O. HYDROLOGY AND WATER QUALITY

Section 4.O, Hydrology and Water Quality, addresses the hydrology and water quality impacts that could result from construction and operation of the proposed Pier 70 Mixed-Use District Project. The Environmental Setting discussion describes the existing hydrology and water quality in the project area, with a focus on San Francisco Bay and the San Francisco waterfront area. Stormwater management in San Francisco and potential areas of flooding and tsunami inundation are also identified. The Environmental Setting section is followed by a discussion of the Federal, State, and local regulatory framework applicable to construction and implementation of the Proposed Project. Potential impacts that could result from construction and implementation of the Proposed Project are then discussed, along with regulatory requirements and features included in the Proposed Project that would ensure water quality impacts would be less than significant. Mitigation measures that would reduce significant impacts to a less-than-significant level are identified.

The impact assessment includes an evaluation of water quality issues related to on-land construction activities as well as in-bay activities for repair or replacement of the existing bulkhead and construction of a new stormwater outfall. Impacts related to changes in flows to the City's combined sewer system and the new separate stormwater system that could be constructed under the Proposed Project are discussed. This is followed by a discussion of potential impacts related to flooding and tsunami inundation.

Existing conditions and potential impacts associated with water supply and wastewater treatment are addressed in Section 4.K, Utilities and Service Systems. Existing conditions and potential impacts associated with water quality impacts on fish and other marine species are addressed in Section 4.M, Biological Resources.

ENVIRONMENTAL SETTING

CLIMATE

The Bay Area has a Mediterranean climate, with cool, dry summers and mild, wet winters. The mean annual precipitation in San Francisco is approximately 24 inches per year with most of the rainfall occurring between November and March.[1] The average annual temperature in San Francisco is 57.3 degrees Fahrenheit, with the minimum average monthly temperature occurring in December and January (46 degrees Fahrenheit) and maximum average monthly temperature occurring during September (70 degrees Fahrenheit).

[1] U.S. Climate Data, San Francisco. Available online at http://www.usclimatedata.com/climate/san-francisco/california/united-states/usca0987. Accessed March 18, 2016.

SAN FRANCISCO BAY

The project site is adjacent to San Francisco Bay, which connects the Pacific Ocean to the west with San Pablo Bay, Suisun Bay, and the Sacramento-San Joaquin Delta to the north and east. The San Francisco Bay is an estuarine environment that receives saltwater inputs from the Pacific Ocean through the Golden Gate, and freshwater inputs from the Sacramento-San Joaquin Delta to the northeast, as well as various other tributary rivers and creeks located around San Francisco Bay.

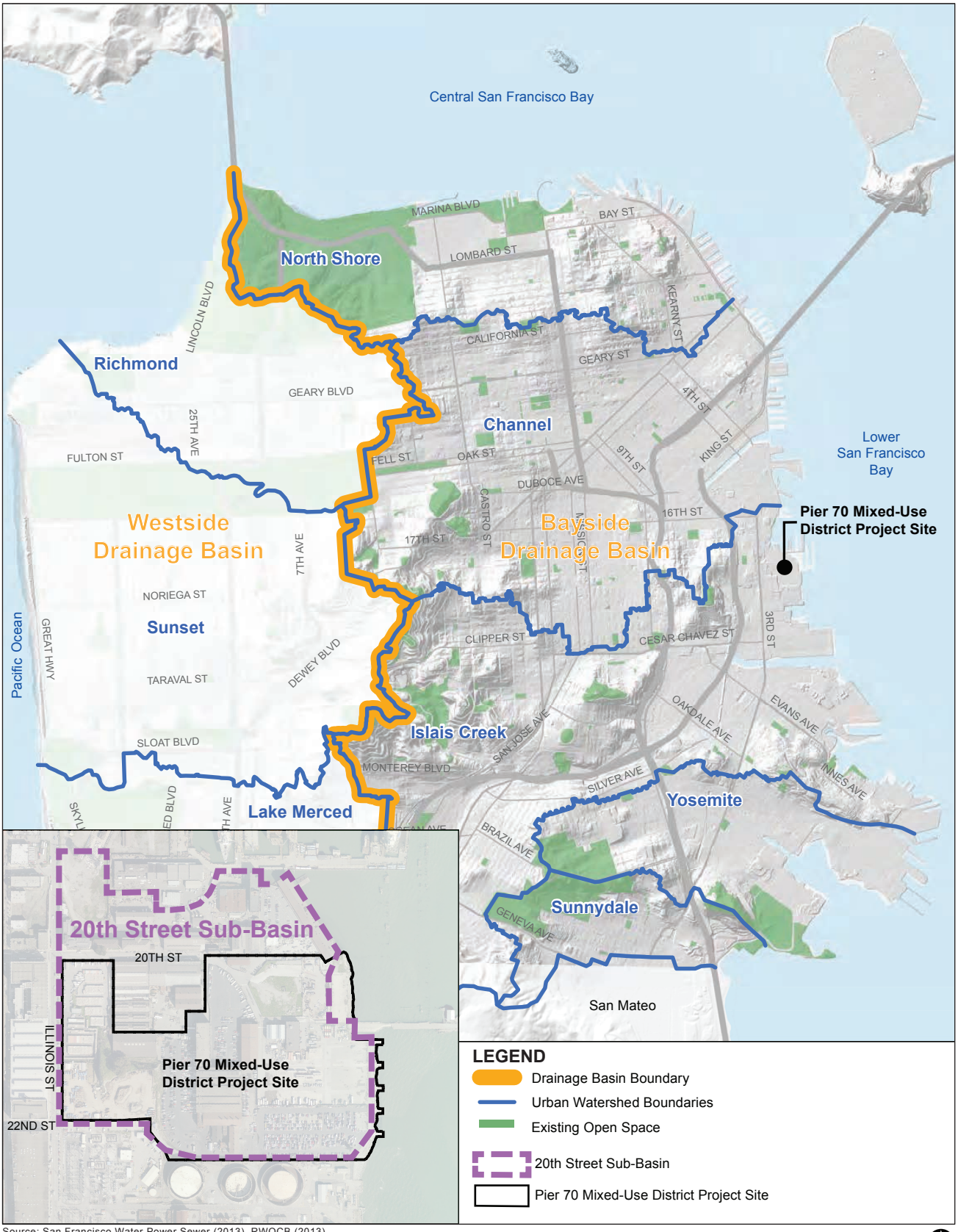
STORMWATER MANAGEMENT

Freshwater flow to San Francisco Bay from San Francisco, including most surface water and stormwater runoff, has been almost entirely diverted to the City's combined sewer system that is operated by the San Francisco Public Utilities Commission (SFPUC). This combined sewer system collects and transports both industrial wastewater and sanitary sewage (collectively referred to as wastewater) and stormwater runoff in the same set of pipes and the combined flows are all treated at the same treatment facilities. However, for portions of the waterfront, the Port of San Francisco (Port) manages separate stormwater systems that discharge stormwater directly to San Francisco Bay. Both the City's combined sewer system and the Port's separate stormwater systems are described below.

All stormwater and wastewater flows from the project site are currently discharged to the City's combined sewer system, discussed below, as are all wastewater flows from the project site. Wastewater flows to the system are discussed below in the context of their contribution to combined sewer discharges during wet weather. Wastewater flows are also discussed in Section 4.K, Utilities and Service Systems, in the context of the potential to exceed the capacity of the City's combined sewer system, including conveyance and treatment facilities.

SFPUC Combined Sewer System

The City's combined sewer system is roughly divided into two major drainages: the Bayside and the Westside drainage basins. The Bayside drainage basin, which includes the project site, covers the eastern side of San Francisco and consists of three distinct regulatory receiving water combined sewer discharge basins and their associated urban watersheds: North Shore (North Shore watershed), Central (Channel watershed in its entirety and a portion of the Islais Creek watershed), and South (remainder of the Islais Creek watershed and the entirety of Yosemite and Sunnydale watersheds). The watersheds are shown on Figure 4.O.1: Bayside Drainage Basin Urban Watersheds. Combined stormwater and wastewater flows from the Bayside drainage basin are conveyed for treatment to the Southeast Water Pollution Control Plant (SEWPCP), located on Phelps Street between Jerrold and Evans avenues.



Source: San Francisco Water Power Sewer (2013), RWQCB (2013)

PIER 70 MIXED-USE DISTRICT PROJECT

FIGURE 4.O.1: BAYSIDE DRAINAGE BASIN URBAN WATERSHEDS

The SEWPCP includes facilities to provide both primary and secondary treatment of the combined wastewater and stormwater flows. Primary treatment is the first stage in treatment and includes physical methods to remove floating and settleable solids from raw flows. Secondary treatment at the SEWPCP involves aeration with oxygen to enhance the biological breakdown of the combined flows, followed by secondary clarification for further solids removal. All discharges from the SEWPCP, whether treated to a primary or secondary level, are disinfected using sodium hypochlorite and dechlorinated with sodium bisulfite to remove any chlorine residual prior to discharge.

During dry weather (typically May through September), the wastewater flows consist mainly of industrial wastewater and sanitary sewage (wastewater from toilet flushing and other wastewater from sanitary conveniences of households and businesses that contains human excrement), collectively referred to as wastewater. The annual average wastewater flow during dry weather is 60 million gallons per day (mgd).[2] The average dry-weather design flow capacity of the SEWPCP is 84.5 mgd; therefore, the existing dry-weather flows are about 71 percent of the treatment capacity, and all dry-weather wastewater flow is treated to a secondary level at the SEWPCP. During dry weather, the treated wastewater is discharged to San Francisco Bay through the deep water outfall at Pier 80, located immediately to the north of the Islais Creek Channel.

During wet weather (generally October through April), the combined sewer system collects large volumes of stormwater runoff in addition to wastewater, referred to as wet-weather flows. Depending on the amount of rainfall, wet-weather flows are treated to varying levels before being discharged to San Francisco Bay. Up to 150 mgd of wet-weather flows receive secondary treatment at the SEWPCP. The SEWPCP can also treat up to an additional 100 mgd to a primary treatment standard plus disinfection, for a total wet-weather treatment capacity of 250 mgd. Treated wet-weather discharges of up to 250 mgd from the SEWPCP occur through the Pier 80 outfall directly to San Francisco Bay or through the Quint Street outfall to Islais Creek Channel on the south bank of Islais Creek. Only wastewater treated to a secondary level is discharged at the Quint Street outfall.

Up to an additional 150 mgd of wet-weather flows receive primary treatment plus disinfection at the North Point Wet Weather Facility, located on the northern side of the City at 111 Bay Street. This facility operates only during wet weather. The treatment process at this facility consists of using bar screens to remove large objects such as garbage; sedimentation to allow solids to settle out; skimming to remove floatables; disinfection with sodium hypochlorite; and dechlorination using sodium bisulfite to remove any chlorine residual before discharge. Primary treated effluent from this facility is discharged through four deep water outfalls, approximately 800 feet from San

[2] San Francisco Water Power Sewer, San Francisco's Wastewater Treatment Facilities, June 2014.

Francisco Bay shore and 18 feet below mean lower low water. Two of the deep water outfalls terminate at the end of Pier 33, and two terminate at the end of Pier 35 on the northeastern San Francisco Bay shore.

The City's combined sewer system includes underground concrete storage and transport boxes that, during wet weather, temporarily retain the combined stormwater and wastewater flows that exceed the total 400-mgd capacity of the SEWPCP and the North Point Wet Weather Facility for later treatment. When rainfall intensity results in combined flows that exceed the total 400-mgd capacity of the SEWPCP and North Point Wet Weather Facility, and the 125-million-gallon capacity of the storage and transport structures, the excess flows are discharged through 29 combined sewer discharge (CSD) structures located along the City's bayside waterfront from the Marina Green to Candlestick Point. Discharges from these structures receive "flow-through treatment," which is equivalent to primary treatment, to remove settleable solids and floatable materials. Wet-weather flows are intermittent throughout the rainy season, and combined sewer discharge events vary in nature and duration, depending largely on the intensity of individual rainstorms.

All discharges from the City's combined sewer system to San Francisco Bay, through either the outfalls or the CSD structures, are operated in compliance with the Federal Clean Water Act (CWA) and the State Porter-Cologne Water Quality Control Act through the National Pollutant Discharge Elimination System (NPDES) permit for discharges from the "Southeast Water Pollution Control Plant, North Point Wet Weather Facility, Bayside Wet Weather Facilities, and Wastewater Collection System" (referred to as the Bayside NPDES Permit).

The SFPUC Wastewater Enterprise manages the City's combined sewer collection, treatment, and discharge system, and is currently implementing the Sewer System Improvement Program, a City-wide program to repair and seismically upgrade aging sewer infrastructure. Prepared with extensive input from the public, the Sewer System Improvement Program focuses on providing reliable, efficient, sustainable, and environmentally acceptable operation and management of the combined sewer system and addresses both critical near-term needs and long-term issues. The plan incorporates adaptations for climate change.

20th Street Sub-Basin

The Proposed Project is entirely located within the 20th Street sub-basin of the Islais Creek watershed of the combined sewer system as shown on Figure 4.O.1, p. 4.O.3. This basin is approximately bounded by Illinois Street on the west, 19th Street on the north, 22nd Street and the Potrero Power Plant on the south, and San Francisco Bay on the east. This sub-basin includes the project site (both the 28-Acre Site and the Illinois Parcels), 20th Street Historic Core site, and the BAE Systems Ship Repair facility between 19th and 20th streets. Within this sub-basin, a 54-inch-

diameter sewer line collects stormwater and wastewater flows from the eastern portion of the project site and a 42-inch-diameter sewer line collects stormwater and wastewater flows from areas near Michigan Street and the northern portion of the project site. These combined sewer lines convey flows to the 20th Street Pump Station near the northeast corner of the project site. The 20th Street Pump Station pumps the flows through a 10-inch-diameter force main located beneath 20th Street to a 27-inch-diameter gravity sewer main under Illinois Street. From there, the combined stormwater and wastewater flows are conveyed to the SEWPCP for treatment prior to discharge to San Francisco Bay in accordance with the Bayside NPDES Permit.

The 20th Street Pump Station was built in 1993 and was designed with a capacity of 3.0 mgd.[3] However, volumetric testing conducted by the SFPUC in July 2013 indicates that the pump station capacity is about 2.65 mgd with both pumps running.[4] Based on 24 hours of flow monitoring conducted in August 2013 by the SFPUC during a period of no rainfall, the average wastewater flow rate to the pump station was 0.75 mgd and the peak flow rate was 1.5 mgd.[5] Based on this, the SFPUC estimated that the pump station has a remaining dry-weather capacity of about 1.2 mgd.

When the capacity of the 20th Street Pump Station is exceeded during wet weather, a portion of the excess wet-weather flows is stored in the 54- and 42-inch-diameter sewer lines. Flows in excess of the pump station and sewer line storage capacity are discharged to the Central Basin of San Francisco Bay via the 20th and 22nd streets CSD structures located along the shoreline of the project site.[6] Consistent with other discharges from CSD structures, these discharges receive the equivalent of primary treatment to remove settleable solids and floatable materials prior to discharge.

The 20th Street sub-basin collection and conveyance facilities are designed to meet a long-term average of no more than 10 CSDs per year.[7] Although the system was designed and constructed based on meeting this long-term average, it is understood that some years are wetter than others. Therefore, the Bayside NPDES Permit allows for the 10-CSD discharge annual average to be

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3 San Francisco Public Utilities Commission (SFPUC), *Bayside Drainage Basin Urban Watershed Characterization, Final Draft Technical Memorandum*, July 2013 (hereinafter referred to as *Bayside Drainage Basin Technical Memorandum*), p. 3-21.

4 SFPUC, *20th Street Pump Station Volumetric Discharge Test and Contributing Flows, Technical Memorandum*, August 30, 2013 (hereinafter referred to as *20th Street Pump Station Technical Memorandum)*, p. 5.

5 SFPUC, *20th Street Pump Station Technical Memorandum*, p. 3.

6 San Francisco Bay Regional Water Quality Control Board, Order No. R2-2013-0029, NPDES No. CA0037664, Southeast Water Pollution Control Plant, North Point Wet Weather Facility, Bayside Wet Weather Facilities, and Wastewater Collection System, August 19, 2013, p. 24.

7 SFPUC, *Task 500, Technical Memorandum No. 509, Combined Sewer Discharges, Final Draft.* December 2010, p. 3.

exceeded in any particular year as long as the long-term average is maintained at the appropriate level.

The weirs for the 20th and 22nd streets CSD structures are at elevations of 8.3 and 8.6 feet NAVD88[8] (96.9 and 97.2 feet project datum[9]), respectively, and the SFPUC estimates that they could become flooded as sea levels rise.[10] The flooding could potentially reduce the storage capacity of the 20th Street sub-basin collection and conveyance facilities, and also introduce sea water into the combined sewer system.[11] The SFPUC recommends installation of tideflex gates in these CSD structures to minimize the backflow of saline water into the sewer system as sea levels rise. The SFPUC will complete an assessment of the CSD structures as part of the City's Sewer System Improvement Program.

Port Stormwater Management

The Port of San Francisco manages approximately 7.5 miles of San Francisco's waterfront from Hyde Street Pier on the north to India Basin on the south.[12] The vast majority of this area is served by separate storm drain systems operated by the Port that drain directly to San Francisco Bay. In other areas of the waterfront, there is no storm drain system and stormwater infiltrates into the ground or runs off to San Francisco Bay. All of these areas are classified as municipal separate stormwater systems (or MS4s) by the State Water Resources Control Board (SWRCB). Accordingly, stormwater discharges from these areas are regulated under the SWRCB Water Quality Order No. 2013-0001-DWQ, NPDES General Permit for Waste Discharge Requirements (WDRs) for Stormwater Discharges from Small Municipal Separate Storm Sewer Systems (MS4s). The Port does not currently maintain a separate storm drain system at the project site.

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[8] North American Vertical Datum of 1988 (NAVD88) is a fixed reference point (vertical elevation) adopted as the official, civilian, vertical datum for elevations determined by Federal surveying. Historically, the average (mean) sea level or some variation of sea level has served as a reference point for elevations. One problem with using sea level is that it changes. In addition, the earth is not spherical, but has an ellipsoid shape, and has local variations due to uplift and sinking of portions of the earth's crust. Therefore, sea level in relation to the earth's crust varies. A vertical datum system not based on sea level avoids these problems. NAVD88 is based on a point in Quebec, Canada. Sources: U.S. Geologic Survey, http://water.usgs.gov/ADR_Defs_2005.pdf, pp. 8-9, accessed June 22, 2015.

[9] San Francisco City Datum establishes the City's zero point for surveying purposes at approximately 11.4 feet above the 1988 North American Vertical Datum. The project sponsors have also established a project datum for project-specific purposes that is equal to San Francisco City Datum plus 100 feet. This is 88.6 feet higher than NAVD88.

[10] SFPUC, *Bayside Drainage Basin Technical Memorandum*, p. 1-25.

[11] SFPUC, *Bayside Drainage Basin Technical Memorandum*, p. 3.22-3.24.

[12] Port of San Francisco, *Storm Water Management Plan 2003-2004*, December 2003.

EXISTING FLOOD ZONES

Some low-lying areas along San Francisco's Bay shoreline are subject to flooding during periods of extreme high tides, storm surge, and waves, although these occurrences are relatively rare in San Francisco compared to areas prone to hurricanes or other major coastal storms or to developed areas near or below sea level. In 2008, the City and County of San Francisco adopted interim flood maps depicting the 100-year flood hazard zone along the City's Bay shoreline. The shoreline portions of the project site are located within a currently identified 100-year flood hazard zone based on the City's interim floodplain maps.[13] Flooding in these areas would have the potential to damage buildings and infrastructure, and structures built in these areas could potentially impede or redirect flood flows.

FLOODING AS A RESULT OF SEA LEVEL RISE

Flooding conditions at the project site and along San Francisco's Bay shoreline would be exacerbated with projected sea level rise over the remainder of the century due to climate change. This section discusses the factors contributing to coastal flooding and the potential for increased flooding in the future as a result of sea level rise, assuming that no flood protection measures are implemented.

Factors Contributing to Coastal Flooding

Coastal areas are vulnerable to periodic flooding due to extreme tides, storm surge, storm waves, and El Niño storm events. These conditions can result in many effects including severe flooding of low-lying areas, including roads, boardwalks, and waterfront promenades; storm drain backup; wave damage to coastal structures; and erosion of natural shorelines. Rising sea level due to climate change has the potential to increase the frequency, severity, and extent of flooding as a result of these conditions, each of which is described below.

