 and MM AQ-6.2 developed for the Project and also required for the Tower Variant.

In terms of human health risks associated with vehicle emissions, vehicle emissions along local roadways for the Tower Variant would remain unchanged from the Project. The prolonged exposure of receptors to increased vehicle emissions could affect human health. Potential $PM_{2.5}$ concentrations at select roadways with the addition of future traffic volumes, including the traffic associated with the Tower Variant (which were assumed to be similar to Project traffic), were estimated compared against SFDPH thresholds to determine the potential health risks attributed to vehicle emissions. Several roadway segments were chosen based on whether Project-related traffic would use these streets to access neighboring freeways and other areas of San Francisco and/or currently or would experience significant truck traffic. The roadways chosen include:

- Third Street
- Innes Avenue/Hunters Point Boulevard/Evans Avenue
- Palou Avenue
- Gilman Avenue/Paul Avenue
- Harney Way
- Jamestown Avenue
- Ingerson Avenue

With the addition of Project-related traffic, no receptors along the streets listed above would experience $PM_{2.5}$ concentrations in excess of SFDPH's 0.2 $\mu g/m^3$ threshold. [1252] As concentrations would not exceed SFDPH's threshold, and as such, impacts would be less than significant, similar to the Project.

Noise and Vibration

As the footprint of development, the total amount of development, and the land uses provided with a Tower Variant would be the same as the Project, noise impacts of a Tower Variant would also be the same as the Project.

Construction activities for a Tower Variant would create a substantial temporary increase in ambient noise levels on the site and in existing residential neighborhoods adjacent to the site. Construction activities would need to comply with the San Francisco Noise Ordinance, which prohibits construction between 8:00 P.M. and 7:00 A.M. and limits noise from any individual piece of construction equipment (except impact tools) to 80 dBA at 100 feet. Implementation of mitigation measures MM NO-1a.1 and

[1252] ENVIRON, *Ambient Air Quality Human Health Risk Assessment: Candlestick Point–Hunters Point Shipyard Phase II Development Plan*, Appendix IV, September 28, 2009.

MM NO-1a, which would require implementation of construction best management practices to reduce construction noise and the use of noise-reducing pile driving techniques, would reduce any potentially significant impacts to less-than-significant levels.

Construction activities could also create excessive ground-borne vibration levels in existing residential neighborhoods adjacent to the site and at proposed on-site residential uses, should the latter be occupied before construction activity on adjacent parcels is complete. Implementation of MM NO-1a.1, MM NO-1a.2, and MM NO-2a would require implementation of construction best management practices, noise-reducing pile driving techniques as feasible, and monitoring of buildings within 50 feet of pile driving activities. Implementation of these measures would reduce vibration impacts under the Tower Variant, but not to a less-than-significant level as vibration levels from pile driving activities could be as high as 103 VdB for the residential uses within the HPS North District, the CP Center, and South Districts when occupied; therefore, this impact would remain significant and unavoidable, similar to the Project.

Daily operation of a Tower Variant, such as mechanical equipment and delivery of goods, would not expose noise-sensitive land uses on- or off- site to noise levels that exceed the standards established by the City of San Francisco. This impact would be less than significant, similar to the Project. Operation activities associated with a Tower Variant, such as delivery trucks, would not generate or expose persons on or off site to excessive groundborne vibration. This impact would also be less than significant, similar to the Project.

Operation of a Tower Variant would generate increased local traffic volumes that would cause a substantial permanent increase in ambient noise levels in existing residential areas along the major Project site access routes. Impacts would be significant along Carroll Avenue, Gilman Avenue, and Jamestown Avenue, similar to the Project. Measures available to address significant traffic noise increases in these residential areas are limited. The ultimate feasibility and implementation of the noise insulation measures that would be required to reduce roadway noise levels to below the threshold of significance would be dependent on factors that would be beyond the control of the City as the lead agency or the Project Applicant to guarantee. Therefore, this impact would remain significant and unavoidable.

Football games and concerts at the proposed stadium with a Tower Variant would generate noise that would adversely affect surrounding residents, similar to the Project. Implementation of mitigation measure MM NO-7.1 would ensure that nearby residential uses do not experience temporary increases in ambient noise levels within their homes that would exceed 45 dBA; however, as with the Project, the feasibility and practicality of mitigation measure MM NO-7.1 cannot be determined at this time, this impact would remain significant and unavoidable.

The Tower Variant site is not located within an airport land use plan area or near a private airstrip. Furthermore, the Tower Variant does not include an aviation component. Therefore, a Tower Variant will not result in the exposure of people to excessive aircraft noise levels. Impacts would be less than significant, similar to the Project.

Cultural Resources and Paleontological Resources

The footprint of development for a Tower Variant would be the same as for the Project, although the construction of an additional residential tower could slightly increase the extent of ground disturbance associated with excavation for the tower foundation. As such, impacts anticipated for Cultural Resources including paleontological, archaeological, and historical resources as a result of construction of a Tower Variant would be similar to the Project.

Similar to the Project, impacts associated with construction of an additional residential tower with a Tower Variant could result in significant impacts to paleontological and archaeological resources or result in the disturbance of human remains interred outside formal cemeteries. Implementation of mitigation measures MM CP-2a (archaeological resources), MM CP-3a (paleontological resources), and MM CP-1b.1 and MM CP-1b.2 (historical resources) would reduce construction impacts to archaeological and paleontological resources to a less-than-significant level, similar to the Project.

Construction of the Project was determined to have a significant and unavoidable impact to historic resources due to the proposed demolition of buildings, structures, and objects associated with the area's "transition from early commercial dry dock operation to high tech naval repair and Radiological research and waste treatment facility." While a Tower Variant would retain the buildings and structures in the potential Hunters Point Commercial Drydock District, identified in 1998 as eligible for listing in the National Register of Historic Properties (NRHP), development would result in the demolition of buildings that have been determined eligible for the CRHR and are contributors to the potential Hunters Point Commercial Dry Dock and Naval Shipyard Historic District. This would be a potentially significant impact because the proposed actions would demolish buildings that contribute to a historic district. The impact would materially alter in an adverse manner those physical characteristics of an historical resource that convey its historical significance and that justify its eligibility for inclusion in the CRHR. Development of an additional residential tower, or a change in the location of residential towers (at Candlestick Point), would not change the effects to historical resources at HPS Phase II. A Tower Variant would be required to implement mitigation measure MM CP-1b.1 and MM CP-1b.2 (historical resources) which would reduce impacts to the extent feasible. However, implementation of mitigation measure MM CP-1b.1 and MM CP-1b.2 (historical resources) would reduce but not avoid the significant adverse impact. As with the Project, the impact on historical resources with a Tower Variant would remain significant and unavoidable.

As the total amount of development and footprint of development with a Tower Variant would be the same as for the Project, operation of the Tower Variants would not result in adverse affects to cultural resources, and this impact would be less than significant, similar to the Project.

Hazards and Hazardous Materials

The footprint of development for a Tower Variant would be the same as for the Project, although the construction of an additional residential tower could slightly increase the extent of ground disturbance associated with excavation for the tower foundation. As such, impacts from construction of a Tower Variant would be similar to the Project.

Construction activities associated with a Tower Variant would: disturb soil and/or groundwater; result in the handling, stockpiling, and transport of soil; involve demolition or renovation of existing structures that could include asbestos-containing materials, lead-based paint, PCBs, or fluorescent lights containing mercury; expose construction workers to hazardous materials; be a source of hazardous air emissions within one-quarter mile of an existing or planned school; and encounter soils or groundwater that contains contaminants from historic uses that could pose a human health or environmental risk if not properly managed. Each of these impacts for a Tower Variant would be the same as the Project and would be reduced to a less-than-significant level with implementation of the identified mitigation measures (MM HY-1a.2, MM HZ-1a, MM HZ1b, MM HZ-2a.1, MM HZ-2a.2, MM HZ-5a, MM HZ-9, MM HZ-10b, MM HZ-12, MM HZ-15, MM HY-1a.1, MM HY-1a.3, MM BI-4a.1, MM BI-4a.2, and MM BI-5a.4).

Construction of a Tower Variants would require improvements to existing utility infrastructure and installation of new underground utilities, which could expose construction workers, the public, or the environment to hazardous materials. With one additional residential tower, a Tower Variant could result in an increase in the amount of excavation and a slightly greater level of ground disturbance and excavation than the Project. However, with the implementation of mitigation measures MM HZ-1a, MM HZ-1b, and MM HZ-2a.1, which require remediation of any contaminated soils, the hazards risk from potential exposure to contaminated soil or groundwater during construction would be reduced to a less-than-significant level, similar to the Project. In addition, mitigation measure MM HZ-2a.2 requires the preparation of a site-specific health and safety plan, which would further ensure that all risks to workers, residents, or the public would be reduced to less than significant, the same as for the Project.

The Tower Variant would require pile supports for the residential towers, the same as the Project. This construction activity could result in groundwater contamination from disturbed soils. Because an additional tower would be constructed under the Tower Variant, the risk of groundwater contamination would be slightly increased. Mitigation measure MM HZ-5a would reduce this impact by requiring a foundation support piles installation plan, which would verify that pilot boreholes for each pile would be drilled through the artificial fill materials so the piles can be installed without damage or misalignment and to prevent potentially contaminated fill materials from being pushed into the underlying sediments or groundwater. With implementation of this mitigation measure, the impact from potential groundwater contamination would be reduced to a less-than-significant level, the same as for the Project.

Shoreline improvements would occur under the Tower Variant the same as for the Project. Shoreline improvements would require concurrence of BCDC, San Francisco RWQCB, and USACE. That permit would contain numerous conditions to ensure that the construction activities are conducted in a manner that is protective of aquatic resources. Mitigation measure MM HZ-10b requires that all shoreline activities that could affect sediment (or in the case of the Navy-installed cover and riprap at Parcel E/E-2) be conducted in accordance with agency-approved remedial design documents, applicable health and safety plans, DCPs, or any other documents or plans required under applicable law or laws, including but not limited to applicable requirements shown in Table III.K-2. In addition, mitigation measures MM HY-1a.1, MM HY-1a.2, MM BI-4a.1, MM BI-4a.2, and MM BI-5b.4 would reduce water quality and biological resources impacts. For Candlestick Point, impacts would be mitigated through mitigation measures MM HY-1a.1 and MM HY-1a.2. With implementation of these mitigation measures,

along with applicable regulations and permits, potential impacts related to exposure to hazardous materials releases from contaminated sediments that could be disturbed during proposed shoreline improvements would be reduced to a less-than-significant level for the Tower Variant, the same as for the Project.

Similar to the Project, remediation activities conducted on behalf of the City or developer in conjunction with development activities at HPS Phase II parcels transferred prior to completion of remediation in an "early transfer" would disturb soil and/or groundwater that may contain contaminants from historic uses. The identified mitigation measure (MM HZ-12) would require the SFDPH to ensure that before development occurs, the Agency or the developer and their contractors have incorporated all applicable requirements into remedial design documents, work plans, health and safety plans, DCPs and any other document or plan required under the AOC or other applicable law, as a condition of development. As a result of these controls and mitigation measure, the potential impact of exposure to hazardous materials during remediation activities conducted on behalf of the Agency or the developer in conjunction with development of HPS Phase II under the Tower Variant would be reduced to less-than-significant levels.

In addition to uncovering hazardous materials within the existing buildings, construction and grading activities associated with the Tower Variant could disturb soil or rock that is a source of naturally occurring asbestos, which could present a human health hazard. As discussed in the paragraph above, a Tower Variant would slightly increase in the amount of excavation and ground disturbance, as compared to the Project. However, with the implementation of mitigation measure MM HZ-15, which requires preparation of an asbestos dust mitigation plan, this impact would be reduced to a less-than-significant level, similar to the Project.

As with the Project, the Bret Harte Elementary School and Muhammad University of Islam elementary school are located within one-quarter mile of the development area of the Tower Variants. Consistent with the discussion above, the Tower Variants could uncover asbestos-containing materials (naturally or in existing building materials) or other hazardous materials during construction, consistent with the Project. However, with incorporation of mitigation measures MM HZ-1a, MM HZ-1b, and MM HZ-2a.1, and MM HZ-15, any impacts to these schools would be reduced to a less-than-significant level, similar to the Project.

After development of a Tower Variant, periodic maintenance could require excavation of site soils to maintain or replace utilities, repair foundations, or make other subsurface repairs, which could expose hazardous materials. As the total amount of development would be the same as the Project, the frequency of maintenance would be the same as the Project. Implementation of mitigation measures MM HZ-1a and MM HZ-1b would require remediation of any contaminated soils pursuant to the appropriate regulations. MM HZ-2a.1 would require the development of an unknown contaminant contingency plan to describe procedures to follow in the event unexpected contamination is encountered during construction activities, including procedures for ensuring compliance with the above laws and regulations. Additionally, mitigation measure MM HZ-2a.2, would require the preparation and implementation of a site-specific HASP in compliance with federal and state OSHA regulations and other applicable laws. The general requirement of mitigation measure MM HZ-9 would require that the Agency or its contractor or Project Applicant shall comply with all requirements incorporated into remedial design documents, work plans, health and safety plans, dust control plans, and any other

document or plan required under the Administrative Order of Consent for any properties subject to early transfer (prior to full Navy remediation). To reduce this impact related to exposure to hazardous materials releases that have not been fully remediated at HPS Phase II. Mitigation measure MM HZ-9 also requires that all work on the Yosemite Slough bridge would comply with Navy work plans for construction and remediation on Navy-owned property. Implementation of these mitigation measures would reduce this impact to a less-than-significant level, same as for the Project.

After construction, land uses anticipated under a Tower Variant would involve the routine use, storage, transportation, and disposal of hazardous materials. None of the additional residential towers proposed for inclusion in the Tower Variants would utilize hazardous materials other than routine maintenance and cleaning products typically used in residential and commercial settings. The Tower Variant would not introduce large-scale manufacturing or processing facilities that would store and use large quantities of hazardous materials that would present a substantial risk to people. However, there would be numerous locations where smaller quantities of hazardous materials would be present, the same as for the Project. The potential risks associated with hazardous materials handling and storage would generally be limited to the immediate area where the materials would be located, because this is where exposure would be most likely. The Tower Variant would comply with applicable laws and regulations that require the implementation of established safety practices, procedures, and reporting requirements pertaining to proper handling, use, storage, transportation, and disposal of hazardous materials. Impacts would be less than significant, similar to the Project.

Hazardous materials would routinely be transported to, from, and within the Project site, and small amounts of hazardous waste would be removed and transported off site to licensed disposal facilities. Compliance with applicable regulations would ensure impacts are less than significant. Since essentially the same amount of development would occur under the Tower Variant and the Project, impacts would be similar to the Project.

Daily operations under the Tower Variant could result in reasonably foreseeable upset and accident conditions involving the release of hazardous materials into the environment, but this would not pose a human health risk and/or result in an adverse effect on the environment. Impacts would be less than significant, similar to the Project.

The Tower Variant site is not located within the San Francisco Airport Land Use Policy Plan Area or other airport land use plan, and a Tower Variant would not result in a safety hazard from airport operations for people residing or working in the area. The Tower Variant site is also not located within the vicinity of a private airstrip and would not result in a safety hazard for people residing or working at the Project site. Similar to the Project, operation of the Tower Variant would not expose people or structures to a significant risk of loss, injury, or death involving fires or conflict with emergency response or evacuation plans

Geology and Soils

The footprint of development for a Tower Variant would be the same as for the Project, although the construction of an additional residential tower could slightly increase the extent of ground disturbance associated with excavation for the tower foundation. As such, impacts from construction of a Tower

Variant would be similar to the Project. As the footprint of development, the total amount of development, and land uses would be the same as the Project, operational impacts from geology and soils would be the same as the Project.

Construction

As with the Project, construction activities, such as grading and excavation, could remove stabilizing vegetation and expose areas of loose soil that, if not properly stabilized, could be subject to soil loss and erosion by wind and stormwater runoff. Newly constructed and compacted engineered slopes could undergo substantial erosion through dispersed sheet flow runoff, and more concentrated runoff can result in the formation of erosional channels and larger gullies, each compromising the integrity of the slope and resulting in significant soil loss. The erosion hazard rating for the local soils in the Project site is slight to severe. Requirements to control surface soil erosion during and after construction with a Tower Variant would be implemented through the requirements of mitigation measure MM HY-1a.1 (SWPPP) and adverse effects on the soil, such as soil loss from wind erosion and stormwater runoff, would be avoided or reduced to a less-than-significant level, similar to the Project.

In addition to the potential for soil erosion, construction activities would have the potential to affect groundwater levels. With implementation of the dewatering techniques, groundwater level monitoring, and subsurface controls as specified in the SFBC and required by mitigation measure MM GE-2a (dewatering), groundwater levels in the area would not be lowered such that unacceptable settlement at adjacent or nearby properties would occur. Consequently, a Tower Variant would result in a less-than-significant impact, similar to the Project.

At the Alice Griffith Public Housing site and the Jamestown area, the removal of bedrock through heavy equipment methods or controlled rock fragmentation activities would have the potential to fracture rock adjacent to the excavation, thereby destabilizing it and possibly causing settlement of structures above it. With implementation of those techniques, ground surface and building damage monitoring, as specified in the SFBC and required by mitigation measure MM GE-3, vibration from controlled rock fragmentation in the area would not cause unacceptable settlement or damage at adjacent or nearby properties would occur. Consequently, settlement hazards related to controlled rock fragmentation would be less than significant, similar to the Project.

Operation

Impacts with respect to geology and soils conditions with a Tower Variant would be substantially similar to those of the Project.

The potential for exposure to adverse affects caused by seismic groundshaking exists at the Project site. Mitigation measures MM GE-4a.1, MM GE-4a.2, and MM GE-4a.3 would require design-level geotechnical investigations that would include site-specific seismic analyses to evaluate the peak ground accelerations for design of a Tower Variant structures and the Yosemite Slough bridge, as required by the SFBC and Caltrans. Implementation of these mitigation measures would ensure that potential impacts from groundshaking would be less than significant, similar to the Project.

The potential for adverse affects caused by seismically induced ground failure such as liquefaction, lateral spreading, and settlement exists at the Project site. Mitigation measures MM GE-4a.1, MM GE-4a.2, MM GE-4a.3, and MM GE-5a would require design-level geotechnical investigations must include site-specific seismic analyses to evaluate the peak ground accelerations for design of Variant structures, as required by the SFBC through review by DBI. It is anticipated that DBI would employ a third-party engineering geologist and/or civil engineer to form a GPRC. The GPRC would complete the technical review of proposed site-specific structural designs prior to building permit approval. The structural design review would ensure that all necessary mitigation methods and techniques were incorporated in the design for a Tower Variant foundations and structures to reduce potential impacts from ground failure or liquefaction a less-than-significant level, similar to the Project.

With a Tower Variant, the potential for adverse affects due to seismically induced landslides exists at the Project site. Implementation of mitigation measures MM GE-6a and MM GE-4a.2 would ensure compliance with the SFBC and any special requirements of the HUD for compliance documentation and would reduce potential impacts from landslides a less-than-significant level, similar to the Project.

With a Tower Variant, one or two tower locations would be different than proposed for the Project. Neither of these specific areas is located adjacent to the shoreline such that a Tower Variant could result in impacts greater than those discussed with the Project. Therefore, a Tower Variant would result in a less-than-significant impact due to shoreline stability, similar to the Project.

The potential for adverse affects caused by landslides exists at the Project site. Site-specific, design-level geotechnical investigations would be required to be submitted to DBI in connection with permit applications for individual Tower Variant elements, as specified in mitigation measure MM GE-6a. The site-specific analyses must assess these conditions and prescribe the requirements for foundations on slopes in accordance with the SFBC. All geotechnical investigations and permits must be approved by DBI. With implementation of this mitigation, a Tower Variant's impact with regard to landslides would be less than significant, similar to the Project.

The potential for adverse affects due to settlement exists at the Project site. However, design-level geotechnical investigations must evaluate the structural design, as required by the SFBC through review by DBI. Implementation of mitigation measures MM GE-5a, MM GE-4a.2, and MM GE-4a.3 would ensure compliance with the provisions of the SFBC and would reduce the impact a less-than-significant level, similar to the Project.

The potential for adverse effects caused by expansive soils exists at the Project site. Design-level geotechnical investigations must evaluate the structural design, as required by the SFBC through review by DBI. Implementation of mitigation measures MM GE-10a, MM GE-4a.1, MM GE-4a.2, and MM GE-4a.3 would avoid or reduce the impact to a Tower Variant structures from expansive soils a less-than-significant level, similar to the Project.

With a Tower Variant, the potential for adverse effects caused by corrosive soils exists at the Project site. Design-level geotechnical investigations must evaluate the structural design, as required by the SFBC through review by DBI. Implementation of mitigation measures MM GE-11a, MM GE-4a.2, and MM GE-4a.3 would avoid or reduce the impact to Tower Variant structures from corrosive soils a less-than-significant level, similar to the Project.

Fault rupture hazards are unlikely. Ground rupture occurs most commonly along preexisting faults. No known active faults cross the Hunters Point shear zone, making hazards from fault rupture unlikely with a Tower Variant.[1253] Therefore, there would be no impact caused by surface fault rupture, similar to the Project.

All development with a Tower Variant would be connected to the City's existing wastewater treatment and disposal system and would not involve the use of septic tanks or alternative wastewater disposal systems. No impact would occur, similar to the Project.

A Tower Variant would not substantially change site topography or affect unique geologic features, and would have no impact on such features, similar to the Project.

Hydrology and Water Quality

The footprint of development for a Tower Variant would be the same as for the Project, although the construction of an additional residential tower could slightly increase the extent of ground disturbance associated with excavation for the foundation of the additional tower. As such, impacts from construction of a Tower Variant would be similar to the Project. As the footprint of development, the total amount of development, and land uses would be the same as the Project, operational impacts to hydrology and water quality would be the same as the Project.

Construction

With adherence to applicable regulatory requirements, construction activities associated with a Housing Variant would not violate water quality standards, cause an exceedance of water quality standards or contribute to or cause a violation of waste discharge requirements due to sediment-laden runoff, contaminated groundwater from dewatering activities, or the incidental or accidental release of construction materials. With additional excavation for building foundations, impacts would be greater than the Project. With implementation of mitigation measures MM HY-1a.1 (preparation of a SWPPP for discharges to the combined sewer system), MM HY-1a.2 (SWPPP preparation for separate storm sewer systems), and MM HY-1a.3 (construction dewatering plan) impacts would be less than significant, similar to the Project.

No streams or rivers are currently located within the Tower Variants area and thus no streams or rivers would be altered by construction activities. During construction of a Tower Variant, the existing drainage patterns within the area would generally be preserved. Construction activities associated with a Tower Variant would not substantially alter the existing drainage pattern of the site or alter the course of a stream or river in ways that would result in substantial erosion, siltation, or flooding on site or off site. Impacts would be less than significant, similar to the Project.

Construction activities associated a Tower Variant, including site clearance, grading, and excavation, would not create or contribute runoff water that would exceed the capacity of existing or planned storm sewer systems or provide substantial additional sources of polluted runoff. During construction, existing stormwater drainage facilities would be replaced by a new storm sewer system that would collect and

[1253] GTC, 2005.

treat on-site stormwater flows and would be sized to accommodate projected flows from upstream contributing areas. With compliance with regulatory requirements as required by mitigation measures MM HY-1a.1 and MM HY-1a.2 (preparation of a SWPPP), impacts would be less than significant, similar to the Project.

Operation

Operation of the Housing Variant would not contribute to violations of water quality standards or waste discharge requirements or otherwise degrade water quality. Compliance with the requirements of the Municipal Stormwater General Permit, the Recycled Water General Permit, and the Industrial General Permit would reduce potential water quality impacts associated with implementation of the R&D Variant. In addition, this variant would be required to comply with the San Francisco SWMP, the Draft San Francisco Stormwater Design Guidelines, and the San Francisco Green Building Ordinance. Compliance with these requirements would be demonstrated in the SDMP or SCP for the project site, as required by mitigation measure MM HY-6a.1. Compliance with the Recycled Water General Permit would be required by implementation of mitigation measure MM HY-a.2. To reduce the potential for stormwater infiltration to mobilize historic soil contaminants at HPS Phase II, the use of infiltration BMPs would be prohibited by mitigation measure MM HY-6b.1. To reduce stormwater runoff impacts associated with industrial activities at HPS Phase II, compliance with the Industrial General Permit would be required by implementation of mitigation measure MM HY-6b.2. To reduce stormwater impacts associated with maintenance dredging of the marina, compliance with the DMMO regulatory requirements would be required by implementation of mitigation measure MM HY-6b.3. Compliance with the Clean Marinas California Program would be required by implementation of mitigation measure MM HY-6b.4. As the footprint of development, land uses, and extent of impervious surfaces would be the same for the Tower Variants as the Project, impacts would be similar to the Project.

Implementation of a Tower Variant would not utilize groundwater as a source of water supply nor interfere substantially with groundwater recharge. Thus, there would be no net deficit in aquifer volume or a lowering of the local groundwater table level and no impact would occur, similar to the Project.

Operation of a Tower Variant could alter the existing drainage pattern of the site, but would not alter the course of an existing stream or river or result in substantial erosion, siltation, or flooding on-site or off-site, similar to the project. Implementation of a Tower Variant would not contribute runoff water that would exceed the capacity of existing or planned storm sewer systems or provide substantial additional sources of polluted runoff, as development would include a separate stormwater system that would be sized to accommodate estimated runoff flows and treat runoff prior to discharge to the Bay. Compliance with regulatory requirements, including the submission of a SDMP and SCP to the SFPUC for approval, as required by mitigation measure MM HY-6a.1, would ensure that this impact would be less than significant, similar to the Project.

Implementation of a Tower Variant would not place housing and other structures within a 100-year flood zone or otherwise include development that would impede or redirect flood flows. Implementation of mitigation measures MM HY-12a.1 (Finished Grade Elevations above Base Flood Elevation) and MM HY-12a.2 (Shoreline Improvements for Future Sea-Level Rise) would reduce impacts to a less-than-significant level, similar to the Project.

Implementation of a Tower Variant would not expose people or structures to a significant risk of loss, injury, or death involving flooding, including flooding as a result of the failure of a levee or dam. Implementation of mitigation measure MM HY-14 (Shoreline Improvements to Reduce Flood Risk) would reduce impacts to a less-than-significant level. Based on historical records and the location of development, the Tower Variants would not expose people or structures to inundation by seiche, tsunami, or mudflow. Impacts would be less than significant, similar to the Project.

Biological Resources

The footprint of development for a Tower Variant would be the same as for the Project, and the area subject to ground disturbance would be the same as the Project. As such, impacts to Biological Resources from construction of a Tower Variant would also be the same as the Project. As the footprint of development, the total amount of development, and land uses would be the same as the Project, operational impacts to biologic resources would also be the similar to the Project.

Construction

Development of a Tower Variant would not conflict with the provisions of an adopted Habitat Conservation Plan, Natural Community Conservation Plan, or other approved local, regional, or State habitat conservation plan, and no impact would occur, similar to the Project.

Construction activities under a Tower Variant would not have a substantial adverse effect, either directly or through habitat modifications, on any common species or habitats of fish, wildlife, or birds due to interference with migratory movement. Impacts would be less than significant, and as the same area would be subject to construction activities as the Project, impacts would be similar to the Project.

Construction activities associated with a Tower Variant would not have a substantial adverse effect, either directly or through habitat modifications, on any plant species identified as a candidate, sensitive, or special-status species in local or regional plans, policies, or regulations, or by the California Department of Fish and Game (CDFG) or United States Fish and Wildlife Service (USFWS), and no impact would result, similar to the Project.

Construction activities associated with a Tower Variant could have a substantial adverse effect on federally protected wetlands as defined by Section 404 of the CWA through direct removal, filling, hydrological interruption, or other means. Implementation of mitigation measures MM BI-4a.1 and MM BI-4a.2 would reduce this impact to a less-than-significant level. As the same area would be subject to construction activities as the Project, impacts would be similar to the Project.

Construction activities associated with a Tower Variant could have a substantial adverse effect on eelgrass beds, a sensitive natural community identified in local or regional plans, policies, and regulations or by the CDFG or USFWS. Implementation of mitigation measures MM BI-5b.1 through MM BI-5b.4 would reduce this impact to a less-than-significant level, similar to the Project.

Construction activities associated with a Tower Variant could have a substantial adverse effect, either directly or through habitat modifications, on any bird species identified as a candidate, sensitive, or special-status species in local or regional plans, policies, or regulations, or by the CDFG or USFWS.

Implementation of mitigation measures MM BI-6a.1 and MM BI-6a.2 would reduce this impact to a less-than-significant level, similar to the Project.

Similar to the Project, the Tower Variant's Draft Parks, Open Space, and Habitat Concept Plan would identify ecological enhancement measures that would include the restoration and management of suitable raptor foraging habitat. To provide a mechanism by which implementation of these enhancements would be ensured, mitigation measure MM BI-7b would be implemented to ensure that specific standards related to the enhancement of raptor foraging habitat would occur. Therefore, a net increase in the quality of raptor foraging habitat would result, similar to the Project, and, with mitigation, the overall effect on raptors is expected to be beneficial.

Mitigation measure MM BI-9b would reduce the effects of pile driving-related activities to fish and marine mammals by recommending the type of piles to use to minimize sound impacts; providing for an alternative method of installation to minimize sound impacts; requiring installation during an agency-approved construction window when fish are least likely to be present to avoid the bulk of potential impacts; and requiring a construction monitor to ensure compliance with all measures, including sound monitoring.

Construction activities could impact designated critical habitat for green sturgeon and Central California Coast steelhead; however, compensatory mitigation for lost aquatic habitat as described in mitigation measures MM BI-4a.1 and MM BI-4a.2 would be implemented to minimize impacts to wetlands, aquatic habitats, and water quality during construction. Overall adverse effects would be less than significant, similar to the Project. Mitigation measures MM BI-4a.1, MM BI-4a.2, MM BI-5b.1 through MM BI-5b.4, MM BI-12a.1, MM BI-12a.2, MM BI-12b.1, and MM BI-12b.2 would reduce potentially significant impacts to Essential Fish Habitat to less-than-significant levels, similar to the Project.