Extreme Tides

Diurnal (twice daily) high tides along San Francisco's Bay shoreline typically range from approximately 5 to 7 feet NAVD88 (94 to 96 feet project datum), and annual maximum tides may exceed 7 feet NAVD88 (96 feet project datum).[14] The twice yearly extreme high and low tides are called "king tides." These occur each year during the winter and summer when the earth, moon, and sun are aligned, and the winter event may be amplified by weather. A portion of the

[13] City and County of San Francisco, San Francisco Interim Floodplain Map, East, Final Draft, July 8, 2008.

[14] SFPUC, *Climate Stressors and Impact: Bayside Sea Level Rise Mapping, Final Technical Memorandum.* June 2014 (hereinafter *Bayside Sea Level Rise Mapping Technical Memorandum*), p. 10.

Embarcadero Promenade near Pier 14 and the Marina area in San Francisco experience inundation under king tide conditions.[15]

Storm Surge

Storm surge occurs when persistent high winds and changes in air pressure elevate bay water levels above normal tide levels, which can raise the water level near the shoreline by several feet and may persist for several days. Along San Francisco's Bay shoreline, storm surge typically raises the surface water elevation by 0.5 foot to as much as 3.0 feet during major winter storms.[16] The degree of storm surge depends on the severity of the storm as well as tidal levels at the time of the storm. Storm surge is characterized using a return period that represents the expected frequency of a storm event occurring based on historical information. One-year storm surge is expected to occur each year while 100-year storm surge (which represents more extreme conditions) has a 1 percent chance of occurring in any year.

Storm Waves

Waves and wave run-up primarily affect a narrow band along the shoreline where wave energy can damage structures and overtop both natural embankments and shoreline protection structures such as seawalls and levees. The influence of waves diminishes inland as wave energy dissipates. In addition, the Pacific Ocean waves, which are generally larger than those originating in San Francisco Bay, are substantially dampened along San Francisco Bay shoreline due to transformation processes within San Francisco Bay. Along the San Francisco Bay shoreline, storm waves typically raise the surface water elevation by 1 to 4 feet during major winter storms several times a year.[17]

El Niño Winter Storms

During El Niño events,[18] atmospheric and oceanographic conditions in the Pacific Ocean bring warm, higher waters to the Bay Area and may produce severe winter conditions that bring intense rainfall and storm conditions to the Bay Area. Tides are often elevated 0.5 to 1.0 foot above normal along the coast and in San Francisco Bay for months at a time, and additional storm surge

[15] SFPUC, *Bayside Sea Level Rise Mapping Technical Memorandum*, p. 7.
[16] SFPUC, *Bayside Sea Level Rise Mapping Technical Memorandum*, p. 10.
[17] SFPUC, *Bayside Sea Level Rise Mapping Technical Memorandum*, p. 10.
[18] El Niño–Southern Oscillation (ENSO) is a natural oceanic-atmospheric cycle. El Niño conditions are defined by prolonged warming in the Pacific Ocean sea surface temperatures. Typically, this happens at irregular intervals of 2 to 7 years, and can last anywhere from 9 months to 2 years.

and wind effects during storm events can elevate water levels even further. El Niño conditions prevailed in 1977-1978, 1982-1983, 1997-1998, 2009-2010,[19] and 2015-2016.[20]

Sea Level Rise

Sea levels are rising globally due to climate change, and they are expected to continue to rise at an accelerating rate for the foreseeable future. The sea level at the San Francisco tidal gage has risen approximately 0.8 inch per year since 1897, resulting in about 0.6 foot of sea level rise between that time and 2015.[21] The National Research Council's (NRC) 2012 report, *Sea Level Rise for the Coasts of California, Oregon, and Washington: Past, Present, and Future* (the NRC Report) provides a scientific review of sea level rise for the West Coast and provides the most recent regional sea level rise predictions for 2030, 2050, and 2100, relative to the year 2000 sea level.[22] In this report, the NRC projects that sea levels in the Bay Area will rise 11 inches by 2050 and 36 inches by 2100, as presented in Table 4.O.1: Sea Level Rise Estimates for San Francisco Bay Relative to the Year 2000. As presented in the NRC Report, these sea level rise projections represent likely sea level rise values based on the current understanding of global climate change and assuming a moderate level of greenhouse gas (GHG) emissions[23] and extrapolation of continued accelerating land ice melt patterns.

The NRC Report also includes ranges of sea level rise that could occur based on different estimates of GHG emissions and ice melt patterns. The extreme upper limit of the ranges represents unlikely but possible levels of sea level rise that are based on very high GHG emissions scenarios and significant ice melt that is not currently anticipated but could occur. Assuming the maximum level of GHG emissions and ice melt, the NRC anticipates that sea levels

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[19] SFPUC, *Bayside Sea Level Rise Mapping Technical Memorandum*, p. 8.

[20] National Oceanic and Atmospheric Administration (NOAA), Climat.gov, El Nino and La Nina (El-Nino-Southern Oscillation. Available online at https://www.climate.gov/enso. Accessed June 13, 2016.

[21] NOAA, Mean Sea Level Trend 9414290 San Francisco, California. Available online at https://tidesandcurrents.noaa.gov/sltrends/sltrends_station.shtml?stnid=9414290. Accessed June 22, 2016.

[22] National Research Council, *Sea-Level Rise for the Coasts of California, Oregon, and Washington: Past, Present, and Future*. Washington, DC: The National Academies Press, 2012. Available online at http://www.nap.edu/catalog.php?record_id=13389. Accessed November 28, 2015.

[23] Future emissions of greenhouse gases depend on a collection of human decisions at local, regional, national, and international levels as well as potential unknown technological developments. For this reason, future changes in greenhouse gas emissions cannot be accurately estimated, and a range of emissions levels is considered in the NRC Report. Estimates of sea level rise relative to thermal expansion of the oceans were formulated using the mid-level, or moderate level, of predicted changes in greenhouse gas emissions (from a combination of fossil and non-fossil fuels), as well as an assumption of high economic growth; this represents scenario "A1B" as described by the Intergovernmental Panel on Climate Change (IPCC).

in the Bay Area could rise up to 24 inches by 2050 and 66 inches by 2100 as presented in Table 4.O.1.

Table 4.O.1: Sea Level Rise Estimates for San Francisco Bay Relative to the Year 2000

Year	Projection (inches)	Upper Range (inches)
2030	6	12
2050	11	24
2100	36	66

Source: National Research Council, 2012

These estimates represent the long-term increase in Mean Sea Level and the associated average daily high tide conditions (represented by Mean Higher High Water, or MHHW)[24] that could result from sea level rise; they do not take into account extreme tides, storm surge, storm waves, or El Niño storm events, all of which can result in water levels that are temporarily higher than MHHW as discussed above.

In March 2013, the California Ocean Protection Council updated its 2010 Statewide sea level rise guidance to adopt the NRC Report as the current, best available science on sea level rise for California.[25] The California Coastal Commission supports the use of the NRC Report as the best science currently available in its *Sea Level Rise Policy Guidance*, which it adopted in 2015. The California Coastal Commission guidance emphasizes the importance of regularly updating sea level rise projections as the science continues to advance.[26] The San Francisco Bay Conservation and Development Commission (BCDC) also considers the NRC Report to be the best available science-based prediction of sea level rise for San Francisco Bay. Accordingly, the Planning Department considers the NRC Report to be the best science currently available on sea level rise affecting San Francisco for both CEQA and planning purposes.

[24] Mean Higher High Water is the higher of each day's two high tides averaged over time.

[25] *State of California Sea-Level Rise Guidance Document.* Developed by the Coastal and Ocean Working Group of the California Climate Action Team (CO-CAT), with science support provided by the Ocean Protection Council's Science Advisory Team and the California Ocean Science Trust. March 2013 Update (hereinafter "*State of California Sea-Level Rise Guidance Document*"). Available online at http://www.opc.ca.gov/webmaster/ftp/pdf/docs/2013_SLR_Guidance_Update_FINAL1.pdf. Accessed November 28, 2015.

[26] California Coastal Commission, *Sea Level Rise Policy Guidance, Interpretive Guidelines for Addressing Sea Level Rise in Local Coastal Programs and Coastal Development Permits, Unanimously Adopted August 12, 2015.* Available online at http://documents.coastal.ca.gov/assets/slr/guidance/August2015/0_Full_Adopted_Sea_Level_Rise_Policy_Guidance.pdf. Accessed November 28, 2015.

Although the NRC Report provides the best available sea level rise projections for San Francisco Bay at this time, scientific uncertainty remains regarding the rate and magnitude of sea level rise. Sea level rise projections beyond 2050 are highly dependent on assumptions regarding future global GHG emissions and future changes in the rate of land ice melting. As a result of the uncertainties inherent in these assumptions, the range of sea level rise predictions becomes substantially broader beyond 2050. In recognition of this uncertainty, the State of California Sea-Level Rise Guidance recommends an adaptive management approach for development in areas that may be subject to sea level rise beyond 2050.[27] Adaptive management is an iterative process that involves monitoring conditions to evaluate whether an area could be inundated as a result of sea level rise, and identifying future actions to be implemented to ensure that the area and existing structures are resilient to future flooding conditions.

SEA LEVEL RISE INUNDATION MAPPING

The SFPUC, as part of the planning for its Sewer System Improvement Program, developed a series of maps published in 2014 that represent areas of inundation along both San Francisco Bay and Pacific Ocean shorelines of San Francisco. These maps use a 1-meter horizontal grid resolution[28] based on the 2010/2011 California Coastal Mapping Program LiDAR. The inundation maps use data from the Federal Emergency Management Agency's (FEMA) California Coastal Mapping and Analysis Project, which includes detailed coastal engineering analyses and mapping of the San Francisco Bay shoreline.

The SFPUC inundation maps evaluate scenarios that represent the NRC projections of sea level rise in combination with the effects of storm surge. They represent permanent inundation that could occur as a result of total water level rises (over and above year 2000 MHHW) based on daily tidal fluctuations. Each scenario also addresses temporary inundation that could occur from extreme tides and from 1-year, 2-year, 5-year, 25-year, 50-year, and 100-year storm surge. Flooding as a result of storm surge would occur on a temporary basis, during and immediately after a storm event or extreme tide.

The scenarios listed below are representative of San Francisco Bay water elevations that could occur by the year 2050 and the year 2100, based on the NRC's projected levels of sea level rise and considering a 100-year storm surge.

- 12 inches above year 2000 MHHW (representative of NRC's projected sea level rise by 2050);

[27] *State of California Sea-Level Rise Guidance Document*; p. 3.

[28] The horizontal grid resolution of a digital elevation model (DEM) defines the scale of the features that are modeled; this is generally the minimum resolution necessary to depict levees, berms, and other topographic features important to diverting floodwaters.

- 36 inches above year 2000 MHHW (representative of NRC's projected sea level rise by 2100);
- 52 inches above year 2000 MHHW (representative of NRC's projected sea level rise by the year 2050 in combination with a 100-year storm surge); and
- 77 inches above year 2000 MHHW (representative of NRC's projected sea level rise by the year 2100 in combination with a 100-year storm surge).

The following scenarios are representative of the maximum San Francisco Bay water elevations that could occur by the year 2100, based on the NRC's upper range of sea level rise and considering 100-year storm surge.

- 66 inches above year 2000 MHHW (representative of NRC's upper range of sea level rise by 2100); and
- 107 inches above year 2000 MHHW (representative of NRC's upper range of sea level rise by the year 2100 in combination with a 100-year storm surge).

The SFPUC cautions that its maps represent a "do nothing" scenario, in which no site-specific measures are taken to prevent future flooding and no area-wide measures such as waterfront protection structures are constructed. In the event that the City undertakes area-wide measures to protect against inundation in the future, the mapping would need to be revised to reflect the modified inundation areas with implementation of these measures. In addition, because the SFPUC sea level rise maps are based on 2010/2011 topographic mapping, they do not account for planned increases in the base elevation of the project site as would occur with implementation of the Proposed Project to prevent future flooding due to sea level rise.

MHHW near the project site is at an elevation of 6 feet NAVD88 (95 feet project datum).[29] Table 4.O.2: Water Elevations Associated with Sea Level Rise Projections, presents water elevations near the project site associated with each of the sea level rise scenarios discussed above, based on the existing MHHW elevation. In Table 4.O.2, elevations are presented in NAVD88, which is a datum commonly used throughout the nation. The elevations are also provided in the project datum that was established by the project sponsors for project-specific purposes. The project datum is 88.6 feet higher than NAVD88.

The SFPUC inundation maps indicate that under existing conditions, only the immediate waterfront portion of the project site would be inundated with 12 inches of sea level rise, which is expected by 2050, even when the effects of 100-year storm surge are considered. Similarly, the site would not be subject to daily tidal inundation with 36 inches of sea level rise, except for the immediate waterfront. However, when the effects of 100-year storm surge are considered in addition to 36 inches of sea level rise, the flood level would be approximately 13 feet NAVD88

[29] SFPUC, *Bayside Sea Level Rise Mapping Technical Memorandum.*

(101 feet project datum). Over half of the 28-Acre Site could be temporarily flooded to a maximum depth of 2 feet with the current site grade. Under this scenario, flooding would occur in the eastern portion of the site and extend westward, just beyond the proposed Maryland Street. Similarly, the eastern portion of the 28-Acre Site would be inundated with 66 inches of sea level rise, and when the effects of 100-year storm surge are considered, the flood level would be approximately 15 feet NAVD88 (104 feet project datum). The entire 28-Acre Site could be temporarily flooded to a maximum depth of 5 feet with the current site grade. The Illinois Parcels sit at a higher surface elevation and no part of the Illinois Parcels is within an anticipated future flood zone.

Table 4.O.2: Water Elevations Associated with Sea Level Rise Projections

Sea Level Rise Scenario	Elevation (feet, NAVD88)	Elevation (feet, Project Datum[1])
2000 MHHW with no sea level rise	6	95
2000 MHHW plus 100-year storm surge	10	98
2000 MHHW plus 12 inches of sea level rise	7	96
2000 MHHW plus 12 inches of sea level rise and 100-year storm surge	11	99
2000 MHHW plus 36 inches of sea level rise	9	98
2000 MHHW plus 36 inches of sea level rise and 100-year storm surge	13	101
2000 MHHW plus 66 inches of sea level rise (upper range)	12	100
2000 MHHW plus 66 inches of sea level rise and 100-year storm surge (upper range)	15	104

Notes:

MHHW – Mean Higher High Water. This is the higher of each day's two high tides averaged over time.

[1] San Francisco City Datum establishes the City's zero point for surveying purposes at approximately 11.4 feet above the 1988 North American Vertical Datum. The project datum is equal to San Francisco City Datum plus 100 feet. This is 88.6 feet higher than NAVD88.

Sources: San Francisco Water, Power, Sewer, 2014; Orion Environmental Associates, 2015

PLANNING FOR SEA LEVEL RISE IN SAN FRANCISCO

The City has convened an inter-agency Climate Adaptation Working Group to identify ways to make sure that it is prepared to adapt to effects of sea level rise.[30] Participating agencies include the Department of the Environment, the SFPUC, the Planning Department, the City Administrator's Office, the Port, San Francisco International Airport (SFO), San Francisco Public

[30] San Francisco Department of the Environment. *Adaptation.* Available online at http://www.sfenvironment.org/article/climate-change/adaptation. Accessed March 4, 2016.

Works (SFPW), the San Francisco Municipal Transportation Agency (SFMTA), the Department of Public Health (DPH), and the Department of Recreation and Parks. The working group is focusing its effort on the City's most imminent adaptation concerns, including sea level rise along Ocean Beach and shores, flooding from storm surge and extreme rain events, an increased likelihood of extreme heat, and decreased fog that supports local ecosystems such as redwoods. It is working on ways to improve the existing coastal flood protection infrastructure in time to prevent significant flooding impacts from sea level rise. The working group will establish requirements addressing proper flood insurance for structures in low-lying areas, flood-resilient construction of new development within inundation areas, and a low carbon footprint for new development. It is also assessing the use of natural solutions, such as wetlands, to protect the shoreline.

San Francisco Mayor Edwin M. Lee also established two interdepartmental committees to manage the City's efforts on addressing sea level rise: the Sea Level Rise (SLR) Coordinating and SLR Technical committees. The SLR Coordinating Committee, established in February 2015, is a director-level committee co-chaired by the Director of Citywide Planning at the Planning Department and the City Engineer and Deputy Director at SFPW. SLR Coordinating Committee members also include the Chief Resiliency Officer and senior staff from the Mayor's Office, the City Administrator's Office, SFO, the Port, the SFPUC, SFMTA, the Department of Building Inspection (DBI), the Office of Community Investment and Infrastructure, the Office of Economic and Workforce Development, and the Capital Planning Committee. The responsibilities of the SLR Coordinating Committee are as follows.

1. Coordinate the efforts of City departments and advise the Mayor's Office on policies, strategies, initiatives, and resolutions to deal with and plan for potential impact on San Francisco from sea level rise;
2. Coordinate local efforts and initiatives with the work of other governmental entities and various stakeholders at the regional, State, and national levels such as the U.S. Environmental Protection Agency (EPA), the U.S. Department of Housing and Urban Development, the Department of the Interior, the California Coastal Commission, the California Ocean Protection Council, and BCDC;
3. Provide guidance and specific recommendations to City departments with regard to land use and strategies to protect assets and communities along the shoreline;
4. Oversee and guide the existing SLR Technical Committee and implementation of the Capital Planning Guidance to address vulnerability and risks, and adaptability of the City's physical infrastructure; and
5. Promote coordination and collaboration among City departments, private utility providers, and other stakeholders.

The SLR Coordinating Committee is first charged with assessing the City's risk to sea level rise. Once the data analysis phase is complete, the SLR Coordinating Committee will coordinate the

City's SLR vulnerability assessment and adaptation planning efforts with local, regional, and national governmental and non-governmental organizations and with community stakeholders, as needed. Key to this effort will be determining how to best involve the community.

The SLR Technical Committee was established in February 2015 and is comprised of the same membership that developed the Capital Planning Committee's Sea Level Rise Guidance, including the SFPUC, Port, SFPW, SFO, SFMTA, Capital Planning, and the Planning Department. This committee is charged with assisting all City agencies with consistent implementation of the Guidance, revising the Guidance as needed, and assisting the SLR Coordinating Committee as requested.

Guidance for Incorporating Sea Level Rise into Capital Planning

On September 22, 2014, the City's Capital Planning Committee adopted the Guidance for Incorporating Sea Level Rise into Capital Planning in San Francisco: Assessing Vulnerability and Risk to Support Adaptation, which was prepared by the SLR Coordinating Committee.[31] The guidance document has been revised to simplify the analysis of specific sea level rise scenarios and clarify how to select the appropriate scenario for design and planning purposes. The revised document also provides a methodology for determining the design tide for use in project design and planning, and was adopted by the Capital Planning Committee on December 14, 2015.[32]

San Francisco Sea Level Rise Action Plan

In March 2016, the SLR Coordinating Committee released the San Francisco Sea Level Rise Action Plan, with lead City staffing by the Planning Department and SFPW, along with other City departments and a consultant team.[33] The Action Plan is intended to guide City departments in their understanding of and adaptation to the impacts of sea level rise, and it also identifies what long-term sea level rise means for San Francisco's residents, visitors, economy, and waterfront.

The Action Plan establishes an overarching vision, goals, and a set of guiding principles for sea level rise planning; summarizes current climate science, relevant policies and regulations, and

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[31] City and County of San Francisco Sea Level Rise Committee, *Guidance for Incorporating Sea Level Rise into Capital Planning in San Francisco: Assessing Vulnerability and Risk to Support Adaptation*, September 14, 2015. Available online at http://onesanfrancisco.org/wp-content/uploads/San%20Francisco%20SLR%20Guidance%20Adopted%209.22.14%2012182014.pdf. Accessed March 15, 2016.

[32] City and County of San Francisco Sea Level Rise Committee, Guidance for Incorporating Sea Level Rise into Capital Planning in San Francisco: Assessing Vulnerability and Risk to Support Adaptation. December 14, 2015. Available online at http://onesanfrancisco.org/wp-content/uploads/Guidance-for-Incorporating-Sea-Level-Rise-into-Capital-Planning1.pdf. Accessed January 22, 2016.

[33] City and County of San Francisco, Sea Level Rise Action Plan, March 2016. Available online at http://default.sfplanning.org/plans-and-programs/planning-for-the-city/sea-level-rise/160309_SLRAP_Final_ED.pdf. Accessed November 28, 2016.

vulnerability and risk assessments conducted to date; identifies data gaps and establishes a framework for further assessment, adaptation planning, and implementation; and provides the foundation and guidance to develop a citywide Sea Level Rise Adaptation Plan.