Construction activities associated with a Tower Variant would not have a substantial adverse effect, either directly or through habitat modifications, on the western red bat, a species identified as a candidate, sensitive, or special-status species in local or regional plans, policies, or regulations, or by the CDFG or USFWS. Impacts would be less than significant and as the same area would be disturbed by construction activities as the Project, impacts would be similar to the Project.

In-water construction activities associated with a Tower Variant would require the removal of hard substrates (docks, riprap, seawalls, pilings, etc) used by native oysters, but would not have a substantial adverse effect, either directly or through habitat modifications, on this species. Impacts would be less than significant, similar to the Project.

Construction activities associated with a Tower Variant would not interfere substantially with the movement of native resident or migratory wildlife species or with established native resident or migratory wildlife corridor, or impede the use of native wildlife nursery sites. Impacts would be less than significant, similar to the Project.

In-water construction associated with a Tower Variant would not result in the disturbance of contaminated soil or the re-suspension of contaminated sediments that could have a substantial adverse effect, either directly or through habitat modifications, on species identified as candidate, sensitive, or special-status species in local or regional plans, policies, or regulations, or by the CDFG or USFWS.

Additionally, construction associated with a Tower Variant would not have a substantial adverse effect on a sensitive natural community identified in local or regional plans, policies, and regulations or by the CDFG or USFWS. Impacts would be less than significant, similar to the Project.

Development of the Tower Variant would not conflict with the natural resource protection policies of the General Plan; however, it could result in the disturbance or loss of trees that are protected by the City's Urban Forestry Ordinance and Section 143 of the *Planning Code*. Mitigation measure MM BI-14a would ensure that development does not result in conflicts with these policies by requiring preservation of street trees, trees that meet the size specification of significant trees, replacement of large trees that are removed, and the planting of street trees, consistent with *Planning Code* Section 143. In addition, mitigation measure MM BI-7b includes the planting of approximately 10,000 net new trees. With implementation of mitigation measures MM BI-14a and MM BI-7b, the Tower Variant would not result in a conflict with City policies designed to protect urban streetscape through the planting of street trees, similar to the Project, and overall impacts would be beneficial.

Operation

Impacts to native oysters and EFH would be less than significant as removed hard structures would be replaced with approximately equal amounts of suitable habitat along the shoreline or the new breakwater. Implementation of mitigation measure MM BI-18b.1 would reduce the effects of marina operational activities to oysters, and mitigation measure MM BI-18b.2 would mandate the application of BMPs to control the distribution of sediments disturbed by the dredging activities to reduce water quality impacts to oysters. Mitigation measures MM BI-19b.1 and MM BI-19b.2 would reduce dredging and contamination impacts to EFH. With implementation of the identified mitigation measures, impacts would be reduced to a less-than-significant level, similar to the Project.

Development of the Tower Variant could interfere substantially with the movement of native resident or migratory fish or wildlife species or with established native resident or migratory wildlife corridors, or impede the use of native wildlife nursery site (eelgrass beds). Mitigation measures MM BI-5b.1 through MM BI-5b.4 would reduce effects on eelgrass by surveying for and avoiding this habitat. Mitigation measures MM BI-20a.1 and MM BI-20a.2 would reduce the effects of operational activities related to tall structures and increased lighting to migrating species to less-than-significant levels by incorporating design features that would help minimize bird strikes, including using operational methods to reduce the effects of new lighting towers. As all three of the Tower Variants would include one additional residential tower, impacts would be slightly greater than the Project. However, implementation of mitigation measures MM BI-20a.1 and MM BI-20a.2 would reduce this impact to a less-than-significant level, similar to the Project.

Implementation of the Tower Variant would be consistent with the biological resources protection policies of the City of San Francisco General Plan, and with implementation of mitigation measure MM BI-14a, development would be constructed in a manner consistent with policies of the Urban Forestry Ordinance and *Planning Code* Section 143. Consequently, the operation of the Tower Variant would not conflict with any local policies or ordinances protecting biological resources, and there would be no impact.

Public Services

Construction

Police and Fire Services

Similar to the Project, access to a Tower Variant site during construction would be maintained by implementation of a construction management traffic plan (CMTP) MM TR-1. The CMTP would provide necessary information to various contractors and agencies as to how to maximize the opportunities for complementing construction management measures and to minimize the possibility of conflicting impacts on the roadway system, while safely accommodating the traveling public in the area. A cohesive program of operational and demand management strategies designed to maintain acceptable levels of traffic flow during periods of construction activities in the area would be implemented.

Similar to the Project, construction of a Tower Variant would not result in increased demand on police protection services, as demands on the SFPD during construction would be supplemented by private security (as required by mitigation measure MM PS-1 [site security measures during construction]), and construction areas would be secured through the installation of fencing and gates.

Therefore, a Tower Variant would result in a less-than-significant impact to police protection and fire services during construction. As construction of a Tower Variant would not impact SFPD or SFFD response times upon implementation of a CMTP. These impacts would be similar to the Project.

Schools and Library Facilities

Construction of a Tower Variant would not result in impacts to the SFUSD or the San Francisco Public Library System. SFUSD or library facilities are not located on the Project site. All area school and library services would be available to the community throughout the duration of a Tower Variant construction. As such, since construction of a Tower Variant would be similar to construction of the Project, no impact to school or library services during construction of a Tower Variant would occur. These impacts are the same as those identified for the Project.

Operation

Police Protection Services

Development with a Tower Variant would have similar impacts to police protection services as development with the Project. Therefore, since operational impacts to police protection services were found to be less than significant for the Project, impacts to police protection services for a Tower Variant would also be less than significant.

Fire Protection Services

Development with a Tower Variant would have similar impacts to fire services as development with the Project. Therefore, since operational impacts to these services were found to be less than significant for the Project, impacts to these services for a Tower Variant would also be less than significant.

Building Safety

All new buildings must meet standards for emergency access, sprinkler, and other water systems, as well as all other requirements specified in the *San Francisco Fire Code*, which would help minimize demand for future fire protection services. Plan review of all structures for compliance with *San Francisco Fire Code* requirements would minimize the potential for fire-related emergencies by providing on-site protective features, reducing the demand for fire protection services.

Response Time

Construction of a new SFFD facility on land designated for community serving uses on the Project site, along with the provision of additional firefighters and on-going fire protection operations, would allow the SFFD to maintain acceptable response times for fire protection and emergency medical services. The Applicant has designated 5.3 acres of community-serving uses in HPS Phase II, including 0.5 acre of which have been designated for a new SFFD facility.

These uses have been anticipated as part of a Tower Variant and the impacts of their construction are evaluated in this EIR. Construction activities associated with proposed public facilities are considered part of the overall Variant. A discussion of project-related construction impacts, including those associated with the construction of public facilities, is provided in the applicable sections of this EIR, including Section III.D, Section III.H, Section III.I, Section III.J, Section III.K, and Section III.M. Construction impacts would be temporary. While it is likely that construction of the various public facilities would not result in significant impacts (either individually or combined), construction of the entire development program, of which the public facilities are a part, would result in significant and unavoidable impacts related to construction noise and demolition of an historic resource; all other construction-related impacts would be less than significant (in some cases, with implementation of identified mitigation). Refer to Section III.D, Section III.H, Section III.I, Section III.J, Section III.K, and Section III.M for the specific significance conclusions for construction-related effects.[1254] As such, the construction impacts associated with a new SFFD facility on the Project site have been addressed in this EIR. Therefore, similar to the Project, the development of a Tower Variant would not require new or physically altered fire protection facilities to maintain acceptable response times. Additionally, compliance with all applicable provisions of the *San Francisco Fire Code* would ensure that this impact is less than significant.

Schools

Operational impacts to schools would be similar to the Project because the number of dwelling units anticipated would be the same. Therefore, the number of school aged children that would require adequate school services would be the same as with the Project. Impacts from a Tower Variant on schools would be less than significant, similar to the Project.

[1254] The impact statements provided in each technical section of the EIR differentiate between construction impacts and operational or development impacts, and all identified mitigation measures are contained in the impact analysis. In addition, Table ES-2 in the Executive Summary of this EIR also summarizes all impact statements, the level of significance before mitigation, any identified mitigation measures, and the level of significance after mitigation.

Library Facilities

Operational impacts to libraries would be similar to the Project because the same number of dwelling units anticipated would be the same. Therefore, the service population for the existing library facilities would be the same as with the Project. Similar to the Project, library branches that currently serve the area including the new Portola branch (opened in 2009), the Visitacion Valley branch currently under construction (opening in 2010), and the Bayview branch to be expanded beginning in 2010 (opening in late 2011), would continue to meet the demands of the community. Therefore, a Tower Variant would result in a less than significant operational impact to library services, similar to the Project.

Recreation

As the amount of open space and parks, the total amount of development, and the land uses provided with a Tower Variant would be the same as the Project, impacts to recreation would also be similar to the Project. This Variant, like the Project, would provide approximately 336.4 acres of parks and open space.

Construction impacts related to recreational facilities would be the same as those identified with the Project because the construction activities would be the same. The Tower Variant would have the same number of housing units as proposed with the Project, thereby resulting in the same residential population of 24,465. Operational impacts are determined based on a ratio of acres of parkland per resident. Currently, the City provides approximately 7.1 acres of parkland per thousand residents, and the standard used in Section III.P assumes a ratio of 5.5 acres of parkland per 1,000 population is sufficient to meet the demand for recreational facilities without causing or accelerating substantial physical deterioration of facilities or requiring the construction of further facilities. The parkland-to-population ratio associated with the Tower Variant would be 13.7, which is the same as the Project. The Tower Variant ratio would be considerably higher than the ratio of 5.5 acres of parkland per thousand residents, which is considered sufficient to meet demand for recreational facilities without causing or accelerating substantial physical deterioration of facilities or requiring the construction of further facilities. Impacts would be less than significant.

The timing of Tower Variant development could result in a temporary increase in the use of parks, recreational facilities, and open space in a manner that would cause or accelerate the substantial physical deterioration or degradation of facilities if the development of residential and/or employment-generating uses were to occur in advance of the development of park and recreational facilities. The conceptual development plan for this Variant would result in the development of residential units and parks during all of four stages of development. Table III.P-3 (Residential Units and Park Acreage Provided during Each Stage of Development) outlines the number of residential units and the acreage of parkland provided during each stage of development, as well as the resulting park-to-population ratio for residents of the Project site (even if developed under the Tower Variant). As this table indicates, the park-to-population ratio would not drop below 13.8 acres per 1,000 population at any time during the four stages of development, which exceeds the benchmark of 5.5 acres of parkland per 1,000 population. Adequate parkland would be provided during each stage of development.

However, during a given phase, park construction could lag behind residential development, leading the parkland-to-population ratio to drop below an acceptable level. Moreover, the development plan is

conceptual and could be modified during the entitlement and development process. Mitigation measure MM RE-2 would ensure that the parks and recreational amenities are constructed as residential and employment-generating uses are developed, and a less-than-significant impact would result.

A Technical Memorandum was prepared to study wind conditions at a launch site at CPSRA (in The Neck area) and in a 55-acre portion of the Bay south of the launch site. The study found that development in the cumulative scenario, which includes development at the Project site (even if under the Tower Variant), generally results in wind speed changes near the shoreline (generally within 300 feet) ranging from no change to a 10 to 20 percent decrease in wind speed. Approximately 7 acres near the shoreline would experience a decrease of 10 to 20 percent in wind speed; approximately 36 acres of the Bay would experience a decrease of five to 10 percent; and approximately 12 acres of the Bay would experience a decrease of less than five percent. The majority of the windsurfing test area (as identified in the Technical Memorandum) would not be substantially affected (e.g., a 10 percent decrease or less in wind speed). Because this Variant is the same as the Project in terms of development amounts and locations, it would not significantly and adversely affect existing windsurfing opportunities at the CPSRA. A less-than-significant impact would occur, and no mitigation is required.

In summary, impacts resulting from the Tower Variant would be substantially similar to the Project.

Utilities

As the footprint of development, the total amount of development, and the land uses provided with a Tower Variant would be the same as the Project, utility impacts for a Tower Variant would also be similar to the Project.

Water

As with the Project, beginning in 2025, during multiple dry-year periods, the total retail water supply would be slightly less than estimated total demand, including demand associated with a Tower Variant. With the implementation of the WSAP and RWSAP during multiple dry-year periods, which could include voluntary rationing or other water conservation strategies, existing and projected future water supplies could accommodate estimated future water demand, including the Project-related demand. As discussed in the WSA, the SFPUC has approved and has made substantial progress towards the implementation of the water facility improvement projects identified in the WSIP. The SFPUC has received voter approval to fund the Phased WSIP program and has initiated bond sales to fund implementation of individual projects, which are in various stages of implementation, including subsequent environmental review, design, or construction.[1255] Thus, there is substantial evidence that the SFPUC would implement the Phased WSIP facility projects described above, including the local water supply projects.

[1255] Per the *Water System Improvement Program Quarterly Report, Q4, FY 2008/2009* (dated August 20, 2009), (prepared by the SFPUC), as of July 1, 2009, two (2) projects are in the Planning Phase, eleven (11) projects are in the Design Phase, six (6) projects are in the Bid and Award Phase, five (5) projects are in the Construction Phase, two (2) projects in the Close-Out Phase, eight (8) projects are completed, one (1) project has not been initiated, and eleven (11) projects have multiple active phases. Available at: http://sfwater.org/Files/Reports/01_RW_Program_Summary.pdf Accessed September 28, 2009.

The San Francisco Recycled Water Program currently includes the Westside, Harding Park, and Eastside Recycled Water Projects, and various conservation efforts. The proposed projects would provide up to 4 mgd of recycled water to a variety of users in San Francisco.[1256,1257] Recycled water will primarily be used for landscape irrigation, toilet flushing, and industrial purposes. The Harding Park Project has completed environmental review, and the Westside Project is expected to begin environmental review in late 2009 or early 2010. The WSIP contains funding for planning, design, and environmental review for the San Francisco Eastside Recycled Water Project. The local water supply improvement projects were approved as part of the Phased WSIP and are included in the WSIP funding program. The SFPUC has initiated planning, environmental review, and design of several recycled water and groundwater projects and conservation programs are in place. Thus, there is substantial evidence that the additional water provided by those projects would be available to supplement retail water supplies.

As noted above, the SFPUC adopted the Phased WSIP, which phased implementation of the water supply program to provide an additional 20 mgd of supply to meet projected demand through 2018 and requires the SFPUC to re-evaluate water demands and water supply options by December 31, 2018 through 2030 to meet projected demand. The Tower Variant would not require water supplies in excess of existing entitlements or result in the need for new or expanded entitlements, and this impact is less than significant, similar to the Project.

Wastewater

Wastewater generated by a Tower Variant would be discharged to the Combined Sewer System operated by the SFPUC. As the additional wastewater flows could be accommodated within the existing treatment capacity of those facilities, no expansion of existing wastewater conveyance or treatment facilities would be required and impacts would be less than significant. With the Tower Variant, Candlestick Point would no longer contribute stormwater or wastewater to the Combined Sewer System, similar to the Project. Implementation of a Tower Variant would not exceed the wastewater treatment requirements of the applicable Regional Water Quality Control Board, and a less-than-significant impact would occur. As the same amount of development would occur with a Tower Variant as with the Project, wastewater generation would be the same, and operational impacts associated with wastewater would be less than significant, similar to the Project.

Solid Waste

Construction of a Tower Variant, including demolition of existing facilities, would generate additional solid waste that may not be able to be accommodated by landfills serving the City of San Francisco. Implementation of mitigation measure MM UT-5a (Construction Waste Diversion Plan), which would require preparation of a construction waste diversion plan, would reduce impacts to a less-than-significant level. Construction of a Tower Variant could require the disposal of hazardous wastes such as lead-based paint, asbestos, and contaminated soils. However, this construction waste would not exceed the capacity of transport, storage, and disposal facilities permitted to treat such waste, and impacts would

[1256] San Francisco Planning Department, Final Program Environmental Impact Report, Water Supply Improvement Program, October, 2008.
[1257] SFPUC, Urban Water Management Plan, 2005.

be less than significant. As the same amount of construction would occur with a Tower Variant as with the Project, construction-period solid waste impacts would be similar to the Project.

Operation of a Tower Variant would generate additional solid waste that may not be able to be accommodated by landfills serving the City of San Francisco. Implementation of mitigation measure MM UT-7a (Solid Waste Management Plan) would reduce impacts to a less-than-significant level. Operation of a Tower Variant would not generate solid waste that would exceed the permitted capacity of transport, storage, and disposal facilities authorized to treat such waste, and impacts would be less than significant. Implementation of a Tower Variant would comply with federal, state, and local statutes and regulations related to solid waste, and impacts would be less than significant. As the same amount of development and the same land uses would occur with a Tower Variant as with the Project, operational impacts to solid waste would be similar to the Project.

Electricity, Natural Gas, and Telecommunications

The proposed improvements within the Project site include the construction of a joint trench for electrical, natural gas, cable TV, and telecommunications. The power supplier may service the project via new extensions of the 12KV distribution and or 115KV transmission lines into HPS Phase II. This could include a new substation within the Project site. Impacts of construction activities associated with the Project, including demolition and installation of new utility infrastructure, are discussed in Section III.D, Section III.H, Section III.I, Section III.J, Section III.K, Section III.L, Section III.M, Section III.O, and Section III.S of this EIR. No new construction impacts beyond those identified in those sections would occur with construction of utility infrastructure associated with the Tower Variant, similar to the Project. Telecommunications providers are "on-demand" services, generally expanding their systems in response to demand, and would be anticipated to provide extensions of existing infrastructure to the Project site as required. Such extensions would require minimal trenching, if any, and would not be anticipated to result in significant environmental impacts beyond those previously analyzed in this EIR. The subdivision process would include submittal of detailed infrastructure plans to the Department of Public Works identifying how they would meet the infrastructure needs of the Project. Implementation of these plans would be a condition of subdivision approval. The subdivision process would ensure that adequate infrastructure is provided to accommodate the demands of the Project such that the capacity of the service providers to provide such utilities would not be exceeded. Therefore, the impact would be less than significant for the Tower Variant, similar to the Project.

Energy

As the footprint of development, the total amount of development, and the land uses provided with a Tower Variant would be the same as the Project, energy impacts for a Tower Variant would also be the same as the Project.

Construction activities associated with a Tower Variant would require: electricity, for operation of hand tools, air compressors, mobile project offices, and security lighting; diesel, for fueling grading and construction equipment, delivery trucks, and earth hauling trucks; and gasoline, to fuel construction worker commute vehicles. Construction would consist of temporary activities that would not generate a prolonged demand for energy. Thus, energy consumption associated with construction activities would

not be large in comparison to the Project, which is of a similar size and with similar land uses. Impacts would be less than significant, similar to the Project.

Operation of the Tower Variants would result in electricity and natural gas demand to operate the buildings and facilities; and petroleum usage associated with vehicle trips. These uses would increase the use of electricity and natural gas in the area, as well as consumption of petroleum; however, this would not be considered a wasteful use, and overall demand on the electrical grid would not be substantially increased. Impacts of a Tower Variant would result in a less-than-significant impact, similar to the Project.

Greenhouse Gas Emissions

The Candlestick Point Tower Variants A, B, and C would have the same GHG emissions as the project for both construction and operational emissions with the implementation of the mitigation measures. The emissions are shown in Table III.S-2 (Project Construction GHG Emissions) and Table III.S-3 (Project Annual GHG Emissions). Based on the less-than-significant conclusion for the Project, the Candlestick Point Tower Variants would all also be less-than-significant.

BAAQMD is considering the future adoption of quantitative CEQA thresholds of significance for operational-related GHG emission impacts. At present, two options relevant to the Project are under consideration for operational GHG emission thresholds; the lead agency can choose either option. Option 1 is based on a project's total operational GHG emissions of 1,100 metric tonnes CO2e per year. The Project's total operational emissions would exceed this level, which means that if this was used, the Project would be significant. Option 2 is based on the amount of a project's operational GHG emissions per service population, set at 4.6 metric tonnes CO2e per year. In anticipation of proposed new BAAQMD CEQA thresholds of significance for GHG emissions, this EIR provides an analysis of the Project's operational GHG emissions under the proposed thresholds of significance identified above. The BAAQMD thresholds stated above are still in draft form and may undergo additional changes before being finalized; a revised version is expected Monday, November 2nd. The methodologies presented in this EIR for quantification of GHG operational emissions is based on using more refined data sources than indicated in the BAAQMD guidance and are the most appropriate to use for the Tower Variant and the Project.

With mitigation, the Project-related operational emissions of 154,639 result in 4.5 tonnes CO2e per service population per year based on a service population of 34,242 (this accounts for 23,869 net new residents and all jobs except for the stadium jobs, which already exist, 10,373). Therefore, the Project-related operational emissions would be less than 4.6 tonnes CO2e per service population per year and would result in a less-than-significant impact on climate change. The Tower Variant would not measurably change the parameters of the Project land use program, and thus this analysis applies to the Tower Variant.

IV.E VARIANT 4: UTILITIES VARIANT

IV.E.1 Overview

The Utilities Variant assumes the implementation of additional on-site utility infrastructure, including (1) district heating and cooling, (2) on-site wastewater treatment, and (3) an automated trash collection system. All land uses at Candlestick Point and the HPS Phase II site would be constructed at the same locations and at the same intensities proposed with the Project, although some minor shifts in building locations could occur to accommodate some elements of the proposed utility systems, which would require some additional built space.

IV.E.2 Project Objectives

The objectives for the Utilities Variant would be similar to the Project. In particular, the Utilities Variant was prepared to address the following from Objective 4:

- The integrated development should incorporate environmental sustainability concepts and practices, and in so doing should:
  - > Apply sustainability principles in the design and development of public open spaces, recreation facilities, and infrastructure including wastewater, storm water, utility, and transportation systems
  - > Incorporate green building construction practices
  - > Include energy efficiency and the use of renewable energy

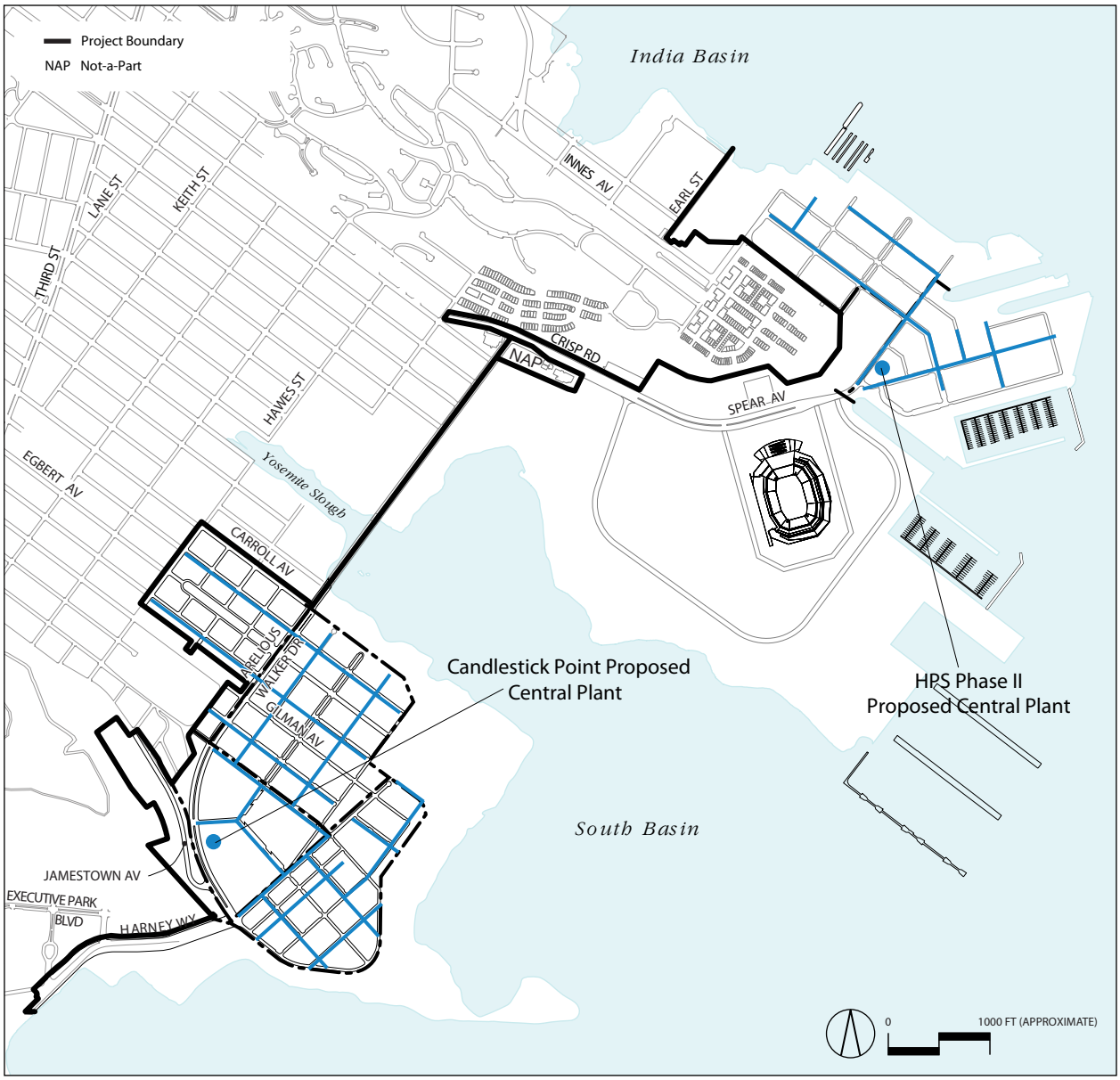
A full list of Project objectives is provided in Section II.D of this EIR.

IV.E.3 Characteristics

Section II.E outlines the Project's land use plan, parks and open space plan, transportation improvements, infrastructure plan, community benefits, and green building concepts. While each of these components of the Project would also apply to this variant, the additional infrastructure described herein would be in addition to that base description.

District Heating and Cooling

For this variant, heating and cooling would be provided from a centralized plant, instead of individual systems in each building or facility. One heating and cooling (district) plant would serve Candlestick Point and a second district plant would serve Hunters Point, with hot water (or steam) and chilled water distributed from the district plant to individual buildings via a pipe distribution network located under the streets (refer to Appendix T1 [District Plant Description]). The district plant serving Candlestick Point is proposed to be located within the parking structure adjacent to the regional retail center, while the district plant serving Hunters Point is proposed to be located within the parking structure adjacent to the R&D facilities (refer to Figure IV-21 [Utilities Variant Location of District Heating and Cooling



SOURCE: Lennar Urban, 2009.

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FIGURE IV-21

UTILITIES VARIANT LOCATION OF DISTRICT HEATING AND COOLING PLANTS

Plants]). Each district plant facility would be approximately 40,000 to 65,000 square feet (depending on the equipment used), arranged on two floors of approximately 15 to 20 feet high, for a maximum development of approximately 130,000 square feet. The first story would contain the boilers, chillers, pumps and other ancillary equipment. The upper story (or roof) would include exhaust ducts and the cooling towers.

Heating is proposed to be provided by natural gas-fired boilers that could generate either steam or hot water, although the most likely medium for distribution would be low temperature hot water (e.g., less than 250 degrees Fahrenheit). Hot water would be distributed via electrically driven pumping systems in the pipe distribution network. (If steam is used, it would be distributed by taking advantage of the backpressure created as the steam cools, and thus a steam distribution system would not require pumps).

Cooling could be provided by several sources including natural gas-fired, steam-fired, or electrically driven chillers. The most likely and energy-efficient option would be to generate chilled water from multiple electrically driven chillers, with the heat that is extracted from the water (by the chillers) transferred to cooling towers (on the roof) where the heat is exhausted to the ambient air through evaporation.

Based on the land uses and amount of developed space proposed in each district, preliminary estimates of the heating and cooling capacities for each district plant are identified in Table IV-35 (Estimated Heating and Cooling Loads). The peak hot water flow capacity of the district plants would be approximately 5,000 gpm for Candlestick Point and approximately 10,000 gpm for Hunters Point. The peak chilled water flow capacity from the district plants would be approximately 25,000 gpm for Candlestick Point and approximately 30,000 gpm for Hunters Point.

Table IV-35 Estimated Heating and Cooling Loads

Load Type	*Candlestick Point*	*HPS, Phase II*	*Totals[a]*
Heating Load (kBtu/hr)	91,511	184,213	220,579
Cooling Load (tons)	14,090	11,822	20,730

SOURCE: Arup, *HP/CP—District Heating and Cooling Description*, August 20, 2009.
a: Diversity, or increased efficiency, has been applied to the totals.

Each building or customer would be provided with a point of connection to the hot and chilled water distribution loops. This point of connection would include meters from which the energy consumption of each service (heating or cooling) could be determined. Within the individual buildings, piping systems would distribute hot and chilled water to air handling units, which would distribute heated or cooled air to building spaces, based on the preferred air temperature set by occupant-controlled thermostats. (Note that proposed district-based systems would provide heated or cooled air only, as hot water would be generated by individual units.)

On-Site Wastewater Treatment

The Utilities Variant would modify the wastewater treatment system to collect and route wastewater flows to decentralized wastewater treatment plants located throughout the Project site, instead of

collecting and conveying wastewater to the Southeast Water Pollutant Control Plant (operated by SFPUC) for treatment. Each decentralized wastewater treatment plant would be sized to accommodate approximately 100,000 gallons per day of wastewater. To accommodate the estimated Project-generated wastewater flow of approximately 1.1 mgd, eleven decentralized wastewater treatment plants would be needed, with seven plants proposed to be located within Candlestick Park and four in Hunters Point, as shown in Figure IV-22 (Utilities Variant Location of Decentralized Wastewater Treatment Plants).