The Action Plan is the first step in the development of the Citywide Sea Level Rise Adaptation Plan, expected to be complete in 2018, which will incorporate the adaptation strategies identified in the Action Plan and help prioritize investments to best improve climate resilience while protecting economic and environmental value. The Adaptation Plan will also identify potential funding sources, governance structures, and implementation timelines.

Planning for Climate Change under the SFPUC Sewer Improvement Program

The SFPUC is also addressing sea level rise as part of its Sewer System Improvement Program, and is conducting a detailed analysis of the potential for new and existing combined sewer infrastructure to be affected by sea level rise.[34] Accordingly, all new facilities will be built using a climate change criterion so the combined sewer system will be better able to respond to rising sea levels. Rising sea levels and storm surge could potentially inundate the combined sewer system and exacerbate existing flooding that can result from backups of the sewer system in some areas of San Francisco. Rising sea levels and storm surge can also cause new flooding. To address these issues, the SFPUC is also evaluating alternatives such as the installation of backflow preventers on the CSD structures to restrict the intrusion of Bay water into the combined sewer system.

TSUNAMI AND SEICHE

Tsunamis (seismic sea waves) are long-period waves that are typically caused by underwater seismic disturbances, volcanic eruptions, or submerged landslides. Tsunamis, which travel at speeds up to 700 miles per hour, are typically only 1 to 3 feet high in open ocean water but may increase in height to up to 90 feet as they reach coastal areas, potentially causing large amounts of damage when they reach land.[35] Low-lying coastal areas such as tidal flats, marshlands, and former bay margins that have been artificially filled but are still at or near sea level are generally the most susceptible to tsunami inundation.

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[34] SFPUC, *Bayside Drainage Basin Urban Watershed Opportunities, Final Draft Technical Memorandum*, July 2014.

[35] City and County of San Francisco, *Emergency Response Plan, an Element of the CCSF Emergency Management Program, Tsunami Response Annex*, March 2011, p. 21 (hereinafter referred to as *Emergency Response Plan).* Available online at http://www.sfdem.org/ftp/uploadedfiles/DEM/PlansReports/TsunamiAnnex-2008.pdf. Accessed November 28, 2015.

A seiche is caused by oscillation of the surface of an enclosed body of water such as the San Francisco Bay due to an earthquake or large wind event. Seiches can result in long-period waves that cause run-up or overtopping of adjacent landmasses, similar to tsunami run-up.

Fifty-one tsunamis were recorded or observed in San Francisco Bay between 1850 and early 2011.[36] Nine of these tsunamis originated in Alaska and were caused by an earthquake, earthquake and landslide, or volcano and earthquake. The 1906 earthquake generated a 4-inch wave run-up, recorded at the Presidio gage station. In more recent years, it is probable that wave impact occurred in and around the Bay Area resulting from a 1946 earthquake in the Aleutian Islands; a tsunami generated in 1960 that killed 61 people in Hawaii and damaged the West Coast; and a 1964 Alaskan earthquake that generated a tsunami and caused 12 deaths and 17 million dollars in damage in Crescent City. The earthquake that hit Japan in March 2011 initiated a tsunami that resulted in a run-up of 0.5 to 7.8 feet along the California Coast with 2.2 feet of run-up observed at the San Francisco Marina.[37] There are no known recorded deaths from tsunami-related events in San Francisco County.

In 2009, the California Geological Survey, California Emergency Management Agency, and the Tsunami Research Center at the University of California completed the State's official tsunami inundation maps. This mapping indicates that the majority of the 28-Acre Site is located in an area identified for potential inundation in the event of a tsunami or seiche based on existing site grades.[38] The estimated maximum potential tsunami and seiche wave height is approximately 6 feet at the project site, based on emergency response mapping conducted by the City.[39] As stated in a site-specific assessment of tsunami risks at the project site, this worst case wave height

[36] City and County of San Francisco, *Emergency Response Plan*, p. 4.

[37] R. Wilson, L. Dengler, J. Borrero, C. Synaloakis, B. Jaffe, A. Barberopoulou, L. Ewing, M. Legg, A. Rtichie, P. Lynette, A. Admire, T. McCrink, J. Falls, J. Treiman, M. Manson, C. Davenport, J. Lancaster, B. Olson, C. Pridmore, C. Real, K. Miller, J. Goltz, *The Effect of the 2011 Tohoku Tsunami on the California Coastline.* Available online at http://www.conservation.ca.gov/cgs/geologic_hazards/Tsunami/Documents/ssa_2011_california_tohoku_small.pdf. Accessed November 28, 2015.

[38] California Emergency Management Agency, California Geological Survey, University of Southern California, *Tsunami Inundation Map for Emergency Planning, San Francisco North Quadrangle/San Francisco South Quadrangle (San Francisco Bay)*, June 15, 2009. Available online at http://www.conservation.ca.gov/cgs/geologic_hazards/Tsunami/Inundation_Maps/SanFrancisco/Documents/Tsunami_Inundation_SouthSFNorthSF_SFBay_SanFrancisco.pdf. Accessed November 28, 2015.

[39] City and County of San Francisco, *Emergency Response Plan*, Attachment B.

includes a 150 percent factor of safety.[40,41] When added to the Mean High Water[42] level of 6 feet NAVD88, the maximum tsunami inundation elevation would be about 12 feet NAVD88 (100 feet project datum).

Tsunami Warning System

The National Oceanic and Atmospheric Administration (NOAA) operates the Pacific Tsunami Warning System with centers located in Hawaii and Alaska. These warning centers are linked to the Advanced National Seismic System that monitors earthquakes in the United States, to international seismic monitoring systems, and to a system of tide gages and buoys. The California Integrated Seismic Network also provides information regarding the magnitude and location of California earthquakes and a quick link to the NOAA/West Coast and Alaska Tsunami Warning Center. Based on the level of threat indicated by these systems, NOAA issues a Tsunami Advisory, Watch, or Warning.

The City and County of San Francisco has prepared a Tsunami Response Annex as part of the City's Emergency Response Plan.[43] In accordance with this annex, the San Francisco Department of Emergency Management (DEM) would determine the appropriate plan of action based on the level of threat. In the event of a Tsunami Advisory or Watch, the DEM would issue a local Emergency Alert Message and evaluate the need to evacuate residents, schools, hotels, and people in the potential inundation zones, as well as the need to close the zoo, wharf, Marina area, and beaches. The DEM would also notify critical City departments and support agencies, and would monitor both the threat status and measured tide levels. If the Tsunami Watch is upgraded to a Tsunami Warning and measured tide levels confirm that the wave has the potential to create significant inundation in San Francisco, the Outdoor Public Warning System would be activated, which includes sirens, a public address system, and broadcasting public safety messages through the local media. The notification would include instructions for walking to higher ground or evacuating and for obtaining basic services such as shelter, food, water, and medical services. The DEM would also coordinate response actions with appropriate local, State, and other emergency response agencies. Once the area is deemed safe for re-entry, an all-clear public safety message would be broadcast.

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[40] Moffatt & Nichol, *Pier 70 Development Project, Tsunami Risk Assessment – DRAFT*, September 25, 2015 (hereinafter referred to as *Tsunami Risk Assessment),* p. 3-4.

[41] Because there are many uncertainties involved in calculating the height of a tsunami wave, such as the height of the originating wave and the attenuation that would occur within San Francisco Bay and along San Francisco Bay shore, it is prudent to include a factor of safety in the estimate. The factor of safety is the amount that the estimated wave height exceeds the calculated wave height. In this case, the estimate is 50 percent higher than the calculated wave height.

[42] Mean High Water is the average of all high water levels observed over a period of several years.

[43] City and County of San Francisco, *Emergency Response Plan*.

The Tsunami Warning System takes an average of 7 to 10 minutes to identify a tsunami threat and communicate it to the media and State warning systems. The initial notification is based on seismic data. A tsunami's travel time is on the order of minutes (for local events) to hours (for distant events). During this time, the initial notification is normally updated once additional information is available, at least every 30 minutes. The status of an advisory, watch, or warning can be upgraded, downgraded, or the impact area expanded based on the new information.

SAN FRANCISCO BAY WATER QUALITY

As described below under "Clean Water Act Section 303(d) and Total Maximum Daily Loads," p. 4.O.22, states must present the EPA with a list of "impaired water bodies," defined as those water bodies that do not meet water quality standards. The Proposed Project is located adjacent to Lower San Francisco Bay, which extends from approximately the Bay Bridge on the north to the Dumbarton Bridge on the south. The Regional Water Quality Control Board (RWQCB) has listed Lower San Francisco Bay as an impaired water body for chlordane, DDT, dieldrin, dioxins, furan compounds, mercury, polychlorinated biphenyls (PCBs), invasive species, and trash.[44]

The Central Basin of Lower San Francisco Bay, where the CSD structures for the 20th Street sub-basin discharge, is an inlet of San Francisco Bay along the City's bay shoreline. This basin is listed as an impaired water body for chlordane, DDT, dieldrin, dioxin compounds, furan compounds, PCBs, mercury, selenium, and invasive species. The sediments of the Central Basin are listed for mercury and polycyclic aromatic hydrocarbons.

GROUNDWATER RESOURCES

The project site is underlain by the San Francisco Downtown Groundwater Basin, one of five groundwater basins in the eastern part of San Francisco.[45] This basin is separated from the surrounding groundwater basins by bedrock ridges. The groundwater basin is composed of shallow unconsolidated sediments underlain by less permeable bedrock. Bedrock outcrops form much of the northeastern and southern basin boundaries. In general, groundwater flow is towards the northeast, following the topography. Groundwater within the San Francisco Downtown Basin is known to contain elevated concentrations of nitrates, chloride, boron, and total dissolved solids. Historically, groundwater quality in the San Francisco Downtown Groundwater Basin has been

[44] State Water Resources Control Board, 2010 Integrated Report (Clean Water Act Section 303(d) List / 305(b) Report) — Statewide. Available online at http://www.waterboards.ca.gov/water_issues/programs/tmdl/integrated2010.shtml. Accessed November 28, 2015.

[45] California Department of Water Resources. California's Groundwater, Bulletin 118. February 27, 2004.

affected by a number of fuel leak cases and groundwater in this basin is considered non-potable.[46] The only groundwater extracted from this basin is for dewatering purposes.

TRASH IN WATERWAYS

Trash is of concern for San Francisco Bay because Lower San Francisco Bay is listed as an impaired water body under Section 303(d) of the CWA for trash. Aquatic debris threatens sensitive ecosystems and has been documented to kill or harm nearly hundreds of wildlife species.[47] The debris also interferes with navigation; degrades natural habitats; costs millions of dollars in property damage and lost revenue from tourism and commercial fishing activities; and is a threat to human health and safety. Most aquatic debris comes from land-based sources including littering, legal and illegal dumping, a lack of or poor waste management practices and recycling capacity, stormwater discharges, animal interference with garbage, and extreme natural events. The growing quantity of single-use plastic packaging contributes substantially to the amount of trash transported to waterways. Plastic in the marine environment also breaks into smaller and smaller pieces and it is eaten—often with fatal consequences—by fish, turtles, birds, and marine mammals.

REGULATORY FRAMEWORK

FEDERAL

Clean Water Act – Water Quality

In 1972, the CWA established the basic structure for regulating discharges of pollutants into the waters of the United States and gave the EPA the authority to implement pollution control programs. The CWA sets water quality standards for contaminants in surface waters. The statute incorporates a variety of regulatory and non-regulatory tools to reduce direct pollutant discharges into waterways, to finance municipal wastewater treatment facilities, and to manage polluted runoff. The EPA has delegated responsibility for implementation of portions of the CWA, including water quality control planning and programs in California, to the SWRCB and the nine RWQCBs. Water quality standards applicable to the Proposed Project are listed in the Water Quality Control Plan for the San Francisco Bay Basin (Basin Plan), discussed further below under "State" in Regulatory Framework on pp. 4.O.25-4.O.26.

[46] San Francisco Bay Regional Water Quality Control Board (RWQCB), Groundwater Committee, San Francisco and Northern San Mateo County Pilot Beneficial Use Designation Project, Part 1: Draft Staff Report, April 4, 1996, Table 3.

[47] National Resources Defense Council, *NRDC News Brief, Waste in our Water: The Annual Cost to California Communities of Reducing Litter That Pollutes our Waterways,* August 2013.

Clean Water Act Section 303(d) and Total Maximum Daily Loads

In accordance with Section 303(d) of the CWA, states must present the EPA with a list of "impaired water bodies," defined as those water bodies that do not meet water quality standards. The CWA requires the development of total maximum daily loads (TMDLs) to improve water quality of impaired water bodies. Implementation of this program in the project area is conducted by the San Francisco Bay RWQCB.

Clean Water Act Section 401—Water Quality Certification

Section 401 of the CWA requires compliance with State water quality standards for actions within State waters. Compliance with the water quality standards required under Section 401 is a condition for issuance of a Section 404 permit (see below). Under Section 401 of the CWA, every applicant for a Federal permit or license for any activity that may result in a discharge to a water body must obtain a State Water Quality Certification that the proposed activity will comply with State water quality standards.

Clean Water Act Section 402—NPDES Permits

Section 402 of the CWA authorizes the EPA to establish a nationwide surface water discharge permit program for municipal and industrial point sources known as the NPDES program. Under Section 402, the San Francisco Bay RWQCB has set standard conditions for each permittee in the Bay Area, including effluent limitation and monitoring programs. Discharges of stormwater and wastewater from the Proposed Project would be subject to NPDES permits issued to the City.

Clean Water Act Section 404 – Dredging or Filling of Navigable Waters of the U.S.

Under Section 404 of the CWA, a Department of the Army permit must be obtained from the U.S. Army Corps of Engineers (Corps) for the discharge of dredged or fill material into Waters of the United States, including wetlands. The discharge of dredged or fill material typically means adding into waters of the U.S. materials such as concrete, dirt, rock, pilings, or side cast material for the purpose of replacing an aquatic area with dry land or raising the elevation of an aquatic area. Activities typically regulated under Section 404 include the use of construction equipment such as bulldozers, and the leveling or grading of sites where jurisdictional waters occur. Construction activities conducted in the Bay below the high tide line[48] at an elevation of 7.4 feet NAVD88 (96.0 feet project datum) would be subject to CWA Section 404.[49]

[48] The high tide line is the maximum height reached by a rising tide. In the absence of actual data, the high tide line may be determined by physical markings such as a line of oil or scum along the shoreline or a more or less continuous deposit of fine shell or debris on a shoreline or berm.

[49] Moffatt & Nichol, *Pier 70 Development, Preliminary Shoreline Improvements Report, San Francisco, California*, draft report, August 2015.

The Corps reviews applications for permits in accordance with Section 404 guidelines, which have been established by the Corps and EPA. To issue a permit under Section 404, the Corps must ensure that any discharge will not violate the State's water quality standards. Therefore, in California, the proponent of any activity that may result in a discharge to surface Waters of the United States must obtain water quality certification or a waiver of certification from the RWQCB (pursuant to Section 401 of the CWA). The project sponsors would be required to obtain a permit from the Corps under CWA Section 404 to conduct any work below the high tide line.

Rivers and Harbors Act

Section 10 of the Rivers and Harbors Act of 1899 prohibits work affecting the course, location, conditions, or capacity of navigable waters of the United States without a permit from the Corps. Navigable waters under the act are those "subject to the ebb and flow of the tide and/or are presently used, or have been used in the past, or may be susceptible for use to transport interstate or foreign commerce" (Title 33 Code of Federal Regulations Section 3294). Examples of activities requiring a permit from the Corps are the construction of any structure in or over any navigable water; excavation or deposition of materials in such waters; and various types of work performed in such waters, including placement of fill and stream channelization. Construction activities conducted in the Bay below the mean high water line at an elevation of 5.7 feet NAVD88 (94.3 feet project datum) would be subject to Section 10 of the Rivers and Harbors Act.

The project sponsors would be required to obtain a permit under Section 10 of the Rivers and Harbors Act from the Corps to conduct any work within its jurisdiction.

Federal Combined Sewer Overflow Control Policy

In 1994, the EPA adopted the Combined Sewer Overflow Control Policy (CSO Control Policy), which became part of the CWA in December 2000. This policy establishes a consistent national approach for controlling discharges from combined sewers to the nation's waters. Using the NPDES permit program, the permittee is required to implement the following nine minimum controls that constitute the technology-based requirements of the CWA and can reduce the frequency of CSDs and their effects on receiving water quality.

1. Conduct proper operation and regular maintenance programs for the combined sewer system and CSD outfalls;
2. Maximize the use of the collection system for storage;
3. Review and modify pretreatment programs to minimize the effect of non-domestic discharges to the collection system;
4. Maximize flow to the SEWPC and North Point Wet Weather Facility for treatment;

5. Prohibit CSDs during dry weather;
6. Control solids and floatable materials in CSDs;
7. Develop and implement a pollution prevention program focused on reducing the effect of CSDs on receiving waters;
8. Notify the public of CSDs; and
9. Monitor to effectively characterize CSD effects and the efficacy of CSD controls.

The City is currently implementing these controls as required by the CSO Control Policy and has also developed a long-term control plan to optimize operations of the City's combined sewer collection and treatment system and maximize pollutant removal during wet weather.

Consistent with the CSO Control Policy and the Long-Term Control Plan, the City captures and treats 100 percent of the combined wastewater and stormwater flow collected in the combined sewer system during precipitation events. Captured flows are directed first to the SEWPCP and North Point Wet Weather Facility for primary or secondary treatment and disinfection. Flows in excess of the capacity of these facilities are diverted to storage and transport boxes constructed around much of the City, and receive the equivalent to primary treatment prior to discharge to San Francisco Bay. The Long-Term Control Plan specifies operational parameters that must be met in each drainage basin before a CSD can occur, and includes the following long-term average annual design goals for CSDs.

- Four CSD events along the North Shore;
- Ten CSD events from the Central Basin (which includes the project site); and
- One CSD event along the Southeast Sector.

The CSO Control Policy allows for this annual average to be exceeded in any particular year as long as the long-term average is maintained at the appropriate level. The City is currently meeting these long-term average design goals for the overall Bayside drainage basin.

Executive Order 11988

Under Executive Order 11988, FEMA is responsible for management of floodplain areas defined as the lowland and relatively flat areas adjoining inland and coastal waters subject to a 1 percent or greater chance of flooding in any given year (the 100-year floodplain). FEMA is a Federal agency whose overall mission is to support citizens and first responders to ensure that the United States builds, sustains, and improves capabilities to prepare for, protect against, respond to, recover from, and mitigate all hazards. With regard to flooding, FEMA provides information, guidance, and regulation associated with flood prevention, mitigation, and response. Under Executive Order 11988, FEMA requires that local governments covered by the Federal flood insurance program pass and enforce a floodplain management ordinance that specifies minimum

requirements for any construction within the 100-year floodplain. Through its Flood Insurance and Mitigation Administration, FEMA manages the National Flood Insurance Program, which includes flood insurance, floodplain management, and flood hazard mapping functions. FEMA maps 100-year floodplains within its jurisdiction and provides flood insurance rate information via flood insurance rate maps.

STATE

California Porter-Cologne Water Quality Control Act

The Porter-Cologne Water Quality Control Act (Division 7 of the California Water Code) provides for protection of the quality of waters of the State of California for use and enjoyment by the people of California. The act also establishes provisions for a Statewide program for the control of water quality, recognizing that waters of the State are increasingly influenced by interbasin water development projects and other Statewide considerations, and that factors such as precipitation, topography, population, recreation, agriculture, industry, and economic development vary regionally within the State. The Statewide program for water quality control is therefore administered most effectively on a local level with Statewide oversight. Within this framework, the act authorizes the SWRCB and RWQCBs to oversee the coordination and control of water quality within California.

San Francisco Bay Water Quality Control Plan (Basin Plan)

San Francisco Bay waters are under the jurisdiction of the San Francisco Bay RWQCB, which established regulatory standards and objectives for water quality in San Francisco Bay in its *Water Quality Control Plan for the San Francisco Bay Basin*, commonly referred to as the Basin Plan.[50] The Basin Plan identifies existing and potential beneficial uses for surface waters and provides numerical and narrative water quality objectives designed to protect those uses. The preparation and adoption of water quality control plans is required by the California Water Code (Section 13240) and supported by the Federal CWA. Because beneficial uses, together with their corresponding water quality objectives, can be defined per Federal regulations as water quality standards, the Basin Plan is a regulatory reference for meeting the State and Federal requirements for water quality control.

Adoption or revision of surface water standards is subject to the approval of the EPA. The project site is located adjacent to Lower San Francisco Bay. The CSD structures for the 20th Street sub-basin of the City's combined sewer system discharges to the Central Basin, an inlet of

[50] San Francisco Bay RWQCB, *Water Quality Control Plan for the San Francisco Bay Basin (Basin Plan)*, March 20, 2015. Available online at http://www.swrcb.ca.gov/rwqcb2/water_issues/programs/planningtmdls/basinplan/web/docs/BP_all_chapters.pdf. Accessed November 28, 2015.

Lower San Francisco Bay along the City's Bay shoreline. Identified beneficial uses for the Central Basin of Lower San Francisco Bay are commercial and sport fishing, estuarine habitat, wildlife habitat, water contact recreation, noncontact water recreation, and navigation. Identified beneficial uses for Lower San Francisco Bay are industrial service supply, commercial and sport fishing, shellfish harvesting, estuarine habitat, fish migration, preservation of rare and endangered species, fish spawning, wildlife habitat, water contact recreation, noncontact water recreation, and navigation.

Impaired Water Bodies and Total Maximum Daily Loads

As described under "Clean Water Act Section 303(d) and Total Maximum Daily Loads," p. 4.O.22, states must present the EPA with a list of "impaired water bodies," defined as those water bodies that do not meet water quality standards. As required by the CWA, the EPA requires the development of TMDLs to improve water quality of impaired water bodies. The first step of the TMDL process is development of a TMDL report describing the water quality problem, detailing the pollutant sources, and outlining the solutions. The TMDL report includes an implementation plan that describes how and when pollution prevention, control, or restoration activities will be accomplished and who will be responsible for these actions. The final step of the TMDL process is adopting and amending the Basin Plan to legally establish the TMDL and to specify regulatory requirements for compliance. As part of a Basin Plan amendment, waste load allocations are specified for entities that have permitted discharges.

TMDLs for PCBs and mercury in San Francisco Bay have been approved by the EPA and officially incorporated into the Basin Plan. The San Francisco RWQCB adopted the San Francisco Bay Watershed Permit (Order No. R2-2012-0096), which addresses mercury and PCBs in municipal and industrial wastewater discharges.[51]

National Pollutant Discharge Elimination System Waste Discharge Regulations

As discussed above under "Federal" in Regulatory Framework, p. 4.O.22, Section 402 of the Federal CWA established the NPDES program to protect water quality of receiving waters. The NPDES program requires all facilities that discharge pollutants into waters of the United States to obtain a permit. The permit provides two levels of control – technology-based limits and water-quality-based limits – to control discharge of pollutants for the protection of water quality. Technology-based limits are based on the ability of dischargers in the same category to treat

[51] San Francisco Bay RWQCB, *Waste Discharge Requirements for Mercury and PCBs from Municipal and Industrial Wastewater Discharges to San Francisco Bay, Order No. R2-2012-0096, NPDES No. CA0038849*, adopted December 12, 2012. Available online at http://www.waterboards.ca.gov/sanfranciscobay/board_decisions/adopted_orders/2012/R2-2012-0096.pdf. Accessed November 28, 2015.

wastewater, while water-quality-based limits are required if technology-based limits are not sufficient to protect the water body. Water-quality-based effluent limitations required to meet water quality criteria in the receiving water are based on criteria specified in the National Toxics Rule, the California Toxics Rule, and the Basin Plan. NPDES permits must also incorporate TMDL wasteload allocations when they are developed. In California, the SWRCB and the RWQCBs implement and enforce the NPDES program.

Construction General Stormwater Permit (SWRCB Order No. 2009-09-DWQ)

Stormwater discharges associated with construction activities that disturb more than 1 acre of land and could discharge to San Francisco Bay directly or via a separate stormwater system would be subject to the SWRCB General Permit for Storm Water Discharges Associated with Construction and Land Disturbance Activities, Order No. 2009-0009-DWQ (Construction General Stormwater Permit). Construction activities subject to this permit include clearing, grading, and disturbances to the ground, such as stockpiling or excavation. Under the Construction General Stormwater Permit, construction projects are characterized by the level of risk to water quality, which is determined using a combination of the sediment risk of the project and the receiving water quality risk. Projects can be characterized as Level 1, Level 2, or Level 3, and the minimum Best Management Practices (BMPs) and monitoring that must be implemented during construction are based on the risk level. The BMPs are designed to prevent pollutants from contacting stormwater and to keep all products of erosion and stormwater pollutants from moving off-site into receiving waters. They are specified in a Stormwater Pollution Prevention Plan (SWPPP) that must be prepared by a Qualified SWPPP Developer (QSD) and submitted to the San Francisco Bay RWQCB before construction begins.

Sediment risk is determined based on the expected intensity of rainfall during the construction period, soil erodibility, and slope of the construction site. Therefore, the sediment risk for the Proposed Project would depend on when it is implemented, and the Proposed Project would have a higher sediment risk if it were implemented during the rainy season rather than the dry season. Receiving water risk is based on whether the project drains to a sediment-sensitive water body. A sediment-sensitive water body is one that appears on the most recent 303(d) list for water bodies as impaired for sediment; has an EPA-approved TMDL implementation plan for sediment; or has the beneficial uses of cold freshwater habitat, fish migration, and fish spawning. Lower San Francisco Bay and the Central Basin (the receiving waters) are not considered sediment-sensitive water bodies under the Construction General Stormwater Permit because they are not listed as impaired for sediment and do not have all three beneficial uses of cold freshwater habitat, fish migration, and fish spawning.

Groundwater General Permit (RWQCB Order No. R2-2012-0060)

The RWQCB has issued Order Number R2-2012-0060 (referred to as the Groundwater General Permit), which is a general permit for the discharge or reuse of extracted brackish groundwater, concentrated brine resulting from the treatment of brackish groundwater,[52] and extracted groundwater from structural dewatering that requires treatment. The permit specifies effluent limitations for the discharges, receiving water limitations, and discharge prohibitions (including flow rate and restrictions on scouring and erosion). Monitoring requirements for demonstrating permit compliance are also specified. To obtain authorization to discharge under this permit, the discharger must submit a Notice of Intent describing the proposed discharge and treatment system and the RWQCB must issue an Authorization to Discharge once it is determined that the discharger is eligible to discharge under the permit. Under this order, extracted groundwater may be reused for purposes such as dust control or soil compaction on construction sites, provided that reuse complies with the water reclamation specifications of the order.

This order does not cover the discharge of groundwater that requires treatment due to contamination from fuels or volatile organic compounds (VOCs). Such discharges must seek coverage under the Volatile Organic Compound and Fuel General Permit, which is described below.

Volatile Organic Compound and Fuel General Permit (RWQCB Order No. R2-2012-0012)

The RWQCB has issued Order Number R2-2012-0012 which is a general permit for the discharge of extracted and treated groundwater resulting from the cleanup of groundwater polluted by VOCs and fuels (referred to as the VOC and Fuel General Permit). The permit specifies effluent limitations for the discharges, receiving water limitations, and discharge prohibitions (including flow rate and restrictions on scouring and erosion). Monitoring requirements for demonstrating permit compliance are also specified. To obtain authorization to discharge under this permit, the discharger must submit a Notice of Intent describing the proposed discharge and treatment system and the RWQCB must issue an Authorization to Discharge once it is determined that the discharger is eligible to discharge under the permit.

Small MS4 General Stormwater Permit (SWRCB Order No. 2013-001-DWQ)

On February 5, 2013, the SWRCB adopted the General Permit for WDRs for Stormwater Discharges from Small Municipal Separate Storm Sewer Systems (MS4s), Order No. 2013-001-DWQ (Small MS4 General Stormwater Permit). Areas that drain to separate stormwater collection systems in San Francisco are subject to this permit. The Phase II General MS4 Permit

[52] Brackish groundwater is groundwater with a high salinity or total dissolved solids content.

identifies specific BMPs and management measures to be addressed and requires permittees to submit a guidance document to the SWRCB documenting their strategies for complying with permit requirements. The required program includes specific elements related to program management, education and outreach on stormwater impacts, public involvement/participation, illicit discharge detection and elimination, construction site stormwater runoff and control, pollution prevention/good housekeeping for permittee operations, post-construction stormwater management for new development and re-development, water quality monitoring requirements, program effectiveness assessment, and annual reporting. For renewal permittees such as the City, the guidance document must identify and describe BMPs included in their previous Stormwater Management Plan that may be more protective of water quality than the minimum requirements of the updated permit, and identify whether the permittee proposes to maintain, reduce, or cease implementation of the BMPs.

Southeast Plant, North Point, and Bayside Facilities NPDES Permit (RWQCB Order No. 2008-0007)

The City currently holds an NPDES permit (RWQCB Order No. R2-2013-0029) adopted by the RWQCB in August 2013 that covers the SEWPCP, the North Point Wet Weather Facility, and all of the Bayside wet-weather facilities, including CSDs to San Francisco Bay.[53] The permit specifies discharge prohibitions, dry-weather effluent limitations, wet-weather effluent performance criteria, receiving water limitations, sludge management practices, and monitoring and reporting requirements. The permit prohibits overflows from the CSD structures during dry weather, and requires wet-weather overflows to comply with the nine minimum controls specified in the Federal Combined Sewer Overflow Control Policy, described above, and the City's Long Term Control Plan. Areas in the Bayside drainage basin that drain to the City's combined sewer system are subject to this permit.

The NPDES permit does not explicitly regulate the number, volume, duration, or frequency of CSDs from the combined sewer system, but instead requires that the system meets the long-term average annual design goals for CSDs from each sub-basin. Under the Long-Term Control Plan, the City must optimize operations of the combined sewer system to minimize CSD frequency, magnitude, and duration and maximize pollutant removal during wet weather, and must also provide treatment of all discharges from the combined sewer system, including CSDs. The NPDES permit also requires the City to monitor the water quality of all CSDs and the efficacy of wet-weather discharge controls. If the CSDs cause a violation of water quality standards in the

[53] San Francisco Bay RWQCB, National Pollutant Discharge Elimination System (NPDES) Permit No. CA0037664, Order No.R2-2013-0029, for City and County of San Francisco Southeast Water Pollution Control Plant, North Point Wet Weather Facility, Bayside Wet Weather Facilities and Wastewater Collection System, adopted January 31, 2008.

receiving water, the City must evaluate its Long-Term Control Plan and combined sewer system operation to ensure compliance with water quality standards.

Inland Surface Waters, Enclosed Bays, and Estuaries Plan

On April 7, 2015, the SWRCB adopted an Amendment to the Part 1 Trash Provisions of the Water Quality Control Plan for Inland Surface Waters, Enclosed Bays, and Estuaries of California. Referred to as "the Trash Amendment," this amendment prohibits the presence of trash in inland surface waters, enclosed bays, estuaries, and along shorelines in amounts that adversely affect beneficial uses or cause nuisance. Compliance with this prohibition is achieved through compliance with NPDES permit limitations, WDRs, and waivers. Discharges that are not subject to these regulatory requirements are also required to comply.

MS4 permittees with authority over priority land uses that would be developed under the Proposed Project[54] are required to comply with the discharge prohibitions. Compliance may be achieved using a full capture system for all storm drains (Track 1) or a combination of full capture systems, multi-benefit projects, other treatment controls, and institutional controls (Track 2). These Track 2 measures must achieve a level of control equivalent to full capture under Track 1. The amendment requires that MS4 permits are modified or reissued to address this amendment within 18 months of adoption of the amendment.

The Trash Amendment also requires that trash is eliminated from all stormwater and non-stormwater discharges from construction activities regulated under the Construction General Stormwater Permit. If this is not economically feasible, dischargers must meet the requirements of Track 1 or Track 2, which are described above.

Existing NPDES permits must be modified or reissued to include the requirements of the Trash Amendment within 18 months of adoption of the amendment. Permittees must submit an implementation plan within 3 months of adoption of the implementing permit.

MS4 permittees must achieve full compliance with the requirements of the Trash Amendment within 10 years of the effective date of the first implementing permit, and must achieve interim milestones during the first 10 years to show progress towards achieving full implementation.

McAteer-Petris Act

The McAteer-Petris Act of 1965 established BCDC as a temporary State agency in charge of preparing the *San Francisco Bay Plan* (Bay Plan), described below. In 1969, the act was

[54] Under the Trash Amendment, priority land uses include high-density residential areas with at least 10 developed dwelling units per acre. Commercial uses and mixed urban developments with high-density residential and commercial land uses are also considered priority land uses.

amended to make BCDC a permanent State agency and to incorporate the policies of the Bay Plan into State law.

San Francisco Bay Conservation and Development Commission Permits

The BCDC has permitting authority for most projects in San Francisco Bay and along the shoreline, which is defined in the McAteer-Petris Act to include Bay waters up to the mean high water line and the area 100 feet landward of and parallel to the mean high water line of San Francisco Bay. Under the McAteer-Petris Act, an agency or individual must secure a permit from BCDC if they propose to place fill, dredge sediment, or place dredged materials in San Francisco Bay or certain tributaries within BCDC jurisdiction. Most activities within the 100-foot shoreline band are also subject to a permit from the BCDC. The type of permit issued depends on the nature and scope of the proposed activities. Construction of those elements of the Proposed Project within BCDC's jurisdiction would require a Major Permit under the McAteer-Petris Act.

San Francisco Bay Plan and San Francisco Waterfront Special Area Plan

BCDC completed and adopted the *Bay Plan* in 1968, and the plan has been periodically amended since its adoption, most recently in 2011 to address climate change and shoreline protection. In 1975, after a collaborative planning process with the San Francisco Planning Department, BCDC adopted the *San Francisco Waterfront Special Area Plan* (*Special Area Plan*). The *Special Area Plan* was substantially amended in 2000. This plan, together with the McAteer-Petris Act and the *Bay Plan* and subsequent amendments to all three documents, prescribes a set of rules for shoreline development along the San Francisco waterfront.

Several policies of the *Bay Plan* are aimed at protecting San Francisco Bay's water quality, ensuring the safety of fills, and guiding the dredging activities of the Bay's sediment. The *Bay Plan* policies that are most relevant to the Proposed Project with respect to water quality and hydrology are as follows:

Water Quality

Policy 1: Bay water pollution should be prevented to the greatest extent feasible. The Bay's tidal marshes, tidal flats, and water surface area and volume should be conserved and, whenever possible, restored and increased to protect and improve water quality. Fresh water inflow into the Bay should be maintained at a level adequate to protect Bay resources and beneficial uses.

Policy 2: Water quality in all parts of the Bay should be maintained at a level that will support and promote the beneficial uses of the Bay as identified in the San Francisco Bay Regional Water Quality Control Board's Basin Plan. The policies, recommendations, decisions, advice, and authority of the State Water Resources Control Board and the San Francisco Bay Regional Water

Quality Control Board should be the basis for carrying out BCDC's water quality responsibilities.

Policy 3: New projects should be sited, designed, constructed, and maintained to prevent or, if prevention is infeasible, to minimize the discharge of pollutants into the Bay by: (a) controlling pollutant sources at the project site; (b) using construction materials that contain non-polluting materials; and (c) applying appropriate, accepted and effective best management practices, especially where water dispersion is poor and near shellfish beds and other significant biotic resources.

Policy 4: When approving a project in an area polluted with toxic or hazardous substances, the Commission should coordinate with appropriate local, state and federal agencies to ensure that the project will not cause harm to the public, to Bay resources, or to the beneficial uses of the Bay.

Policy 6: To protect the Bay and its tributaries from the water quality impacts of nonpoint source pollution, new development should be sited and designed consistent with standards in municipal stormwater permits and state and regional stormwater management guidelines, where applicable, and with the protection of Bay resources. To offset impacts from increased impervious areas and land disturbances, vegetated swales, permeable pavement materials, preservation of existing trees and vegetation, planting native vegetation, and other appropriate measures should be evaluated and implemented where appropriate.

Policy 7: Whenever practicable, native vegetation buffer areas should be provided as part of a project to control pollutants from entering the Bay, and vegetation should be substituted for rock riprap, concrete, or other hard surface shoreline and bank erosion control methods where appropriate and practicable.

Climate Change

Policy 2: When planning shoreline areas or designing larger shoreline projects, a risk assessment should be prepared by a qualified engineer and should be based on the estimated 100-year flood elevation that takes into account the best estimates of future sea level rise and current flood protection and planned flood protection that will be funded and constructed when needed to provide protection for the proposed project or shoreline area. A range of sea level rise projections for mid-century and end of century based on the best scientific data available should be used in the risk assessment. Inundation maps used for the risk assessment should be prepared under the direction of a qualified engineer. The risk assessment should identify all types of potential flooding, degrees of uncertainty, consequences of defense failure, and risks to existing habitat from proposed flood protection devices.

Policy 3: To protect public safety and ecosystem services, within areas that a risk assessment determines are vulnerable to future shoreline flooding that threatens public safety, all projects—other than repairs of existing facilities, small projects that do not increase risks to public safety, interim projects and infill projects within existing urbanized areas—should be designed to be

resilient to a mid-century sea level rise projection. If it is likely the project will remain in place longer than mid-century, an adaptive management plan should be developed to address the long-term impacts that will arise based on a risk assessment using the best available science-based projection for sea level rise at the end of the century.

Policy 4: To address the regional adverse impacts of climate change, undeveloped areas that are both vulnerable to future flooding and currently sustain significant habitats or species, or possess conditions that make the areas especially suitable for ecosystem enhancement, should be given special consideration for preservation and habitat enhancement and should be encouraged to be used for those purposes.

Policy 5: Wherever feasible and appropriate, effective, innovative sea level rise adaptation approaches should be encouraged.

Safety of Fills

Policy 2: Even if the Bay Plan indicates that a fill may be permissible, no fill or building should be constructed if hazards cannot be overcome adequately for the intended use in accordance with the criteria prescribed by the Engineering Criteria Review Board.

Policy 3: To provide vitally needed information on the effects of earthquakes on all kinds of soils, installation of strong-motion seismographs should be required on all future major landfills. In addition, the Commission encourages installation of strong-motion seismographs in other developments on problem soils, and in other areas recommended by the U.S. Geological Survey, for purposes of data comparison and evaluation.

Policy 4: Adequate measures should be provided to prevent damage from sea level rise and storm activity that may occur on fill or near the shoreline over the expected life of a project. The Commission may approve fill that is needed to provide flood protection for existing projects and uses. New projects on fill or near the shoreline should either be set back from the edge of the shore so that the project will not be subject to dynamic wave energy, be built so the bottom floor level of structures will be above a 100-year flood elevation that takes future sea level rise into account for the expected life of the project, be specifically designed to tolerate periodic flooding, or employ other effective means of addressing the impacts of future sea level rise and storm activity. Rights-of-way for levees or other structures protecting inland areas from tidal flooding should be sufficiently wide on the upland side to allow for future levee widening to support additional levee height so that no fill for levee widening is placed in the Bay.

Shoreline Protection

Policy 1: New shoreline protection projects and the maintenance or reconstruction of existing projects and uses should be authorized if: (a) the project is necessary to provide flood or erosion protection for (i) existing development, use, or infrastructure, or (ii) proposed development, use, or infrastructure that is consistent with other Bay Plan policies; (b) the type of the protective

structure is appropriate for the project site, the uses to be protected, and the erosion and flooding conditions at the site; (c) the project is properly engineered to provide erosion control and flood protection for the expected life of the project based on a 100-year flood event that takes future sea level rise into account; (d) the project is properly designed and constructed to prevent significant impediments to physical and visual public access; and (e) the protection is integrated with current or planned adjacent shoreline protection measures. Professionals knowledgeable of the Commission's concerns, such as civil engineers experienced in coastal processes, should participate in the design.

Policy 2: Riprap revetments, the most common shoreline protective structure, should be constructed of properly sized and placed material that meet sound engineering criteria for durability, density, and porosity. Armor materials used in the revetment should be placed according to accepted engineering practice, and be free of extraneous material, such as debris and reinforcing steel. Generally, only engineered quarry stone or concrete pieces that have either been specially cast, are free of extraneous materials from demolition debris, and are carefully selected for size, density, and durability will meet these requirements. Riprap revetments constructed out of other debris materials should not be authorized.

Policy 3: Authorized protective projects should be regularly maintained according to a long-term maintenance program to assure that the shoreline will be protected from tidal erosion and flooding and that the effects of the shoreline protection project on natural resources during the life of the project will be the minimum necessary.

Policy 4: Whenever feasible and appropriate, shoreline protection projects should include provisions for nonstructural methods such as marsh vegetation and integrate shoreline protection and Bay ecosystem enhancement, using adaptive management. Along shorelines that support marsh vegetation, or where marsh establishment has a reasonable chance of success, the Commission should require that the design of authorized protection projects include provisions for establishing marsh and transitional upland vegetation as part of the protective structure, wherever feasible.