The wastewater treatment plants would use membrane bioreactors (MBRs) to treat wastewater, via a series of screens, anoxic and aerobic bioreactors (which remove solids and convert nitrogen and ammonia compounds), a membrane filter, and disinfection via exposure to ultraviolet light (refer to Appendix T2 [Decentralized MBR]). Sludge produced by the aerobic bioreactor would be held in a storage tank for periodic collection (e.g., once a week) and transport (via a truck) for recycling, composting, or disposal. The recycled water produced by the treatment plants would be distributed via separate plumbing systems for both exterior (e.g., water features, landscape irrigation) and interior uses (e.g., toilets and urinals). With approximately 1.1 mgd of anticipated wastewater flows, and assuming a 5 percent loss (via sludge disposal), the eleven decentralized plants would generate approximately 1.05 mgd of reclaimed water.[1258]

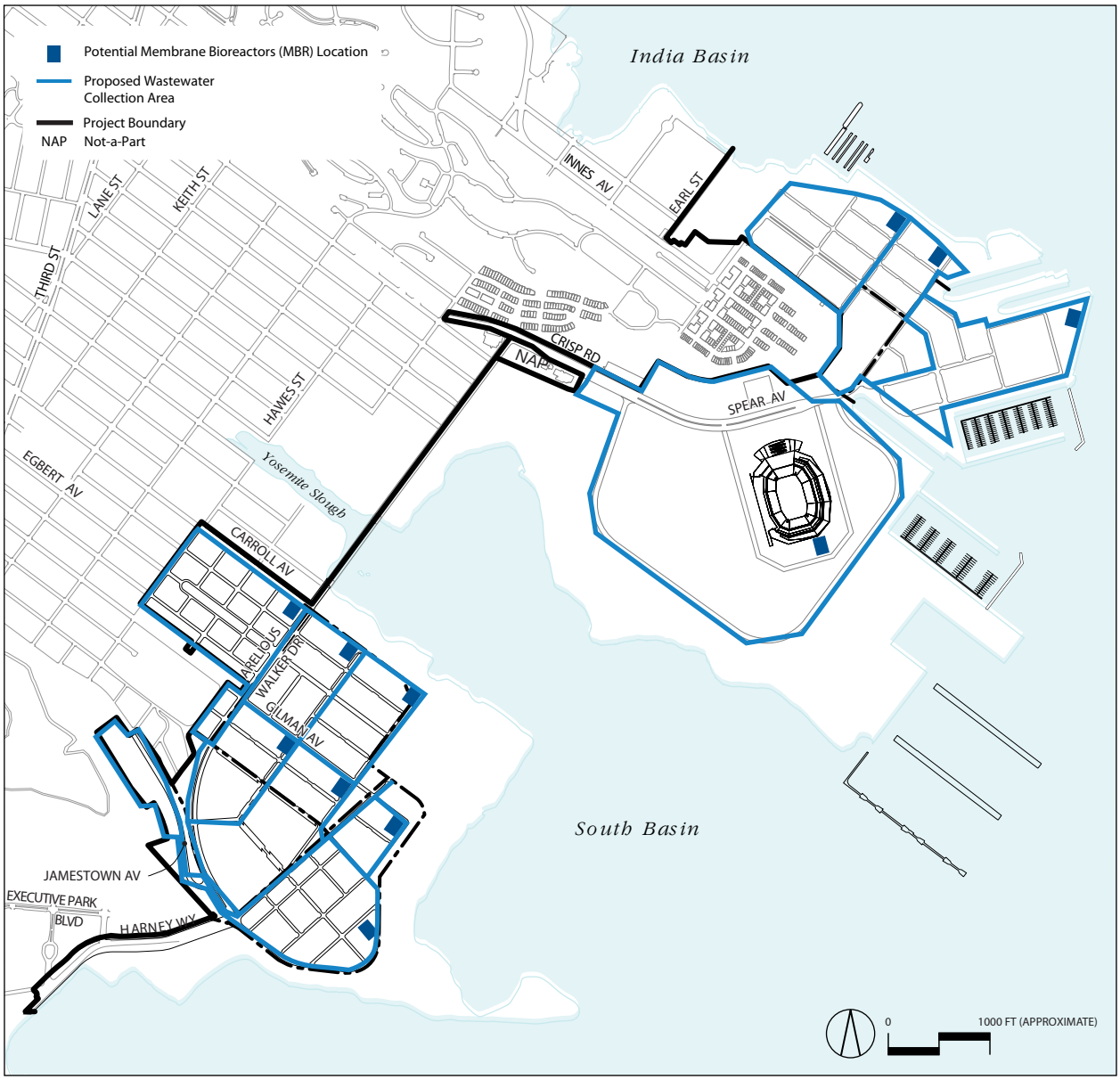
A sludge-holding tank would be used to store sludge, which typically has a water content of about 70 percent, prior to removal. Each wastewater treatment plant would produce about 25 cubic feet or 1,115 pounds (lbs) of wet weight sludge per day. The sludge holding tank would have a storage volume of approximately 175 cubic feet or 6 cubic yards, which could store up to one week of sludge production. Assuming 11 treatment plants, approximately 3,432 cubic yards[1259] of sludge would be generated annually, with a wet weight of approximately 2,238 tons.[1260]

Each wastewater treatment plant would require approximately 6,250 square feet of aboveground footprint to house the treatment plant components, pumps, and chemical storage area. Wastewater, recycled water, and sludge storage tanks could be located below ground (e.g., under parking spaces or driveways) to reduce the footprint of the facility. The estimated belowground footprint requirement for each facility would be approximately 30,000 square feet. Thus, each plant would require approximately 36,250 square feet and the proposed eleven plants would occupy approximately 400,000 square feet.

Automated Trash Collection System

This Variant would provide an automated trash collection system, which would transport trash from individual buildings and collection points and transfer it, via underground pneumatic tubes, to a centralized collection facility, from which solid waste, recyclable materials, and compostable materials would be removed via trucks (refer to Appendix T3 [System Overview]). This automated system would replace the trash and recycling bins at individual buildings with two centralized facilities, one in Candlestick Point and another at Hunters Point (refer to Figure IV-23 [Utilities Variant Location of Centralized Solid Waste Collection Facilities]).

[1258] Arup, MBR Decentralized Wastewater Treatment, EIR Description, August 19, 2009.
[1259] Calculated as 11 treatment plants generating 6 cubic yards per week: 11 plants X 6 yds^3 X 52 weeks = 3,432 yds^3/year.
[1260] Calculated as 11 treatment plants generated 1,115 lbs/day: 11 plants X 1,115 lbs/day X 365 days = 2,238 tons/year.



SOURCE: Lennar Urban, 2009.

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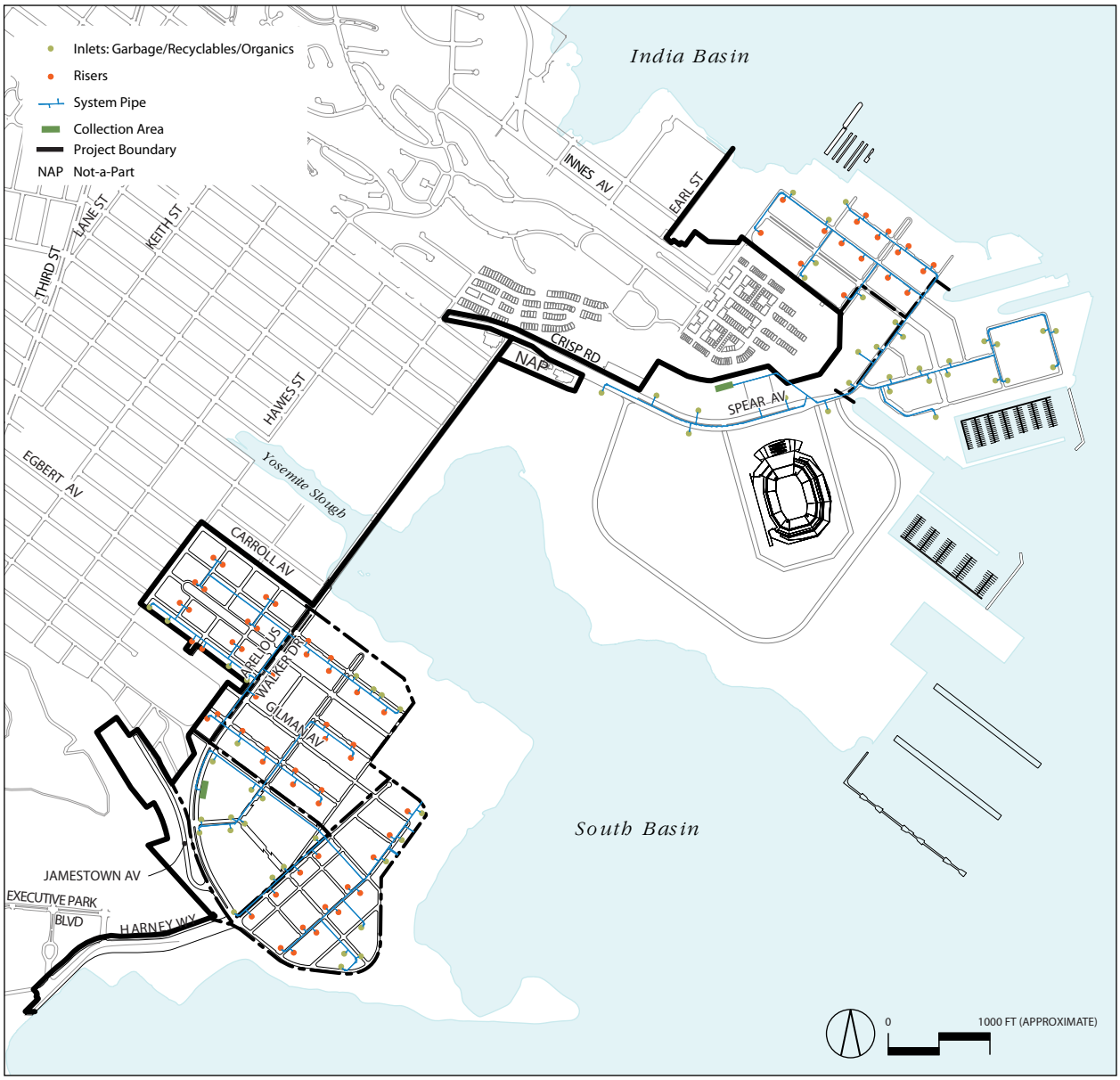
FIGURE IV-22

UTILITIES VARIANT LOCATION OF DECENTRALIZED WASTEWATER TREATMENT PLANTS



SOURCE: Lennar Urban, 2009.

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FIGURE IV-23

UTILITIES VARIANT LOCATION OF CENTRALIZED SOLID WASTE COLLECTION FACILITIES

The proposed automated waste collection system would permit the on-site source separation of recyclables, compostables, and trash, and the introduction of those materials into separate collection points (e.g., trash chutes), which would be located at ground level and on each floor of the multi-story buildings (or in a common areas for a group of single-family homes). Once deposited, the material would be temporarily stored at the loading point, and periodically transferred (via an underground pipe network located within roadways) to a central waste handling facility, via a 60 mph air stream within the transport pipes. The discharge of materials into the underground transport pipe network would occur on a regularly scheduled basis, although a sensor in the temporary storage space would initiate the discharge sequence when the level of materials reaches the capacity of the storage space. At the central waste handling facility, each type of material would be deposited into separate containers for compaction before being transported off site via trucks. With this system, solid waste trucks would not visit individual buildings to collect solid waste, recyclable, and compostable materials, but instead would travel to the two centralized facilities to collect these materials.

The two central waste handling facilities would each house fan units, air scrubbers (to minimize odors), cyclone waste separators (to enhance separation of materials), compactors (to reduce the volume of materials), and 40 cubic yard containers. Once filled, the containers would be moved to a staging location within the facility to await removal by truck and an empty container would be quickly moved into place and connected to the compactor. Each central waste handling facility would be approximately 15,000 to 20,000 square feet and about 35 feet in height, for a maximum of approximately 40,000 square feet.[1261] The facilities could be located completely or partially underground, below a building or parking deck. Sound insulation would be provided around the fan and/or collection area to minimize ambient noise from the facility. Air exhaust from the facilities would be scrubbed prior to discharge, by forcing the exhaust air to pass through a screen of water that removes particles and provides odor neutralization. The scrubber water would be filtered and recycled.

IV.E.4 Potential Environmental Effects

Overall, the Utilities Variant would increase the total amount of development compared to the Project due to an increase in the amount of square footage allocated to utilities. Two district heating and cooling plants, approximately 40,000 to 65,000 square feet each, would be developed, reducing the amount of infrastructure that would need to be included within individual buildings. It is assumed that the size of individual buildings would slightly decrease (because less mechanical equipment would be needed), and thus the amount of total new space associated with heating and cooling systems would be essentially the same. The inclusion of decentralized wastewater treatment plants would increase the amount of built space by approximately 400,000 square feet, assuming the inclusion of eleven decentralized MBR treatment facilities, each approximately 36,250 feet in size. However, approximately 30,000 square feet of each facility would be located underground effectively reducing the new development associated with the MBR facilities (from a pedestrian standpoint) to 68,750 square feet.[1262] The inclusion of the automated solid waste collection system would result in the development of two central waste collection facilities, each approximately 15,000 to 20,000 square feet in size, for a total of approximately 40,000 square feet.

[1261] TransVac Systems, CP-HPS System Overview, August 18, 2009.
[1262] 6,250 square feet of above ground development for each of the eleven MBR facilities.

As these facilities would eliminate the inclusion of solid waste receptacles (and compaction equipment) within individual buildings, it is assumed that the total amount of space attributed to the collection, storage and compaction of solid waste could be greater than the more standard methods of collection, such as dumpsters within each building. Thus, this Variant would increase the total amount of built space by approximately 568,750 square feet.

The Utilities Variant would include underground distribution systems such as pipes and pumps, located underneath the streets within the Utilities Variant area, similar to the Project. The number of underground systems would increase with development with this Variant, as hot water, chilled water, and three separate waste collection systems (for solid waste, recyclables, and compostables) would be provided. Storage tanks associated with the decentralized wastewater treatment plants are proposed to be located underground. Compared to the Project, the Utilities Variant would increase the extent of underground construction, with additional underground utility systems located within the street network and storage tanks located beneath the wastewater treatment plants.

Thus, the potential construction-related environmental effects of the Utilities Variant would be related to an increase in the amount of total building space, approximately 568,750 square feet, of which approximately 330,000 square feet would be below-grade, and an increase in the extent of underground construction (from additional utility systems located beneath the street network and the underground storage space for the wastewater treatment plants).

The potential operational effects of the Utilities Variant would be related to operation of district heating and cooling plants, the decentralized wastewater treatment plants, and the automated solid waste collection system.

Land Use and Plans

Development of the Utilities Variant would be substantially similar to the Project and would not physically divide an established community or conflict with plans, policies, or regulations adopted to avoid or mitigate an environmental effect. Operation of the Utilities Variant would alter the existing land use character of the vicinity, but such an alteration would not be adverse, similar to the Project. The Utilities Variant would include approximately 568,750 square feet of additional space, when compared to the Project, to accommodate the heating and cooling plants, the wastewater treatment plants, and the solid waste collection system. Notably, approximately 330,000 square feet of this total would be constructed below ground, thereby reducing potential impacts. Therefore, construction proposed above-ground with the Utilities Variant includes approximately 15 new buildings, the tallest of which would be 35 feet in height, and the largest of which would be approximately 40,000 to 65,000 square feet (the heating or cooling plants). This development is consistent with uses and building characteristics proposed with the Project. Therefore, these additional structures would not result in an adverse change to the land use character of the site or the surrounding areas, and the Utilities Variant would result in a less-than-significant impact, similar to the Project. The Utilities Variant would result in an urban development replacing deteriorating industrial and open space, similar to the Project, and would not conflict with existing land use plans. Thus, potential impacts of the Utilities Variant to land use and plans would be less than significant, similar to the Project.

Population, Housing, and Employment

As discussed in the introduction, the Utilities Variant includes the development proposed with the Project plus the addition of substantial infrastructure, including a subterranean piping network, new heating and cooling towers, new wastewater treatment facilities, and relocated/redesigned solid waste collection facilities. All impacts related to the inducement of substantial population growth (directly or indirectly) were found to be less than significant for the Project. The installation of additional infrastructure to better serve the proposed development would not result in the generation of substantial additional residents or employees in the area, in addition to what is anticipated with the Project. While some additional short-term employment opportunities may be made available during the construction period, these opportunities would be few and placement would be from the surrounding community.

Operation of the Utilities Variant, which would consist of the operation and maintenance of the proposed infrastructure improvements, would not result in the generation of a substantial number of people to the area. While operation of the Utilities Variant could induce population growth directly and/or indirectly, this growth would not be substantial and the Utilities Variant would result in a less-than-significant impact, similar to the Project. As with the Project, the Utilities Variant could temporarily displace existing housing units and residents at Candlestick Point, but construction of replacement housing would not be necessitated elsewhere. Thus, potential population, employment, and housing impacts of the Utilities Variant would be less than significant, and similar to the Project.

Transportation and Circulation

As is considered for the Project, under the Utilities Variant, the installation of additional infrastructure to better serve development would not result in the generation of additional residents or employees in the area that would result in additional traffic. All land uses at Candlestick Point and the HPS Phase II site would be constructed at the same locations and at the same intensities proposed under the Project, although some minor shifts in building locations could occur to accommodate some elements of the proposed utility systems, which would require some additional built space. Therefore, the Utilities Variant would not result in an increase in traffic that is substantial in relation to the existing traffic load and capacity of the street system, above what was analyzed for the Project. Furthermore, the Utilities Variant would not exceed, either individually or cumulatively, a level of service standard established by the county congestion management plan (CMP) for roads or highways. Generally speaking, transportation impacts associated with the Utilities Variant would be the same as those identified for the Project.

The Utilities Variant site is not located within the San Francisco Airport Land Use Policy Plan Area or near a private airstrip. Therefore, the Utilities Variant would result in a less than significant impact to aircraft activity and traffic levels, similar to the Project.

The Utilities Variant includes the installation of a subterranean piping network, as well as approximately 15 new buildings to house the requisite utility functions. The subterranean development would not affect or increase hazards due to design features or incompatible uses above ground. The new buildings would be designed consistent with the SFBC which would reduce all potential design hazards to a less than significant level. Furthermore, the roadway network associated with both the Project and the Utilities

Variant would be designed to meet all applicable codes, including design guidelines for emergency access, and would result in a less than significant impact due to design hazards, similar to the Project.

The provision of a sophisticated utility system under the Utilities Variant would not substantially increase the number of residents or employees in the area. As such, substantial additional parking, above that considered for the Project, would not be required. Parking at the new buildings associated with the utilities including, but not limited to, the heating and cooling plants, the wastewater treatment facilities, and the solid waste collection facilities would be provided consistent with the requirements of the SFBC. Therefore, the Utilities Variant would result in a less than significant impact to parking, similar to the Project. As the Utilities Variant would not change the roadway design or alternative transportation plans analyzed for the Project, the Utilities Variant would comply with adopted policies and plans regarding alternative transportation and would result in a less than significant impact.

Aesthetics

Construction

Similar to the Project, construction activities associated with the Utilities Variant would generally include demolition (scraping and/or cutting) of existing asphalt and concrete, grading for roadways, roadway improvements, trenching for the proposed underground piping network, and construction of new buildings. Construction activities associated with the Utilities Variant would not have a substantial adverse effect on a scenic vista, scenic resources including, but not limited to, trees and rock outcroppings, or the visual character of the area. Construction activities may be seen from adjacent land uses, similar to the Project; however, these construction conditions would be temporary visual distractions typically associated with construction activities and commonly encountered in developed areas. Therefore, impacts to the visual character of the area would be less than significant, similar to the Project. While construction activities are taking place, appropriate security lighting would be utilized. However, this would be a temporary occurrence and lighting would be removed upon completion of construction. Therefore, the Utilities Variant would not create a new source of substantial light or glare that would adversely affect day or night views in the area or substantially adversely impact other people or properties. Mitigation measures MM AE-7a.1 through MM AE-7a.4, MM AE-7b.1, and MM AE-7b.2 would reduce lighting impacts to less than significant for this variant.

Operation

The Utilities Variant would result in approximately 15 new buildings on site including a variety of heating and cooling plants, wastewater treatment plants, and solid waste collection facilities. However, all of these buildings would have a height no greater than 35 feet. This is consistent with other development in the surrounding urban and developed area. Additionally, this height is consistent with, and lower than, the building heights proposed with the Project. As such, similar to the Project, the Utilities Variant would result in less-than-significant impacts to aesthetics due to the creation of impediments to views. Operation of the Utilities Variant would not remove or substantially block a scenic vista or scenic resources, including but not limited to trees and rock outcroppings. As such, operation of the Utilities Variant would result in less than significant aesthetic impacts, similar to the Project.

The Project would result in the generation of plumes of evaporated water at multiple locations throughout the Project site from the operation of evaporative cooling towers, particularly during cool, damp, or foggy weather. With the Utilities Variant, the plumes of evaporated water resulting from the heating and cooling plants would be consolidated and effectively relocated to two locations, rather than numerous smaller but scattered locations anticipated with the Project. These two new locations include the parking structure adjacent to the regional retail center at Candlestick Point, as well as the parking structure adjacent to the R&D facilities at Hunters Point (as depicted on Figure IV-21). These plumes would be most visible during cool, damp, or foggy weather. However, as clouds or fog would generally be present at those times, the concentration of evaporated water plumes would not substantially degrade the existing visual character or quality of the site and its surroundings, and this impact would be less than significant, similar to the Project.

Similar to the Project, the Utilities Variant would create new sources of light, including light emanating from parking areas and the 49ers stadium, which could be obtrusive in nearby residential areas. Each of the heating and cooling plants (one of each type), wastewater treatment plants, and central waste handling facilities would require appropriate operational and security lighting that could result in a greater number of lighting sources than the Project. However, these sources would not include substantially more (in number) sources than the Project. Furthermore, these lighting sources would be consistent with those anticipated with the Project, as well as those existing in the urban, developed area within which the Project and the Utilities Variant are proposed. Therefore, aesthetic impacts of the Utilities Variant due to new sources of lighting would be similar to the Project. Similar to the Project, implementation of mitigation measures MM AE-7b.1 (test field lighting) and MM AE-7b.2 (avoid spill lighting) would further reduce this impact to a less-than-significant level.

Thus, potential aesthetic impacts of the Utilities Variant would be less than significant, similar to the Project.

Shadows

The Utilities Variant would result in approximately 15 new buildings on site including a variety of heating and cooling plants, wastewater treatment plants, and solid waste collection facilities. However, all of these buildings would have a height no greater than 35 feet. This would be consistent with other development in the surrounding urban and developed area. Additionally, this height would be consistent with, or lower than, the building heights proposed with the Project. As such, the Utilities Variant would result in less-than-significant impacts of shadow effects on existing and proposed open space, similar to the Project,.

Wind

Development of the Utilities Variant would result in development that is similar to the Project, with the exception of 15 structures ranging in height from 15 to 35 feet. As none of these structures would exceed 100 feet in height, none would have the potential to generate winds that could affect pedestrian spaces as ground level. With the incorporation of mitigation measure MM W-1a (Building Design Wind Analysis), impacts would be reduced to a less than significant level, similar to the project.

Air Quality

The Utilities Variant would involve the development of additional on-site utility infrastructure. While construction of centralized utilities would result in a greater amount of development, most of the development would be underground, and the level of overall above-ground development with this alternative would be substantially similar to the Project, as shown in Table IV-1. Construction and operational impacts would be substantially similar to the Project.

Construction

As stated above, overall construction impacts of the Utilities Variant with respect to air quality would be similar to the Project. Construction activities would occur throughout the 702-acre site over the approximately 20-year build-out period ending in 2029 with Utilities Variant. Similar to the Project, construction activities with Utilities Variant would include site preparation, grading, placement of infrastructure, placement of foundations for structures, and fabrication of structures. Demolition, excavation and construction activities would require the use of heavy trucks, excavating and grading equipment, concrete breakers, concrete mixers, and other mobile and stationary construction equipment. Emissions during construction would be caused by material handling, traffic on unpaved or unimproved surfaces, demolition of structures, use of paving materials and architectural coatings, exhaust from construction worker vehicle trips, and exhaust from diesel-powered construction equipment.

Construction-related emissions are generally short-term in duration, but may still cause adverse air quality impacts. However, the BAAQMD does not recommend any significance thresholds for the emissions during construction. Instead, the BAAQMD bases the criteria on a consideration of the mitigation measures to be implemented. If all appropriate emissions mitigation measures recommended by the BAAQMD CEQA Guidelines are implemented for a project, construction emissions are not considered adverse. Fine particulate matter (PM_{10}) is the pollutant of greatest concern with respect to construction activities. Any project within the City of San Francisco, including Utilities Variant, would be required to comply with San Francisco Health Code Article 22B, Construction Dust Control, which requires the preparation of a site-specific dust control plan, (with mandatory mitigation measures similar to the BAAQMD's) for construction projects within 1,000 feet of sensitive receptors (residence, school, childcare center, hospital or other health-care facility or group-living quarters). As such, with implementation of mitigation MM HZ-15, which identifies specific mitigation measures that would be used to reduce emissions associated with construction, construction-related criteria pollutant impacts associated with Utilities Variant would be less than significant, similar to the Project.

With respect to airborne human health risks, construction activities associated with the Utilities Variant would increase the levels of two potential human health risks: (1) diesel particulate matter (DPM) and (2) dust or particulate matter (PM_{10}) bound to certain metals and/or organic compounds from on-site soils. MM AQ-2.1 (Implement Accelerated Emission Control Device Installation on Construction Equipment) and MM AQ-2.2 (Implement Accelerated Emission Control Device Installation on Construction Equipment Used for Alice Griffith Parcels) would address construction sources of DPM including off-road construction equipment such as lifts, loaders, excavators, dozers, and graders. In addition, the delivery of equipment and construction materials, spoils and debris hauling, and employee commute traffic could contribute to construction-related DPM emissions. In terms of DPM, ENVIRON

prepared a human health risk assessment (HRA)[1263] that evaluated potential human health risks associated with construction and operation of the Project. As construction emissions associated with the Utilities Variant are expected to be the same as those associated with Project, the Utilities Variant would have the same impacts than the Project, would not exceed the BAAQMD CEQA threshold. As the carcinogenic and non-carcinogenic health risks posed by DPM emissions during construction activities associated with development of the Utilities Variant have been determined to be below established thresholds, this impact is less than significant with MM AQ-2.1 and MM AQ-2.2, similar to the Project.

Similar to the Project, construction activities at both Candlestick Point and HPS Phase II for the Utilities Variant have the potential to generate TACs associated with soil-PM_{10} and an HRA evaluated the potential concentrations of the airborne soil-PM_{10} at numerous receptors on site (residents at the Alice Griffith Public Housing units) and off site (adult and child residents, workers, and schoolchildren) in the Project vicinity. As the carcinogenic and noncarcinogenic health risks posed by soil-PM_{10} emissions during construction activities associated with development of the Project have been determined to be below established thresholds, the same impacts would be expected from the Utilities Variant. This impact is less than significant with MM HZ-15, similar to the Project.

Operation

The level of emissions anticipated with Utilities Variant would be the same as the Project; as such impacts to regional and local air quality would be substantially similar to the Project.

Both this variant and the Project would result in fewer emissions during the operation of their respective land uses compared to a similar level of development without the energy and transportation considerations discussed in this EIR. The Utilities Variant, similar to the Project, would incorporate features intended to reduce motor vehicle trips, designed as a dense, compact development with a mix of land uses that would facilitate pedestrian, bicycle, and transit travel. Nonetheless, criteria pollutant emissions of ROG, NO_X, PM_{10}, and $PM_{2.5}$ associated with land uses anticipated with Utilities Variant would be expected to exceed existing BAAQMD thresholds. Under BAAQMD's current thresholds, impacts are considered significant if daily emissions of criteria pollutants exceed 80 lbs/day of ROG, NO_X, and PM_{10}. Similar to the Project, no additional feasible mitigation measures are available to reduce Utilities Variant's operational criteria emissions below the BAAQMD thresholds. This would be a significant and unavoidable impact.

With respect to airborne human health risks, emissions associated with operation activities under the Utilities Variant would increase the levels of two potential human health risks: (1) TACs and (2) vehicle emissions ($PM_{2.5}$).

This Utilities Variant continues to include R&D facilities at HPS Phase II, which are situated on a peninsula extending to the south of other proposed residential areas. As the predominant winds are out of the west, on-site receptors will generally be upwind from these R&D areas. As such, the Project is designed to minimize potential adverse impacts between TAC sources in R&D areas and both on-site and off-site receptors. As discussed for the R&D Variant, an analysis was conducted to determine the

[1263] Environ. 2009. Ambient Air Quality Human Health Risk Assessment: Candlestick Point – Hunters Point Shipyard Phase II Development Plan. September 28. Appendices I & II.

potential impacts from a variety of TAC sources in the R&D areas. Details regarding this assessment can be found in Appendix H1, Attachment III.[1264]

The HRA estimated the excess lifetime cancer risk and chronic noncancer HI due to the combined TAC emissions from the R&D areas at any surrounding receptor location. All receptors were initially evaluated as residential receptors. The estimated excess lifetime cancer risks and HIs within areas designated for residential use were found not to exceed the BAAQMD's significance thresholds for carcinogenic and noncarcinogenic health risks. As the Utilities Variant has the same configuration as the Project, the estimated cancer risks for long-term residential exposure would be above 10 in one million in an area designated as open space that would extend slightly south beyond the R&D boundary. The maximum estimated cancer risk for a residential receptor in this location would be 17 in one million; the noncarcinogenic health risks would have an HI of 1.6. However, as noted above, this receptor location would be in an area designated as open space, and would not be a residential location. If cancer risks were estimated based on exposure assumptions consistent with recreational use of the open space, the risks would be reduced well below the threshold of 10 in one million. Due to the decrease in the frequency and duration of potential exposures, the chronic HI would also be reduced below the HI threshold of 1.0

The estimated health risks would be below BAAQMD thresholds for all residential receptor locations as a result of implementation of the Project. As such, impacts would be less than significant with implementation of MM AQ-6.1 and MM AQ-6.2 developed for the Project and also required for the Utilities Variant.