Policy 5: Adverse impacts to natural resources and public access from new shoreline protection should be avoided. Where significant impacts cannot be avoided, mitigation or alternative public access should be provided.

LOCAL AND REGIONAL REGULATIONS AND PLANS

San Francisco Public Works Code, Article 4.2 – Stormwater Management Requirements and Design Guidelines

Development projects that discharge stormwater to either the combined sewer system or a separate stormwater system must comply with Article 4.2 of the San Francisco Public Works Code, Section 147, which was last updated on April 27, 2016. The SFPUC and the Port have developed San Francisco Stormwater Management Requirements and Design Guidelines in

accordance with the requirements of the Small MS4 General Stormwater Permit and Article 4.2, Section 147.[55]

The Stormwater Management Requirements and Design Guidelines describe the regulatory context for a post-construction stormwater control program and provide tools to help project developers achieve compliance with stormwater management requirements, including but not limited to:

- A set of stormwater BMP fact sheets;
- A vegetation palette to assist in bioretention BMP-appropriate plant selection;
- Sizing calculators to determine the required size of each BMP; and
- Illustrative examples of green infrastructure.

In accordance with the Stormwater Management Requirements and Design Guidelines, developers of projects that create and/or replace 5,000 square feet or more of impervious surface and discharge to the combined sewer system must implement BMPs to manage the flow rate and volume of stormwater going into the combined sewer system by achieving LEED® Sustainable Sites Credit 6.1 (Stormwater Design: Quantity Control). This credit includes two different standards for post-construction stormwater controls depending on the amount of existing impervious surfaces. For covered projects with 50 percent existing impervious surfaces or less, the stormwater management approach must prevent the stormwater runoff flow rate and volume from exceeding existing conditions for storms that produce a rainfall depth of 2.9 inches in 24-hours and a rainfall intensity of approximately 2.4 inches per hour (referred to as the one- and two-year 24-hour design storm). For covered projects that include more than 50 percent existing impervious surfaces, the stormwater management approach must reduce the existing stormwater runoff flow rate and volume by 25 percent for a two-year 24-hour design storm. The Stormwater Management Requirements and Design Guidelines require low-impact development measures to reduce the rate of stormwater runoff and to reduce and delay the volumes of discharge entering the combined sewer system, thereby reducing the frequency of combined sewer overflows, minimizing flooding effects, and protecting water quality. Examples of BMPs that may be implemented include rainwater harvesting, rain gardens, green roofs, and permeable paving.

Developers of projects that discharge to a separate stormwater system must also implement BMPs to reduce the flow rate and volume and improve the quality of stormwater going into the separate stormwater system. In areas served by separate stormwater systems, the Stormwater Management Requirements and Design Guidelines specify different performance requirements according to the following project size thresholds:

- Small Project: 2,500 to 5,000 square feet of impervious surface created and/or replaced.

[55] SFPUC and Port of San Francisco, *San Francisco Stormwater Management Requirements and Design Guidelines*, April 2016.

- Large Project: 5,000 square feet or more of impervious surface created and/or replaced.

Small Projects that discharge to a separate stormwater system must implement one or more site design measure(s) (e.g., tree planting and preservation, permeable pavement, green roofs, vegetated swales, rainwater harvesting, etc.). Large Projects must implement source controls and BMPs to meet performance requirements. Large Projects located in the 28-Acre Site on Port property must manage runoff from storms that produce a rainfall depth of 0.63 inch in 24 hours and a rainfall intensity of approximately 0.2 inch per hour (referred to as the 85th percentile, 24-hour storm). Large Projects within the Hoedown Yard would be under SFPUC jurisdiction and must manage runoff from storms that produce a rainfall depth of 0.75 inch in 24 hours and a rainfall intensity of approximately 0.24 inch per hour (referred to as the 90th percentile, 24-hour storm).

The Stormwater Management Requirements and Design Guidelines also require developers to use certain preferred BMPs to the maximum extent feasible before considering use of remaining BMPs. The preferred BMP hierarchy prioritizes infiltration-based BMPs, rainwater harvesting, and vegetated roofs followed by lined bioretention (e.g., lined bioretention materials with an underdrain, commonly known as a "flow-through planter"). If none of these BMPs are feasible on site, projects may be able to incorporate high-rate filtration BMPs (e.g., tree-box filters and media filters) into their site design pending approval by the SFPUC and Port. For projects located on Port property, both the SFPUC and Port may inspect stormwater BMPs once they are constructed, and any issues noted by the inspection must be corrected. Although the Port is the primary oversight agency for stormwater controls on Port property that discharge to the Port's MS4, the SFPUC is also authorized to inspect stormwater controls on Port property, and would most likely inspect projects that discharge to the City's combined sewer system. For stormwater controls on Port property, the Port tenant, project sponsors, or designated agent is also responsible for completing an annual self-certification inspection, and must submit completed checklists and maintenance logs for the year to the Port and/or SFPUC. In addition, the Port and/or SFPUC inspects all stormwater BMPs every third year and any issues identified by either inspection must be resolved.

Projects on Port property are also subject to the requirements of the 2013 Port Building Code that includes provisions for managing drainage for new construction. Specifically, Section 1503.4 of the Port Building Code allows roofs and other building areas to drain to locations other than the combined sewer (e.g., cisterns, rain gardens).

Modified Compliance Program

The City has developed the Modified Compliance Program to allow development projects with proven site challenges and limitations to modify the standard stormwater performance

requirements set by the Stormwater Management Requirements and Design Guidelines. The Modified Compliance Program applies only to projects served by the combined sewer system.

To qualify for modified compliance, a site owner must submit a modified compliance application to the SFPUC that documents existing and proposed site features that limit infiltration such as high groundwater, shallow depth to bedrock, poorly infiltrating soils, steep slopes, contamination, or limited space for infiltration. The application also requires the applicant to estimate the non-potable demand for the project if the project is subject to the City's Recycled Water Ordinance. Based on this information, the SFPUC can decrease the amount the applicant must reduce the stormwater runoff volume, and would increase the required flow rate reduction by the same percentage.

San Francisco Public Works Code, Article 4.2 – Construction-Related Stormwater Discharges

Discharges of construction-related stormwater runoff are subject to the construction site runoff requirements of Article 4.2 of the San Francisco Public Works Code, Section 146. In accordance with these requirements, developers must obtain a Construction Site Runoff Control Permit for any construction activity that disturbs 5,000 square feet or more of ground surface and all land-disturbing activities, regardless of size, and they must also implement and maintain BMPs to minimize surface runoff, erosion, and sedimentation. Regulated land-disturbing activities include building demolition, clearing, grading, grubbing, filling, stockpiling, excavating, and transporting soil. The permit specifically requires easements for drainage facilities; provision of adequate dust controls in conformance with applicable air pollution laws and regulations; and improvement of any existing grading, ground surface, or site drainage to meet the requirements of Article 4.2. The application for the permit must also include an Erosion and Sediment Control Plan. A building permit cannot be issued until a Construction Site Runoff Control Permit has been issued.

Under the Construction Site Runoff Control Permit, the project sponsors would be required to conduct daily inspections and maintenance of all erosion and sediment controls and must provide inspection and maintenance information to the Port and/or SFPUC. The Port and/or SFPUC would also conduct periodic inspections of the project site to ensure compliance with the plan. The project sponsors would be required to notify the Port and/or SFPUC at least 2 days prior to the start of construction, completed installation of erosion and sediment control measures, completion of final grading, and project completion. At the Port's and/or SFPUC's discretion, sampling, metering, and monitoring also may be required.

San Francisco Public Works Code, Article 4.1—Wastewater Discharges to Combined Sewer System

Discharges of non-sewage wastewater to the combined sewer system are subject to the permit requirements specified in Article 4.1 of the San Francisco Public Works Code and supplemented by SFPW Order No. 158170. The permit requires development and implementation of a pollution prevention program and specifies discharge limitations for specific chemical constituents as well as general conditions for the discharge. In addition, the discharge must meet the pretreatment standards specified in Article 4.1 and the discharger must monitor the discharge quality for compliance with permit limitations. The discharger must also submit periodic reports to the SFPUC, and the City conducts periodic inspections to ensure compliance.

San Francisco Recycled Water Use Ordinance

The City's Recycled Water Ordinance, which added Article 22 of the San Francisco Public Works Code, requires property owners located within the designated recycled water use areas to install recycled water systems in certain development projects. The recycled water use area comprises the majority of the City's bayside waterfront and some inland areas as well as Treasure Island. The goal of the ordinance is to maximize the use of recycled water, and buildings and facilities that are located within the designated recycled water use areas are required to use recycled water for all uses authorized by the State, once a source of recycled water becomes available. Commonly approved uses include irrigation, cooling, and/or toilet and urinal flushing. These systems must meet San Francisco Plumbing and Health Codes, which include specifications for pipe type, pipe separation, backflow prevention assemblies, water meters, and signage.

The following types of developments that are located within the designated recycled water use area must comply with this ordinance:

- New construction or major alterations to a building totaling 40,000 square feet or more;
- All subdivisions; and
- New and existing irrigated areas of 10,000 square feet or more.

In a mixed-use residential building where a recycled water system is installed, any restaurant or other retail food-handling establishment must be supplied by a separate potable water system to ensure public health and safety.

As discussed in Section 4.K, Utilities and Service Systems, under "Recycled Water System," on p. 4.K.10, the SFPUC Eastside Recycled Water Project will ultimately provide an estimated 2 mgd of tertiary recycled water on the bayside of San Francisco. However, the Eastside Recycled Water Project is in the planning stages, with construction not expected to be completed until the

end of 2029.[56] Although the Proposed Project is subject to the Recycled Water Use Ordinance, there is currently no available source of recycled water.

San Francisco Non-potable Water Program

In September 2012, the City adopted the Onsite Water Reuse for Commercial, Multi-family, and Mixed Use Development Ordinance. Commonly known as the Non-potable Water Ordinance, it added Article 12C to the San Francisco Health Code, allowing for the collection, treatment, and use of alternate water sources for non-potable applications. In October 2013, the City amended the ordinance to allow district-scale water systems, defined as systems consisting of two or more buildings sharing non-potable water. The City also amended the ordinance in July 2015, requiring new construction to use alternative water supplies for non-potable use. These amendments became effective on November 1, 2015, and specifically require that:

- All new buildings of 250,000 square feet or more of gross floor area located within the boundaries of San Francisco's designated recycled water use area be constructed, operated, and maintained using available alternate water sources for toilet and urinal flushing and irrigation;
- All new buildings in San Francisco of 40,000 square feet or more of gross floor area prepare water budget calculations; and
- Subdivision approval requirements include compliance with Article 12C of the San Francisco Health Code.

The City is considering adoption of an ordinance that would revise the definition of large and small developments. If adopted, the ordinance would change to definitions for development projects, as follows:

- Large developments: new single buildings of 250,000 square feet or more of gross floor area and multiple buildings constructed in accordance with a phased plan or approval with a total gross floor area of 250,000 square feet or more.
- Small development projects: single buildings of 40,000 square feet or more of gross floor area and multiple buildings constructed in accordance with a phased plan or approval with a total gross floor area of 40,000 square feet or more.

If adopted, all developments within the Pier 70 Special Use District would need to comply with the non-potable water ordinance because they would be part of a subdivision approval comprising more than 250,000 square feet of gross floor area.

Effective November 1, 2016, new buildings of 250,000 square feet or more of gross floor that are located outside the boundaries of San Francisco's designated recycled water use area must also be

[56] SFPUC, *San Francisco Eastside Recycled Water Project*. Available online at http://sfwater.org/bids/projectDetail.aspx?prj_id=311. Accessed December 29, 2015.

constructed, operated, and maintained using available alternate water sources for toilet and urinal flushing and irrigation.

There are six steps for complying with the Non-potable Water Ordinance, which is implemented by the SFPUC, DBI, and DPH:[57]

1. Submit a water budget application to SFPUC that assesses water supplies and non-potable water demands.
2. Submit an engineering report to DPH that provides a detailed design and the technical aspects of the on-site water system.
3. Obtain permits from DBI and complete construction.
4. Schedule a cross connection test with the SFPUC to ensure separation of potable and non-potable water systems.
5. Obtain a Permit to Operate from DPH and begin operating the on-site water system with DPH oversight.
6. Conduct ongoing monitoring, reporting, and inspections.

In accordance with the Permit to Operate, the on-site water system must treat the alternative water supply to water quality criteria specified by the DPH, and these criteria are dependent on the alternate water source and end use for the water. Filtration and disinfection are the primary treatment processes implemented; however, disinfection may not be required if the system is used solely for subsurface irrigation where there is no human exposure.

The DPH has designated the following three consecutive operational modes for on-site water systems:

- Start-Up Mode: For the first 90 days, the alternate water source is treated and discharged to the combined sewer system while the system performance is monitored. Potable water is supplied to all end uses.
- Temporary Use Mode: For the following 9 months, the alternate water source is treated and supplied to the approved non-potable end uses with frequent monitoring.
- Final Use Mode: After satisfying all temporary use requirements, the system is put into Final Use Mode. Once a final permit is issued by DPH, an annual license renewal is required to continue operation and use of the on-site water system.

On-site water systems that collect and treat rainwater and/or stormwater are required to operate in the Start-Up and Final Use Modes; however, these systems are not required to operate under the

[57] San Francisco Water, Power, Sewer; San Francisco Department of Building Inspection; San Francisco Department of Public Health, Environmental Health, *San Francisco's Non-potable Water Program, A Guidebook for Implementing Onsite Water Systems in the City and County of San Francisco*, March 2015. Available online at http://sfwater.org/modules/showdocument.aspx?documentid=4962. Accessed December 14, 2015.

Temporary Use Mode. On-site water systems that collect and treat foundation water, graywater, and blackwater must operate under the Temporary Use Mode to demonstrate achievement of water quality standards before being operated in the Final Use Mode.

The project site is located within a designated recycled water use area;[58] therefore, the requirements of the Non-potable Water Program apply to the Proposed Project.

Well Permitting Requirements

In accordance with Article 12B of the San Francisco Health Code, DPH must permit any groundwater well or soil boring. To obtain a permit, the party responsible for installing and operating the well must submit a well permit application to the DPH that specifies the well location, proposed use, and anticipated operational life; construction parameters; and a plan for the safe and appropriate disposal of any drilling fluids or other drilling materials. The application must also include approval from the SFPUC if any drilling fluids or groundwater would be discharged to the sanitary sewer. The well must be constructed in accordance with the water well standards of the State of California and Article 12B of the San Francisco Health Code. It may not be constructed until a well construction permit is issued by the DPH.

San Francisco Sea Level Rise Guidance

The City has developed guidance for incorporating sea level rise into the planning of capital projects implemented by the City.[59] The guidance presents a framework for considering the effects of sea level rise and for selecting appropriate adaptation measures based on site-specific information. The planning process described in the guidance includes six primary steps:

1. Review sea level rise science.
2. Assess vulnerability.
3. Assess risk.
4. Plan for adaptation.
5. Implement adaptation measures.
6. Monitor.

[58] SFPUC, *Recycled Water Us*e. Available online at http://www.sfwater.org/index.aspx?page=687. Accessed November 29, 2015.

[59] City and County of San Francisco Sea Level Rise Committee, *Guidance for Incorporating Sea Level Rise into Capital Planning in San Francisco: Assessing Vulnerability and Risk to Support Adaptation*. September 22, 2014. Available online at http://onesanfrancisco.org/wp-content/uploads/San%20Francisco%20SLR%20Guidance%20Adopted%209.22.14%2012182014.pdf. Accessed November 29, 2015.

As discussed above, as of September 2014, the City considers the NRC Report as the best available science on sea level rise in California. However, the guidance acknowledges that the science of sea level rise is continually advancing and projections of sea level rise may need to be updated at some point to reflect the most updated science. Sea level rise inundation maps prepared by the SFPUC, described above under "Sea Level Rise Inundation Mapping," pp. 4.O.12-4.O.13, are considered the most up-to-date maps and take into account both water level rises and the temporary effects of storm surge along the shoreline based on existing topography and conditions. The guidance states that the review of available sea level science should determine whether the project site could be subject to flooding during the lifespan of the project.

For those projects costing 5 million dollars or more that could be flooded during their lifespan, the guidance requires a vulnerability assessment based on the degree of flooding that could occur, the sensitivity of the project to sea level rise, and the adaptive capacity of the project site and design (the ability to adjust to sea level rise impacts without the need for substantial intervention or modification). The risk assessment takes into consideration the likelihood that the project could be adversely affected by sea level rise and the related consequences of flooding. An adaptation plan is required for projects that are found to be vulnerable to sea level rise and have a potential for substantial consequences. The plan should focus on those aspects of the project that have the greatest consequences if flooded. It should include clear accountability and trigger points for bringing adaptation strategies online as well as a well-defined process to ensure that milestones are being met and the latest science is being considered.

The City sea level rise guidance document also acknowledges that there is some flexibility in how to plan for adaptations, and it may not always be feasible or cost effective to design and build for long-term potential sea level rise scenarios that are of a highly uncertain nature, such as the upper end of the NRC Report range for the year 2100 (66 inches of sea level rise). In this case, a capital project constructed by the City could be designed and constructed to be resilient to the likely mid-century sea level rise (11 inches by 2050). Under this guidance, an alternative approach for a City capital project would be to build the project to be resilient to the *likely* sea level rise by 2100 (36 inches), while including adaptive capacity to be resilient to the *upper range* of sea level rise estimates for 2100 (66 inches).

Trash Management

Article 6 of the San Francisco Health Code, Garbage and Refuse, requires that properties have appropriate containers placed in appropriate locations for the collection of refuse. In accordance with this article, the refuse containers must be constructed with tight-fitting lids or sealed enclosures, and the contents of the container may not extend above the top of the rim. The property owner must also have adequate refuse collection service. Article 6 also prohibits the dumping of refuse onto any streets or lands within San Francisco.

IMPACTS AND MITIGATION MEASURES

SIGNIFICANCE THRESHOLDS

The thresholds for determining the significance of impacts in this analysis are consistent with the environmental checklist in Appendix G of the State CEQA Guidelines, which has been modified by the San Francisco Planning Department. For the purpose of this analysis, the following applicable thresholds were used to determine whether implementing the Proposed Project would result in a significant impact on hydrology and water quality. Implementation of the Proposed Project would have a significant effect on hydrology and water quality if the project would:

- O.1 Violate any water quality standards or waste discharge requirements.
- O.2 Substantially deplete groundwater supplies or interfere substantially with groundwater recharge such that there would be a net deficit in aquifer volume or a lowering of the local groundwater table level (e.g., the production rate of pre-existing nearby wells would drop to a level which would not support existing land uses or planned uses for which permits have been granted).
- O.3 Substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river, in a manner that would result in substantial erosion or siltation on- or off-site.
- O.4 Substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river, or substantially increase the rate or amount of surface runoff in a manner that would result in flooding on- or off-site.
- O.5 Create or contribute runoff water which would exceed the capacity of existing or planned stormwater drainage systems or provide substantial additional sources of polluted runoff.
- O.6 Otherwise substantially degrade water quality.
- O.7 Place housing within a 100-year flood hazard area as mapped on a federal Flood Hazard Boundary or Flood Insurance Rate Map or other authoritative flood hazard delineation map.
- O.8 Place within a 100-year flood hazard area structures that would impede or redirect flood flows.
- O.9 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.
- O.11 Expose people or structures to a significant risk of loss, injury, or death involving inundation by seiche, tsunami, or mudflow.

Because of the Proposed Project's location, there would be no impact related to Criterion O.9, flooding as a result of failure of a levee or dam, because there are no levees or dams in the

vicinity of the project site, and the project site is not located within the inundation area of any San Francisco reservoirs.[60]

APPROACH TO ANALYSIS

This analysis evaluates the Proposed Project's potential effects related to hydrology and water quality. Potential water quality impacts are assessed with respect to the potential for the Proposed Project to result in an exceedance of water quality criteria or exceedance of WDRs, including NPDES permit effluent limitations and the frequency and composition of CSDs. In addition, the impact analysis assesses potential impacts related to groundwater depletion and recharge as well as changes in stormwater flows and flooding (including flooding as a result of 100-year flooding under existing conditions, future flooding as a result of sea level rise, and flooding as a result of a tsunami). The impact analysis assumes that all construction and operations would be completed in compliance with applicable regulations, including the NPDES and City permit requirements related to stormwater permitting requirements and discharges to the combined sewer system or a surface water (i.e., San Francisco Bay). If compliance with these standards would ensure that impacts related to water quality would be less than significant, then no mitigation is necessary. The analysis of flooding impacts considers whether increasing the site grade by up to 5 feet, as would occur under the Proposed Project to alleviate the effects of flooding, would adversely impede or direct existing or future flood flows, or otherwise exacerbate flooding conditions. If not, impacts related to flooding would be less than significant and no mitigation is necessary.

The location, depth, and area of ground disturbance within the project site would be substantially similar under the Maximum Residential Scenario and the Maximum Commercial Scenario, all three options for stormwater/wastewater treatment, all three options for grading around Building 12, and the construction of shoreline improvements. To the extent that the particular locations, depths, and areas of ground disturbance may differ somewhat from one to another, they are generally included and accounted for in an assumption of maximum ground disturbance within the project site.

The regulatory requirements for erosion control and discharge requirements applicable to the Proposed Project are equally applicable to all of the Proposed Project scenarios. However, the regulatory requirements differ according to the option implemented for stormwater and wastewater management, depending on whether discharges would be made to the combined sewer system under Options 1 and 3 or to the proposed separate stormwater system under Options 2 and 3. The regulatory requirements related to both systems are discussed separately in Impact HY-2. Similarly, the potential effects related to a change in the frequency of CSDs differ

[60] San Francisco Planning Department, *Community Safety, an Element of the General Plan of the City and County of San Francisco,* October 2012, Map 06.

according to the option implemented, and these effects are also discussed separately in Impact HY-2.

PROJECT FEATURES

During construction, stormwater discharges and discharges of groundwater produced during excavation dewatering have the potential to exceed water quality criteria or WDRs, including NPDES and City permit effluent limitations. The project-related activities that could result in these impacts include grading and excavation for the construction of basements for new buildings and improvements to Building 12; renovation of Buildings 2, 12, and 21; construction of street improvements (including the new 21st Street); construction of the new 20th Street Pump Station northeast of the project site that includes a basement approximately 20 feet below ground surface; and installation of new utilities for potable water, recycled water, fire protection water, wastewater, stormwater, electricity, and natural gas. In-bay construction activities could also affect Bay water quality. These activities include construction of the shoreline improvements and modifications to the existing 20th and 22nd streets CSD outfall structures. These impacts apply to construction equally to all project scenarios and options. Construction of a new outfall for the separate storm drain system that would be constructed under Options 2 and 3 would also involve in-bay construction and could also affect San Francisco Bay water quality.

During operation, the specific Proposed Project elements that could result in hydrology and water quality impacts include discharges of wastewater and stormwater runoff from the project site that could exceed the capacity of the stormwater system, provide additional sources of polluted runoff, exceed water quality criteria, or result in changes in CSD frequencies. The Proposed Project includes three wastewater and stormwater management options: installation of new on-site combined sewer facilities and connection to the SFPUC combined sewer system (Option 1); construction of a new separate stormwater system and a new separate wastewater system (Option 2); and development of a hybrid system (Option 3) that would use the City's combined sewer system for a portion of the site and construct a new separate system for the remainder of the site. The analysis presents the regulatory requirements for each option and discusses the potential changes in the frequency and composition of CSDs. This section also analyzes the Proposed Project's use of an alternative water supply for non-potable uses, and discusses the regulatory requirements for such use.

In addition, the impact analysis assesses potential impacts related to changes in stormwater flows and flooding (including flooding as a result of 100-year flooding under existing conditions, future flooding as a result of sea level rise, and flooding as a result of a tsunami). These impacts apply to construction and operation of all of the proposed infrastructure, buildings, and shoreline protection improvements regardless of the project scenario or option implemented.

IMPACT EVALUATION

Construction Impacts

Impact HY-1: Construction of the Proposed Project would not violate a water quality standard or a waste discharge requirement, or otherwise substantially degrade water quality. ***(Less than Significant)***

Construction of the Proposed Project would include both on-land construction activities that are conducted above the high tide line which occurs at an elevation of 7.4 feet NAVD88 (96.0 feet project datum) and in-bay construction activities that would occur below the high tide level. Water quality impacts related to on-land and in-bay construction activities are described separately below, followed by a discussion of impacts related to construction dewatering. All of these impact analyses discuss the regulatory requirements in place to ensure that construction activities would not violate water quality standards or WDRs, or substantially degrade water quality.

Water Quality Effects of On-Land Construction Activities

Grading and earthmoving for the on-land construction of utilities and infrastructure by the project sponsors, demolition of existing buildings, and construction of individual development projects within the project site would expose soil during construction and without proper controls, these activities could result in erosion and excess sediments carried in stormwater runoff. Stormwater runoff from temporary on-site use and storage of vehicles, fuels, wastes, and building materials could also carry pollutants if these materials were improperly handled.

However, the CWA effectively prohibits discharges of stormwater from construction projects unless the discharge is in compliance with an NPDES permit. As discussed below under the impact analyses for construction-related stormwater discharges, during construction, stormwater from the project site would drain to the City's combined sewer system, a new separate stormwater system constructed under the Proposed Project, or directly to San Francisco Bay. Construction-related stormwater discharges to the combined sewer system would be in accordance with the Bayside NPDES Permit, and construction-related stormwater discharges to the separate stormwater system or directly to San Francisco Bay would be in accordance with the Construction General Stormwater Permit. Both of these NPDES permits apply to on-land construction activities that would be conducted inland of the high tide line which occurs at an elevation of 7.4 feet NAVD88 (96.0 feet project datum).

Construction-Related Stormwater Discharges to Combined Sewer System

Construction activities conducted within areas served by the City's existing combined sewer system or the new combined sewer system infrastructure that would be constructed under Option 1, Combined Sewer System, and Option 3, Hybrid System, for the proposed stormwater and wastewater facilities would be subject to the Construction Site Runoff requirements of Article 4.2 of the San Francisco Public Works Code, Section 146. Applicable activities include construction of utilities, roadways, other infrastructure, and demolition of existing buildings, as well as excavation for construction of the proposed buildings.

The Construction Site Runoff Control Permit is required for projects that involve any land-disturbing activities such as building demolition, clearing, grading, grubbing, filling, stockpiling, excavating, and transporting soil. The permit application must include an Erosion and Sediment Control Plan that provides a vicinity map showing the location of the site in relationship to the surrounding area's water courses, water bodies, and other significant geographic features; a site survey; suitable contours for the existing and proposed topography; area drainage; proposed construction and sequencing; proposed drainage channels; proposed erosion and sediment controls; dewatering controls where applicable; soil stabilization measures where applicable; maintenance controls; sampling, monitoring, and reporting schedules; and any other information deemed necessary by the SFPUC. The Erosion and Sediment Control Plan would also include the appropriate BMPs to prevent stormwater contact with hazardous materials stored at the construction site and limit the potential for a release of these hazardous materials that could affect water quality.

Article 4.2 also specifies that the contractor must provide adequate dust controls in conformance with applicable air pollution laws and regulations (including Article 22B of the San Francisco Health Code, described in Section 4.P, Hazards and Hazardous Materials, and Section 4.G, Air Quality). Improvements to any existing grading, ground surface, or site drainage must also meet the requirements of Article 4.2 for new grading, drainage, and erosion control. A building permit cannot be issued until a Construction Site Runoff Control Permit has been issued.

Under the Construction Site Runoff Control Permit, the project sponsors would be required to conduct daily inspections and maintenance of all erosion and sediment controls and must provide inspection and maintenance information to the SFPUC. The SFPUC would also conduct periodic inspections of the project site to ensure compliance with the plan. The project sponsors would be required to notify the SFPUC at least 2 days prior to the start of construction, completed installation of erosion and sediment control measures, completion of final grading, and project completion. At the SFPUC's discretion, sampling, metering, and monitoring may also be required.

Implementation of the Construction Site Runoff requirements of Article 4.2 of the San Francisco Public Works Code, Section 146, would ensure that water quality impacts related to violation of water quality standards or degradation of water quality due to discharge of construction-related stormwater runoff in areas served by the existing or future combined sewer system would be less than significant. No mitigation is necessary.

Construction-Related Stormwater Discharges to Separate Stormwater System or to Bay

Construction activities conducted within areas that drain to San Francisco Bay or to the proposed separate stormwater system that would be constructed under Options 2 and 3 for the proposed stormwater and wastewater facilities (separate systems and hybrid system) would be subject to the Construction General Stormwater Permit. Applicable activities include construction of the shoreline improvements above the high tide line and construction for the installation of new utilities, roadways, and other infrastructure, as well as demolition of existing buildings and excavation for construction of the proposed buildings.

Construction of the shoreline improvements has the greatest potential to cause water quality effects in San Francisco Bay because these activities would involve excavation, disruption of slopes, and placement of rock immediately adjacent to San Francisco Bay, particularly in Reach I where an entirely new riprap revetment would be constructed. Improvements in Reaches III and IV include repair of the existing slope protection features with armor stone, which would also involve some rearrangement of existing riprap and associated soil disturbance. The on-land component of these improvements would be constructed along the shoreline slope between the high tide line at 7.4 feet NAVD88 (96.0 feet project datum) and the top elevation of the shoreline improvements at 15.4 feet NAVD88 (104.0 feet project datum). The maximum slope in each reach is about 30 percent. Sediment from these construction activities could potentially become entrained in stormwater runoff, or a release of hazardous materials could occur, potentially degrading water quality in San Francisco Bay.

Excavation for the installation of new utilities, roadways, and other infrastructure, as well as demolition of existing buildings and excavation for the proposed developments, could also result in runoff to the new separate stormwater system, if Option 2 or Option 3 for the proposed stormwater and wastewater facilities (separate systems and hybrid system) is implemented. As this new separate stormwater system would discharge to San Francisco Bay via a new outfall, stormwater runoff from construction activities that discharge to this system could carry sediment or a release of hazardous materials used during construction, potentially degrading water quality in San Francisco Bay.

Under the Construction General Stormwater Permit, construction of the shoreline improvements and other on-land construction activities that would drain to the new separate stormwater system,

if constructed, would be characterized by the level of risk to water quality. This is determined using a combination of the sediment risk of the project and the receiving water quality risk. Projects can be characterized as Risk Level 1, Level 2, or Level 3, and the minimum BMPs and monitoring that must be implemented during construction are based on the risk level. The BMPs are designed to prevent pollutants from coming into contact with stormwater and to keep all products of erosion and stormwater pollutants from moving offsite into receiving waters. They are specified in a SWPPP that must be prepared by a QSD and submitted to the San Francisco RWQCB before construction begins. Construction activities under the Proposed Project would not be characterized as Risk Level 3, because the Central Basin and Lower San Francisco Bay are not considered sediment-sensitive water bodies under the Construction General Stormwater Permit.

For construction activities characterized as Risk Level 1, the Construction General Stormwater Permit specifies minimum BMPs to be implemented that address good housekeeping practices (including those for managing hazardous materials used during construction), non-stormwater management, erosion and sediment control, and run-on and runoff control. A qualified professional must inspect the required BMPs weekly when there is no rain and daily during a qualifying rainstorm. For construction activities characterized as Risk Level 2, the minimum requirements identified for Risk Level 1 apply in addition to some more stringent requirements. For instance, erosion controls must be implemented in conjunction with sediment controls in active construction areas, and linear sediment controls such as silt fences, gravel bag berms, or fiber rolls must be used along slopes. In addition, a QSD must prepare a rain event action plan for Risk Level 2 construction activities. This plan would identify the designated site stormwater manager, the provider of erosion and sediment controls, and the stormwater sampling agent, as well as the types of construction workers active at the site during all construction phases. The plan would include suggested actions for each construction phase.

Compliance with the Construction General Stormwater Permit would ensure that water quality impacts related to violation of water quality standards or degradation of water quality due to discharge of construction-related stormwater runoff to San Francisco Bay, either directly or via the new separate stormwater system (if constructed), would be less than significant. No mitigation is necessary.

Water Quality Effects of In-Bay Construction Activities

As discussed in “Wetlands and Other Jurisdictional Waters” in Section 4.M, Biological Resources, pp. 4.M.18-4.M.19, San Francisco Bay is a navigable water of the United States. Therefore, San Francisco Bay is considered a jurisdictional water of the U.S. regulated by the Corps under Section 10 of the Rivers and Harbors Act up to the mean high water mark, which is at an elevation of 5.7 feet NAVD88 (94.3 feet project datum). San Francisco Bay is also

considered jurisdictional waters of the U.S. and regulated by the Corps under Section 404 of the CWA up to the high tide line which is at an elevation of 7.4 feet NAVD88 (96.0 feet project datum). These waters are also regulated by the RWQCB as Waters of the State and BCDC regulates the fill and extraction of materials in San Francisco Bay below the mean high water mark (see Impact BI-4 in Section 4.M, Biological Resources, pp. 4.M.69-4.M.71, for further discussion of the requirements specified by these regulations). Therefore, any work along San Francisco Bay shoreline below the high tide line which is at an elevation of 7.4 feet NAVD88 (96.0 feet project datum) is considered construction in the Bay.

The Proposed Project includes several features that would involve in-bay construction and therefore would be subject to these regulations: repairs to the shoreline protection system in Reaches I, III, and IV of San Francisco Bay shoreline that are below the high tide line; repair or replacement of the bulkhead in Reach II of San Francisco the Bay shoreline as part of the shoreline improvements; repair of two existing CSD structures at 20th and 22nd streets; and construction of a new stormwater outfall for the separate stormwater system that would be constructed under Option 2, Separate Wastewater and Stormwater Systems, and Option 3, Hybrid System. The proposed shoreline improvements would result in approximately 2,200 cubic yards of excavation and 2,070 cubic yards of fill below the high tide level.[61] These activities are described in more detail below, followed by a discussion of applicable regulatory requirements that would ensure that adverse water quality effects do not result from the proposed in-bay construction activities.

Repairs to Shoreline Protection System in Reaches I, III, and IV

In Reach I, the existing riprap revetment would be repaired by removing the riprap and placing new geotextile fabric and riprap materials. Improvements in Reaches III and IV would include repair of the existing slope protection features with armor stone, which would also involve some rearrangement of existing riprap and associated soil disturbance. In addition, some concrete debris would be removed from Reach III and replaced with engineered riprap between the craneways. Those activities conducted below the high tide line would be considered in-bay construction activities.

Repair or Replacement of Bulkhead in Reach II

The two options under consideration for the repair/replacement of the bulkhead in Reach II include installation of a sheet pile or soldier pile wall. Under the sheet pile wall option, interlocking steel sheet piles would be installed. The sheet piles would be driven below the water

[61] Moffatt & Nichol, *Pier 70 Development, Preliminary Shoreline Improvements Report, San Francisco, California*, draft report, August 2015.

surface without the need for temporary cofferdams or dewatering. Under the soldier pile wall option, individual piles would be spaced a short distance apart, with gaps between the piles filled with lagging. The piles would be cast-in-drilled-hole piles, which are built by drilling a hole and inserting a reinforcing cage, then filling the hole with concrete. Installing a soldier pile wall may require temporary cofferdams or dewatering.

Repair of Combined Sewer Discharge Structures and Construction of New Outfall

The existing 20th and 22nd streets CSD structures would remain in approximately the same locations and would be repaired. The repairs may include reconstruction or repair of the existing outfall pipe, foundation, adjacent rock slope, and headwalls. Flap gates to control intrusion of San Francisco Bay water would be constructed, if necessary, and any blockages would be removed. Repair of the structures may require a sheet pile cofferdam at each location to allow for dewatering of the construction area to facilitate construction. The extent of excavation has not been determined for construction of the proposed stormwater outfall that would be constructed under Options 2 and 3, but excavation would likely extend below the high tide line.

Impact Discussion and Conclusion for In-Bay Construction Activities

Excavation, fill, and construction activities for improvements to the shoreline protection system in Reaches I, III, and IV; the repairs or replacement of the bulkhead in Reach II; repairs to the two CSD structures; and construction of the stormwater outfall, would be considered in-bay construction and would result in short-term disturbance of localized San Francisco Bay sediments. The disturbance would temporarily re-suspend these sediments in San Francisco Bay waters, which could result in temporary adverse water quality effects including increased turbidity and suspended solids in the immediate vicinity of the construction activities. The sediments may also contain chemicals from historic activities, including those identified in the offshore sediments adjacent to Reaches III and IV from Pacific Gas and Electric Company (PG&E) activities (see Section 4.P, Hazards and Hazardous Materials, pp. 4.P.34-4.P.35, for a description of PG&E's plans for remediation of the offshore sediments). Turbidity is a condition in which the concentration of particles suspended in the water is increased, making the water appear cloudy. The suspended solids can lower the levels of dissolved oxygen levels in water, increase the salinity of the water, and decrease light penetration into the water. In addition, nutrient loading can occur as a result of resuspension of sediments.

However, the overall water quality effect would be minor because of the very small area that would be disturbed and the temporary nature of the disturbance. Further, these in-bay construction activities would be subject to the requirements of a Section 10 and Section 404 permit from the Corps that would receive water quality certification from the RWQCB in accordance with Section 401 of the CWA. Further, placement of fill below the high water mark

would be subject to a permit from the BCDC, which would ensure that the water quality policies of the Bay Plan are implemented. The permits would specify BMPs for the protection of water quality such as use of floating booms and/or silt curtains to control the dissipation of bottom sediments during pile and rock installation. Implementation of water quality control measures as part of compliance with the Section 10 or Section 404 permit requirements, subject to water quality certification by the RWQCB, along with the requirements of the BCDC permit, would ensure that the anticipated temporary water quality impacts related to construction activities in San Francisco Bay would be less than significant. No mitigation is necessary.

Water Quality Effects of Groundwater Dewatering

As noted in "Groundwater" in Section 4.N, Geology and Soils, p. 4.N.6, the groundwater level at the project site is about 6 to 29 feet below ground surface. Given that the estimated depth of excavation on the site would be 15 to 27 feet for the construction of basements, construction-related groundwater dewatering would likely be required. However, the Proposed Project would be designed such that permanent dewatering would not be required, because the proposed buildings would be constructed to withstand hydrostatic pressure from the surrounding groundwater and would be waterproofed to prevent intrusion of groundwater.

The project sponsors have evaluated two options for discharge of groundwater produced during construction dewatering: (1) directly discharging to the City's combined sewer system; and (2) installing an on-site dewatering treatment system and discharging the treated water to San Francisco Bay. If discharged to the combined sewer system, groundwater discharges would be subject to Article 4.1 of the Public Works Code, as supplemented by SFPW Order No. 158170, which regulates the quantity and quality of discharges to the combined sewer system. In accordance with Article 4.1 and SFPW Order No. 158170, the discharger would be required to obtain a permit for the discharges and the permit would contain appropriate discharge standards. The permit may also require installation of meters to measure the volume of the discharge. The groundwater could contain contaminants related to past site activities, as discussed in Section 4.P, Hazards and Hazardous Materials, on pp. 4.P.11-4.P.16, as well as sediment and suspended solids, but would be treated as necessary to meet the discharge limitations of Article 4.1 and SFPW Order No. 158170. Treatment could include methods such as using settling tanks to remove sediments; filters to remove suspended solids; and other methods to meet chemical-specific discharge limitations. The chemical-specific treatment method used would depend on the chemicals that exceed the specified discharge limitation, but could include methods such as filtration or activated carbon treatment to reduce chemical concentrations as necessary to meet permit requirements prior to discharge.

If discharged directly to San Francisco Bay, the groundwater discharges could be subject to permitting requirements of the RWQCB under the Groundwater General Permit or the VOC and Fuel General Permit. These permits specify water quality criteria and monitoring requirements for discharges of extracted groundwater. Accordingly, under this option, the project sponsors would be required to submit a Notice of Intent to the RWQCB describing the proposed discharge and treatment system. The RWQCB must issue an Authorization to Discharge once it is determined that the discharger is eligible to discharge under the permit. The contractors would install an on-site treatment system(s) as needed to comply with the effluent limitations of the applicable discharge permit. The treated water would likely be discharged through a temporary discharge structure and regular influent and effluent water quality monitoring would be conducted to demonstrate permit compliance. Alternatively, an individual NPDES permit from the RWQCB would be required, and would impose similar requirements.

With discharge to the combined sewer system or San Francisco Bay in accordance with the regulatory requirements described above, water quality impacts related to a violation of water quality standards or degradation of water quality due to discharge of groundwater produced during construction-related dewatering would be less than significant, and no mitigation is necessary.