In terms of human health risks associated with vehicle emissions, vehicle emissions along local roadways for the Utilities Variant would remain unchanged from the Project. The prolonged exposure of receptors to increased vehicle emissions could affect human health. Potential $PM_{2.5}$ concentrations at select roadways with the addition of future traffic volumes, including the traffic associated with the Utilities Variant (which were assumed to be similar to Project traffic), were estimated compared against SFDPH thresholds to determine the potential health risks attributed to vehicle emissions. Several roadway segments were chosen based on whether Project-related traffic would use these streets to access neighboring freeways and other areas of San Francisco and/or currently or would experience significant truck traffic. The roadways chosen include:

- Third Street
- Innes Avenue/Hunters Point Boulevard/Evans Avenue
- Palou Avenue
- Gilman Avenue/Paul Avenue
- Harney Way
- Jamestown Avenue
- Ingerson Avenue

[1264] ENVIRON, *Ambient Air Quality Human Health Risk Assessment: Candlestick Point–Hunters Point Shipyard Phase II Development Plan*, Attachment III, September 28, 2009.

With the addition of Project-related traffic, no receptors along the streets listed above would experience $PM_{2.5}$ concentrations in excess of SFDPH's 0.2 $\mu g/m^3$ threshold.[1265] As concentrations would not exceed SFDPH's threshold, and as such, impacts would be less than significant, similar to the Project.

Noise and Vibration

As discussed in the introduction, the Utilities Variant includes the development proposed under the Project plus the addition of substantial infrastructure, including a subterranean piping network, new heating and cooling towers, new wastewater treatment facilities, and relocated/redesigned solid waste collection facilities. As the land uses provided with the Utilities Variant would be the same as the Project, with just the addition of additional utilities within the Project area, noise impacts of a Utilities Variant would also be the same as the Project.

Construction activities for a Utilities Variant would create a substantial temporary increase in ambient noise levels on the site and in existing residential neighborhoods adjacent to the site. Construction activities would need to comply with the San Francisco Noise Ordinance, which prohibits construction between 8:00 P.M. and 7:00 A.M. and limits noise from any individual piece of construction equipment (except impact tools) to 80 dBA at 100 feet. Implementation of mitigation measures MM NO-1a.1 and MM NO-1a.2, which would require implementation of construction best management practices to reduce construction noise and the use of noise-reducing pile driving techniques, would reduce any potentially significant impacts to less-than-significant levels.

Construction activities could also create excessive ground-borne vibration levels in existing residential neighborhoods adjacent to the site and at proposed on-site residential uses, should the latter be occupied before construction activity on adjacent parcels is complete. Implementation of MM NO-1a.1, MM NO-1a.2, and MM NO-2a would require implementation of construction best management practices, noise-reducing pile driving techniques as feasible, and monitoring of buildings within 50 feet of pile driving activities. Implementation of these measures would reduce vibration impacts under the Utilities Variant, but not to a less-than-significant level as vibration levels from pile driving activities could be as high as 103 VdB for the residential uses within the HPS North District, the CP Center, and South Districts when occupied; therefore, this impact would remain significant and unavoidable, similar to the Project.

Daily operation of a Utilities Variant, such as mechanical equipment and delivery of goods, would not expose noise-sensitive land uses on- or off- site to noise levels that exceed the standards established by the City of San Francisco. This impact would be less than significant, similar to the Project. Operation activities associated with a Utilities Variant, such as delivery trucks, would not generate or expose persons on or off site to excessive groundborne vibration. This impact would also be less than significant, similar to the Project.

Operation of a Utilities Variant would generate increased local traffic volumes that would cause a substantial permanent increase in ambient noise levels in existing residential areas along the major Project site access routes. Impacts would be significant along Carroll Avenue, Gilman Avenue, and Jamestown

[1265] ENVIRON, *Ambient Air Quality Human Health Risk Assessment: Candlestick Point–Hunters Point Shipyard Phase II Development Plan*, Appendix IV, September 28, 2009.

Avenue, similar to the Project. Measures available to address significant traffic noise increases in these residential areas are limited. The ultimate feasibility and implementation of the noise insulation measures that would be required to reduce roadway noise levels to below the threshold of significance would be dependent on factors that would be beyond the control of the City as the lead agency or the Project Applicant to guarantee. Therefore, this impact would remain significant and unavoidable.

Football games and concerts at the proposed stadium with a Utilities Variant would generate noise that would adversely affect surrounding residents, similar to the Project. Implementation of mitigation measure MM NO-7.1 would ensure that nearby residential uses do not experience temporary increases in ambient noise levels within their homes that would exceed 45 dBA; however, as with the Project, the feasibility and practicality of mitigation measure MM NO-7.1 cannot be determined at this time, this impact would remain significant and unavoidable.

The Utilities Variant site is not located within an airport land use plan area or near a private airstrip. Furthermore, the Utilities Variant does not include an aviation component. Therefore, a Utilities Variant will not result in the exposure of people to excessive aircraft noise levels. Impacts would be less than significant, similar to the Project.

Cultural Resources and Paleontological Resources

Construction

The footprint of development with the Utilities Variant would be substantially similar to the Project. As such, impacts anticipated to Cultural Resources including paleontological, archaeological, and historical resources as a result of construction of the Utilities Variant would generally be similar to the Project as well. With the Utilities Variant, additional utility systems would be located beneath the street network. This work would not substantially alter the land surface proposed for traffic and circulation as compared to the Project, and all areas anticipated for streets, sidewalks, and associated roadway infrastructure would already be assumed to be subject to grading and some excavation as part of the Project. The installation of underground storage space beneath the wastewater treatment plants (approximately 30,000 square feet per building) as well as the potential for increased excavation under the heating/cooling plants and solid waste collection facilities, as compared to the Project, would increase the extent of excavation in some locations. Similar to the Project, impacts associated with additional excavation for the Utilities Variant could result in significant impacts to paleontological and archaeological resources or result in the disturbance of human remains interred outside formal cemeteries. However, implementation of mitigation measures MM CP-2a (archaeological resources), MM CP-3a (paleontological resources), and MM CP-1b.1 and MM CP-1b.2 (historic resources) would reduce construction impacts to archaeological and paleontological resources to a less-than-significant level, similar to the Project.

Construction of the Project was determined to have a significant and unavoidable impact to historic resources due to the proposed demolition of buildings, structures, and objects associated with the area's "transition from early commercial dry dock operation to high tech naval repair and Radiological research and waste treatment facility."[1266] While the Project proposes to retain the buildings and structures in the

[1266] Circa Historic Property Development, *Hunters Point Commercial Dry Dock and Naval Shipyard Historic District DPR form*, October 31, 2008.

potential Hunters Point Commercial Drydock District, identified in 1998 as eligible for listing in the NRHP, development would result in the demolition of buildings that have been determined eligible for the CRHR and are contributors to the potential Hunters Point Commercial Dry Dock and Naval Shipyard Historic District. This would be a potentially significant impact because the proposed actions would demolish buildings that contribute to a historic district; the impact would materially alter in an adverse manner those physical characteristics of an historical resource that convey its historical significance and that justify its eligibility for inclusion in the CRHR. With the Utilities Variant the same impacts would occur due to removal of the same structures discussed above. Installation of the heating/cooling towers, MRP buildings, and solid waste collection facilities, in addition to all associated infrastructure would not alter any additional structures that may be considered to contribute to the district. The Utilities Variant would comply with MM CP-3b (historical resources), which would reduce impacts to the extent feasible. However, the impact would not be fully reduced and the Utilities Variant would result in a significant and unavoidable impact with mitigation to historic resources during construction. This impact would be similar to that identified for the Project.

Operation

Operation of the Utilities Variant would result in less-than-significant impacts to cultural resources, including paleontological, archaeological, and historic resources, similar to the Project.

Hazards and Hazardous Materials

Construction activities associated with the Utilities Variant would disturb soil and/or groundwater; result in the handling, stockpiling, and transport of soil; involve demolition or renovation of existing structures that could include asbestos-containing materials, lead-based paint, PCBs, or fluorescent lights containing mercury; expose construction workers to hazardous materials; be a source of hazardous air emissions within one-quarter mile of an existing or planned school; and encounter soils or groundwater that contains contaminants from historic uses that could pose a human health or environmental risk if not properly managed. Each of these impacts for the Utilities Variant would be similar to the Project and would be reduced to a less-than-significant level with implementation of the identified mitigation measures (MM HY-1a.2, MM HZ-1a, MM HZ1b, MM HZ-2a.1, MM HZ-2a.2, MM HZ-5a, MM HZ-9, MM HZ-10b, MM HZ-12, MM HZ-15, MM HY-1a.1, MM HY-1a.3, MM BI-4a.1, MM BI-4a.2, and MM BI-5b.4).

Construction of the Utilities Variant would require improvements to existing utility infrastructure and installation of new underground utilities, including hot and chilled water distribution lines as well as solid waste collection lines, which could expose construction workers, the public, or the environment to hazardous materials. This additional utility work could result in an increase in the amount of excavation and a slightly greater level of ground disturbance and excavation than the Project. However, with the implementation of mitigation measures MM HZ-1a, MM HZ-1b, and MM HZ-2a.1, which require remediation of any contaminated soils, the hazards risk from potential exposure to contaminated soil or groundwater during construction would be reduced to a less-than-significant level, similar to the Project. In addition, mitigation measure MM HZ-2a.2 requires the preparation of a site-specific health and safety plan, which would further ensure that all risks to workers, residents, or the public would be reduced to less than significant, the same as for the Project.

The Utilities Variant would require pile supports for the residential towers, the same as the Project. This construction activity could result in groundwater contamination from disturbed soils. Mitigation measure MM HZ-5a would reduce this impact by requiring a foundation support piles installation plan, which would verify that pilot boreholes for each pile would be drilled through the artificial fill materials so the piles can be installed without damage or misalignment and to prevent potentially contaminated fill materials from being pushed into the underlying sediments or groundwater. With implementation of this mitigation measure, the impact from potential groundwater contamination would be reduced to a less-than-significant level, the same as for the Project.

Shoreline improvements would occur under the Utilities Variant the same as for the Project. Shoreline improvements would require concurrence of BCDC, San Francisco RWQCB, and USACE. That permit would contain numerous conditions to ensure that the construction activities are conducted in a manner that is protective of aquatic resources. Mitigation measure MM HZ-10b requires that all shoreline activities that could affect sediment (or in the case of the Navy-installed cover and riprap at Parcel E/E-2) be conducted in accordance with agency-approved remedial design documents, applicable health and safety plans, DCPs, or any other documents or plans required under applicable law or laws, including but not limited to applicable requirements shown in Table III.K-2. In addition, mitigation measures MM HY-1a.1, MM HY-1a.2, MM BI-4a.1, MM BI-4a.2, and MM BI-5b.4 would reduce water quality and biological resources impacts. For Candlestick Point, impacts would be mitigated through mitigation measures MM HY-1a.1 and MM HY-1a.2. With implementation of these mitigation measures, along with applicable regulations and permits, potential impacts related to exposure to hazardous materials releases from contaminated sediments that could be disturbed during proposed shoreline improvements would be reduced to a less-than-significant level for the Utilities Variant, the same as for the Project.

Similar to the Project, remediation activities conducted on behalf of the City or developer in conjunction with development activities at HPS Phase II parcels transferred prior to completion of remediation in an "early transfer" would disturb soil and/or groundwater that may contain contaminants from historic uses. The identified mitigation measure (MM HZ-12) would require the SFDPH to ensure that before development occurs, the Agency or the developer and their contractors have incorporated all applicable requirements into remedial design documents, work plans, health and safety plans, DCPs and any other document or plan required under the AOC or other applicable law, as a condition of development. As a result of these controls and mitigation measure, the potential impact of exposure to hazardous materials during remediation activities conducted on behalf of the Agency or the developer in conjunction with development of HPS Phase II under the Utilities Variant would be reduced to less-than-significant levels.

In addition to uncovering hazardous materials within the existing buildings, construction and grading activities associated with the Utilities Variant could disturb soil or rock that is a source of naturally occurring asbestos, which could present a human health hazard. As discussed in the paragraph above, the Utilities Variant includes installation of utilities in addition to that anticipated under the Project. This additional work could result in an increase in the amount of excavation and ground disturbance, as compared to the Project. However, with the implementation of mitigation measure MM HZ-15, which requires preparation of an asbestos dust mitigation plan, this impact would be reduced to a less-than-significant level, similar to the Project.

As with the Project, the Bret Harte Elementary School and Muhammad University of Islam elementary schools are located within one-quarter mile of the development area of the Utilities Variant. Consistent with the discussion above, the Utilities Variant could uncover asbestos-containing materials (naturally or in existing building materials) or other hazardous materials during construction, consistent with the Project. However, with incorporation of mitigation measures MM HZ-1a, MM HZ-1b, MM HZ-2a.1, and MM HZ-15, any impacts to these schools would be reduced to a less-than-significant level, similar to the Project.

After development of the Utilities Variant, periodic maintenance could require excavation of site soils to maintain or replace utilities, repair foundations, or make other subsurface repairs which could expose hazardous materials. As the frequency of infrastructure maintenance under the Utilities Variant would likely be greater than the Project based on the increased amount of infrastructure, it is anticipated that the Utilities Variant could result in a slightly greater impact than the Project with respect to potential exposure to hazardous materials. Implementation of mitigation measures MM HZ-1a and MM HZ-1b would require remediation of any contaminated soils pursuant to the appropriate regulations. MM HZ-2a.1 would require the development of an unknown contaminant contingency plan to describe procedures to follow in the event unexpected contamination is encountered during construction activities, including procedures for ensuring compliance with the above laws and regulations. Additionally, mitigation measure MM HZ-2a.2, would require the preparation and implementation of a site-specific HASP in compliance with federal and state OSHA regulations and other applicable laws. The general requirement of mitigation measure MM HZ-9 would require that the Agency or its contractor or Project Applicant shall comply with all requirements incorporated into remedial design documents, work plans, health and safety plans, dust control plans, and any other document or plan required under the Administrative Order of Consent for any properties subject to early transfer (prior to full Navy remediation). To reduce this impact related to exposure to hazardous materials releases that have not been fully remediated at HPS Phase II. Mitigation measure MM HZ-9 also requires that all work on the Yosemite Slough bridge would comply with Navy work plans for construction and remediation on Navy-owned property. Implementation of these mitigation measures would reduce this impact to a less-than-significant level, same as for the Project.

After construction, land uses anticipated under the Utilities Variant would involve the routine use, storage, transportation, and disposal of hazardous materials. None of the systems proposed for inclusion in the Utilities Variant would utilize hazardous materials other than routine maintenance and cleaning products typically used in residential, office and commercial settings. Products containing hazardous materials used in required to address additional square footage anticipated under the Utilities Variant would be incrementally small, and would not substantially increase the risk from handling these materials. The Utilities Variant would not introduce large-scale manufacturing or processing facilities that would store and use large quantities of hazardous materials that would present a substantial risk to people. However, there would be numerous locations where smaller quantities of hazardous materials would be present, the same as for the Project. The potential risks associated with hazardous materials handling and storage would generally be limited to the immediate area where the materials would be located, because this is where exposure would be most likely. None of the outputs of the utility systems (hot water, chilled water, recycled water, sludge, solid waste, recyclable materials, and compostable materials) would contain hazardous materials in amounts greater than that which would be utilized under the Project (e.g., if

building occupants disposed of small amount of hazardous materials, such as cleaning products, via trash receptacles or if the use of an automated solid waste collection system would not increase or decrease the presence of any such substances). The Utilities Variant would comply with applicable laws and regulations that require the implementation of established safety practices, procedures, and reporting requirements pertaining to proper handling, use, storage, transportation, and disposal of hazardous materials.

Hazardous materials would routinely be transported to, from, and within the Project, and small amounts of hazardous waste would be removed and transported off site to licensed disposal facilities. The precise amount of hazardous materials that would be transported to or from the site under the Utilities Variant is difficult to predict accurately at the current time due to the pending selection of tenants for the future retail-commercial stores. However, it is understood that these uses would be consistent with those uses analyzed for the Project and therefore, potential impacts would be similar under this variant to the Project's impacts.

Daily operations under the Utilities Variant could result in reasonably foreseeable upset and accident conditions involving the release of hazardous materials into the environment, but this would not pose a human health risk and/or result in an adverse effect on the environment. With increased routine use of hazardous materials compared to existing conditions for Utilities Variant operations, exposure of future occupants, visitors, and employees to hazardous materials could occur by improper handling or use of hazardous materials or hazardous wastes during operation of the Utilities Variant. Accidents involving the transportation of hazardous materials to, from, or within the area, although rare, could also occur. In general, the types and amounts of hazardous materials would not pose any greater risk of upset or accident compared to other similar development elsewhere in the City. Impacts would be less than significant, similar to the Project.

The Utilities Variant site is not located within the San Francisco Airport Land Use Policy Plan Area and the Utilities Variant would not result in a safety hazard from airport operations for people residing or working in the area. The site is not located within any other airport land use plan area. The Utilities Variant site is also not located within the vicinity of a private airstrip and would not result in a safety hazard for people residing or working at the Project site. Similar to the Project, operation of the R&D Variant would not expose people or structures to a significant risk of loss, injury, or death involving fires or conflict with emergency response or evacuation plans.

Geology and Soils

Construction

As with the Project, construction activities, such as grading and excavation, could remove stabilizing vegetation and expose areas of loose soil that, if not properly stabilized, could be subject to soil loss and erosion by wind and stormwater runoff. Newly constructed and compacted engineered slopes could undergo substantial erosion through dispersed sheet flow runoff, and more concentrated runoff can result in the formation of erosional channels and larger gullies, each compromising the integrity of the slope and resulting in significant soil loss. The erosion hazard rating for the local soils in the Project site is slight to severe. Requirements to control surface soil erosion during and after construction with a

Utilities Variant would be implemented through the requirements of mitigation measure MM HY-1a.1 (SWPPP) and adverse effects on the soil, such as soil loss from wind erosion and stormwater runoff, would be avoided or reduced to a less-than-significant level, similar to the Project.

In addition to the potential for soil erosion, construction activities would have the potential to affect groundwater levels. With implementation of the dewatering techniques, groundwater level monitoring, and subsurface controls as specified in the SFBC and required by mitigation measure MM GE-2a (dewatering), groundwater levels in the area would not be lowered such that unacceptable settlement at adjacent or nearby properties would occur. Consequently, the Utilities Variant would result in a less-than-significant impact, similar to the Project.

At the Alice Griffith Public Housing site and the Jamestown area, the removal of bedrock through heavy equipment methods or controlled rock fragmentation activities would have the potential to fracture rock adjacent to the excavation, thereby destabilizing it and possibly causing settlement of structures above it. With implementation of those techniques, ground surface and building damage monitoring, as specified in the SFBC and required by mitigation measure MM GE-3, vibration from controlled rock fragmentation in the area would not cause unacceptable settlement or damage at adjacent or nearby properties would occur. Consequently, settlement hazards related to controlled rock fragmentation would be less than significant, similar to the Project.

Operation

Impacts with respect to geology and soils conditions with the Utilities Variant would be substantially similar to those of the Project.

The potential for exposure to adverse affects caused by seismic groundshaking exists at the Project site. Mitigation measures MM GE-4a.1, MM GE-4a.2, and MM GE-4a.3 would require design-level geotechnical investigations that would include site-specific seismic analyses to evaluate the peak ground accelerations for design of the Utilities Variant structures and the Yosemite Slough bridge, as required by the SFBC and Caltrans. Implementation of these mitigation measures would ensure that potential impacts from groundshaking would be less than significant, similar to the Project.

The potential for adverse affects caused by seismically induced ground failure such as liquefaction, lateral spreading, and settlement exists at the Project site. Mitigation measures MM GE-4a.1, MM GE-4a.2, MM GE-4a.3, and MM GE-5a would require design-level geotechnical investigations must include site-specific seismic analyses to evaluate the peak ground accelerations for design of the Utilities Variant structures, as required by the SFBC through review by DBI. It is anticipated that DBI would employ a third-party engineering geologist and/or civil engineer to form a GPRC. The GPRC would complete the technical review of proposed site-specific structural designs prior to building permit approval. The structural design review would ensure that all necessary mitigation methods and techniques were incorporated in the design for the Utilities Variant foundations and structures to reduce potential impacts from ground failure or liquefaction a less-than-significant level, similar to the Project.

With the Utilities Variant, the potential for adverse affects due to seismically induced landslides exists at the Project site. Implementation of mitigation measures MM GE-6a and MM GE-4a.2 would ensure

compliance with the SFBC and any special requirements of the HUD for compliance documentation and would reduce potential impacts from landslides a less-than-significant level, similar to the Project.

With the Utilities Variant, additional utility infrastructure would be constructed throughout the Project site. None of these specific areas is located adjacent to the shoreline such that the Utilities Variant could result in impacts greater than those discussed with the Project. Therefore, the Utilities Variant would result in a less-than-significant impact due to shoreline stability, similar to the Project.

The potential for adverse affects caused by landslides exists at the Project site. Site-specific, design-level geotechnical investigations would be required to be submitted to DBI in connection with permit applications for individual Utilities Variant elements, as specified in mitigation measure MM GE-6a. The site-specific analyses must assess these conditions and prescribe the requirements for foundations on slopes in accordance with the SFBC. All geotechnical investigations and permits must be approved by DBI. With implementation of this mitigation, the Utilities Variant's impact with regard to landslides would be less than significant, similar to the Project.

The potential for adverse affects due to settlement exists at the Project site. However, design-level geotechnical investigations must evaluate the structural design, as required by the SFBC through review by DBI. Implementation of mitigation measures MM GE-5a, MM GE-4a.2, and MM GE-4a.3 would ensure compliance with the provisions of the SFBC and would reduce the impact a less-than-significant level, similar to the Project.

The potential for adverse effects caused by expansive soils exists at the Project site. Design-level geotechnical investigations must evaluate the structural design, as required by the SFBC through review by DBI. Implementation of mitigation measures MM GE-10a, MM GE-4a.1, MM GE-4a.2, and MM GE-4a.3 would avoid or reduce the impact to the Utilities Variant structures from expansive soils a less-than-significant level, similar to the Project.

With the Utilities Variant, the potential for adverse effects caused by corrosive soils exists at the Project site. Design-level geotechnical investigations must evaluate the structural design, as required by the SFBC through review by DBI. Implementation of mitigation measures MM GE-11a, MM GE-4a.2, and MM GE-4a.3 would avoid or reduce the impact to the Utilities Variant structures from corrosive soils a less-than-significant level, similar to the Project.

Fault rupture hazards are unlikely. Ground rupture occurs most commonly along preexisting faults. No known active faults cross the Hunters Point shear zone, making hazards from fault rupture unlikely with the Utilities Variant.[1267] Therefore, there would be no impact caused by surface fault rupture, similar to the Project.

All development with the Utilities Variant would be connected to the City's existing wastewater treatment and disposal system and would not involve the use of septic tanks or alternative wastewater disposal systems. No impact would occur, similar to the Project.

The Utilities Variant would not substantially change site topography or affect unique geologic features, and would have no impact on such features, similar to the Project.

[1267] GTC, 2005.

Hydrology and Water Quality

For this variant, heating and cooling would be provided from a centralized plant, instead of individual systems in each building or facility. In addition to the installation of a larger underground piping network than that required of the Project, the Utilities Variant includes the installation of underground storage tanks for the decentralized wastewater treatment plants. The Utilities Variant would result in the construction of approximately 30,000 square feet of underground storage space per wastewater treatment building, for a total of approximately 330,000 square feet of underground space. The district plant serving Candlestick Point is proposed to be located within the parking structure adjacent to the regional retail center, while the district plant serving Hunters Point is proposed to be located within the parking structure adjacent to the R&D facilities. All land uses at Candlestick Point and the HPS Phase II site would be constructed at the same locations and at the same intensities proposed with the Project, although some minor shifts in building locations could occur to accommodate some elements of the proposed utility systems, which would require some additional built space. As the footprint of development and the total amount of development would be incrementally greater than the Project, operational impacts to hydrology and water quality would be the substantially similar to the Project.

Construction

Operation of the Utilities Variant would not contribute to violations of water quality standards or waste discharge requirements or otherwise degrade water quality. Compliance with the requirements of the Municipal Stormwater General Permit, the Recycled Water General Permit, and the Industrial General Permit would reduce potential water quality impacts associated with implementation of the R&D Variant. In addition, this variant would be required to comply with the San Francisco SWMP, the Draft San Francisco Stormwater Design Guidelines, and the San Francisco Green Building Ordinance. Compliance with these requirements would be demonstrated in the SDMP or SCP for the project site, as required by mitigation measure MM HY-6a.1. Compliance with the Recycled Water General Permit would be required by implementation of mitigation measure MM HY-6a.2. To reduce the potential for stormwater infiltration to mobilize historic soil contaminants at HPS Phase II, the use of infiltration BMPs would be prohibited by mitigation measure MM HY-6b.1. To reduce stormwater runoff impacts associated with industrial activities at HPS Phase II, compliance with the Industrial General Permit would be required by implementation of mitigation measure MM HY-6b.2. To reduce stormwater impacts associated with maintenance dredging of the marina, compliance with the DMMO regulatory requirements would be required by implementation of mitigation measure MM HY-6b.3. Compliance with the Clean Marinas California Program would be required by implementation of mitigation measure MM HY-6b.4. As extent of impervious surfaces for the Housing Variant would be less than the Project, impacts would be similar and slightly less than the Project.

Development of the Utilities Variant would not utilize groundwater as a source of water supply nor interfere substantially with groundwater recharge Construction of additional underground facilities could require short- and/or long-term dewatering, which could result in localized lowering of groundwater levels in the vicinity of these underground spaces. However, the approximately 330,000 square feet of underground space represents approximately 1 percent of the total 702-acre site, and a substantial lowering of groundwater levels resulting from short- or long-term dewatering is unlikely. Compliance with mitigation measure MM GE-2 (Mitigation to Minimize Dewatering Impacts during Construction)

would ensure that this impact would be less than significant, similar to the Project. As the total amount of open space with the Utilities Variant would remain the same as with the Project, the amount of permeable surface would also remain the same. Therefore, the Utilities Variant would not interfere substantially with groundwater recharge such that there would be a net deficit in aquifer volume or a lowering of the local groundwater table level. This impact would be less than significant, similar to the Project.

No streams or rivers are currently located within the Utilities Variant area and, thus, no streams or rivers would be altered by construction activities. During construction of the Utilities Variant, the existing drainage patterns within the area would generally be preserved. Construction activities associated with the Utilities Variant would not substantially alter the existing drainage pattern of the site or alter the course of a stream or river in ways that would result in substantial erosion, siltation, or flooding on site or off site. Impacts would be less than significant, similar to the Project.

Construction activities associated the Utilities Variant, including site clearance, grading, and excavation, would not create or contribute runoff water that would exceed the capacity of existing or planned storm sewer systems or provide substantial additional sources of polluted runoff. During construction, existing stormwater drainage facilities would be replaced by a new storm sewer system that would collect and treat on-site stormwater flows and would be sized to accommodate projected flows from upstream contributing areas. With compliance with regulatory requirements as required by mitigation measures MM HY-1a.1 and MM HY-1a.2 (preparation of a SWPPP), impacts would be less than significant, similar to the Project.

Operation

Operation of the Utilities Variant would not contribute to violations of water quality standards or waste discharge requirements or otherwise degrade water quality. Compliance with the requirements of the Municipal Stormwater General Permit, the Recycled Water General Permit, and the Industrial General Permit would reduce potential water quality impacts associated with implementation of the R&D Variant. In addition, this variant would be required to comply with the San Francisco SWMP, the Draft San Francisco Stormwater Design Guidelines, and the San Francisco Green Building Ordinance. Compliance with these requirements would be demonstrated in the SDMP or SCP for the project site, as required by mitigation measure MM HY-6a.1. Compliance with the Recycled Water General Permit would be required by implementation of mitigation measure MM HY-a.2. To reduce the potential for stormwater infiltration to mobilize historic soil contaminants at HPS Phase II, the use of infiltration BMPs would be prohibited by mitigation measure MM HY-6b.1. To reduce stormwater runoff impacts associated with industrial activities at HPS Phase II, compliance with the Industrial General Permit would be required by implementation of mitigation measure MM HY-6b.2. To reduce stormwater impacts associated with maintenance dredging of the marina, compliance with the DMMO regulatory requirements would be required by implementation of mitigation measure MM HY-6b.3. Compliance with the Clean Marinas California Program would be required by implementation of mitigation measure MM HY-6b.4. As the footprint of development, land uses, and extent of impervious surfaces for the Utilities Variant would be the same as the Project, impacts would be similar to the Project.

The Utilities Variant would modify the wastewater treatment system to collect and route wastewater flows to decentralized wastewater treatment plants located throughout the Project site, instead of collecting and conveying wastewater to the Southeast Water Pollutant Control Plant (operated by SFPUC) for treatment. Each decentralized wastewater treatment plant would be sized to accommodate approximately 100,000 gallons per day of wastewater. To accommodate the estimated Project-generated wastewater flow of approximately 1.1 mgd, eleven decentralized wastewater treatment plants would be needed, with seven plants proposed to be located within Candlestick Park and four in Hunters Point, Therefore, wastewater flows from the Project site would be retained on site and not discharged to the Combined Sewer System.

Implementation of the Utilities Variant would not utilize groundwater as a source of water supply nor interfere substantially with groundwater recharge. Thus, there would be no net deficit in aquifer volume or a lowering of the local groundwater table level and this impact would be less than significant, similar to the Project.

Operation of the Utilities Variant could alter existing drainage pattern of the site, but would not alter the course of a stream or river or result in substantial erosion, siltation, or flooding on site or off site. Implementation of the Utilities Variant would not contribute runoff water that would exceed the capacity of existing or planned storm sewer systems or provide substantial additional sources of polluted runoff, as development would include a separate stormwater system that would be sized to accommodate estimated runoff flows and treat runoff prior to discharge to the Bay. Compliance with regulatory requirements, including the submission of a SDMP and SCP to the SFPUC for approval, as required by mitigation measure MM HY-6a.1, would ensure that this impact would be less than significant, similar to the Project.