If groundwater wells are required for construction dewatering, the wells could provide a downward conduit for contamination, potentially affecting groundwater quality, if not properly constructed. However, the project sponsors would be required to obtain a well construction permit for any dewatering wells in accordance with the well permitting requirements described above under “Well Permitting Requirements,” p. 4.O.41. The permit would specify requirements for construction of the wells in accordance with the water well standards of the State and Article 12B of the San Francisco Health Code, including requirements for placement of a seal around the wells, referred to as an annular seal, to prevent the downward migration of contaminants. This would ensure that any wells installed for construction-related dewatering would not provide a downward conduit for contamination that could adversely affect groundwater quality. Therefore, water quality impacts associated with installation and operation of the dewatering wells would be less than significant, and no mitigation is necessary.

Operational Impacts

Impact HY-2: The Proposed Project could violate a water quality standard or waste discharge requirement or otherwise substantially degrade water quality, but runoff from the Proposed Project could exceed the capacity of a storm drain system or provide a substantial source of stormwater pollutants. ***(Less than Significant with Mitigation)***

The Proposed Project includes three options for stormwater and wastewater management: Option 1, Combined Sewer System; Option 2, Separate Wastewater and Stormwater Systems; and Option 3, Hybrid System, all of which are described in "Wastewater and Stormwater Flow Options" in Chapter 2, Project Description, pp. 2.61-2.66. Under Option 1, Combined Sewer System, stormwater and wastewater flows from the project site would be conveyed to the SEWPCP for treatment via the City's combined sewer system. Under Option 2, Separate Wastewater and Stormwater Systems, wastewater from the project site would continue to be conveyed to the City's combined sewer system for treatment at the SEWPCP. A new separate stormwater system would also be constructed under this option to convey stormwater flows to a new outfall located near the foot of the realigned 21st Street and the new outfall would discharge stormwater to the Central Basin of Lower San Francisco Bay. Under Option 3, Hybrid System, the combined sewer would continue to serve most of the project site and would convey wastewater and stormwater to the SEWPCP for treatment. The area to the east of the proposed Maryland Street, including the proposed open space areas, would be served by a new separate stormwater system that would convey stormwater flows to a new outfall located near the foot of the realigned 21st Street; the new outfall would discharge stormwater to the Central Basin of Lower San Francisco Bay. Wastewater from this portion of the site would be conveyed in the combined sewer system to the SEWPCP for treatment. The effects of each option on water quality and storm drain system capacity are discussed below.

Water Quality Effects Related to Exceedance of Water Quality Criteria and Waste Discharge Requirements

Discharges to the Combined Sewer System

Option 1, Combined Sewer System, and Option 3, Hybrid System, would both involve discharges of wastewater and stormwater to the City's combined sewer system, and Option 2, Separate Wastewater and Stormwater Systems, would involve discharges of wastewater to the combined sewer system. However, these discharges would not violate water quality standards or otherwise degrade water quality because all discharges would be in accordance with City regulatory requirements that have been developed to ensure compliance with the Bayside NPDES permit.

Wastewater discharges from future development projects would be subject to the permit requirements of Article 4.1 of the San Francisco Public Works Code and supplemented by SFPW Order No. 158170. Accordingly, future commercial users of the site would be required to develop and implement a pollution prevention program and comply with the pretreatment standards and discharge limitations specified in Article 4.1. These dischargers would also be required to monitor the discharge quality for compliance with permit limitations.

Stormwater discharges to the combined sewer system under Options 1 and 3 would be subject to Article 4.2 of the San Francisco Public Works Code, Section 147 and the San Francisco Stormwater Management Requirements and Design Guidelines that apply to future development projects that create and/or replace 5,000 square feet or more of impervious surfaces. Under Option 1, all future development projects would discharge stormwater to the combined sewer system. Covered projects that include more than 50 percent existing impervious surfaces must reduce the stormwater runoff flow rate and volume from the site by 25 percent for a two-year 24-hour storm. For covered projects with less than 50 percent existing impervious surfaces, the stormwater management approach must prevent the stormwater runoff flow rate and volume from exceeding existing conditions for the one- and two-year 24-hour design storm. Alternatively, if site conditions limit infiltration of stormwater, the project sponsors may apply for modified compliance with the Stormwater Management Ordinance and Stormwater Design Guidelines to adjust the amount by which the project must reduce the stormwater runoff volume and flow rate relative to existing conditions.

The Stormwater Management Requirements and Design Guidelines require the use of the low-impact development measures to reduce runoff and to reduce and delay the volumes of discharge entering the combined sewer system, thereby reducing the frequency of combined sewer overflows, minimizing flooding effects, and protecting water quality. One method of reducing stormwater runoff volumes would be to increase the amount of pervious surfaces by providing planters or other unpaved surfaces so that stormwater can infiltrate the ground. Other options include replacing asphalt or concrete with pervious asphalt or other hard pervious surfaces that allow rainwater to percolate into the ground. Vegetated roofs and green walls also could be used to capture a portion of the rainfall and reduce discharges to the combined sewer system. Stormwater runoff volumes also could be decreased by collecting stormwater runoff in tanks and using it for non-potable purposes such as landscape irrigation, toilet and urinal flushing under the San Francisco Non-Potable Water Program, or for landscape irrigation.

The Stormwater Control Plan prepared for each development project in accordance with the Stormwater Management Requirements and Design Guidelines would describe BMPs that would be implemented to achieve the specified reduction in stormwater flow rates and volumes as well as a plan for post-construction operation and maintenance of the BMPs. The plan must be

reviewed and approved by the SFPUC to certify compliance with the Stormwater Management Requirements and Design Guidelines, and the SFPUC would inspect stormwater BMPs once they are constructed to confirm that they perform as designed.

Under Option 3, future development projects that discharge to the combined sewer system would not be subject to the reductions in stormwater runoff volumes and rates specified in the Stormwater Management Requirements and Design Guidelines, because the overall reduction in stormwater flows would be achieved by diverting a portion of the stormwater from the project site to the separate stormwater system that would be constructed as part of the project under this option. All wastewater and stormwater discharges to the combined sewer system would be treated at the SEWPCP and Bayside wet-weather facilities in compliance with the Bayside NPDES permit for discharges from the SEWPCP, North Point Wet Weather Facility, and all of the Bayside wet-weather facilities. Therefore, project-related discharges to the combined sewer system during operation under all three options would not cause a violation of water quality standards or WDRs and would not otherwise substantially degrade water quality. This impact would be less than significant for discharges to the combined sewer system, and no mitigation is necessary.

Discharges to a Separate Stormwater System

Under Option 2, Separate Wastewater and Stormwater Systems, and Option 3, Hybrid System, future development projects would discharge stormwater to new separate stormwater systems constructed under the Proposed Project, as discussed in Chapter 2, Project Description, pp. 2.61-2.66. Runoff from the project site could entrain common urban stormwater pollutants such as animal waste, litter, metals, oil and grease, and other potential pollutants. However, these discharges would not violate water quality standards or otherwise degrade water quality because all discharges would be in accordance with City regulatory requirements that have been developed to ensure compliance with the Small MS4 General Stormwater Permit.

Stormwater runoff from the project site to the separate stormwater system would be managed in accordance with Article 4.2 of the San Francisco Public Works Code, Section 147, and the Stormwater Management Requirements and Design Guidelines. These requirements apply to individual projects that create or replace 5,000 square feet or more of impervious surfaces. Small Projects (between 2,500 and 5,000 square feet) that discharge to a separate stormwater system must implement one or more Site Design Measure(s) (e.g., tree planting and preservation, permeable pavement, green roofs, vegetated swales, rainwater harvesting, etc.). Large Projects that create and/or replace 5,000 square feet or more of impervious surfaces must implement source controls and BMPs to meet performance requirements. Large Projects located on Port property must manage runoff from the 85th percentile, 24-hour storm. Large Projects within the

Hoedown Yard would be under SFPUC jurisdiction and must manage runoff from the 90th percentile, 24-hour storm.

The Stormwater Control Plan prepared for each development project in accordance with the Stormwater Management Requirements and Design Guidelines would describe BMPs that would be implemented to achieve the specified stormwater treatment as well as a plan for post-construction operation and maintenance of the BMPs. The plan must be reviewed and approved by the Port and/or SFPUC to certify compliance with the Stormwater Design Guidelines, and the Port and/or SFPUC would inspect stormwater BMPs once they are constructed to confirm that they perform as designed.

Article 4.2 of the San Francisco Public Works Code, Section 147, and the Stormwater Management Requirements and Design Guidelines implement the stormwater treatment requirements of the Small MS4 General Stormwater Permit. Therefore, project-related stormwater discharges to the separate stormwater system that would be constructed under Options 2 and 3 would not cause a violation of water quality standards or WDRs and would not otherwise substantially degrade water quality. This impact would be less than significant for discharges to the separate stormwater system, and no mitigation is necessary.

Water Quality Effects Related to Exceeding the Capacity of the Stormwater System

None of the three stormwater management options would result in stormwater runoff that would exceed the capacity of the stormwater conveyance system because, as described in Section 4.K, Utilities and Service Systems, pp. 4.K.24-4.K.25, the new stormwater systems would be constructed in accordance with the City Subdivision Regulations. Accordingly, the new separate stormwater system and components of the combined sewer system would be sized to accommodate the 5-year storm, and flows for the 100-year storm would be directed to San Francisco Bay via streets and other approved corridors that would be designed to accommodate 100-year flood flows in excess of the 5-year storm in accordance with the subdivision regulations. Therefore, water quality effects related to exceeding the capacity of the stormwater system would be less than significant, and no mitigation is necessary.

While compliance with the specified design criteria for sizing of the stormwater infrastructure would ensure that the stormwater flows to the combined system would be within the capacity of the new infrastructure, increases in wastewater flows to the City's combined sewer system could potentially increase the number of combined sewer discharges from the 20th Street sub-basin and downstream basins. This would not constitute an exceedance of the stormwater system capacity, but could result in a violation of the Bayside NPDES permit requirements. The potential for this to occur is addressed in this impact analysis under the subheading "Water Quality Effects Related to Changes in Combined Sewer Discharges," below.

Water Quality Effects Related to Additional Sources of Polluted Runoff

Option 1, Combined Sewer System, and Option 3, Hybrid System, would both involve discharges of stormwater to the City's combined sewer system. Option 2, Separate Wastewater and Stormwater Systems, and Option 3 would both involve discharges of stormwater to the separate stormwater system that would be built for the Proposed Project. However, these discharges would not provide an additional source of stormwater pollutants, because all discharges would be in accordance with Article 4.2, Section 147 of the San Francisco Public Works Code and Stormwater Management Requirements and Design Guidelines that have been developed to ensure compliance with the Bayside NPDES permit and the Small MS4 General Stormwater Permit.

Implementation of source control BMPs for all developments constructed under the Proposed Project would reduce potential pollutant loads in the stormwater runoff and would improve the quality of the runoff to the combined sewer system or separate stormwater system. Source control measures described in the Stormwater Management Requirements and Design Guidelines include covering and hydraulically isolating pollutant generating activities, implementing maintenance activities such as regular sweeping of exposed areas, and using non-polluting building and maintenance materials. Treatment BMPs would further reduce pollutant loads in stormwater via infiltration (e.g., permeable pavement or infiltration basins or trenches), bioretention (e.g., flow through planter or rain garden), or biofiltration (e.g., vegetated areas; media, sand, or vegetated rock filters; use of swirl separators, water quality inlets, or drain inserts). One or more treatment BMPs would be required to address each of the potential stormwater pollutants of concern.

Development projects implemented under the Proposed Project would primarily use two Low Impact Development approaches for treating stormwater discharges: (1) maximizing the amount of pervious area by adding traditional landscaping, vegetated roofs, flow through planters, or permeable pavement; and (2) reuse of stormwater for non-potable uses such as irrigation and toilet flushing.[62] Although infiltration of stormwater is also an allowable method of stormwater management, it is unlikely that infiltration is a feasible approach for the project site because of the presence of shallow bedrock and Bay Mud. However, selection of the appropriate BMPs would be guided by existing site conditions, design and development goals, and the pollutants of concern at the site.

With implementation of the source control and treatment BMPs in accordance with Article 4.2 of the San Francisco Public Works Code, Part 147, the Proposed Project would not provide an

[62] BKF, Pier 70 – Conceptual Stormwater Management Description, April 15, 2015.

additional source of stormwater pollutants, and this impact would be less than significant. No mitigation is necessary.

Water Quality Effects Related to Changes in Combined Sewer Discharges

The project site is located within the 20th Street sub-basin of the City's combined sewer system. When the wet-weather capacity of the 20th Street Pump Station is exceeded, a portion of the wet-weather flows within this sub-basin is stored in the 54-inch and 42-inch storage and detention lines. Flows to the combined sewer system that exceed the pump station capacity and storage capacity of the storage and detention lines are discharged to the Central Basin of Lower San Francisco Bay via the 20th and 22nd streets CSD structures.[63] The Bayside NPDES permit requires that the wet-weather facilities within this sub-basin be designed for a long-term average of no more than 10 CSD events per year. The permit allows for this annual average to be exceeded in any particular year as long as the long-term average is maintained at the appropriate level. However, a permanent increase in wastewater flows could affect the ability to maintain the long-term average of no more than 10 CSD events, potentially resulting in a violation of the NPDES permit, a significant water quality impact. This impact is discussed in relation to each of the wastewater and stormwater management options below.

Option 1: Combined Sewer System

Under Option 1, Combined Sewer System, both wastewater and stormwater from the project site would be conveyed to the new 20th Street Pump Station (described under "Common Improvements" in Chapter 2, Project Description, pp. 2.59-2.61) for ultimate conveyance to the SEWPCP via the City's combined sewer system. Stormwater flows in the sub-basin would be reduced by up to 25 percent relative to existing conditions as required by Article 4.2 of the San Francisco Public Works Code, Section 147, and the Stormwater Management Requirements and Design Guidelines. However, without sufficient pumping capacity, the new pump station could cause the frequency of CSDs from the 20th Street sub-basin and/or downstream basins to increase beyond the long-term average of 10 CSD events per year, in violation of the Bayside NPDES permit. This would constitute a significant impact. This impact would be reduced to a less-than-significant level with implementation of Mitigation Measure M-HY-2a: Design and Construction of Proposed Pump Station for Options 1 and 3, which specifies performance standards for the pump station. With achievement of these performance standards, wastewater and stormwater discharges would not exceed the long-term average of 10 CSD events specified in the Bayside NPDES permit.

[63] San Francisco Bay RWQCB, Order No. R2-2013-0029, NPDES No. CA0037664, Southeast Water Pollution Control Plant, North Point Wet Weather Facility, Bayside Wet Weather Facilities, and Wastewater Collection System, August 19, 2013, p. 24.

Mitigation Measure M-HY-2a: Design and Construction of Proposed Pump Station for Options 1 and 3

The project sponsors shall design the new pump station proposed as part of the Proposed Project to achieve the following performance criteria.

- The dry-weather capacity of the new pump station and associated force main shall be sufficient to convey dry-weather wastewater flows within the 20th Street sub-basin, including flows from the existing baseline, the Proposed Project at full build-out, and cumulative project contributions; and
- The wet-weather capacity of the new pump station shall be sufficient to ensure that potential wet-weather combined sewer discharges from the 20th Street sub-basin and associated downstream basins do not exceed the long-term average of ten discharges per year specified in the SFPUC Bayside NPDES permit or applicable corresponding permit condition at time of final design. The capacity shall be based on the existing baseline, the Proposed Project at full build-out, and cumulative project contributions,

The project sponsors shall coordinate with the SFPUC regarding the design and construction of the pump station. The final design shall be subject to approval by the SFPUC.

Option 2: Separate Wastewater and Stormwater Systems

Under Option 2, Separate Wastewater and Stormwater Systems, wastewater from the project site would continue to be conveyed to the City's combined sewer system for treatment at the SEWPCP. A new separate stormwater system would also be constructed to convey stormwater flows to a new outfall located near the foot of the realigned 21st Street. This option would eliminate all stormwater flows from the project site to the combined sewer system, although stormwater flows from the 20th Street Historic Core site and BAE Systems Ship Repair facility to the north of 20th Street would continue to discharge to the combined sewer system. The analysis below addresses the potential effects of changes in wastewater and stormwater discharges to the combined system on the frequency and composition of CSDs from the 20th Street sub-basin. The water quality effects of stormwater discharges from the separate system are discussed above under the heading "Water Quality Effects Related to Exceedance of Water Quality Criteria and Waste Discharge Requirements."

Under this option, wet-weather discharges to the new pump station would consist of wastewater from the entire sub-basin, and stormwater from the 20th Street Historic Core and BAE Systems site. Because of the elimination of stormwater discharges from the project site and the addition of wastewater discharges from the project site to the new 20th Street Pump Station, future combined sewer discharges would consist of a much larger portion of sanitary sewage and industrial wastewater relative to existing conditions. The Bayside NPDES permit (pp. 16 and 17) includes collection system management requirements that require the combined sewer system to be operated in a manner that does not result in a release of untreated or partially treated wastewater.

Therefore, this option could result in a violation of the Bayside NPDES permit without appropriate design of the proposed pump station. This would constitute a significant impact. This impact would be reduced to a less-than-significant level with implementation of Mitigation Measure M-HY-2b: Design and Construction of Proposed Pump Station for Option 2, which specifies performance standards for the pump station. With achievement of these performance standards, wastewater and stormwater discharges would not exceed the CSD limitations of the Bayside NPDES permit, and water quality impacts related to changes in combined sewer overflows would be less than significant.

Mitigation Measure M-HY-2b: Design and Construction of Proposed Pump Station for Option 2

The project sponsors shall design the new pump station proposed as part of the Proposed Project to achieve the following performance criteria.

- The dry-weather capacity of the new pump station and associated force main shall be sufficient to convey dry-weather wastewater flows within the 20th Street sub-basin, including flows from the existing baseline, the Proposed Project at full build-out, and cumulative project contributions;
- During wet weather, wastewater flows from the project site shall bypass the wet-weather facilities and be conveyed to the combined sewer system in such a manner that they do not contribute to combined sewer discharges within the 20th Street sub-basin; and
- The wet-weather capacity of the new pump station shall be sufficient to ensure that potential wet-weather combined sewer discharges from the 20th Street sub-basin and associated downstream basins do not exceed the long-term average of ten discharges per year specified in the SFPUC Bayside NPDES permit or applicable corresponding permit condition at time of final design. The capacity shall be based on the existing baseline and cumulative project contributions.

The project sponsor shall coordinate with the SFPUC regarding the design and construction of the pump station. The final design shall be subject to approval by the SFPUC.

Option 3: Hybrid System

Under Option 3, Hybrid System, wastewater from the entire project site and stormwater from the areas of the project site to the west of the proposed Maryland Street would be conveyed to the new pump station for ultimate conveyance to the SEWPCP via the City's combined sewer system. Only the small area to the east of the proposed Maryland Street would be served by a new separate stormwater system that would discharge stormwater to the Central Basin of Lower San Francisco Bay. The required capacity of the new pump station would be less than required under Option 1, because the total flows to the new pump station would be less under this option. However, without sufficient pumping capacity, the new pump station could cause the frequency of CSDs to increase beyond the long-term average of 10 CSD events per year specified in the

Bayside NPDES Permit, a significant impact. This impact would be reduced to a less-than-significant level with implementation of Mitigation Measure M-HY-2a, which specifies performance standards for the pump station. With achievement of the performance standards specified in this mitigation measure, wastewater and stormwater discharges would not exceed the CSD limitations of the Bayside NPDES permit, and water quality impacts related to changes in combined sewer overflows would be less than significant.

The water quality effects of stormwater discharges from the separate system are discussed above under the heading "Water Quality Effects Related to Exceedance of Water Quality Criteria and Waste Discharge Requirements."

Water Quality Effects Related to Use of Alternate Water Supply

In accordance with San Francisco's Non-potable Water Ordinance, the Proposed Project would use alternate water sources for non-potable applications such as toilet and urinal flushing as well as irrigation. Available sources of water include rainwater and stormwater, as well as graywater collected from on-site uses. Use of this water would not violate water quality standards because in accordance with the Non-potable Water Ordinance, project sponsors would be required to treat the alternate water supply to water quality criteria specified by the DPH and conduct monitoring to demonstrate compliance with the specified water quality criteria. For each water supply, the Non-potable Water Ordinance includes water quality limits for both bacteria (*Escherichia coli*) and turbidity. If the alternate water supply is disinfected using chlorine, the ordinance also includes water quality limits for residual chlorine.[64] If stormwater is used, the treated water must also meet specified standards for VOCs. If graywater is used, the treated water must also meet specified standards for pH.