Implementation of the Utilities Variant would not place housing and other structures within the proposed 100-year flood zone or otherwise include development that would impede or redirect flood flows. Implementation of mitigation measures MM HY-12a.1 (Finished Grade Elevations above Base Flood Elevation) and MM HY-12a.2 (Shoreline Improvements for Future Sea-Level Rise) would reduce impacts to a less-than-significant level, similar to the Project.

Implementation of a Utilities Variant would not expose people or structures to a significant risk of loss, injury, or death involving flooding, including flooding as a result of the failure of a levee or dam. Implementation of mitigation measure MM HY-14 (Shoreline Improvements to Reduce Flood Risk) would reduce impacts to a less-than-significant level. Based on historical records and the location of development, the Utilities Variant would not expose people or structures to inundation by seiche, tsunami, or mudflow. Impacts would be less than significant, similar to the Project

Biological Resources

The additional subterranean work required under the Utilities Variant (as compared to the Project) for installation of the piping network, and heating/cooling towers, wastewater treatment facilities, and solid waste collection facilities would not increase the potential for impacts to biological resources as the amount of land disturbance, and therefore habitat, would not be increased. The Utilities Variant would generally involve the same amount of ground disturbance, shoreline improvements, and in-water work as

the Project. Thus, overall construction-related impacts to biological resources would be similar to the Project. Implementation of the Utilities Variant would result in generally the same amount of development, would preserve the same amount of existing open space, and would create the same amount of new open space as the Project. Thus, operation of the Utilities Variant would result in similar, less than significant impacts to biological resources as the Project. Both construction and operational impacts to biological resources would be similar to the Project, as discussed below, because the type of development and associated construction activities are generally the same.

Construction

Development of the Utilities Variant would not conflict with the provisions of an adopted Habitat Conservation Plan, Natural Community Conservation Plan, or other approved local, regional, or State habitat conservation plan, and no impact would occur, similar to the Project.

Development of the Utilities Variant would not have a substantial adverse effect, either directly or through habitat modifications, on any common species or habitats since ecological enhancements and measures to avoid and minimize impacts to common vegetation communities and wildlife species would be proposed, similar to the Project. Impacts would be less than significant, similar to the Project.

Development of the Utilities Variant could have a substantial adverse effect, either directly or through habitat modifications, on sensitive natural communities or species identified as a candidate, sensitive, or special status in local or regional plans, policies, or regulations, or by the CDFG or USFWS. Mitigation measures MM BI-5b.1 through MM BI-5b.4 would reduce the effects on eelgrass, and the sensitive or special-status fish species that could occupy these areas by surveying for and avoiding this habitat. Mitigation measures MM BI-6a.1, MM BI-6a.2, and MM BI-6b would require surveys for special-status and nesting avian species and implement impact-avoidance measures such as construction buffers to ensure that the loss or take of these species would not occur.

Similar to the Project, the Utilities Variant's Draft Parks, Open Space, and Habitat Concept Plan would identify ecological enhancement measures that would include the restoration and management of suitable raptor foraging habitat. To provide a mechanism by which implementation of these enhancements would be ensured, mitigation measure MM BI-7b would be implemented to ensure that specific standards related to the enhancement of raptor foraging habitat would occur. Therefore, a net increase in the quality of raptor foraging habitat would result, similar to the Project, and, with mitigation, the overall effect on raptors is expected to be beneficial. Mitigation measure MM BI-9b would reduce the effects of pile driving-related activities to fish and marine mammals by recommending the type of piles to use to minimize sound impacts; providing for an alternative method of installation to minimize sound impacts; requiring installation during an agency-approved construction window when fish are least likely to be present to avoid the bulk of potential impacts; and requiring a construction monitor to ensure compliance with all measures, including sound monitoring. Construction activities could impact designated critical habitat for green sturgeon and Central California Coast steelhead; however, compensatory mitigation for lost aquatic habitat as described in mitigation measures MM BI-4a.1 and MM BI-4a.2 would be implemented to minimize impacts to wetlands, aquatic habitats, and water quality during construction. Overall adverse effects would be less than significant, similar to the Project. Mitigation measures MM BI-4a.1, MM BI-4a.2, MM BI-5b.1 through MM BI-5b.4, MM BI-12a.1,

MM BI-12a.2, MM BI-12b.1, and MM BI-12b.2 would reduce potentially significant impacts to Essential Fish Habitat to less-than-significant levels, similar to the Project. Ecological design features described in the Draft Parks, Open Space, and Habitat Concept Plan would result in increased habitat for western red bats, and impacts to this species would be less than significant.

Development of the Utilities Variant could have a substantial adverse effect on federally protected wetlands and other waters as defined by Section 404 of the CWA (including, but not limited to, marsh, vernal pool, coastal, etc.) through direct removal, filling, hydrological interruption, or other means. With implementation of mitigation measures MM BI-4a.1 and MM BI-4a.2, potential adverse effects of the Project to federally protected wetlands and other waters as defined by Section 404 of the CWA would be reduced to a less-than-significant level, similar to the Project.

Development of the Utilities Variant would not conflict with the natural resource protection policies of the General Plan; however, it could result in the disturbance or loss of trees that are protected by the City's Urban Forestry Ordinance and Section 143 of the *Planning Code*. Mitigation measure MM BI-14a would ensure that development does not result in conflicts with these policies by requiring preservation of street trees, trees that meet the size specification of significant trees, replacement of large trees that are removed, and the planting of street trees, consistent with *Planning Code* Section 143. In addition, mitigation measure MM BI-7b includes the planting of approximately 10,000 net new trees. With implementation of mitigation measures MM BI-14a and MM BI-7b, the Utilities Variant would not result in a conflict with City policies designed to protect urban streetscape through the planting of street trees, similar to the Project, and overall impacts would be beneficial.

Operation

Impacts to native oysters and EFH would be less than significant as removed hard structures would be replaced with approximately equal amounts of suitable habitat along the shoreline or the new breakwater. Implementation of mitigation measure MM BI-18b.1 would reduce the effects of marina operational activities to oysters, and mitigation measure MM BI-18b.2 would mandate the application of BMPs to control the distribution of sediments disturbed by the dredging activities to reduce water quality impacts to oysters. Mitigation measures MM BI-19b.1 and MM BI-19b.2 would reduce dredging and contamination impacts to EFH. With implementation of the identified mitigation measures, impacts would be reduced to a less-than-significant level, similar to the Project.

Development of the Utilities Variant could interfere substantially with the movement of native resident or migratory fish or wildlife species or with established native resident or migratory wildlife corridors, or impede the use of native wildlife nursery site (eelgrass beds). Mitigation measures MM BI-5b.1 through MM BI-5b.4 would reduce effects on eelgrass by surveying for and avoiding this habitat. Mitigation measures MM BI-20a.1 and MM BI-20a.2 would reduce the effects of operational activities related to tall structures and increased lighting to migrating species to less-than-significant levels by incorporating design features that would help minimize bird strikes, including using operational methods to reduce the effects of new lighting towers. With implementation of the identified mitigation measures, impacts would be reduced to a less-than-significant level, similar to the Project.

Implementation of the Utilities Variant would be consistent with the biological resources protection policies of the City of San Francisco General Plan, and with implementation of mitigation measure

MM BI-14a, development would be constructed in a manner consistent with policies of the Urban Forestry Ordinance and *Planning Code* Section 143. Consequently, the operation of the Utilities Variant would not conflict with any local policies or ordinances protecting biological resources, and there would be no impact.

Public Services

Construction

Police and Fire Services

Similar to the Project, access to the Utilities Variant site during construction would be maintained by implementation of a construction management traffic plan (CMTP) MM TR-1. The CMTP would provide necessary information to various contractors and agencies as to how to maximize the opportunities for complementing construction management measures and to minimize the possibility of conflicting impacts on the roadway system, while safely accommodating the traveling public in the area. A cohesive program of operational and demand management strategies designed to maintain acceptable levels of traffic flow during periods of construction activities in the area would be implemented.

Similar to the Project, construction of the Utilities Variant would not result in increased demand on police protection services, as demands on the SFPD during construction would be supplemented by private security (as required by mitigation measure MM PS-1 [site security measures during construction]), and construction areas would be secured through the installation of fencing and gates.

Therefore, the Utilities Variant would result in a less-than-significant impact to police protection and fire services during construction, as construction of the Utilities Variant would not impact SFPD or SFFD response times upon implementation of a CMTP. These impacts would be similar to the Project.

Schools and Library Facilities

Construction of the Utilities Variant would not result in impacts to the SFUSD or the San Francisco Public Library System. SFUSD or library facilities are not located on the Project site. All area school and library services would be available to the community throughout the duration of Project construction. As such, since construction of the Utilities Variant would be similar to construction of the Project, no impact to school or library services during construction of the Utilities Variant would occur. These impacts are the same as those identified for the Project.

Operation

Police Protection Services

Development with the Utilities Variant would have similar impacts to police protection services as development with the Project. Although the Utilities Variant would increase the amount of utility infrastructure and some associated employees, since operational impacts to police protection services were found to be less than significant for the Project, impacts to police protection services for the Utilities Variant would also be less than significant.

Fire Protection Services

Development with the Utilities Variant would have similar impacts to fire services as development with the Project. Although the Utilities Variant would increase the amount of utility infrastructure and associated employees, since operational impacts to these services were found to be less than significant for the Project, impacts to these services for the Utilities Variant would also be less than significant.

Building Safety

All new buildings must meet standards for emergency access, sprinkler, and other water systems, as well as all other requirements specified in the *San Francisco Fire Code*, which would help minimize demand for future fire protection services. Plan review of all structures for compliance with *San Francisco Fire Code* requirements would minimize the potential for fire-related emergencies by providing on-site protective features, reducing the demand for fire protection services.

Response Time

Construction of a new SFFD facility on land designated for community serving uses on the Utilities Variant site, along with the provision of additional firefighters and on-going fire protection operations, would allow the SFFD to maintain acceptable response times for fire protection and emergency medical services. The Applicant has designated 5.3 acres of community-serving uses in HPS Phase II, including 0.5 acre of which have been designated for a new SFFD facility.

These uses have been anticipated as part of the Utilities Variant and the impacts of their construction are evaluated in this EIR. Construction activities associated with proposed public facilities are considered part of the overall Utilities Variant. A discussion of project-related construction impacts, including those associated with the construction of public facilities, is provided in the applicable sections of this EIR, including Section III.D, Section III.H, Section III.I, Section III.J, Section III.K, and Section III.M. Construction impacts would be temporary. While it is likely that construction of the various public facilities would not result in significant impacts (either individually or combined), construction of the entire development program, of which the public facilities are a part, would result in significant and unavoidable impacts related to construction noise and demolition of an historic resource; all other construction-related impacts would be less than significant (in some cases, with implementation of identified mitigation). Refer to Section III.D, Section III.H, Section III.I, Section III.J, Section III.K, and Section III.M for the specific significance conclusions for construction-related effects.[1268] As such, the construction impacts associated with a new SFFD facility on the Project site have been addressed in this EIR. Therefore, similar to the Project, the development of the Utilities Variant would not require new or physically altered fire protection facilities to maintain acceptable response times. Additionally, compliance with all applicable provisions of the *San Francisco Fire Code* would ensure that this impact is less than significant.

[1268] The impact statements provided in each technical section of the EIR differentiate between construction impacts and operational or development impacts, and all identified mitigation measures are contained in the impact analysis. In addition, Table ES-2 in the Executive Summary of this EIR also summarizes all impact statements, the level of significance before mitigation, any identified mitigation measures, and the level of significance after mitigation.

Schools

Operational impacts to schools would be similar to the Project because the number of dwelling units anticipated would be the same. Therefore, the number of school-age children that would require adequate school services would be the same as with the Project. Impacts from the Utilities Variant on schools would be less than significant, similar to the Project.

Library Facilities

Operational impacts to libraries would be similar to the Project because the same number of dwelling units anticipated would be the same. Therefore, the service population for the existing library facilities would be the same as with the Project. Similar to the Project, library branches that currently serve the area including the new Portola branch (opened in 2009), the Visitacion Valley branch currently under construction (opening in 2010), and the Bayview branch to be expanded beginning in 2010 (opening in late 2011), would continue to meet the demands of the community. Therefore, the Utilities Variant would result in a less than significant operational impact to library services, similar to the Project.

Recreation

The Utilities Variant includes all development proposed with the Project plus the addition of substantial infrastructure including a subterranean piping network, new heating and cooling towers, new wastewater treatment facilities, and relocated/redesigned solid waste collection facilities. The installation of additional infrastructure to better serve the proposed development would not result in the generation of additional residents or substantial additional employees in the area that would result in additional demand on recreational opportunities. As the amount of open space and parks, the total amount of development, and the land uses provided with the Utilities Variant would be the same as the Project (and the same as the Utilities Variant), impacts to recreation would also be similar to the Project. This Variant, like the Project, would provide approximately 336.4 acres of parks and open space.

Construction impacts related to recreational facilities would be the same as those identified with the Project because the construction activities would be the same. The Utilities Variant would have the same number of housing units as proposed with the Project, thereby resulting in the same residential population of 24,465. Operational impacts are determined based on a ratio of acres of parkland per resident. Currently, the City provides approximately 7.1 acres of parkland per thousand residents, and the standard used in Section III.P assumes a ratio of 5.5 acres of parkland per 1,000 population is sufficient to meet the demand for recreational facilities without causing or accelerating substantial physical deterioration of facilities or requiring the construction of further facilities. The parkland-to-population ratio associated with the Utilities Variant would be 13.7, which is the same as the Project. The Utilities Variant ratio would be considerably higher than the ratio of 5.5 acres of parkland per thousand residents, which is considered sufficient to meet demand for recreational facilities without causing or accelerating substantial physical deterioration of facilities or requiring the construction of further facilities. Impacts would be less than significant.

The timing of Utilities Variant development could result in a temporary increase in the use of parks, recreational facilities, and open space in a manner that would cause or accelerate the substantial physical deterioration or degradation of facilities if the development of residential and/or employment-generating

uses were to occur in advance of the development of park and recreational facilities. The conceptual development plan for this Variant would result in the development of residential units and parks during all of four stages of development. Table III.P-3 (Residential Units and Park Acreage Provided during Each Stage of Development) outlines the number of residential units and the acreage of parkland provided during each stage of development, as well as the resulting park-to-population ratio for residents of the Project site (even if developed under the Utilities Variant). As this table indicates, the park-to-population ratio would not drop below 13.8 acres per 1,000 population at any time during the four stages of development, which exceeds the benchmark of 5.5 acres of parkland per 1,000 population. Adequate parkland would be provided during each stage of development.

However, during a given phase, park construction could lag behind residential development, leading the parkland-to-population ratio to drop below an acceptable level. Moreover, the development plan is conceptual and could be modified during the entitlement and development process. Mitigation measure MM RE-2 would ensure that the parks and recreational amenities are constructed as residential and employment-generating uses are developed, and a less-than-significant impact would result.

A Technical Memorandum was prepared to study wind conditions at a launch site at CPSRA (in The Neck area) and in a 55-acre portion of the Bay south of the launch site. The study found that development in the cumulative scenario, which includes development at the Project site (even if under the Utilities Variant), generally results in wind speed changes near the shoreline (generally within 300 feet) ranging from no change to a 10 to 20 percent decrease in wind speed. Approximately 7 acres near the shoreline would experience a decrease of 10 to 20 percent in wind speed; approximately 36 acres of the Bay would experience a decrease of five to 10 percent; and approximately 12 acres of the Bay would experience a decrease of less than five percent. The majority of the windsurfing test area (as identified in the Technical Memorandum) would not be substantially affected (e.g., a 10 percent decrease or less in wind speed). Because this Variant is the same as the Project in terms of development amounts and locations, it would not significantly and adversely affect existing windsurfing opportunities at the CPSRA. A less-than-significant impact would occur, and no mitigation is required.

In summary, impacts resulting from the Utilities Variant would be substantially similar to the Project.

Utilities

As discussed in the introduction, the Utilities Variant includes all development proposed with the Project plus the addition of substantial infrastructure including a subterranean piping network, two heating/ cooling plants to provide a more centralized system, eleven individual wastewater treatment facilities, and two central solid waste collection facilities. With the Utilities Variant, upgrades to the individual utility systems are considered for the Project. As such, generally the Utilities Variant would not result in significant impacts that would require the construction of new or expanded facilities to handle projected demand and a less-than-significant impact would result, creating a lesser impact than the Project. Additionally, the Utilities Variant would treat wastewater on site, rather than sending it to the municipal plant for treatment thereby also reducing impacts.

Similar to the Project, with the Utilities Variant, the installation of additional infrastructure to better serve development would not result in the generation of substantial additional residents or employees in the

area that would result in additional wastewater generation requiring treatment. Therefore, the Utilities Variant would not require or result in the construction of new or expanded water treatment facilities, the construction of which could cause significant environmental effects, and would result in a less-than-significant impact. Furthermore, the Utilities Variant includes installation of a wastewater treatment system, including 11 decentralized facilities to handle all treatment demand. With the Utilities Variant, all wastewater treatment would be handled on site rather than conveying the water to the SFPUC, as is done currently. This would relieve the SFPUC of treatment of approximately 1.05 mgd, creating a beneficial effect on wastewater treatment, compared to the Project. Construction activities would include replacement of existing wastewater conveyance lines within the area and new decentralized wastewater treatment facilities. Impacts related to these construction activities would be less than significant, generally similar to the Project.

Water

While operation of the Utilities Variant would not generate additional population (residents or employees, permanent or temporary), operation of the proposed utility system would increase water demand. Although the piping network would be substantially larger with the Utilities Variant, much of this is to convey solid waste and would not increase water demand. However, operational activities of the two heating/cooling plants, the eleven wastewater treatment plants, as well as the two solid waste collection facilities would increase water usage. It is important to note that this operational water demand for utilities would effectively be shifted within the existing area-wide water usage because existing utility service provider(s) would otherwise be handling the associated heating/cooling distribution, wastewater treatment, and solid waste collection for the site and would require water during their operations. These utility operations are being shifted "on site" away from the existing service providers with the Utilities Variant and effectively, the water demand is being shifted as well. Little, if any, additional water demand would be placed on the water system at an areawide level to provide these services. Therefore, the Utilities Variant would not require water supplies in excess of existing entitlements and resources or result in the need for new or expanded entitlements and would result in a less-than-significant impact. Additionally, as discussed above, with the Utilities Variant, treatment at the decentralized wastewater treatment facilities would produce approximately 1.05 mgd of recycled water, and total water demand would be reduced by an equivalent amount. Thus, the water demand impact of the Utilities Variant would be less than the Project.

Wastewater

With the Utilities Variant, expansion of existing wastewater conveyance or treatment facilities operated by the SFPUC would not be necessary and no impact would occur. As the area would no longer contribute stormwater or wastewater to the Combined Sewer System operated by the SFPUC, the Utilities Variant would result in an exceedance of treatment capacity and would result in a less-than-significant impact. However, this impact would be less than anticipated with the Project.

Implementation of the Utilities Variant would not exceed wastewater treatment requirements of the applicable Regional Water Quality Control Board, and a less-than-significant impact would occur, similar to the Project.

Solid Waste

Construction of the Utilities Variant, including demolition of existing facilities, could generate solid waste that exceeds the permitted capacity of landfills serving the City of San Francisco. Trenching and excavation for the subterranean piping network and underground storage facilities (for the wastewater treatment facilities) could result in additional material that needs removal from the site. While it is assumed that at least some of this material can be utilized elsewhere within the development area, the potential for additional haul trips could result. However, any potential impact would be reduced to a less-than-significant level by implementation of mitigation measure MM UT-5a (Construction Waste Diversion Plan), similar to the Project.

Implementation of the Utilities Variant includes operation of a more sophisticated infrastructure system. The Utilities Variant would not substantially increase the number of residents or employees in the area, and would, therefore, not substantially increase solid waste generation. Operation of the decentralized waste treatment facilities would generate approximately 2,238 tons of sludge per year, which would be recycled, composted, or disposed of in landfills as permitted. The solid waste collection system that is proposed with the Utilities Variant would make it easier for residents and employees to recycle by creating a single point drop off for waste and recyclables. This waste stream would be sorted on site, prior to being hauled off site to a landfill or recycling station. Therefore, by making it easier for people to utilize methods of solid waste disposal other than waste that is taken to landfills, the Utilities Variant has the potential to reduce the generation of solid waste arriving at San Francisco landfills. As operation of the Utilities Variant would not generate substantial solid waste, this Variant would not exceed the permitted capacity of landfills serving the City of San Francisco over what was analyzed for the Project, and impacts would be less than significant, similar to the Project.

Furthermore, operation of the Utilities Variant would be required to comply with federal, state, and local statutes and regulations related to solid waste, including the disposal of sludge. This impact would be less than significant with mitigation, similar to the Project.

Electricity, Natural Gas, and Telecommunications

The proposed improvements within the Project site include the construction of a joint trench for electrical, natural gas, cable TV, and telecommunications. The power supplier may service the project via new extensions of the 12KV distribution and or 115KV transmission lines into HPS Phase II. This could include a new substation within the Project site. Impacts of construction activities associated with the Project, including demolition and installation of new utility infrastructure, are discussed in Section III.D, Section III.H, Section III.I, Section III.J, Section III.K, Section III.L, Section III.M, Section III.O, and Section III.S of this EIR. No new construction impacts beyond those identified in those sections would occur with construction of utility infrastructure associated with the Utilities Variant, similar to the Project. Telecommunications providers are "on-demand" services, generally expanding their systems in response to demand, and would be anticipated to provide extensions of existing infrastructure to the Project site as required. Such extensions would require minimal trenching, if any, and would not be anticipated to result in significant environmental impacts beyond those previously analyzed in this EIR. The subdivision process would include submittal of detailed infrastructure plans to the Department of Public Works identifying how they would meet the infrastructure needs of the Project. Implementation

of these plans would be a condition of subdivision approval. The subdivision process would ensure that adequate infrastructure is provided to accommodate the demands of the Project such that the capacity of the service providers to provide such utilities would not be exceeded. Therefore, the impact would be less than significant for the Utilities Variant, similar to the Project.

Energy

Construction

Similar to the Project, construction would not be expected to result in demand for natural gas. However, construction of the Utilities Variant would require the use of electricity and fossil fuels. The construction activities proposed with the Utilities Variant do not include unusual or atypical activities that would result in a higher than average demand for fuels. Construction would consist of temporary activities that would not generate a prolonged demand for energy. Thus, construction activities would not be large in comparison to a project of a similar size and with similar land uses. Thus, the Utilities Variant would result in a less-than-significant impact, similar to the Project.

Operation

Operation of the Utilities Variant would include electricity and natural gas demand to run the heating and cooling plants, wastewater treatment plants and solid waste collection system and facilities. These uses would increase the use of electricity and natural gas in the area, however, this would not be considered a wasteful use. Additionally, provision of these heating and cooling utilities in a centralized fashion would reduce the overall use of electricity and natural gas as compared to a decentralized system. The on-site wastewater treatment facilities would require an increased use of electricity and natural gas as compared to existing conditions at the site. However, by removing the wastewater generation of the Project from the wastewater stream treated by the SFPUC, electricity and natural gas utilized by the SFPUC would be reduced and effectively shifted to provide service with the Utilities Variant. As such, the overall demand on the grid would not be substantially increased. The proposed solid waste collection system would require additional electricity to run the collection facilities. However, the centralized collection areas have the potential to reduce the amount of waste being transferred to landfills based on the ease provided to residents and employees for recycling and alternative waste provisions. The reduction in waste and the centralized collection locations would reduce the amount of space allotted within each building to solid waste collection, which would effectively be transferred into these larger collection facilities, reduce the number of trucks to and from the area, and reduce the number of trips and idling that garbage trucks would generate around the proposed neighborhoods. Therefore, while operation of the Utilities Variant may increase the demand for electricity and natural gas, this use would not be considered wasteful and would not be large in comparison to operations of a similar size, and the Utilities Variant would result in a less-than-significant impact, similar to the Project.

Greenhouse Gas Emissions

The Utilities Variant would involve the development of additional on-site utility infrastructure. While construction of centralized utilities would result in a greater amount of development, most of the development would be underground, and the level of overall above-ground development with this

alternative would be substantially similar to the Project. Construction and operational impacts would be substantially similar to the Project. The GHG emissions may even decrease due to the availability of less carbon intense electricity sources and alternatives for heating and cooling. However, depending on the amount of energy required to operate these new utilities, the GHG emissions may increase slightly. Since the majority of the GHG emissions for the Utilities Variant would remain the same, the GHG emissions would be less-than-significant.

BAAQMD is considering the future adoption of quantitative CEQA thresholds of significance for operational-related GHG emission impacts. At present, two options relevant to the Project are under consideration for operational GHG emission thresholds; the lead agency can choose either option. Option 1 is based on a project's total operational GHG emissions of 1,100 metric tonnes CO_2e per year. The Project's total operational emissions would exceed this level, which means that if this was used, the Project would be significant. Option 2 is based on the amount of a project's operational GHG emissions per service population, set at 4.6 metric tonnes CO_2e per year. In anticipation of proposed new BAAQMD CEQA thresholds of significance for GHG emissions, this EIR provides an analysis of the Project's operational GHG emissions under the proposed thresholds of significance identified above. The BAAQMD thresholds stated above are still in draft form and may undergo additional changes before being finalized; a revised version is expected Monday, November 2nd. The methodologies presented in this EIR for quantification of GHG operational emissions is based on using more refined data sources than indicated in the BAAQMD guidance and are the most appropriate to use for the Utilities Variant and the Project.

With mitigation, the Project-related operational emissions of 154,639 result in 4.5 tonnes CO_2e per service population per year based on a service population of 34,242 (this accounts for 23,869 net new residents and all jobs except for the stadium jobs, which already exist, 10,373). Therefore, the Project-related operational emissions would be less than 4.6 tonnes CO_2e per service population per year and would result in a less-than-significant impact on climate change. The Utilities Variant would not measurably change the parameters of the Project land use program, and thus this analysis applies to the Utilities Variant.

IV.F VARIANT 5: SAN FRANCISCO 49ERS AND OAKLAND RAIDERS SHARED STADIUM AT HUNTERS POINT SHIPYARD

IV.F.1 Overview

The San Francisco 49ers and Oakland Raiders Shared Stadium at Hunters Point Shipyard Variant (49ers/Raiders Shared Stadium Variant) assumes that development would occur exactly as proposed for the Project, except that the new stadium would be home to both the San Francisco 49ers and the Oakland Raiders. Therefore, there would be an increase in the number of football games that would occur during the NFL football season, which lasts from August until late December. This could result in an event at the stadium every week during the football season. For the purposes of this analysis, 20 football games and 20 other events per year were assumed. This assumption assumes a conservative, but possible scenario. It includes two pre-season and eight regular season games, and the possibility that either team could host up to two post-season playoff games. A maximum of four post-season games would only occur at the proposed stadium if (1) both teams were in separate conferences (American Football Conference or National Football Conference), (2) each team hosted and won either a first round wild-card playoff game or a second round divisional playoff game, and (3) each team then hosted a conference championship game. The likelihood of four post-season games occurring is remote; therefore, this EIR analysis only assumes up to two playoff games per year total.

IV.F.2 Project Objectives

The objectives for the 49ers/Raiders Shared Stadium Variant would be the same as for the Project. A full list of Project objectives is provided in Section II.D of this EIR.

IV.F.3 Characteristics

Section II.E outlines the Project's land use plan, parks and open space plan, transportation improvements, infrastructure plan, community benefits, and green building concepts. Each of these components of the Project would also apply to this variant.

IV.F.4 Potential Environmental Effects

Overall, the 49ers/Raiders Shared Stadium Variant would not change the amount or type of development compared to the Project. However, the 49ers/Raiders Shared Stadium Variant includes an increase in NFL events per season from 12 to 20 games. Development with this Variant is also likely to result in events occurring weekly for the entire NFL season. Thus, no construction-related environmental effects would occur in excess of those identified for the Project. The potential operational effects of the 49ers/Raiders Shared Stadium Variant would be related to the increase of stadium use and would affect air quality, noise, transportation, utilities, energy, and aesthetics.

Land Use and Plans

Development of the 49ers/Raiders Shared Stadium Variant would be substantially similar to the Project and would not physically divide an established community or conflict with plans, policies, or regulations adopted to avoid or mitigate an environmental effect. Operation of the 49ers/Raiders Shared Stadium Variant would alter the existing land use character of the vicinity, but such an alteration would not be adverse, similar to the Project. The 49ers/Raiders Shared Stadium Variant would include eight additional football games a year. This additional use is consistent with uses and building characteristics proposed with the Project. Therefore, these additional event days would not result in an adverse change to the land use character of the site or the surrounding areas, and the 49ers/Raiders Shared Stadium Variant would result in a less-than-significant impact, similar to the Project. The 49ers/Raiders Shared Stadium Variant would result in an urban development replacing deteriorating industrial and open space, similar to the Project, and would not conflict with existing land use plans. Thus, potential impacts of the 49ers/Raiders Shared Stadium Variant to land use and plans would be less than significant, similar to the Project.

Population, Housing, and Employment

In general, impacts from the 49ers/Raiders Shared Stadium Variant would be similar to the Project because land uses and densities are the same, with the exception of increased use of the football stadium. The 49ers/Raiders Shared Stadium Variant would allow 8 more football games at the football stadium. However, the 49ers/Raiders Shared Stadium Variant would not increase the number of residential units, nor other land uses. As such, the 49ers/Raiders Shared Stadium Variant would have the potential to increase the number of employment opportunities (operational) at the site over levels anticipated with the Project, as discussed below. However, the permanent residential population would not change.

Direct Impacts

With the 49ers/Raiders Shared Stadium Variant, construction is scheduled for completion beginning in the Year 2017, extending through the Year 2029, a period of approximately 12 years. This is similar to the construction schedule proposed at the HPS Phase II site for the Project, and, therefore, the number of construction personnel required at any given time at the HPS Phase II site would be similar to the total projected to be required for the Project. Construction employment opportunities are temporary in nature and would not result in a substantial increase in the number of employees in the area. Therefore, the 49ers/Raiders Shared Stadium Variant would result in a less than significant construction impact to population during construction.

Direct population growth with the 49ers/Raiders Shared Stadium Variant would include residents and employees who would occupy new homes and the employment space(s), respectively. With the 49ers/Raiders Shared Stadium Variant, 8 more football games would occur at the football stadium. There would be no change to the number of proposed housing units; therefore, the permanent resident population with the 49ers/Raiders Shared Stadium Variant would be the same as with the Project. However, the 49ers/Raiders Shared Stadium Variant would increase the number of jobs compared to the Project due to 8 more football games. As identified in Section III.C, the stadium is anticipated to generate approximately 359 jobs when used for football events (12 football games and 20 other events with the Project). With the 49ers/Raiders Shared Stadium Variant, 8 more football games would result in

approximately 10,820 jobs, approximately 90 more than the Project (refer to Table III.C-7 [Project Employment by Land Use]). Total employment with the 49ers/Raiders Shared Stadium Variant would represent approximately 1.4 percent of the 748,100 jobs anticipated Citywide in 2030. Overall, development with the 49ers/Raiders Shared Stadium Variant would be similar to the Project.

Although the 49ers/Raiders Shared Stadium Variant would result in an increase in employment at the HPS Phase II site, growth in this area has long been the subject of many planning activities. As with the Project, the 49ers/Raiders Shared Stadium Variant development program is based on the land uses, number of housing units, and objectives approved by voters under Proposition G in 2008. The uses proposed with the 49ers/Raiders Shared Stadium Variant would support planned growth for the Candlestick Point and HPS Phase II. As a result of these ongoing planning activities, City service providers have been aware of, and have included future growth projections for site in their long-term operations plans for population growth and necessary infrastructure.

Employment growth at HPS Phase II would be considered substantial if it resulted in housing demand that would exceed planned regional housing development. The 49ers/Raiders Shared Stadium Variant would not alter the number of housing units proposed with the Project. There would be a net increase in jobs; however, the 49ers/Raiders Shared Stadium Variant would result in a less-than-significant impact, similar to the Project. Total demand for housing with the 49ers/Raiders Shared Stadium Variant would represent 3.9 percent of the total Bay Area housing need of 214,500 units (based on the RHNA targets; refer to Section III.C.3 projected by ABAG through 2014.[1269] Based on the total employment available with the 49ers/Raiders Shared Stadium Variant (10,820 jobs), total housing demand would be 8,330 units (approximately 90 more employees associated with 8 more football games would result in housing demand for 69 more units than the Project, refer to Table III.C-9 [Project Housing Demand]).[1270] As discussed above, the 49ers/Raiders Shared Stadium Variant would provide approximately 10,500 dwelling units. This would exceed the approximately 8,330 dwelling unit demand anticipated with the 49ers/Raiders Shared Stadium Variant. Therefore, the population increase associated with employment with the 49ers/Raiders Shared Stadium Variant could be entirely accommodated. However, it is likely that some employees with the 49ers/Raiders Shared Stadium Variant would elect to live elsewhere in the City or within surrounding Bay Area communities.

Based on existing commuting patterns, the 49ers/Raiders Shared Stadium Variant would generate a demand for about 3,749 units in surrounding Bay Area communities. This housing demand would be dispersed throughout the nine-county Bay Area, which would result in negligible potential increases in housing demand within the Bay Area.

It is not anticipated that the increase in employment with the 49ers/Raiders Shared Stadium Variant would create a substantial demand for housing in the immediate neighborhood, in San Francisco, or in the region in excess of the housing provided as part of the 49ers/Raiders Shared Stadium Variant or housing otherwise available in the Bay Area. Necessary improvements to infrastructure, public services, and housing associated with direct population growth proposed as part of the 49ers/Raiders Shared

[1269] The RHNP is updated every five years and does not extend through 2030.
[1270] Calculated as the projected employment divided by 1.36, plus 4.7% additional housing units to account for vacancy rate, times 55% total demand in San Francisco.

Stadium Variant has been anticipated in ongoing local and regional planning activities. All impacts associated with direct population growth are considered less than significant, similar to the Project.

Indirect Impacts

As infrastructure, public services, roads, and other services and communities amenities are expanded, there would also be potential for development with the 49ers/Raiders Shared Stadium Variant to generate indirect population growth. Indirect growth is often defined as "leapfrog" development, development that occurs as infrastructure is expanded to previously un-served areas. Such development patterns usually occur in suburban areas adjacent to undeveloped lands. Areas surrounding the 49ers/Raiders Shared Stadium Variant site are built out, except for sites such as Executive Park or India Basin that are currently undergoing development or are the subject of planned future development. Thus, the surrounding lands are not vulnerable to leapfrog-type development.

Infrastructure and services would be expanded to serve both the Candlestick Point and HPS Phase II sites, without significant excess capacity that might encourage additional local growth beyond that already anticipated under Proposition G and with the redevelopment plans. Development with the 49ers/Raiders Shared Stadium Variant would not expand infrastructure to geographic areas that were not previously served, nor would it create new transportation access to a previously inaccessible area. All impacts associated with indirect population growth are considered less than significant, similar to the Project.

The potential for impacts due to housing displacement would be the same as the Project, and would be less than significant. The 49ers/Raiders Shared Stadium Variant would not increase residential units proposed with the Project however, any dwelling units removed with the 49ers/Raiders Shared Stadium Variant would be replaced on site by the proposed development.

■ Transportation and Circulation

The 49ers/Raiders Shared Stadium Variant assumes that both the 49ers and Oakland Raiders would play home games at the new stadium at HPS Phase II. This Variant addresses the requirements of the National Football League (NFL) for NFL teams in close geographic proximity to one another to evaluate the potential shared use of a stadium. Land uses would be identical to the Project, however, the number of days during which football games would occur at the stadium would increase from 12 under the Project to 20 under the 49ers/Raiders Shared Stadium Variant. Given that the teams typically play half of all pre-season, post-season, and regular season games at home, the use of the stadium by two NFL teams could result in one NFL event at the stadium occurring every week from the beginning of the pre-season in August through the end of December for up to 20 NFL events per year. In addition, there would also be up to 20 secondary smaller events at the stadium per year.

The 49ers/Raiders Shared Stadium Variant would not result in an increase in traffic that is substantial in relation to the existing traffic load and capacity of the street system, and would be similar to that analyzed for the Project. The 49ers/Raiders Shared Stadium Variant would not exceed, either individually or cumulatively, a level of service standard established by the county congestion management plan (CMP) for roads or highways. However, similar to the Project, traffic impacts related to the new stadium would

be significant and unavoidable. The stadium would still likely host special events and would have the same impacts as the Project.

The 49ers/Raiders Shared Stadium Variant site is not located within the San Francisco Airport Land Use Policy Plan Area or other airport land use plan, and therefore, would not result in a safety hazard from airport operations for people residing or working in the area. The 49ers/Raiders Shared Stadium Variant site is also not located within the vicinity of a private airstrip and would not result in a safety hazard for people residing or working at the Project site. Therefore, the 49ers/Raiders Shared Stadium Variant would result in a less than significant impact to aircraft activity and traffic levels, similar to the Project.

Development under the 49ers/Raiders Shared Stadium Variant would not affect or increase hazards due to design features or incompatible uses aboveground. The new buildings would be designed consistent with the SFBC, which would reduce all potential design hazards to a less than significant level. The roadway network associated with the 49ers/Raiders Shared Stadium Variant would be designed to meet all applicable codes, including design guidelines for emergency access, and would result in a less than significant impact associated with design hazards. As a similar amount of development would result from the 49ers/Raiders Shared Stadium Variant as the Project, and since the same design standards would apply for both, potential traffic impacts from design hazards would be similar to the Project.

Thus substantial additional parking, above that provided by the Project, would not be required, and impacts would be less than significant. As the same amount of development and the same land uses would occur under the 49ers/Raiders Shared Stadium Variant as with the Project, parking impacts would be similar to the Project.

The 49ers/Raiders Shared Stadium Variant would comply with adopted policies and plans regarding alternative transportation, and impacts would be less than significant, similar to the Project.

Aesthetics

Construction

All construction-related impacts of the 49ers/Raiders Shared Stadium Variant would be similar to those identified for the Project since the development program is the same. All potential aesthetics impacts resulting from construction of the Project were found to be less than significant with the incorporation of mitigation measure MM AE-2 (Mitigation for Visual Character/Quality Impacts during Construction), which requires contractors to keep construction areas generally clean, regulates worker parking, requires strict control of the staging of equipment, and requires temporary fencing to block views of the staging areas from the street. MM AE-2 (construction staging) would be required with the 49ers/Raiders Shared Stadium Variant and impacts would, therefore, be less than significant with this Variant as well. Since construction of the 49ers/Raiders Shared Stadium Variant would, like the Project, be constructed during daylight hours, impacts resulting from additional sources of light and glare during construction would be less than significant.

Operation

Operation-related impacts of the 49ers/Raiders Shared Stadium Variant would be similar to those identified for the Project since the development program with each is the same. However, the 49ers/Raiders Shared Stadium Variant proposes to double the number of NFL events to 20 per year. The stadium would physically exist regardless of the number of events per year. Section III.E of this EIR found that effects resulting from the relocation of the stadium to HPS would not cause significant impacts related to substantial sources of new light and glare. Since it is estimated that the lighting towers at the stadium would be 192 feet above street level, the lights can be focused directly onto the playing surface, which would minimize spillover lighting and generate virtually no additional light or glare in the surrounding area. In addition, the playing surface would not be visible outside of the stadium, thereby eliminating the possibility of glare from the playing surface impacting surrounding areas. The EIR found that light spill from the stadium would be between 0.2 and 1.0 foot-candle. Such a change in the light level at this location would be less than that associated with typical street lighting, which is not considered substantial. Project mitigation measures MM AE-7b.1 (field lighting testing) and MM AE-7b.2 (field lighting testing) would be incorporated into the 49ers/Raiders Shared Stadium Variant and would require any spillover of light from the stadium to be similar to that of surrounding street lighting. Since the impact of stadium light and glare is less than significant with the incorporation of mitigation measures with the Project, the doubling of the number of games with this Variant would not result in a significant impact.

All other impacts to visual character and scenic vistas related to the operation of the Project were found to be less than significant. The stadium use proposed with the Project would be the same with the 49ers/Raiders Shared Stadium Variant. Although the number of game days would be increased, the use would be the same and the amount of lighting needed for each use would be the same. Impacts resulting from the creation of additional light or glare that could impact scenic views of downtown or impacts surrounding land uses were found to be less than significant with the incorporation of mitigation measures MM AE-7a.1 (parking lot lighting), MM AE-7a.2 (landscape and sign illumination), MM AE-7a.3 (lighting plan), MM AE-7a.4 (non-reflective materials), MM AE-7b.1 (field lighting testing), and MM AE-7b.2 (field lighting testing). These measures require parking lot, security, and landscaping lighting to comply with City requirements that eliminate light spill onto surrounding uses and that proposed structures are constructed with non-reflective surface to eliminate glare. Therefore, since the 49ers/Raiders Shared Stadium Variant is the same as the Project with respect to the stadium use, impacts would be less than significant with mitigation.

■ Shadows

The 49ers/Raiders Shared Stadium Variant would result in the same development as the Project. The 49ers/Raiders Shared Stadium Variant would have the same impacts related to solar access as the Project. Overall, given the heights, layouts, and orientations of the Project buildings, existing parks and open space would experience variable levels of shading throughout the day, generally receiving some new shade from morning until noon in spring, summer, and fall with less increase in the afternoons in winter, spring, and fall. Public use of these existing parks in the vicinity of Candlestick Point would not be

adversely affected by these shade conditions and impacts would be less than significant, similar to the Project.

The CPSRA would be affected by new shade in the afternoon but most areas would experience limited to no new shadow from the Project. Other areas of the CPSRA would largely continue to remain in the sun throughout the year. Project shadow would not interfere with the public's use or enjoyment of the CPSRA and impacts would be less than significant, similar to the project.

Wind

Since the proposed development with the 49ers/Raiders Shared Stadium Variant would be the same as the Project, impacts related to wind would be the same as the Project. The 49ers/Raiders Shared Stadium Variant would increase use of the stadium, which would have no effect on wind impacts. With the incorporation of mitigation measure MM W-1a (Building Design Wind Analysis), impacts would be reduced to a less than significant level, similar to the project.

Air Quality

Since the proposed development with the 49ers/Raiders Shared Stadium Variant is exactly the same as the Project, impacts related to air quality would be substantially the same as the Project. The 49ers/Raiders Shared Stadium Variant only proposes more use of the stadium, which slightly increases the criteria pollutant emissions associated with extra use of the stadium and traffic coming to extra games.

Section III.G found that all impacts related to wind were less than significant with the incorporation of mitigation measure MM W-1a (wind modeling). This mitigation measure requires that a Building Design Wind Analysis be prepared prior to approval of 49ers/Raiders Shared Stadium Variant buildings, ensuring that the applicable 26 mph threshold would not be exceeded. If an impact would occur, the developer would be required to implement measures to reduce potential wind impacts. Thus, similar to the Project, impacts would be less than significant.

Construction

As stated above, overall construction impacts of the 49ers/Raiders Shared Stadium Variant with respect to air quality would be the same as the Project. The level of development with 49ers/Raiders Shared Stadium Variant and the level of construction activities that would occur over the approximately 20-year build-out period would be the same as the Project. Similar to the Project, construction activities with 49ers/Raiders Shared Stadium Variant would include site preparation, grading, placement of infrastructure, placement of foundations for structures, and fabrication of structures. Demolition, excavation and construction activities would require the use of heavy trucks, excavating and grading equipment, concrete breakers, concrete mixers, and other mobile and stationary construction equipment. Emissions during construction would be caused by material handling, traffic on unpaved or unimproved surfaces, demolition of structures, use of paving materials and architectural coatings, exhaust from construction worker vehicle trips, and exhaust from diesel-powered construction equipment.

Construction-related emissions are generally short-term in duration, but may still cause adverse air quality impacts. However, the BAAQMD does not recommend any significance thresholds for the emissions during construction. Instead, the BAAQMD bases the criteria on a consideration of the mitigation measures to be implemented. If all appropriate emissions mitigation measures recommended by the BAAQMD CEQA Guidelines are implemented for a project, construction emissions are not considered adverse. Fine particulate matter (PM_{10}) is the pollutant of greatest concern with respect to construction activities. Any project within the City of San Francisco, including the 49ers/Raiders Shared Stadium Variant, would be required to comply with San Francisco Health Code Article 22B, Construction Dust Control, which requires the preparation of a site-specific dust control plan, (with mandatory mitigation measures similar to the BAAQMD's) for construction projects within 1,000 feet of sensitive receptors (residence, school, childcare center, hospital or other health-care facility or group-living quarters). As such, with implementation of mitigation MM HZ-15, which identifies specific mitigation measures that would be used to reduce emissions associated with construction, construction-related criteria pollutant impacts associated with the 49ers/Raiders Shared Stadium Variant would be less than significant and the same as the Project.

With respect to airborne human health risks, construction activities associated with the 49ers/Raiders Shared Stadium Variant would increase the levels of two potential human health risks: (1) diesel particulate matter (DPM) and (2) dust or particulate matter (PM_{10}) bound to certain metals and/or organic compounds from on-site soils. MM AQ-2.1 (Implement Accelerated Emission Control Device Installation on Construction Equipment) and MM AQ-2.2 (Implement Accelerated Emission Control Device Installation on Construction Equipment Used for Alice Griffith Parcels) would address construction sources of DPM including off-road construction equipment such as lifts, loaders, excavators, dozers, and graders. In addition, the delivery of equipment and construction materials, spoils and debris hauling, and employee commute traffic could contribute to construction-related DPM emissions. In terms of DPM, ENVIRON prepared a human health risk assessment (HRA)[1271] that evaluated potential human health risks associated with construction and operation of the Project. As construction emissions associated with the 49ers/Raiders Shared Stadium Variant are expected to be the same as those associated with Project, the 49ers/Raiders Shared Stadium Variant would have the same impacts than the Project, would not exceed the BAAQMD CEQA threshold. As the carcinogenic and non-carcinogenic health risks posed by DPM emissions during construction activities associated with development of the 49ers/Raiders Shared Stadium Variant have been determined to be below established thresholds, this impact is less than significant with MM AQ-2.1 and MM AQ-2.2, similar to the Project.

Similar to the Project, construction activities at both Candlestick Point and HPS Phase II for the 49ers/Raiders Shared Stadium Variant have the potential to generate TACs associated with soil-PM_{10} and an HRA evaluated the potential concentrations of the airborne soil-PM_{10} at numerous receptors on site (residents at the Alice Griffith Public Housing units) and off site (adult and child residents, workers, and schoolchildren) in the Project vicinity. As the carcinogenic and noncarcinogenic health risks posed by soil-PM_{10} emissions during construction activities associated with development of the Project have been determined to be below established thresholds, the same impacts would be expected from the

[1271] Environ. 2009. Ambient Air Quality Human Health Risk Assessment: Candlestick Point – Hunters Point Shipyard Phase II Development Plan. September 28. Appendices I & II.

49ers/Raiders Shared Stadium Variant. This impact is less than significant with MM HZ-15, similar to the Project.

Operation

Operational impacts to regional and local air quality would be substantially similar to the Project. The anticipated land uses would remain the same as the Project and impacts would be the same as identified with the Project. It should be noted that the shared use of the stadium by the San Francisco 49ers and the Oakland Raiders would increase the annual usage of the stadium but not the daily use. As such, the daily emissions anticipated with 49ers/Raiders Shared Stadium Variant would be the same as the Project.

Both this variant and the Project would result in fewer emissions during the operation of their respective land uses compared to a similar level of development without the energy and transportation considerations discussed in this EIR. 49ers/Raiders Shared Stadium Variant, similar to the Project, would incorporate features intended to reduce motor vehicle trips, designed as a dense, compact development with a mix of land uses that would facilitate pedestrian, bicycle, and transit travel. Nonetheless, criteria pollutant emissions of ROG, NO_X, PM_{10}, and $PM_{2.5}$ associated with land uses anticipated with the 49ers/Raiders Shared Stadium Variant would be expected to exceed existing BAAQMD thresholds. Under BAAQMD's current thresholds, impacts are considered significant if daily emissions of criteria pollutants exceed 80 lbs/day of ROG, NO_X, and PM_{10}. Similar to the Project, no additional feasible mitigation measures are available to reduce 49ers/Raiders Shared Stadium Variant's operational criteria emissions below the BAAQMD thresholds. This would be a significant and unavoidable impact.

With respect to airborne human health risks, emissions associated with operation activities under the 49ers/Raiders Shared Stadium Variant would increase the levels of two potential human health risks: (1) TACs and (2) vehicle emissions ($PM_{2.5}$).

This 49ers/Raiders Shared Stadium Variant continues to include R&D facilities at HPS Phase II, which are situated on a peninsula extending to the south of other proposed residential areas. As the predominant winds are out of the west, on-site receptors will generally be upwind from these R&D areas. As such, the Project is designed to minimize potential adverse impacts between TAC sources in R&D areas and both on-site and off-site receptors. As discussed for the R&D Variant, an analysis was conducted to determine the potential impacts from a variety of TAC sources in the R&D areas. Details regarding this assessment can be found in Appendix H1, Attachment III.[1272]

The HRA estimated the excess lifetime cancer risk and chronic noncancer HI due to the combined TAC emissions from the R&D areas at any surrounding receptor location. As the 49ers/Raiders Shared Stadium Variant has the same configuration as the Project, the estimated cancer risks for long-term residential exposure would be above 10 in one million in an area designated as open space that would extend slightly south beyond the R&D boundary. The maximum estimated cancer risk for a residential receptor in this location would be 17 in one million; the noncarcinogenic health risks would have an HI of 1.7. However, as noted above, this receptor location would be in an area designated as open space, and would not be a residential location. If cancer risks were estimated based on exposure assumptions

[1272] ENVIRON, *Ambient Air Quality Human Health Risk Assessment: Candlestick Point–Hunters Point Shipyard Phase II Development Plan*, Attachment III, September 28, 2009.

consistent with recreational use of the open space, the risks would be reduced well below the threshold of 10 in one million. Due to the decrease in the frequency and duration of potential exposures, the chronic HI would also be reduced below the HI threshold of 1.0

The estimated health risks would be below BAAQMD thresholds for all residential receptor locations as a result of implementation of the Project. As such, impacts would be less than significant with implementation of MM AQ-6.1 and MM AQ-6.2 developed for the Project and also required for the 49ers/Raiders Shared Stadium Variant.

In terms of human health risks associated with vehicle emissions, vehicle emissions along local roadways for the 49ers/Raiders Shared Stadium Variant would remain unchanged from the Project. The prolonged exposure of receptors to increased vehicle emissions could affect human health. Potential $PM_{2.5}$ concentrations at select roadways with the addition of future traffic volumes, including the traffic associated with the 49ers/Raiders Shared Stadium Variant (which were assumed to be similar to Project traffic as an annual average), were estimated compared against SFDPH thresholds to determine the potential health risks attributed to vehicle emissions. Several roadway segments were chosen based on whether Project-related traffic would use these streets to access neighboring freeways and other areas of San Francisco and/or currently or would experience significant truck traffic. The roadways chosen include:

- Third Street
- Innes Avenue/Hunters Point Boulevard/Evans Avenue
- Palou Avenue
- Gilman Avenue/Paul Avenue
- Harney Way
- Jamestown Avenue
- Ingerson Avenue

With the addition of Project-related traffic, no receptors along the streets listed above would experience $PM_{2.5}$ concentrations in excess of SFDPH's 0.2 $\mu g/m^3$ threshold.[1273] As concentrations would not exceed SFDPH's threshold, and as such, impacts would be less than significant, similar to the Project.

Noise and Vibration

As described above, the 49ers/Raiders Shared Stadium Variant land uses will be the same as the Project. However, with the shared stadium, there would be an increase in the number of football games that would occur during the football season. This could result in an event at the stadium every week during the football season. As the footprint of development, the total amount of development, and the land uses provided with the 49ers/Raiders Shared Stadium Variant would be the same as the Project, noise impacts of a 49ers/Raiders Shared Stadium Variant would also be the same as the Project, except with additional noise impacts around the stadium associated with the additional game days.

Construction activities for a 49ers/Raiders Shared Stadium Variant would create a substantial temporary increase in ambient noise levels on the site and in existing residential neighborhoods adjacent to the site.

[1273] ENVIRON, *Ambient Air Quality Human Health Risk Assessment: Candlestick Point–Hunters Point Shipyard Phase II Development Plan*, Appendix IV, September 28, 2009.

Construction activities would need to comply with the San Francisco Noise Ordinance, which prohibits construction between 8:00 P.M. and 7:00 A.M. and limits noise from any individual piece of construction equipment (except impact tools) to 80 dBA at 100 feet. Implementation of mitigation measures MM NO-1a.1 and MM NO-1a.2, which would require implementation of construction best management practices to reduce construction noise and the use of noise-reducing pile driving techniques, would reduce any potentially significant impacts to less-than-significant levels.

Construction activities could also create excessive ground-borne vibration levels in existing residential neighborhoods adjacent to the site and at proposed on-site residential uses, should the latter be occupied before construction activity on adjacent parcels is complete. Implementation of MM NO-1a.1, MM NO-1a.2, and MM NO-2a would require implementation of construction best management practices, noise-reducing pile driving techniques as feasible, and monitoring of buildings within 50 feet of pile driving activities. Implementation of these measures would reduce vibration impacts under the 49ers/Raiders Shared Stadium Variant, but not to a less-than-significant level as vibration levels from pile driving activities could be as high as 103 VdB for the residential uses within the HPS North District, the CP Center, and South Districts when occupied; therefore, this impact would remain significant and unavoidable, similar to the Project.

Daily operation of a 49ers/Raiders Shared Stadium Variant, such as mechanical equipment and delivery of goods, would not expose noise-sensitive land uses on or off site to noise levels that exceed the standards established by the City of San Francisco. This impact would be less than significant, similar to the Project. Operation activities associated with a 49ers/Raiders Shared Stadium Variant, such as delivery trucks, would not generate or expose persons on or off site to excessive groundborne vibration. This impact would also be less than significant, similar to the Project.

Operation of a 49ers/Raiders Shared Stadium Variant would generate increased local traffic volumes that would cause a substantial permanent increase in ambient noise levels in existing residential areas along the major Project site access routes. Impacts would be significant along Carroll Avenue, Gilman Avenue, and Jamestown Avenue, similar to the Project. Measures available to address significant traffic noise increases in these residential areas are limited. The ultimate feasibility and implementation of the noise insulation measures that would be required to reduce roadway noise levels to below the threshold of significance would be dependent on factors that would be beyond the control of the City as the lead agency or the Project Applicant to guarantee. Therefore, this impact would remain significant and unavoidable.

Football games and concerts at the proposed stadium with a 49ers/Raiders Shared Stadium Variant would generate noise that would adversely affect surrounding residents, similar to the Project. Implementation of mitigation measure MM NO-7.1 would ensure that nearby residential uses do not experience temporary increases in ambient noise levels within their homes that would exceed 45 dBA; however, as with the Project, the feasibility and practicality of mitigation measure MM NO-7.1 cannot be determined at this time, this impact would remain significant and unavoidable.

The 49ers/Raiders Shared Stadium Variant site is not located within an airport land use plan area or near a private airstrip. Furthermore, the 49ers/Raiders Shared Stadium Variant does not include an aviation

component. Therefore, a 49ers/Raiders Shared Stadium Variant will not result in the exposure of people to excessive aircraft noise levels. Impacts would be less than significant, similar to the Project.

Cultural Resources and Paleontological Resources

Although no fossils have been reported at the HPS Phase II site, the presence of Franciscan sedimentary rocks (shanstone, shale, chert, and greenstone) on the flanks of Hunters Point indicates the possibility of fossils being discovered during construction-related excavation. Additionally, the presence of Bay mud under the fill around Hunters Point also indicates the possibility of fossils being discovered during construction-related excavation. However, mitigation measure MM CP-3a (paleontological resources) and MM CP-2a (human remains) would reduce the effects of construction-related activities to paleontological resources to a less-than-significant level by mitigating for the permanent loss of the adversely affected resources through implementation of a *Paleontological Resources Monitoring and Mitigation Program*. Impacts related to the disturbance of human remains was also found to be less than significant with the incorporation of mitigation measure MM CP-2a (human remains), which requires compliance with all applicable laws related to the discovery of human remains. Therefore, the 49ers/Raiders Shared Stadium Variant would result in a less-than-significant impact to paleontological resources during construction activities, similar to the Project.

Previous archaeological investigations have shown that prehistoric archaeological sites within the Candlestick Point and HPS Phase II sites tend to be located along the original shoreline. Hunters Point had numerous maritime-related industries, including dry docks and boarding houses. In addition, there were several historically documented large offshore "rocks" that presented navigational hazards. Therefore, it is possible that buried shipwrecks may occur within the HPS Phase II site and construction activities may encounter previously unknown archaeological resources. Candlestick Point was found to have potential archaeological resources resulting from Chinese fishing camps. Similar to the Project, implementation of mitigation measure MM CP-2a (archeological resources) for this Variant would reduce the effects of construction-related activities to potential archaeological resources within the HPS Phase II and Candlestick Point sites to a less-than-significant level by mitigating for the permanent loss of the adversely affected archaeological resources through implementation of the *Archaeological Research Design and Treatment Plan for the Bayview Waterfront Project, San Francisco, California*. Therefore, the 49ers/Raiders Shared Stadium Variant would result in a less-than-significant impact to archaeological resources during construction activities, similar to the Project.

Similar to the Project, development with the 49ers/Raiders Shared Stadium Variant would result in the demolition of Buildings 208, 211, 224, 231, and 253, which have been determined eligible for the CRHR and are contributors to the potential Hunters Point Commercial Dry Dock and Naval Shipyard Historic District. As such, this would be a potentially significant impact because the proposed actions would demolish buildings that contribute to a historic district; the impact would materially alter in an adverse manner those physical characteristics of an historical resource that convey its historical significance and that justify its eligibility for inclusion in the CRHR. Furthermore, with incorporation of mitigation measure MM CP-1b.1 and MM CP-1b.2 (historic resources), (which requires the preparation of a written and photographic documentation of the potential Hunters Point Commercial Dry Dock and Naval Shipyard Historic District, as identified in the report titled *Bayview Waterfront Plan Historic Resources*

Evaluation, Volume II: Draft Historic Resources Survey and Technical Report, July 2009, prepared by Circa Historic Property Development), potential impacts would be reduced to the extent possible. Nonetheless, the impact to historical resources during construction activities of the 49ers/Raiders Shared Stadium Variant would remain significant and unavoidable, similar to the Project.

Operational activities with the 49ers/Raiders Shared Stadium Variant would include the day-to-day activities typical of residential, office, commercial, and stadium use. However, this would not have the potential to adversely disturb paleontological, archaeological, or historical resources. Therefore, the 49ers/Raiders Shared Stadium Variant would result in no impact to these resources, similar to the Project.

Hazards and Hazardous Materials

The footprint of development for a 49ers/Raiders Shared Stadium Variant would be the same as for the Project. As such, impacts from construction of this Variant would be the same as the Project.

Construction activities associated with the 49ers/Raiders Shared Stadium Variant would: disturb soil and/or groundwater; result in the handling, stockpiling, and transport of soil; involve demolition or renovation of existing structures that could include asbestos-containing materials, lead-based paint, PCBs, or fluorescent lights containing mercury; expose construction workers to hazardous materials; be a source of hazardous air emissions within one-quarter mile of an existing or planned school; and encounter soils or groundwater that contains contaminants from historic uses that could pose a human health or environmental risk if not properly managed. Each of these impacts for the 49ers/Raiders Shared Stadium Variant would be similar to the Project, and would be reduced to a less-than-significant level with implementation of the identified mitigation measures (MM HY-1a.2, MM HZ-1a, MM HZ-1b, MM HZ-2a.1, MM HZ-2a.2, MM HZ-5a, MM HZ-9, MM HZ-10b, MM HZ-12, MM HZ-15, MM HY-1a.1, MM HY-1a.3, MM BI-4a.1, MM BI-4a.2, and MM BI-5b.4).