Compliance with water quality criteria would be ensured through the permitting process. This process requires the project sponsors submit a water budget application to the SFPUC and an engineering report to the DPH. Based on these documents, the project sponsors would obtain a construction permit from the DBI. After completing a cross connection test, the project sponsors would obtain a permit to operate from the DPH and conduct the required ongoing monitoring, reporting, and inspections. With compliance with these requirements, the quality of the alternate water supply would not exceed water quality criteria, and water quality effects related to use of an alternate water supply would be less than significant. No mitigation is necessary.

[64] San Francisco Department of Public Health, Director's Rules and Regulations for the Operation of Alternate Water Source Systems, December 4, 2015.

Water Quality Effects Related to Littering

The proposed use of the project site for commercial, residential, RALI, and public open space uses could increase the potential for litter, and the adjacent Lower San Francisco Bay is listed as impaired for trash. In accordance with Article 6 of the San Francisco Health Code, Garbage and Refuse, the project sponsors would be required to place containers in appropriate locations for the collection of refuse. In accordance with this article, the refuse containers must be constructed with tight fitting lids or sealed enclosures, and the contents of the container may not extend above the top of the rim. The project sponsors must also have adequate refuse collection service. Further, Article 6 prohibits the dumping of refuse onto any streets or lands within San Francisco.

The Proposed Project would be required to comply with several City ordinances, discussed in Section 4.K, Utilities and Service Systems, which would decrease the amount of non-degradable trash generated under the Proposed Project. The San Francisco Mandatory Recycling and Composting Ordinance requires facilities to separate their refuse into recyclables, compostables, and trash. In addition, the Food Service Waste Reduction Ordinance prohibits any establishment that serves food prepared in San Francisco from using polystyrene foam (Styrofoam) to-go containers. This ordinance also requires that any containers used in the City's programs be either recyclable or compostable.

Further, under Option 2, Separate Wastewater and Stormwater Systems, and Option 3, Hybrid System, the Proposed Project would be required to comply with the Trash Amendment of the Water Quality Control Plan for Inland Surface Waters, Enclosed Bays, and Estuaries of California, described above under "Inland Surface Waters, Enclosed Bays, and Estuaries Plan," pp. 4.O.30-4.O.31. This amendment would require the Proposed Project to implement specific measures to prevent the transport of trash to San Francisco Bay. Compliance with this requirement may be achieved using a full capture system for all storm drains (Track 1) or a combination of full capture systems, multi-benefit projects, other treatment controls, and institutional controls (Track 2) as described in Regulatory Framework.

Compliance with Article 6 of the San Francisco Health Code, the City ordinances described above, and the Trash Amendment for wastewater and stormwater, Options 2 and 3 would reduce the amount of non-recyclable and non-compostable wastes produced at the project site, would ensure that adequate containers and refuse service are provided, and would ensure that offshore San Francisco Bay water is kept free of trash as a result of littering at the Proposed Project site. This would reduce the potential for transport of litter to the combined or separate stormwater systems and directly to San Francisco Bay via wind or stormwater runoff. Therefore, water quality impacts related to littering would be less than significant, and no mitigation is necessary.

Impact HY-3: The Proposed Project would not substantially deplete groundwater supplies or interfere with groundwater recharge such that there would be a net deficit in aquifer volume or a lowering of the local groundwater table. ***(Less than Significant)***

The project site is located within the San Francisco Downtown Groundwater Basin. Groundwater in this basin is not considered potable, and the only groundwater extracted from this groundwater basin is for dewatering purposes. Implementation of the Proposed Project would not result in depletion of groundwater resources in the San Francisco Downtown Groundwater Basin because, other than pumping of groundwater during construction dewatering, the project would not involve the use or extraction of groundwater. Rather, potable water for the Proposed Project would be provided via pipe by the SFPUC from the regional water supply system, and non-potable water for the project would be obtained from graywater re-use and/or captured stormwater or rain water during wet weather, in accordance with the City's Non-Potable Water Program. If and when a supply of recycled water becomes available through the Eastside Recycled Water Project,[65] the Proposed Project could also use recycled water for non-potable uses, although the bulk of the non-potable water demand would already be met by on-site sources. Further, the Pier 70 Risk Management Plan, described in Section 4.P, Hazards and Hazardous Materials, pp. 4.P.20-4.P.26, prohibits the use of groundwater throughout the Pier 70 Risk Management Plan Area.

The Proposed Project would replace many existing impervious surfaces and would create some new ones. However, the total amount of impervious surfaces would only increase from approximately 1.34 million square feet (87 percent of the project site) to 1.36 million square feet (88 percent of the project site). Therefore, the Proposed Project would not appreciably decrease groundwater recharge as a result of increased imperious surfaces. Although the Proposed Project could reuse rainwater under the City Non-potable Water Program, rainwater is currently captured in the combined sewer system and conveyed to the SEWPCP. Therefore, the Proposed Project would not decrease the amount of rainwater recharged to the groundwater at the project site.

For the reasons stated above, impacts related to depletion of groundwater resources and interference with groundwater recharge would be less than significant, and no mitigation is necessary.

[65] The SFPUC plans to provide 2 million gallons per day of high-quality recycled water to the customers in the east side of the City through the Eastside Recycled Water Project for non-potable uses such as irrigation and toilet flushing. This project is still in the planning stages, and the implementation date is uncertain.

Impact HY-4: The Proposed Project would not substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river, in a manner that would result in substantial erosion, siltation, or flooding on or off site. ***(Less than Significant)***

The project site does not include any existing streams or water courses that could be altered or diverted. Therefore, the Proposed Project would have no impact related to alteration of drainage patterns by altering the course of a stream in a manner that would cause erosion or flooding on- or off-site.

Under the Proposed Project, stormwater would be routed to a new separate stormwater system or the City's combined sewer system. In accordance with the Stormwater Management Requirements and Design Guidelines, stormwater controls for future development projects that discharge to the new separate stormwater system would be designed to treat rainfall from the 85th or 90th percentile, 24-hour storm and include measures to reduce or eliminate downstream water pollution. In areas served by the combined sewer system, Article 4.2 of the San Francisco Public Works Code, Section 147, and the Stormwater Management Requirements and Design Guidelines would require that the stormwater controls for individual development projects reduce or maintain existing stormwater runoff flow rates and volumes. Further, as described in Impact HY-2, the new separate stormwater system and components of the combined sewer system would be sized to accommodate the 5-year storm, and flows for the 100-year storm would be directed to San Francisco Bay via streets and other approved corridors that would be designed to accommodate 100-year flood flows in excess of the 5-year storm in accordance with the subdivision regulations. Compliance with these design requirements, subject to approval by SFPW, would ensure that no on- or off-site flooding, erosion, or siltation would occur.

Therefore, neither alteration of existing drainage patterns at the project site nor changes in stormwater runoff volumes would result in substantial erosion, siltation, or flooding on- or off-site, and this impact would be less than significant. No mitigation is necessary.

Impact HY-5: Operation of the Proposed Project would not place housing within a 100-year flood zone or place structures within an existing 100-year flood zone that would impede or redirect flood flows. ***(Less than Significant)***

The shoreline portions of the project site are located within a 100-year flood zone identified on the City's 2008 Interim Flood Hazard Maps. However, the Proposed Project includes construction of shoreline protection improvements that would repair or improve riprap revetments along the entire waterfront of the project site to protect the waterfront from the damaging effects of wave action. The Proposed Project would also raise the grade of the inland portions of the project site to 15.4 feet NAVD88 (104.0 feet project datum), which is above the existing 100-year flood elevation. The final slopes along the waterfront would be similar to existing conditions.

Factors that could exacerbate flooding issues along the waterfront portion of the project site include changes in the shape and configuration of the shoreline as well as construction of in-bay structures or enclosures such as jetties, breakwaters, or marinas that could change circulation patterns in San Francisco Bay in the vicinity of the project site. Because the final slope and shape of the shoreline along the waterfront portion of the project site would be substantially the same as existing conditions and the Proposed Project does not include the construction of any new in-water structures, the patterns of flood flows at the project site or in the vicinity would not be substantially affected.

In addition, the Proposed Project would raise the grade of the 28-Acre Site and low-lying portions of the Illinois Parcels by adding between 3 and 5 feet of fill which would further reduce the risk of flooding within the inland portions of the project site. Although the Proposed Project includes the construction of housing, any proposed housing and other proposed structures would be constructed more than 100 feet inland from the shoreline and would not be constructed within an identified 100-year flood zone. Therefore, impacts related to placement of housing within a 100-year flood zone and the impedance or redirection of flood flows within an existing 100-year flood zone would be less than significant. No mitigation is necessary.

Impact HY-6: Operation of the Proposed Project would not place structures within a future 100-year flood zone that would impede or redirect flood flows. ***(Less than Significant)***

The existing elevation at the top of the shoreline along the 28-Acre Site and westward to the approximate location of the future Maryland Street is approximately 8.4 to 12.4 feet NAVD88 (97.0 to 101.0 feet project datum). At the existing site grades, over half of the 28-Acre Site could be temporarily flooded to a maximum depth of 2 feet as a result of 36 inches of sea level rise in combination with 100-year storm surge. This is the amount of sea level rise that the NRC projects will occur by the year 2100. The NRC Report concludes that the worst case amount of sea level rise would increase San Francisco Bay water levels by up to 66 inches by the year 2100. In combination with 100-year storm surge, this amount of sea level rise would flood the entire 28-Acre Site to a maximum depth of 5 feet with the current site grade. The flood levels associated with both scenarios are 13 feet NAVD88 (101 feet project datum) and 15 feet NAVD88 (104 feet project datum), respectively. No portion of the Illinois Parcels is within an anticipated future flood zone, even under the worst-case scenario of 66 inches of sea level rise in combination with a 100-year storm surge.

As described under “Shoreline Protection Improvements” in Chapter 2, Project Description, pp. 2.71-2.74, the Proposed Project would raise the grade of the inland portions of the project site to an elevation of 15.4 feet NAVD88 (104.0 feet project datum). Raising the inland grade to this elevation would protect all buildings and immovable facilities such as roadways from flooding

with 66 inches of sea level rise in combination with a 100-year storm surge, which would result in a flood elevation of 15 feet NAVD88, or 104 feet project datum. As for existing conditions, the shoreline would continue to be subject to flooding and wave action as a result of sea level rise. However, the shoreline protection improvements would include construction of repaired or improved riprap revetments along the entire waterfront of the project site to protect the waterfront from the damaging effects of wave action. The final slopes along the waterfront would be similar to existing conditions.

As for existing flooding conditions, factors that could exacerbate flooding and increase the potential for coastal erosion along the waterfront portion of the project site include changes in the shape and configuration of the shoreline as well as construction of in-bay structures or enclosures such as jetties, breakwaters, or marinas that could change circulation patterns in San Francisco Bay at the project site and in the vicinity. Because the final slope and shape of the shoreline along the project waterfront portion of the project site would be substantially the same as existing conditions, and the Proposed Project does not include the construction of any new in-water structures, the patterns of flood flows and potential for coastal erosion at the project site and in the vicinity would not be substantially affected.

The Proposed Project does not include additional stormwater discharges or other discharges that would increase the frequency or severity of flooding and, as discussed above in Impact HY-4, the stormwater drainage systems installed under any of the three wastewater and stormwater options would be sized to adequately convey stormwater flows in accordance with San Francisco's subdivision regulations. The Proposed Project would not cause flooding to occur in areas that would not be subject to flooding without the Proposed Project for the reasons stated above. Therefore, this impact would be less than significant, and no mitigation is necessary.

Impact HY-7: The Proposed Project would not expose people or structures to substantial risk of loss, injury, or death due to inundation by seiche, tsunami, or mudflow. ***(Less than Significant)***

The majority of the 28-Acre Site is located in an area identified for potential inundation in the event of a tsunami or seiche based on existing site grades.[66] The potential tsunami and seiche wave height is approximately 6 feet at the project site.[67] When added to the Mean High Water

[66] California Emergency Management Agency, California Geological Survey, University of Southern California, *Tsunami Inundation Map for Emergency Planning, San Francisco North Quadrangle/San Francisco South Quadrangle (San Francisco Bay)*, June 15, 2009. Available online at http://www.conservation.ca.gov/cgs/geologic_hazards/Tsunami/Inundation_Maps/SanFrancisco/Documents/Tsunami_Inundation_SouthSFNorthSF_SFBay_SanFrancisco.pdf. Accessed November 28, 2015.

[67] Moffatt & Nichol, *Tsunami Risk Assessment*, p. 4.

level of 6 feet NAVD88, the maximum tsunami wave height would have an elevation of 12 feet NAVD88, or 100 feet project datum.

Risks to Structures

As discussed in "Shoreline Protection Improvements" in Chapter 2, Project Description, pp. 2.71-2.74, and in Impact HY-6, above, the Proposed Project would include construction of shoreline improvements that would raise the top of the shoreline along the entire waterfront of the 28-Acre Site to an elevation of 15.4 feet NAVD88 (104.0 feet project datum). The project sponsors would also emplace up to 5 feet of imported fill to elevate the interior portions of the 28-Acre Site and low-lying areas of the Illinois Parcels above the projected flood elevation in 2100. Building 12 would be protected from flood waters by intervening elevated portions of the site or raising the existing finished floor, and the finished floor elevations of all other proposed buildings and existing buildings would have a minimum elevation of 15.8 feet NAVD88 (104.4 feet project datum) which would be higher than the estimated tsunami inundation level. Therefore, the Proposed Project would not expose people or structures to substantial risk of loss, injury, or death due to inundation by seiche or tsunami.

Risks to People

In the event of an earthquake capable of producing a seiche or tsunami that could affect San Francisco, the National Warning System, described in the Environmental Setting, would provide warning to the City. The San Francisco outdoor warning system (sirens and loudspeakers, tested each Tuesday at 12:00 noon) would then be initiated, which would sound an alarm alerting the public to tune into local TV, cable TV, or radio stations. These alert messages would carry instructions for appropriate actions to be taken as part of the Emergency Alert System. Police would also canvass the neighborhoods sounding sirens and bullhorns, as well as knocking on doors as needed, to provide emergency instructions. Evacuation centers would be set up if required. The advance warning system would allow for evacuation of people from the public use areas closest to the shoreline prior to a seiche or tsunami and would provide a high level of protection to public safety.

Conclusion

For the reasons discussed above, the Proposed Project would not expose structures or people to substantial risk of loss, injury, or death due to inundation by a seiche or tsunami. Rather, the project would reduce tsunami risks to people and structures by raising the interior grades of the project site well above the projected tsunami level. This impact would be less than significant, and no mitigation is necessary.

Cumulative Impacts

Section 4.A, Approach to Cumulative Impact Analysis and Cumulative Projects, pp. 4.A.12-4.A.18, describes the approach to the cumulative analysis used throughout this EIR and summarizes cumulative projects in the vicinity of the project site.

The geographic scope of potential cumulative impacts on water quality encompasses Lower San Francisco Bay. The geographic scope of effects on drainage and flooding consists of the Bayside Drainage Basin. Impacts related to future flooding as a result of sea level rise and inundation by tsunami could occur along the entire San Francisco Bay waterfront; therefore, the geographical scope for this impact includes the entire waterfront.

Impact C-HY-1: The Proposed Project, in combination with past, present, and reasonably foreseeable future projects in the site vicinity, would not result in a considerable contribution to cumulative impacts on hydrology and water quality. ***(Less than Significant)***

As discussed in Impact HY-1, implementation of appropriate regulatory requirements would ensure that the Proposed Project would result in less than significant impacts related to erosion and discharges of groundwater during dewatering. Other projects that could potentially contribute to a cumulative impact would be subject to the same or similar regulatory requirements including the Construction General NPDES permit, Article 4.1 of the Public Works Code as supplemented by SFPW Order No. 158170, and Article 4.2 of the Public Works Code, Section 146 (including implementation of an erosion control plan). Similarly, all in-bay construction along the waterfront would be required to implement the requirements of Section 404 and Section 10 permits from the Corps that would receive water quality certification from the RWQCB in accordance with Section 401 of the CWA. Implementation of these requirements under each individual project would ensure that all discharges comply with regulatory standards and would not result in a violation of water quality standards. Therefore, cumulative impacts related to these topics would be less than significant, and no mitigation is necessary.

As discussed in Impact HY-2, stormwater discharges to both the new separate stormwater system, if constructed, and the City's combined sewer system would be subject to Article 4.2 of the San Francisco Public Works Code, which would ensure compliance with the Small MS4 General Stormwater Permit and the Bayside NPDES permit. Compliance with these regulatory standards by the Proposed Project and all of the potentially cumulative projects would ensure that stormwater discharges would not result in a violation of water quality standards or provide an additional source of polluted runoff. Therefore, cumulative impacts related to these impacts would be less than significant, and no mitigation is necessary.

Cumulative impacts related to contributions to combined sewer overflows would be potentially significant because, the combined wastewater and stormwater discharges to the new 20th Street Pump Station could cause an increase in the frequency or change in composition of CSDs from the 20th Street sub-basin. However, under all options, the project sponsors would be required by Mitigation Measure M-HY-2a or M-HY-2b, pp. 4.O.60-4.O.61, to design and construct the new 20th Street Pump Station and associated facilities with a sufficient capacity to ensure that project-related and cumulative discharges from the 20th Street sub-basin and associated downstream basins do not exceed the long-term average number of discharges per year specified in the SFPUC Bayside NPDES permit or applicable corresponding permit condition at time of final design. With implementation of these mitigation measures, wastewater and stormwater flow from the project site and the entire 20th Street sub-basin would be managed in accordance with the Bayside NPDES Permit and would not contribute to an increase in CSDs from the combined sewer system. Although the project's contribution to this impact would be cumulatively considerable, the project's contribution would be reduced to a less-than-significant level with implementation of Mitigation Measures M-HY-2a and M-HY-2b.

There would be no cumulative impacts related to exceeding the capacity of the separate stormwater system or providing an additional source of polluted runoff because the separate system would serve the project site only, and would not accept flows from other areas.

As discussed in Impact HY-2, the Proposed Project's water quality impacts related to use of an alternate water supply for non-potable uses would be less than significant through compliance with the City's Non-potable Water Ordinance. Water quality impacts related to use of alternate water supplies are site-specific; therefore, there would be no cumulative water quality impacts related to use of alternate water supplies.

As discussed in Impact HY-2, the Proposed Project's water quality impacts related to littering would be less than significant through compliance with Article 6 of the San Francisco Health Code, City ordinances addressing recycling and composting of wastes, and the Trash Amendment of the Water Quality Control Plan for Inland Surface Waters, Enclosed Bays, and Estuaries of California. Other projects in the area are also required to comply with these requirements. Therefore, cumulative water quality impacts related to litter would be less than significant, and no mitigation is necessary.

As discussed in Impact HY-4, project elements affecting drainage and flooding issues at the project site would be subject to compliance with established guidelines for the separate storm drainage system and/or the combined sewer system, which would ensure that impacts related to alteration of drainage patterns are less than significant. Other past, present, and reasonably foreseeable future projects within the Bayside Drainage Basin would also be subject to these regulations. Therefore, based on the City's established regulations and guidelines for the separate

and combined sewer system, which are designed to serve the City as a whole, cumulative impacts related to alteration of drainage patterns would also be less than significant, and no mitigation is necessary.

As described in Impacts HY-5 and HY-6, the City's Bay shoreline is subject to coastal flooding and will be subject to an increased risk of flooding in the future due to sea level rise. Past, present, and foreseeable future development in such areas could impede or redirect future flood flows. However, as described above, construction of shoreline protection improvements that would raise the top of the shoreline along the entire waterfront portion of the 28-Acre Site to an elevation of 15.4 feet NAVD88 (104.0 feet project datum) and the proposed raising of the elevation of the interior of the site above the upper range of projected 2100 flood elevations would not impede or redirect flood flows. Therefore, the Proposed Project's contribution to cumulative impacts related to existing flooding hazards and future flood hazard risks due to sea level rise would not be cumulatively considerable (i.e., less than significant), and no mitigation is necessary.

As discussed in Impact HY-7, a tsunami or seiche would not adversely affect the project site because the Proposed Project would include construction of shoreline protection improvements that would raise the shoreline along the entire waterfront portion of the 28-Acre Site to an elevation of 15.4 feet NAVD88 (104.0 feet project datum) which is well above the maximum tsunami wave height of 12 feet NAVD88, or 100 feet project datum. San Francisco also has a well-established Tsunami Warning System that would be activated, which would protect people from harm, and the new structures would be constructed in accordance with the current building code, which would make them resilient to damage by tsunamis. Because other projects would be built to current building codes, and the Tsunami Warning System would also protect other people in the project vicinity from harm due to tsunamis, cumulative impacts related to inundation by a tsunami or seiche would be less than significant, and no mitigation is necessary.

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