Construction of the 49ers/Raiders Shared Stadium Variant would require improvements to existing utility infrastructure and installation of new underground utilities, but this would not expose construction workers, the public, or the environment to unacceptable levels of hazardous materials. However, with the implementation of mitigation measures MM HZ-1a, MM HZ-1b, and MM HZ-2a.1, which require remediation of any contaminated soils, the hazards risk from potential exposure to contaminated soil or groundwater during construction would be reduced to a less-than-significant level, similar to the Project. In addition, mitigation measure MM HZ-2a.2 requires the preparation of a site-specific health and safety plan, which would further ensure that all risks to workers, residents, or the public would be reduced to less than significant, the same as for the Project.

The 49ers/Raiders Shared Stadium Variant would require pile supports for the residential towers, the same as the Project. This construction activity could result in groundwater contamination from disturbed soils. Mitigation measure MM HZ-5a would reduce this impact by requiring a foundation support piles installation plan, which would verify that pilot boreholes for each pile would be drilled through the artificial fill materials so the piles can be installed without damage or misalignment and to prevent potentially contaminated fill materials from being pushed into the underlying sediments or groundwater.

With implementation of this mitigation measure, the impact from potential groundwater contamination would be reduced to a less-than-significant level, the same as for the Project.

Shoreline improvements would occur under the 49ers/Raiders Shared Stadium Variant the same as for the Project. Shoreline improvements would require concurrence of BCDC, San Francisco RWQCB, and USACE. That permit would contain numerous conditions to ensure that the construction activities are conducted in a manner that is protective of aquatic resources. Mitigation measure MM HZ-10b requires that all shoreline activities that could affect sediment (or in the case of the Navy-installed cover and riprap at Parcel E/E-2) be conducted in accordance with agency-approved remedial design documents, applicable health and safety plans, DCPs, or any other documents or plans required under applicable law or laws, including but not limited to applicable requirements shown in Table III.K-2. In addition, mitigation measures MM HY-1a.1, MM HY-1a.2, MM BI-4a.1, MM BI-4a.2, and MM BI-5b.4 would reduce water quality and biological resources impacts. For Candlestick Point, impacts would be mitigated through mitigation measures MM HY-1a.1 and MM HY-1a.2. With implementation of these mitigation measures, along with applicable regulations and permits, potential impacts related to exposure to hazardous materials releases from contaminated sediments that could be disturbed during proposed shoreline improvements would be reduced to a less-than-significant level for the 49ers/Raiders Shared Stadium Variant, the same as for the Project.

Similar to the Project, remediation activities conducted on behalf of the City or developer in conjunction with development activities at HPS Phase II parcels transferred prior to completion of remediation in an "early transfer" would disturb soil and/or groundwater that may contain contaminants from historic uses. The identified mitigation measure (MM HZ-12) would require the SFDPH to ensure that before development occurs, the Agency or the developer and their contractors have incorporated all applicable requirements into remedial design documents, work plans, health and safety plans, DCPs and any other document or plan required under the AOC or other applicable law, as a condition of development. As a result of these controls and mitigation measure, the potential impact of exposure to hazardous materials during remediation activities conducted on behalf of the Agency or the developer in conjunction with development of HPS Phase II under the 49ers/Raiders Shared Stadium Variant would be reduced to less-than-significant levels.

In addition to uncovering hazardous materials within the existing buildings, construction and grading activities associated with the 49ers/Raiders Shared Stadium Variant could disturb soil or rock that is a source of naturally occurring asbestos, which could present a human health hazard. However, with the implementation of mitigation measure MM HZ-15, which requires preparation of an asbestos dust mitigation plan, this impact would be reduced to a less-than-significant level, similar to the Project.

As with the Project, the Bret Harte Elementary School and Muhammad University of Islam elementary schools are located within one-quarter mile of the development area of the 49ers/Raiders Shared Stadium Variant. Consistent with the discussion above, the 49ers/Raiders Shared Stadium Variant could uncover asbestos-containing materials (naturally or in existing building materials) or other hazardous materials during construction, consistent with the Project. However, with incorporation of mitigation measures MM HZ-1a, MM HZ-1b, and MM HZ-2a.1, and MM HZ-15, any impacts to these schools would be reduced to a less-than-significant level, similar to the Project.

After development of the 49ers/Raiders Shared Stadium Variant, periodic maintenance could require excavation of site soils to maintain or replace utilities, repair foundations, or make other subsurface repairs which could expose hazardous materials. Implementation of mitigation measures MM HZ-1a and HZ-1b would require remediation of any contaminated soils pursuant to the appropriate regulations. MM HZ-2a.1 would require the development of an unknown contaminant contingency plan to describe procedures to follow in the event unexpected contamination is encountered during construction activities, including procedures for ensuring compliance with the above laws and regulations. Additionally, mitigation measure MM HZ-2a.2, would require the preparation and implementation of a site-specific HASP in compliance with federal and state OSHA regulations and other applicable laws. The general requirement of mitigation measure MM HZ-9 would require that the Agency or its contractor or Project Applicant shall comply with all requirements incorporated into remedial design documents, work plans, health and safety plans, dust control plans, and any other document or plan required under the Administrative Order of Consent for any properties subject to early transfer (prior to full Navy remediation). To reduce this impact related to exposure to hazardous materials releases that have not been fully remediated at HPS Phase II, mitigation measure MM HZ-9 also requires that all work on the Yosemite Slough bridge would comply with Navy work plans for construction and remediation on Navy-owned property. Implementation of these mitigation measures would reduce this impact to a less-than-significant level, same as for the Project.

The 49ers/Raiders Shared Stadium Variant would provide for 8 more game days than the Project. This would result in the same amount of hazardous materials being used compared to the Project. The 49ers/Raiders Shared Stadium Variant would not introduce large-scale manufacturing or processing facilities that would store and use large quantities of hazardous materials that would present a substantial risk to people. However, there would be numerous locations where smaller quantities of hazardous materials would be present, the same as for the Project. Maintenance products anticipated under the 49ers/Raiders Shared Stadium Variant would be incrementally small, and would not substantially increase the risk from handling these materials. The potential risks associated with hazardous materials handling and storage would generally be limited to the immediate area where the materials would be located, because this is where exposure would be most likely. The 49ers/Raiders Shared Stadium Variant would comply with applicable laws and regulations that require the implementation of established safety practices, procedures, and reporting requirements pertaining to proper handling, use, storage, transportation, and disposal of hazardous materials. Impacts would be less than significant, similar to the Project.

Hazardous materials would routinely be transported to, from, and within the Project, and small amounts of hazardous waste would be removed and transported off site to licensed disposal facilities. Compliance with federal, state, and local regulations would ensure that the impact would be less than significant, the same as for the Project.

Daily operations under the 49ers/Raiders Shared Stadium Variant could result in reasonably foreseeable upset and accident conditions involving the release of hazardous materials into the environment but it would not pose a human health risk and/or result in an adverse effect on the environment. Accidents involving the transportation of hazardous materials to, from, or within the area, although rare, could occur. In general, the types and amounts of hazardous materials would not pose any greater risk of upset

or accident compared to other similar development elsewhere in the City. Impacts would be less than significant, similar to the Project.

The 49ers/Raiders Shared Stadium Variant site is not located within the San Francisco Airport Land Use Policy Plan Area and the 49ers/Raiders Shared Stadium Variant would not result in a safety hazard from airport operations for people residing or working in the area. The site is not located within any other airport land use plan area. The 49ers/Raiders Shared Stadium Variant site is also not located within the vicinity of a private airstrip and would not result in a safety hazard for people residing or working at the Project site. Similar to the Project, operation of the R&D Variant would not expose people or structures to a significant risk of loss, injury, or death involving fires or conflict with emergency response or evacuation plans.

Geology and Soils

Since the 49ers/Raiders Shared Stadium Variant would be developed exactly as the Project, impact significance determinations made for the Project in Section III.L (Geology and Soils) of this EIR would be the same with this Variant.

Construction

As with the Project, construction activities, such as grading and excavation, could remove stabilizing vegetation and expose areas of loose soil that, if not properly stabilized, could be subject to soil loss and erosion by wind and stormwater runoff. Newly constructed and compacted engineered slopes could undergo substantial erosion through dispersed sheet flow runoff, and more concentrated runoff can result in the formation of erosional channels and larger gullies, each compromising the integrity of the slope and resulting in significant soil loss. The erosion hazard rating for the local soils in the Project site is slight to severe. Requirements to control surface soil erosion during and after construction with the 49ers/Raiders Shared Stadium Variant would be implemented through the requirements of mitigation measure MM HY-1a.1 (SWPPP) and adverse effects on the soil, such as soil loss from wind erosion and stormwater runoff, would be avoided or reduced to a less-than-significant level, similar to the Project.

In addition to the potential for soil erosion, construction activities would have the potential to affect groundwater levels. With implementation of the dewatering techniques, groundwater level monitoring, and subsurface controls as specified in the SFBC and required by mitigation measure MM GE-2a (dewatering), groundwater levels in the area would not be lowered such that unacceptable settlement at adjacent or nearby properties would occur. Consequently, the 49ers/Raiders Shared Stadium Variant would result in a less-than-significant impact, similar to the Project.

At the Alice Griffith Public Housing site and the Jamestown area, the removal of bedrock through heavy equipment methods or controlled rock fragmentation activities would have the potential to fracture rock adjacent to the excavation, thereby destabilizing it and possibly causing settlement of structures above it. With implementation of those techniques, ground surface and building damage monitoring, as specified in the SFBC and required by mitigation measure MM GE-3, vibration from controlled rock fragmentation in the area would not cause unacceptable settlement or damage at adjacent or nearby properties would occur. Consequently, settlement hazards related to controlled rock fragmentation would be less than significant, similar to the Project.

Operation

Impacts with respect to geology and soils conditions with the 49ers/Raiders Shared Stadium Variant would be substantially similar to those of the Project.

The potential for exposure to adverse affects caused by seismic groundshaking exists at the Project site. Mitigation measures MM GE-4a.1, MM GE-4a.2, and MM GE-4a.3 would require design-level geotechnical investigations that would include site-specific seismic analyses to evaluate the peak ground accelerations for design of Variant structures and the Yosemite Slough bridge, as required by the SFBC and Caltrans. Implementation of these mitigation measures would ensure that potential impacts from groundshaking would be less than significant, similar to the Project.

The potential for adverse affects caused by seismically induced ground failure such as liquefaction, lateral spreading, and settlement exists at the Project site. Mitigation measures MM GE-4a.1, MM GE-4a.2, MM GE-4a.3, and MM GE-5a would require design-level geotechnical investigations must include site-specific seismic analyses to evaluate the peak ground accelerations for design of 49ers/Raiders Shared Stadium Variant structures, as required by the SFBC through review by DBI. It is anticipated that DBI would employ a third-party engineering geologist and/or civil engineer to form a GPRC. The GPRC would complete the technical review of proposed site-specific structural designs prior to building permit approval. The structural design review would ensure that all necessary mitigation methods and techniques were incorporated in the design for 49ers/Raiders Shared Stadium Variant foundations and structures to reduce potential impacts from ground failure or liquefaction a less-than-significant level, similar to the Project.

With the 49ers/Raiders Shared Stadium Variant, the potential for adverse affects due to seismically induced landslides exists at the Project site. Implementation of mitigation measures MM GE-6a and MM GE-4a.2 would ensure compliance with the SFBC and any special requirements of the HUD for compliance documentation and would reduce potential impacts from landslides a less-than-significant level, similar to the Project.

With the 49ers/Raiders Shared Stadium Variant, more game days would occur, and no structural development difference would occur. Therefore, the 49ers/Raiders Shared Stadium Variant would result in a less-than-significant impact due to shoreline stability, similar to the Project.

The potential for adverse affects caused by landslides exists at the Project site. Site-specific, design-level geotechnical investigations would be required to be submitted to DBI in connection with permit applications for individual 49ers/Raiders Shared Stadium Variant elements, as specified in mitigation measure MM GE-6a. The site-specific analyses must assess these conditions and prescribe the requirements for foundations on slopes in accordance with the SFBC. All geotechnical investigations and permits must be approved by DBI. With implementation of this mitigation, the 49ers/Raiders Shared Stadium Variant's impact with regard to landslides would be less than significant, similar to the Project.

The potential for adverse affects due to settlement exists at the Project site. However, design-level geotechnical investigations must evaluate the structural design, as required by the SFBC through review by DBI. Implementation of mitigation measures MM GE-5a, MM GE-4a.2, and MM GE-4a.3 would

ensure compliance with the provisions of the SFBC and would reduce the impact a less-than-significant level, similar to the Project.

The potential for adverse effects caused by expansive soils exists at the Project site. Design-level geotechnical investigations must evaluate the structural design, as required by the SFBC through review by DBI. Implementation of mitigation measures MM GE-10a, MM GE-4a.1, MM GE-4a.2, and MM GE-4a.3 would avoid or reduce the impact to Project structures from expansive soils a less-than-significant level, similar to the Project.

With the 49ers/Raiders Shared Stadium Variant, the potential for adverse effects caused by corrosive soils exists at the Project site. Design-level geotechnical investigations must evaluate the structural design, as required by the SFBC through review by DBI. Implementation of mitigation measures MM GE-11a, MM GE-4a.2, and MM GE-4a.3 would avoid or reduce the impact to Project structures from corrosive soils a less-than-significant level, similar to the Project.

Fault rupture hazards are unlikely. Ground rupture occurs most commonly along preexisting faults. No known active faults cross the Hunters Point shear zone, making hazards from fault rupture unlikely with the 49ers/Raiders Shared Stadium Variant.[1274] Therefore, there would be no impact caused by surface fault rupture, similar to the Project.

All development with the 49ers/Raiders Shared Stadium Variant would be connected to the City's existing wastewater treatment and disposal system and would not involve the use of septic tanks or alternative wastewater disposal systems. No impact would occur, similar to the Project.

The R&D Variant would not substantially change site topography or affect unique geologic features, and would have no impact on such features, similar to the Project.

Hydrology and Water Quality

The footprint and amount of development for the 49ers/Raiders Shared Stadium Variant would be the same as for the Project. As such, impacts from construction of the 49ers/Raiders Shared Stadium Variant would be similar to the Project.

Construction

Construction activities associated with a 49ers/Raiders Shared Stadium Variant would not cause an exceedance of water quality standards or contribute to or cause a violation of waste discharge requirements due to sediment-laden runoff, contaminated groundwater from dewatering activities, or the incidental or accidental release of construction materials. With implementation of mitigation measures MM HY-1a.1 (preparation of a SWPPP for discharges to the combined sewer system), MM HY-1a.2 (SWPPP preparation for separate storm sewer systems), and MM HY-1a.3 (construction dewatering plan) impacts would be less than significant, similar to the Project.

Construction activities associated with the 49ers/Raiders Shared Stadium Variant would include excavation for building foundations and underground utilities which could require short-term and/or

[1274] GTC, 2005.

long-term dewatering of the affected areas. As the total amount of open space under the 49ers/Raiders Shared Stadium Variant would remain the same as under the Project, the amount of permeable surface would also remain the same. Therefore, the 49ers/Raiders Shared Stadium Variant would not interfere substantially with groundwater recharge such that there would be a net deficit in aquifer volume or a lowering of the local groundwater table level. This impact would be less than significant, similar to the Project.

No streams or rivers are currently located within the 49ers/Raiders Shared Stadium Variant site and thus no streams or rivers would be altered by construction activities. During construction of the 49ers/Raiders Shared Stadium Variant, the existing drainage patterns within the area would generally be preserved. Construction activities associated with the 49ers/Raiders Shared Stadium Variant would not substantially alter the existing drainage pattern of the site or alter the course of a stream or river in ways that would result in substantial erosion, siltation, or flooding on site or off site. Impacts would be less than significant, similar to the Project.

Construction activities associated the 49ers/Raiders Shared Stadium Variant, including site clearance, grading, and excavation, would not create or contribute runoff water that would exceed the capacity of existing or planned storm sewer systems or provide substantial additional sources of polluted runoff. During construction, existing stormwater drainage facilities would be replaced by a new storm sewer system that would collect and treat on-site stormwater flows and would be sized to accommodate projected flows from upstream contributing areas. With compliance with regulatory requirements as required by mitigation measures MM HY-1a.1 and MM HY-1a.2 (preparation of a SWPPP), impacts would be less than significant, similar to the Project.

Operation

Operation of the 49ers/Raiders Shared Stadium Variant Operation of the Housing Variant would not contribute to violations of water quality standards or waste discharge requirements or otherwise degrade water quality. Compliance with the requirements of the Municipal Stormwater General Permit, the Recycled Water General Permit, and the Industrial General Permit would reduce potential water quality impacts associated with implementation of the R&D Variant. In addition, this variant would be required to comply with the San Francisco SWMP, the Draft San Francisco Stormwater Design Guidelines, and the San Francisco Green Building Ordinance. Compliance with these requirements would be demonstrated in the SDMP or SCP for the project site, as required by mitigation measure MM HY-6a.1. Compliance with the Recycled Water General Permit would be required by implementation of mitigation measure MM HY-6a.2. To reduce the potential for stormwater infiltration to mobilize historic soil contaminants at HPS Phase II, the use of infiltration BMPs would be prohibited by mitigation measure MM HY-6b.1. To reduce stormwater runoff impacts associated with industrial activities at HPS Phase II, compliance with the Industrial General Permit would be required by implementation of mitigation measure MM HY-6b.2. To reduce stormwater impacts associated with maintenance dredging of the marina, compliance with the DMMO regulatory requirements would be required by implementation of mitigation measure MM HY-6b.3. Compliance with the Clean Marinas California Program would be required by implementation of mitigation measure MM HY-6b.4. As extent of impervious surfaces for the 49ers/Raiders Shared Stadium Variant would the same as with the Project, impacts would be the same as those with the Project.

Implementation of the 49ers/Raiders Shared Stadium Variant would not utilize groundwater as a source of water supply, substantially deplete groundwater supplies, or substantially interfere with groundwater recharge. Thus, there would be no net deficit in aquifer volume or a lowering of the local groundwater table level and this impact would be less than significant, similar to the Project.

Operation of a 49ers/Raiders Shared Stadium Variant could alter the existing drainage pattern of the site, but would not alter the course of an existing stream or river or result in substantial erosion, siltation, or flooding on-site or off-site, similar to the project. Implementation of the 49ers/Raiders Shared Stadium Variant would not contribute runoff water that would exceed the capacity of existing or planned storm sewer systems or provide substantial additional sources of polluted runoff, as development would include a separate stormwater system that would be sized to accommodate estimated runoff flows and treat runoff prior to discharge to the Bay. Compliance with regulatory requirements, including the submission of a SDMP and SCP to the SFPUC for approval, as required by mitigation measure MM HY-6a.1, would ensure that this impact would be less than significant, similar to the Project.

Implementation of a 49ers/Raiders Shared Stadium Variant would not place housing and other structures within a 100-year flood zone or otherwise include development that would impede or redirect flood flows. Implementation of mitigation measures MM HY-12a.1 (Finished Grade Elevations above Base Flood Elevation) and MM HY-12a.2 (Shoreline Improvements for Future Sea-Level Rise) would reduce impact to a less-than-significant level, similar to the Project.

Implementation of a 49ers/Raiders Shared Stadium Variant would not expose people or structures to a significant risk of loss, injury, or death involving flooding, including flooding as a result of the failure of a levee or dam. Implementation of mitigation measure MM HY-14 (Shoreline Improvements to Reduce Flood Risk) would reduce impacts to a less-than-significant level. Based on historical records and the location of development, the 49ers/Raiders Shared Stadium Variant would not expose people or structures to inundation by seiche, tsunami, or mudflow. These impacts would be less than significant, similar to the Project.

Biological Resources

The footprint of development for 49ers/Raiders Shared Stadium Variant would be the same as for the Project, and the area subject to ground disturbance would be the same as the Project. Both construction and operational impacts to biological resources would be substantially similar to the Project, as discussed below, because the type of development and associated construction activities are substantially the same. Additionally, operational activities are the same as those under the Project, with the exception of the new stadium being home to both the San Francisco 49ers and the Oakland Raiders.

Construction

Development of the 49ers/Raiders Shared Stadium Variant would not have a substantial adverse effect, either directly or through habitat modifications, on any common species or habitats since ecological enhancements and measures to avoid and minimize impacts to common vegetation communities and wildlife species would be proposed, similar to the Project. Impacts would be less than significant, similar to the Project.

Development of the 49ers/Raiders Shared Stadium Variant could have a substantial adverse effect, either directly or through habitat modifications, on sensitive natural communities or species identified as a candidate, sensitive, or special status in local or regional plans, policies, or regulations, or by the CDFG or USFWS. Mitigation measures MM BI-5b.1 through MM BI-5b.4 would reduce the effects on eelgrass, and the sensitive or special-status fish species that could occupy these areas by surveying for and avoiding this habitat. Mitigation measures MM BI-6a.1, MM BI-6a.2, and MM BI-6b would require surveys for special-status and nesting avian species and implement impact-avoidance measures such as construction buffers to ensure that the loss or take of these species would not occur.

Similar to the Project, the Draft Parks, Open Space, and Habitat Concept Plan would identify ecological enhancement measures that would include the restoration and management of suitable raptor foraging habitat. To provide a mechanism by which implementation of these enhancements would be ensured, mitigation measure MM BI-7b would be implemented to ensure that specific standards related to the enhancement of raptor foraging habitat would occur. Therefore, a net increase in the quality of raptor foraging habitat would result, similar to the Project, and, with mitigation, the overall effect on raptors is expected to be beneficial. Mitigation measure MM BI-9b would reduce the effects of pile driving-related activities to fish and marine mammals by recommending the type of piles to use to minimize sound impacts; providing for an alternative method of installation to minimize sound impacts; requiring installation during an agency-approved construction window when fish are least likely to be present to avoid the bulk of potential impacts; and requiring a construction monitor to ensure compliance with all measures, including sound monitoring. Construction activities could impact designated critical habitat for green sturgeon and Central California Coast steelhead; however, compensatory mitigation for lost aquatic habitat as described in mitigation measures MM BI-4a.1 and MM BI-4a.2 would be implemented to minimize impacts to wetlands, aquatic habitats, and water quality during construction. Overall adverse effects would be less than significant, similar to the Project. Mitigation measures MM BI-4a.1, MM BI-4a.2, MM BI-5b.1 through MM BI-5b.4, MM BI-12a.1, MM BI-12a.2, MM BI-12b.1, and MM BI-12b.2 would reduce potentially significant impacts to Essential Fish Habitat to less-than-significant levels, similar to the Project. Ecological design features described in the Draft Parks, Open Space, and Habitat Concept Plan would result in increased habitat for western red bats, and impacts to this species would be less than significant.

Development of the 49ers/Raiders Shared Stadium Variant could have a substantial adverse effect on federally protected wetlands and other waters as defined by Section 404 of the CWA (including, but not limited to, marsh, vernal pool, coastal, etc.) through direct removal, filling, hydrological interruption, or other means. With implementation of mitigation measures MM BI-4a.1 and MM BI-4a.2, potential adverse effects of the Project to federally protected wetlands and other waters as defined by Section 404 of the CWA would be reduced to a less-than-significant level, similar to the Project.

Development of the 49ers/Raiders Shared Stadium Variant would not conflict with the natural resource protection policies of the General Plan; however, it could result in the disturbance or loss of trees that are protected by the City's Urban Forestry Ordinance and Section 143 of the *Planning Code*. Mitigation measure MM BI-14a would ensure that development does not result in conflicts with these policies by requiring preservation of street trees, trees that meet the size specification of significant trees, replacement of large trees that are removed, and the planting of street trees, consistent with *Planning Code*

Section 143. In addition, mitigation measure MM BI-7b includes the planting of approximately 10,000 net new trees. With implementation of mitigation measures MM BI-14a and MM BI-7b, the 49ers/Raiders Shared Stadium Variant would not result in a conflict with City policies designed to protect urban streetscape through the planting of street trees, similar to the Project, and overall impacts would be beneficial.

Operation

Impacts to native oysters and EFH would be less than significant as removed hard structures would be replaced with approximately equal amounts of suitable habitat along the shoreline or the new breakwater. Implementation of mitigation measure MM BI-18b.1 would reduce the effects of marina operational activities to oysters, and mitigation measure MM BI-18b.2 would mandate the application of BMPs to control the distribution of sediments disturbed by the dredging activities to reduce water quality impacts to oysters. Mitigation measures MM BI-19b.1 and MM BI-19b.2 would reduce dredging and contamination impacts to EFH. With implementation of the identified mitigation measures, impacts would be reduced to a less-than-significant level, similar to the Project.

Development of the 49ers/Raiders Shared Stadium Variant could interfere substantially with the movement of native resident or migratory fish or wildlife species or with established native resident or migratory wildlife corridors, or impede the use of native wildlife nursery site (eelgrass beds). Mitigation measures MM BI-5b.1 through MM BI-5b.4 would reduce effects on eelgrass by surveying for and avoiding this habitat. Mitigation measures MM BI-20a.1 and MM BI-20a.2 would reduce the effects of operational activities related to tall structures and increased lighting to migrating species to less-than-significant levels by incorporating design features that would help minimize bird strikes, including using operational methods to reduce the effects of new lighting towers. With implementation of the identified mitigation measures, impacts would be reduced to a less-than-significant level, similar to the Project.

Implementation of the 49ers/Raiders Shared Stadium Variant would be consistent with the biological resources protection policies of the *City of San Francisco General Plan*, and with implementation of mitigation measure MM BI-14a, development would be constructed in a manner consistent with policies of the Urban Forestry Ordinance and *Planning Code* Section 143. Consequently, the operation of the Utilities Variant would not conflict with any local policies or ordinances protecting biological resources, and there would be no impact.

Public Services

Construction

Police and Fire Services

Similar to the Project, access to the 49ers/Raiders Shared Stadium Variant site during construction would be maintained by implementation of a construction management traffic plan (CMTP) MM TR-1. The CMTP would provide necessary information to various contractors and agencies as to how to maximize the opportunities for complementing construction management measures and to minimize the possibility of conflicting impacts on the roadway system, while safely accommodating the traveling public in the area. A cohesive program of operational and demand management strategies designed to maintain

acceptable levels of traffic flow during periods of construction activities in the area would be implemented.

Similar to the Project, construction of the 49ers/Raiders Shared Stadium Variant would not result in increased demand on police protection services, as demands on the SFPD during construction would be supplemented by private security (as required by mitigation measure MM PS-1 [site security measures during construction]), and construction areas would be secured through the installation of fencing and gates.

Therefore, the 49ers/Raiders Shared Stadium Variant would result in a less-than-significant impact to police protection and fire services during construction. As construction of the 49ers/Raiders Shared Stadium Variant would not impact SFPD or SFFD response times upon implementation of a CMTP. These impacts would be similar to the Project.

Schools and Library Facilities

Construction of the Project would not result in impacts to the SFUSD or the San Francisco Public Library System. SFUSD or library facilities are not located on the Project site. All area school and library services would be available to the community throughout the duration of Project construction. As such, since construction of the 49ers/Raiders Shared Stadium Variant would be similar to construction of the Project, no impact to school or library services during construction of the Variant would occur. These impacts are the same as those identified for the Project.

Operation

Police Protection Services

Development with the 49ers/Raiders Shared Stadium Variant would have similar impacts to police protection services as development with the Project. Although the 49ers/Raiders Shared Stadium Variant would double the number of NFL events per year (from 12 to 20), response times and service staffing ratios are calculated on a daily basis, and, therefore, twice the number of days with an acceptable levels of service still results in less-than-significant impacts. Response times are determined per event where police response is required and, therefore, is not degraded by the number of days where potential response would be required. Therefore, since operational impacts to police protection services were found to be less than significant for the Project, impacts to police protection services for the 49ers/Raiders Shared Stadium Variant would also be less than significant.

Fire Protection Services

Development with the 49ers/Raiders Shared Stadium Variant would have similar impacts to fire services as development with the Project. Although the 49ers/Raiders Shared Stadium Variant would double the number of NFL events per year (from 12 to 20), response times and service staffing ratios are calculated on a daily basis, and, therefore, twice the number of days with acceptable levels of service still results in less-than-significant impacts. Response times are determined per event where fire/emergency medical service response is required and, therefore, is not degraded by the number of days where potential response would be required. Therefore, since operational impacts to these services were found to be less

than significant for the Project, impacts to these services for the 49ers/Raiders Shared Stadium Variant would also be less than significant.

Building Safety

All new buildings must meet standards for emergency access, sprinkler, and other water systems, as well as all other requirements specified in the *San Francisco Fire Code*, which would help minimize demand for future fire protection services. Plan review of all structures for compliance with *San Francisco Fire Code* requirements would minimize the potential for fire-related emergencies by providing on-site protective features, reducing the demand for fire protection services.

Response Time

Construction of a new SFFD facility on land designated for community serving uses on the Project site, along with the provision of additional firefighters and on-going fire protection operations, would allow the SFFD to maintain acceptable response times for fire protection and emergency medical services. The Applicant has designated 5.3 acres of community-serving uses in HPS Phase II, including 0.5 acre of which have been designated for a new SFFD facility.

These uses have been anticipated as part of the 49ers/Raiders Shared Stadium Variant and the impacts of their construction are evaluated in this EIR. Construction activities associated with proposed public facilities are considered part of the overall Project. A discussion of project-related construction impacts, including those associated with the construction of public facilities, is provided in the applicable sections of this EIR, including Section III.D, Section III.H, Section III.I, Section III.J, Section III.K, and Section III.M. Construction impacts would be temporary. While it is likely that construction of the various public facilities would not result in significant impacts (either individually or combined), construction of the entire development program, of which the public facilities are a part, would result in significant and unavoidable impacts related to construction noise and demolition of an historic resource; all other construction-related impacts would be less than significant (in some cases, with implementation of identified mitigation). Refer to Section III.D, Section III.H, Section III.I, Section III.J, Section III.K, and Section III.M for the specific significance conclusions for construction-related effects.[1275] As such, the construction impacts associated with a new SFFD facility on the Project site have been addressed in this EIR. Therefore, similar to the Project, the development of this Variant would not require new or physically altered fire protection facilities to maintain acceptable response times. Additionally, compliance with all applicable provisions of the *San Francisco Fire Code* would ensure that this impact is less than significant.

Schools

Operational impacts to schools would be similar to the Project because the number of dwelling units anticipated would be the same. Therefore, the number of school aged children that would require

[1275] The impact statements provided in each technical section of the EIR differentiate between construction impacts and operational or development impacts, and all identified mitigation measures are contained in the impact analysis. In addition, Table ES-2 in the Executive Summary of this EIR also summarizes all impact statements, the level of significance before mitigation, any identified mitigation measures, and the level of significance after mitigation.

adequate school services would be the same as with the Project. Impacts from the 49ers/Raiders Shared Stadium Variant on schools would be less than significant, similar to the Project.

Library Facilities

Operational impacts to libraries would be similar to the Project because the same number of dwelling units anticipated would be the same. Therefore, the service population for the existing library facilities would be the same as with the Project. Similar to the Project, library branches that currently serve the area including the new Portola branch (opened in 2009), the Visitacion Valley branch currently under construction (opening in 2010), and the Bayview branch to be expanded beginning in 2010 (opening in late 2011), would continue to meet the demands of the community. Therefore, the 49ers/Raiders Shared Stadium Variant would result in a less than significant operational impact to library services, similar to the Project.

Recreation

Development with the 49ers/Raiders Shared Stadium Variant would be similar to the Project. The Shared Stadium Variant would include the construction and improvement of new parks, recreational facilities, and open space. At buildout of this Variant, approximately 337.5 acres of parks, open space, and recreational uses would be provided, as described in Table IV-1, which is about 0.5 acre more than proposed with the Project. The Sports Field Complex with the Shared Stadium Variant would be the same as the Project, which is 91.6 acres; however, a total of 148.6 acres of parkland would be provided, about 0.5 acre more than proposed with the Project.

Construction impacts related to recreational facilities would be the substantially the same as those identified with the Project because the construction activities would be substantially similar, with the Shared Stadium Variant requiring slightly more construction due to the provision of about 0.5 acres more of parkland.

The Shared Stadium Variant would have the same number of housing units as proposed with the Project, thereby resulting in the same residential population of 24,465, although 0.5 acres more of parkland would be provided. Operational impacts are determined based on a ratio of acres of parkland per resident. Currently, the City provides approximately 7.1 acres of parkland per thousand residents, and the standard used in Section III.P assumes a ratio of 5.5 acres of parkland per 1,000 population is sufficient to meet the demand for recreational facilities without causing or accelerating substantial physical deterioration of facilities or requiring the construction of further facilities. The parkland-to-population ratio associated with the Shared Stadium Variant would be 13.7, which is the same as the Project. The Shared Stadium Variant ratio would be considerably higher than the ratio of 5.5 acres of parkland per thousand residents, which is considered sufficient to meet demand for recreational facilities without causing or accelerating substantial physical deterioration of facilities or requiring the construction of further facilities. Impacts would be less than significant.

The timing of Shared Stadium Variant development could result in a temporary increase in the use of parks, recreational facilities, and open space in a manner that would cause or accelerate the substantial physical deterioration or degradation of facilities if the development of residential and/or employment-generating uses were to occur in advance of the development of park and recreational facilities. The

conceptual development plan for this Variant would result in the development of residential units and parks during all of four stages of development. Table III.P-3 (Residential Units and Park Acreage Provided during Each Stage of Development) outlines the number of residential units and the acreage of parkland provided during each stage of development, as well as the resulting park-to-population ratio for residents of the Project site (even if developed under the Shared Stadium Variant). As this table indicates, the park-to-population ratio would not drop below 13.8 acres per 1,000 population at any time during the four stages of development, which exceeds the benchmark of 5.5 acres of parkland per 1,000 population. Adequate parkland would be provided during each stage of development.

However, during a given phase, park construction could lag behind residential development, leading the parkland-to-population ratio to drop below an acceptable level. Moreover, the development plan is conceptual and could be modified during the entitlement and development process. Mitigation measure MM RE-2 would ensure that the parks and recreational amenities are constructed as residential and employment-generating uses are developed, and a less-than-significant impact would result.

A Technical Memorandum was prepared to study wind conditions at a launch site at CPSRA (in The Neck area) and in a 55-acre portion of the Bay south of the launch site. The study found that development in the cumulative scenario, which includes development at the Project site (even if under the Shared Stadium Variant), generally results in wind speed changes near the shoreline (generally within 300 feet) ranging from no change to a 10 to 20 percent decrease in wind speed. Approximately 7 acres near the shoreline would experience a decrease of 10 to 20 percent in wind speed; approximately 36 acres of the Bay would experience a decrease of five to 10 percent; and approximately 12 acres of the Bay would experience a decrease of less than five percent. The majority of the windsurfing test area (as identified in the Technical Memorandum) would not be substantially affected (e.g., a 10 percent decrease or less in wind speed). Because this Variant is the same as the Project in terms of development amounts and locations, it would not significantly and adversely affect existing windsurfing opportunities at the CPSRA. A less-than-significant impact would occur, and no mitigation is required.

In summary, impacts resulting from the Shared Stadium Variant would be substantially similar to the Project.

Utilities

Implementation of the Shared Stadium Variant would increase demand for water treatment, which could be accommodated within existing water treatment facilities operated by the SFPUC, and impacts would be less than significant. As the same amount of development would occur with the Shard Stadium Variant as with the Project, the demand for water treatment would be the same, and impacts would be similar to the Project.

As with the Project, beginning in 2025, during multiple dry-year periods, the total retail water supply would be slightly less than estimated total demand, including demand associated with the Shared Stadium Variant. With the implementation of the WSAP and RWSAP during multiple dry-year periods, which could include voluntary rationing or other water conservation strategies, existing and projected future water supplies could accommodate estimated future water demand, including the Project-related demand. As discussed in the WSA, the SFPUC has approved and has made substantial progress towards the

implementation of the water facility improvement projects identified in the WSIP. The SFPUC has received voter approval to fund the Phased WSIP program and has initiated bond sales to fund implementation of individual projects, which are in various stages of implementation, including subsequent environmental review, design, or construction.[1276] Thus, there is substantial evidence that the SFPUC would implement the Phased WSIP facility projects described above, including the local water supply projects.

The San Francisco Recycled Water Program currently includes the Westside, Harding Park, and Eastside Recycled Water Projects, and various conservation efforts. The proposed projects would provide up to 4 mgd of recycled water to a variety of users in San Francisco.[1277,1278] Recycled water will primarily be used for landscape irrigation, toilet flushing, and industrial purposes. The Harding Park Project has completed environmental review, and the Westside Project is expected to begin environmental review in late 2009 or early 2010. The WSIP contains funding for planning, design, and environmental review for the San Francisco Eastside Recycled Water Project. The local water supply improvement projects were approved as part of the Phased WSIP and are included in the WSIP funding program. The SFPUC has initiated planning, environmental review, and design of several recycled water and groundwater projects and conservation programs are in place. Thus, there is substantial evidence that the additional water provided by those projects would be available to supplement retail water supplies.

As noted above, the SFPUC adopted the Phased WSIP, which phased implementation of the water supply program to provide an additional 20 mgd of supply to meet projected demand through 2018 and requires the SFPUC to re-evaluate water demands and water supply options by December 31, 2018 through 2030 to meet projected demand. The Shared Stadium Variant would not require water supplies in excess of existing entitlements or result in the need for new or expanded entitlements, and this impact is less than significant, similar to the Project.

Wastewater

Construction impacts of the 49ers/Raiders Shared Stadium Variant would be similar to the Project due to their similar development programs. Existing wastewater infrastructure within the Project site is aging and in poor condition in some locations as a result of the intrusion of saline groundwater from the San Francisco Bay, which corrodes pipes, and the settling of fill material that underlies portions of the area, which has resulted in pipeline stress at some locations.[1279] Similar to the Project, the 49ers/Raiders Shared Stadium Variant would replace existing wastewater conveyance infrastructure within the HPS Phase II and Candlestick Point areas to adequately serve development with this Variant.

[1276] Per the *Water System Improvement Program Quarterly Report, Q4, FY 2008/2009* (dated August 20, 2009), (prepared by the SFPUC), as of July 1, 2009, two (2) projects are in the Planning Phase, eleven (11) projects are in the Design Phase, six (6) projects are in the Bid and Award Phase, five (5) projects are in the Construction Phase, two (2) projects in the Close-Out Phase, eight (8) projects are completed, one (1) project has not been initiated, and eleven (11) projects have multiple active phases. Available at: http://sfwater.org/Files/Reports/01_RW_Program_Summary.pdf Accessed September 28, 2009.

[1277] San Francisco Planning Department, Final Program Environmental Impact Report, Water Supply Improvement Program, October, 2008.

[1278] SFPUC, Urban Water Management Plan, 2005.

[1279] Winzler & Kelly Consulting Engineers, *Candlestick Point/Hunters Point Shipyard Infrastructure Concept Report*, October 26, 2009.

As shown in Table IV-36 (49ers/Raiders Shared Stadium Variant Wastewater Generation), the 49ers/Raiders Shared Stadium Variant would result in the generation of approximately 2.03 mgd of wastewater, an increase of 0.85 mgd of wastewater over the Project (refer to Table IV-37 [Sewer Trunk Capacity and Shared Stadium Variant Maximum Peak Flows] for peak flows). The 49ers/Raiders Shared Stadium Variant would have an increase in wastewater generation when compared to the Project since the stadium would theoretically be used 40 days instead of 32 days during each NFL season.

Table IV-36 49ers/Raiders Shared Stadium Variant Wastewater Generation

Land Use	*Estimated Wastewater Generation Expressed As % of Water Demand (or as otherwise specified)*	*Candlestick Point (mgd)*	*Hunters Point (mgd)*	*Total Shared Stadium Variant (mgd)*
Residential	95%	1.08	0.36	1.44
Regional Retail	57%	0.05	0	0.05
Neighborhood Retail	57%	0.01	0.01	0.02
Office	57%	0.02	0.01	0.03
Community Uses	57%	0.01	0.01	0.02
Research and Development	57%	0	0.41	0.41
Hotel	57%	0.03	0	0.03
Artist Studios	95%	0	0.02	0.02
Football Stadium	95%	0	0.02	0.02
Performance Venue	95%	0.01	0	0.01
Total		***1.21***	***0.84***	***2.05***

SOURCE: Arup, October, 2009 and PBS&J, October, 2009

Table IV-37 Sewer Trunk Capacity and Shared Stadium Variant Maximum Peak Flows

Sewer Trunk	*Design Capacity (gpm)*	*Existing Average Dry-Weather Flow[a] (gpm)*	*Existing Maximum Peak Dry-Weather Flow[b] (gpm)*	*Variant Contribution—Maximum Peak Dry-Weather Flow[c] (gpm)*	*Remaining Peak Flow Capacity (gpm) With Shared Stadium Variant*
Candlestick tunnel sewer	34,722	1,736	5,208	2,520.8	26,993.2[e]
Hunters Point tunnel sewer	83,333	4,167[d]	12,501[d]	1,750	69,082[f]

SOURCE: Bayside Operations Plan, 2002.

a. Calculated as existing average dry-weather flow in mgd/24 hours/60 minutes 1,000,000.
b. Calculated as existing average flow in gpm x peaking factor of 3.0.
c. Calculated as proposed average dry-weather flow in mgd/24 hours/60 minutes X 1,000,000 X peaking factor of 3.0.
d. These flows are *inclusive* of flows from the Candlestick tunnel sewer.
e. Calculated as design capacity less existing maximum peak flow less Project maximum peak flow, all in gpm. This calculation does NOT take credit for the existing uses at Candlestick Point (including Alice Griffith Public Housing, the RV park, and the stadium) that will be demolished on site and that currently contribute to the Candlestick tunnel sewer. Therefore, the actual remaining peak flow capacity of the Candlestick tunnel sewer with the Project will be somewhat greater than 28,035 gpm.
f. Calculated as design capacity less existing maximum peak flow less Project maximum peak flow, all in gpm. This calculation does NOT take credit for the existing uses on the HPS Phase II site that will be demolished that currently contribute wastewater flows to the Hunters Point tunnel sewer. Therefore, the actual remaining peak flow capacity of the Hunters Point tunnel sewer with the Project will be somewhat greater than 69,853 gpm.

Similar to the Project, since the existing conveyance infrastructure could accommodate additional flows from the development in addition to existing flows, even during periods of peak flows, no expansion of the off-site wastewater conveyance lines would be required as a result of the 49ers/Raiders Shared Stadium Variant development.

Stormwater flows from the Candlestick Point site would be the same with the 49ers/Raiders Shared Stadium Variant as the Project, and would not increase. Therefore, treatment of stormwater from Candlestick Point would also be the same as the Project. Stormwater from the Project site is collected and discharged to the Bay via a separate stormwater system, which does not contribute any flows to the Combined Sewer System during wet weather. With development of the49ers/Raiders Shared Stadium Variant, stormwater would continue to be collected and treated in a separate stormwater system, and stormwater runoff would not contribute to the Combined Sewer System during wet weather. Although development with the49ers/Raiders Shared Stadium Variant site would result in a slight net increase in wastewater flows of 0.85 mgd, the additional flows would represent less than 0.1 percent of the remaining treatment capacity of the SWPCP. The increase in wastewater generation with the 49ers/Raiders Shared Stadium Variant would incrementally contribute to the total amount of wet-weather flows that are collected and treated at the SWPCP, the NPWWF, and the Bayside Wet Weather Facilities. When the combined storage and treatment capacity of those facilities are exceeded, wastewater could be discharged, along with other wet-weather flows from the combined system, via the CSOs located around the perimeter of San Francisco. Mitigation measure MM UT-3a would ensure that there would be no net increase in wet-weather flows in the Combined Sewer System as a result of the Project that could result in a temporary increase in CSO volume. During wet weather, the temporary retention or detention of wastewater on site during wet weather or completion of the separate stormwater and wastewater systems for the Project would ensure that there would be no increase in the likelihood of a CSO event as a result of the Project. The impact would be less than significant, similar to the Project.

The NPDES permit system requires that all existing and future municipal and industrial discharges to surface waters within the City be subject to specific discharge requirements. Wastewater from the 49ers/Raiders Shared Stadium Variant would be treated at the SWPCP wastewater treatment plant and the SFPUC, which operates the SWPCP wastewater treatment plant, and is required to comply with waste discharge requirements (WDRs) set by the RWQCB, which specify the allowable levels of pollutants in discharges from the facility. Compliance with any applicable WDRs, as monitored and enforced by the SFPUC, would ensure that the 49ers/Raiders Shared Stadium Variant would not exceed the applicable wastewater treatment requirements of the RWQCB, and this impact would be less than significant, similar to the Project.

Solid Waste

With the 49ers/Raiders Shared Stadium Variant, construction wastes, including demolition and hazardous wastes, would be similar to that generated with the Project. Construction waste would be sorted, prior to disposal, to ensure that all recyclable materials are salvaged from the waste stream that is ultimately taken to a landfill. Incorporation of mitigation measures MM UT-5a (Construction Waste Diversion Plan) would ensure that solid waste impacts during construction are reduced to a less-than-significant level.

As shown in Table IV-38 (49ers/Raiders Shared Stadium Variant Projected Solid Waste Generation), the 49ers/Raiders Shared Stadium Variant would result in approximately 22,411.9 tons of waste per year at full build-out, similar to the Project. The increase in solid waste generation associated with the 49ers/Raiders Shared Stadium Variant development would not be substantial in the context of citywide solid waste infrastructure demand. Development with the 49ers/Raiders Shared Stadium Variant would increase yearly production of solid waste by 585 tons per year as a result of twice as many NFL events annually.

Table IV-38 49ers/Raiders Shared Stadium Variant Projected Solid Waste Generation

Land Use	*Generation Factor*	*Total Tons*
Residential	5.653/Unit	29.67
Retail	0.02600411 lbs/sf	11.50
Office	0.006 lbs/sf	0.45
Hotel	0.0108 lbs/sf	0.81
R&D	0.006 lbs/sf	75.0
Performance Venue	2.23 lbs/seat	76.94
Community Services	0.006 lbs/sf	0.3
Total		***194.67***

SOURCE: PBS&J 2009; Generation Factors from Arup, *Carbon Footprint Report*, March 24, 2009.

Landfill capacity is a dynamic metric dependent on the amount of solid waste that requires disposal (and the effectiveness of source reduction and recycling methods), the permitted capacity of the landfills, and the number of landfills that can accommodate solid waste. The City has a contract with Altamont Landfill to accept the City's waste through 2014. In 1988, the City of San Francisco entered into an agreement with what is now Waste Management of Alameda for the disposal of 15 million tons of solid waste. Through August 1, 2009, the City has used 12,579,318 tons of this capacity. The City projects that the remaining capacity would be reached no sooner than August 2014 (assuming an average of 467,000 tons a year disposal).[1280]

The City has issued a Request for Qualifications to solicit bids for a new contract to accommodate the City's disposal capacity beyond the expiry of the current agreement. The City has selected three landfills that have the capacity to meet the City's future needs and is in the final stages of the selection process that will result in an agreement for ratification by the Board of Supervisors no later than early 2010. The agreement will be for an additional 5 million tons of capacity, which could represent 20 or more years of capacity for San Francisco's waste. Future agreements will be negotiated as needed for San Francisco's waste disposal needs.

As noted, at current disposal rates, the Altamont Landfill would be expected to reach capacity in January 2032; however, it may close three years earlier, in January 2029.[1281] Demolition activities, which generate

[1280] E-mail communication with David Assman, City of San Francisco, Department of the Environment, October 19, 2009.
[1281] CIWMB, 2009.

construction debris, are expected to conclude in 2024 at Candlestick Point and in 2021 at HPS Phase II, a minimum of five years before the landfill is expected to close. Further, the City requires the diversion of at least 75 percent of construction waste, as also required by MM UT-5a, which would reduce the amount of waste interred at the landfill. Further, the City continues to actively explore various waste-reduction strategies with the goal of moving towards zero waste. If the City achieves this goal, the impact of construction of the Shared Stadium Variant on solid waste would be further reduced. The impact of the construction waste generated by the Shared Stadium Variant on the capacity of the Altamont Landfill would be less than significant.

Typical municipal solid waste has a landfill density of 739 pounds per cubic yard.[1282] Using this density factor, 45.7 million cubic yards of remaining capacity at the Altamont Landfill would be equivalent to 33.7 million tons of remaining capacity. The contribution of 72,592 tons from the 49ers/Raiders Shared Stadium Variant development would represent only 0.02 percent of the remaining capacity of the Altamont Landfill. Additionally, approximately 72 percent of the City's total waste stream, by volume, was diverted in 2008.[1283] Of the wastes that were not diverted, the City estimates that up to 65 percent of the total volume consists of readily recyclable or compostable materials, such as paper and food scraps.[1284] The remainder of the wastes consists of materials such as disposed household items and furniture, hazardous wastes, and construction wastes. The City has prepared a number of strategies to divert additional solid waste and achieve citywide diversion goals. These strategies would be utilized to achieve the City's overall waste reductions goals. The City's contribution to landfills is anticipated to diminish over time as the City implements more aggressive waste diversion strategies. Increasing solid waste diversions would extend the life of the landfills utilized by the City, lengthening the time horizon before the remaining disposal capacity is filled.

Similar to the Project, all residents and businesses of the 49ers/Raiders Shared Stadium Variant development would be expected to comply with the City's waste and recycling ordinances. As there would be several landfills with sufficient capacity to accommodate the solid waste generated by the 49ers/Raiders Shared Stadium Variant, along with the City's past waste diversion rate of 72 percent in 2008, implementation of the comprehensive waste diversion strategies, and implementation of mitigation measure MM UT-7a (Solid Waste Management Plan), the 49ers/Raiders Shared Stadium Variant would result in a less-than-significant impact to solid waste generation, although impacts would be slightly greater than those of the Project.

Electricity, Natural Gas, and Telecommunications

The proposed improvements within the Project site include the construction of a joint trench for electrical, natural gas, cable TV, and telecommunications. The power supplier may service the project via new extensions of the 12 KV distribution and or 115 KV transmission lines into HPS Phase II. This could include a new substation within the Project site. Impacts of construction activities associated with

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[1282] http://wasteage.com/mag/waste_municipal_solid_waste/. Accessed September 29, 2009.
[1283] This figure is a preliminary estimate and represents the most recent data available. California Integrated Waste Management Board, 2008. *Jurisdiction Profile for City of San Francisco.* Available online at: <http://www.ciwmb.ca.gov/Profiles/Juris/JurProfile1.asp?RG=C&JURID= 438&JUR=San+Francisco>, Accessed: November 5, 2008.
[1284] San Francisco, *Waste Characterization Study: Final Report.* 2008.

the Project, including demolition and installation of new utility infrastructure, are discussed in Section III.D, Section III.H, Section III.I, Section III.J, Section III.K, Section III.L, Section III.M, Section III.O, and Section III.S of this EIR. No new construction impacts beyond those identified in those sections would occur with construction of utility infrastructure associated with the 49ers/Raiders Shared Stadium Variant, similar to the Project. Telecommunications providers are "on-demand" services, generally expanding their systems in response to demand, and would be anticipated to provide extensions of existing infrastructure to the Project site as required. Such extensions would require minimal trenching, if any, and would not be anticipated to result in significant environmental impacts beyond those previously analyzed in this EIR. The subdivision process would include submittal of detailed infrastructure plans to the Department of Public Works identifying how they would meet the infrastructure needs of the Project. Implementation of these plans would be a condition of subdivision approval. The subdivision process would ensure that adequate infrastructure is provided to accommodate the demands of the Project such that the capacity of the service providers to provide such utilities would not be exceeded. Therefore, the impact would be less than significant for the 49ers/Raiders Shared Stadium Variant, similar to the Project.

Energy

Construction

Similar to the Project, construction of the 49ers/Raiders Shared Stadium Variant is not expected to result in a substantial increase in the demand for natural gas. The BAAQMD and the CARB offer incentives for the replacement of diesel construction equipment with lower-emitting engines, which may include natural gas. However, such engines are not standard and would not be required for Project or Variant construction.

Similar to the Project, the construction activities proposed with the 49ers/Raiders Shared Stadium Variant do not include unusual or atypical activities that would result in a higher than average demand for fuels. Construction would consist of temporary activities that would not generate a prolonged demand for energy. Thus, given the type of development proposed, the energy demand created during the construction period would not be large in comparison to a project of a similar size and with similar land uses. During the construction period, the Project Applicant would be required to use the BAAQMD's Construction Best Management Practices. The Best Management Practices limit equipment idling time to 5 minutes (also required by CCR Title 13, Section 2485), which helps to minimize wasteful fuel consumption. Additional standards pertaining to construction fuel efficiency have not been developed by the City, the CEC, or any other regulatory agency. Given these considerations, the construction-related energy use associated with the 49ers/Raiders Shared Stadium Variant would not be large or wasteful and is considered less than significant, similar to the Project.

Operation

Electricity

The criterion for this impact considers whether the 49ers/Raiders Shared Stadium Variant would result in a large increase in electricity consumption. The 49ers/Raiders Shared Stadium Variant would use nearly double the amount of electricity for stadium use, when compared to the Project, due to an

increase from 12 games to 20 games per year. This would increase the 49ers/Raiders Shared Stadium Variant consumption to 8,160 from 4,080 MWh/year. This would result in an overall increase in total 49ers/Raiders Shared Stadium Variant consumption to 39,054 MWh/year from 34,974 MWh/year resulting from the Project. This represents an 11 percent annual increase. Taking the 49ers/Raiders Shared Stadium Variant's compliance with the Green Building Ordinance and its voluntary implementation of energy-saving design features into consideration, as well as the level of development proposed, the electricity increase associated with the 49ers/Raiders Shared Stadium Variant would not be considered large.

The City's threshold also considers whether the 49ers/Raiders Shared Stadium Variant's energy consumption would be wasteful. The efficiency measures proposed under the 49ers/Raiders Shared Stadium Variant would result in building envelope consumption of at least 15 percent less electricity than a project that would not implement such measures. Further electricity savings would be anticipated as a result of the 49ers/Raiders Shared Stadium Variant's compliance with the Green Building Ordinance, installation of ENERGY STAR appliances, and the 49ers/Raiders Shared Stadium Variant's voluntary implementation of LEED® ND standards. However, because the 49ers/Raiders Shared Stadium Variant Applicant's commitment to implement energy reductions and voluntary green building practices (beyond the measures required in the City's Green Building Ordinance) is preliminary and not based on actual building designs, mitigation is necessary to reduce potential electricity use impacts to a less-than-significant level. Mitigation measure MM GC-2, which requires the 49ers/Raiders Shared Stadium Variant Applicant to exceed the 2008 Title 24 energy efficiency standards for homes and businesses by at least 15 percent, mitigation measure MM GC-3, which would require installation of ENERGY STAR appliances for builder-supplied appliances, and MM GC-4, which would require installation of energy efficient lighting, would reduce electricity consumption impacts to less than significant.

Natural Gas

The 49ers/Raiders Shared Stadium Variant would use nearly double the amount of natural gas for stadium use, when compared to the Project, due to an increase from 12 games to 20 games per year. This would increase the 49ers/Raiders Shared Stadium Variant consumption to 14,400 from 7,200 MBtu per year. This would result in an overall increase in total 49ers/Raiders Shared Stadium Variant consumption to 70,463 MBtu per year from 63,263 MBtu per year resulting from the Project. The 49ers/Raiders Shared Stadium Variant would result in an 11 percent increase over the natural gas amount that would be consumed by the Project. This is due to the increase from 12 yearly NFL events to 20 yearly NFL events with this Variant. The natural gas use at the Project site would represent less than 1 percent of the City's overall natural gas consumption of 28,918,000 million Btus, and overall natural gas demand would be over four times higher than under existing conditions, largely attributable to R&D uses at HPS Phase II. Natural gas use would be roughly five times higher at HPS Phase II than at Candlestick Point due to peak daytime demand from R&D uses. However, on a per-square-foot basis, the R&D Variant would result in 15 percent less electricity use than projects that comply with minimum Title 24 requirements only.

However, because the R&D Variant Applicant's commitment to implement energy reductions and voluntary green building practices (beyond the measures required in the City's Green Building Ordinance) is preliminary and not based on actual building designs, mitigation is necessary to reduce

potential electricity use impacts to a less-than-significant level. Mitigation measure MM GC-2, which requires the R&D Variant Applicant to exceed the 2008 Title 24 energy efficiency standards for homes and businesses by at least 15 percent, and mitigation measure MM GC-3, which would require installation of ENERGY STAR appliances for builder-supplied appliances, would reduce natural gas consumption impacts to less than significant.

Petroleum Consumption

The 49ers/Raiders Shared Stadium Variant would increase trips to and from the Project site, increasing the use of petroleum fuels. Based on average fuel efficiencies for the City of San Francisco and the Project VMT (reported in the *Candlestick Point–Hunters Point Shipyard Phase II Development Plan Transportation Study*), the 49ers/Raiders Shared Stadium Variant would result in a demand for 14.01 million gallons of gasoline and 0.93 million gallons of diesel annually. The use of fuels resulting from Similar to the Project, Project-related travel to and from the Project site with development of this Variant would be five times as high as existing conditions, a large increase in consumption. Similar to the Project, the 49ers/Raiders Shared Stadium Variant would increase trips to and from the site, increasing the use of petroleum fuels. However, this consumption would not be wasteful because (1) the 49ers/Raiders Shared Stadium Variant proposes to minimize transportation-related fuel use by implementing a number of transit, bicycle, and pedestrian improvements; (2) the 49ers/Raiders Shared Stadium Variant would include a transportation demand management (TDM) program designed to reduce the remaining vehicle trips; and (3) the 49ers/Raiders Shared Stadium Variant would result in dense development within an urbanized area with a mixture of neighborhood-serving uses, which would reduce the total number of trips to and from the site, as well as the overall trip lengths. Therefore, the 49ers/Raiders Shared Stadium Variant would result in a less-than-significant impact due to the wasteful use of transportation-related fuels, similar to the Project.

Greenhouse Gas Emissions

The 49ers/Raiders Shared Stadium Variant would have similar GHG emissions as the Project for both construction and operational emissions with the implementation of the mitigation measures. GHG emissions for this Variant were not explicitly calculated since the only increase would be in a few more game days (20 instead of 12) and associated mobile emissions which would make a small increase to the total annual GHG emission inventory. Therefore since the majority of the GHG emissions for the 49ers/Raiders Shared Stadium Variant would remain the same, based on the less-than-significant conclusion for the Project, the 49ers/Raiders Shared Stadium Variant would also be less than significant.

BAAQMD is considering the future adoption of quantitative CEQA thresholds of significance for operational-related GHG emission impacts. At present, two options relevant to the Project are under consideration for operational GHG emission thresholds; the lead agency can choose either option. Option 1 is based on a project's total operational GHG emissions of 1,100 metric tonnes CO_2e per year. The Project's total operational emissions would exceed this level, which means that if this was used, the Project would be significant. Option 2 is based on the amount of a project's operational GHG emissions per service population, set at 4.6 metric tonnes CO_2e per year. In anticipation of proposed new BAAQMD CEQA thresholds of significance for GHG emissions, this EIR provides an analysis of the Project's operational GHG emissions under the proposed thresholds of significance identified above.

The BAAQMD thresholds stated above are still in draft form and may undergo additional changes before being finalized; a revised version is expected Monday, November 2nd. The methodologies presented in this EIR for quantification of GHG operational emissions is based on using more refined data sources than indicated in the BAAQMD guidance and are the most appropriate to use for the 49ers/Raiders Shared Stadium Variant and the Project.

With mitigation, the Project-related operational emissions of 154,639 result in 4.5 tonnes CO_2e per service population per year based on a service population of 34,242 (this accounts for 23,869 net new residents and all jobs except for the stadium jobs, which already exist, 10,373). Therefore, the Project-related operational emissions would be less than 4.6 tonnes CO_2e per service population per year and would result in a less-than-significant impact on climate change. The 49ers/Raiders Shared Stadium Variant would not measurably change the parameters of the Project land use program, and thus this analysis applies to the 49ers/Raiders Shared Stadium Variant.