

## E. HYDROLOGY AND WATER QUALITY

This section describes the existing hydrology setting for the project site, including runoff, drainage, and water quality characteristics, based on available information provided as part of the project application and published reports. Data gathered as part of a site reconnaissance conducted in July 2008 were also used in this section. Impacts that could result from the proposed Master Plan, and mitigation measures to reduce significant impacts are identified, where appropriate.

### 1. Setting

The project site's existing conditions related to hydrology and water quality are described below.

**a. Climate.** The climate of the Foster City area is characterized as dry-summer subtropical (often referred to as Mediterranean), with cool wet winters and relatively warmer dry summers. The approximate annualized average high temperature is 71° Fahrenheit (F); the average low is 47° F. The mean annual rainfall in the vicinity of the project site, for the period between 1948 and 2008, was approximately 19.2 inches, the majority of which occurs from November through April.<sup>1</sup> During the period of record, annual rainfall has varied from 8.0 inches (1976) to 43 inches (1983), with a one-day high of 4.9 inches of precipitation on October 13, 1962. Analysis of long-term precipitation records indicates that wetter and drier cycles lasting several years are common in the region. Severe, damaging rainstorms occur at a frequency of about once every 3 years.<sup>2</sup>

**b. Runoff and Drainage.** The topography of the project site is relatively flat with an existing ground surface elevation of approximately 5 to 7 feet National Geodetic Vertical Datum 1929 (NGVD).<sup>3,4</sup> The project site is currently developed and includes multi-story office and research/development buildings with intervening driveways and parking lots. Small areas of lawns front most buildings, with islands of landscaping, shrubs, and trees throughout the parking areas. Storm drains are set into the curbs and gutters of the streets and within the larger parking areas between buildings. Generally, the parking areas are gently sloped towards these storm water drainage inlets with no predominant grade apparent at the site. Runoff is collected in the storm water mains of the public systems and directed to the Foster City Lagoon.<sup>5</sup>

**c. Flooding.** Based on the Federal Emergency Management Agency (FEMA) Flood Insurance Rate Map (FIRM) for the vicinity of the project site, the site is mapped as Zone X: Special Flood Hazard Zone (SFHZ). Properties within this flood zone designation include areas subject to a 500-year flood, areas of a 100-year flood with average depths of less than 1 foot or drainage areas less

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<sup>1</sup> Western Regional Climate Center, *General Climate Summary, Redwood City, CA*. Accessed 8/8/08 at: [www.wrcc.dri.edu/summary/Climsmcca.html](http://www.wrcc.dri.edu/summary/Climsmcca.html).

<sup>2</sup> Brown, William M. III, 1988. *Historical Setting of the Storm: Perspectives on Population, Development, and Damaging Rainstorms in the San Francisco Bay Region*, in *Landslides, Floods, and Marine Effects of the Storm of January 3-5, 1982*, in the San Francisco Bay Region, California, Stephen D. Ellen and Gerald F. Wiczorek, Eds., U.S. Geological Survey Professional Paper 1434.

<sup>3</sup> The NGVD 1929 is a vertical control datum established to measure vertical positions or elevations based on mean sea level measurements circa 1929. For most purposes, NGVD is equivalent to mean sea level.

<sup>4</sup> The Foster City Datum is equal to the National Geodetic Vertical Datum of 1929 plus 100 feet. Source: Towne, R., 2007. City of Foster City Public Works, personal communication with Baseline.

<sup>5</sup> City of Foster City, 2008. *Foster City Storm Drain Plans - GIS layer*. Public Works. July.

than 1 square mile, and areas protected by levees from a 100-year flood.<sup>6</sup> The FIRM is in the process of being revised by FEMA, as described below.<sup>7</sup>

It has been determined that a section of levee within the City of San Mateo does not meet FEMA's requirements for adequate protection. This resulted in portions of San Mateo and all of Foster City being reclassified from Zone X (non-mandatory flood insurance) to Zone A (mandatory flood insurance required). On April 18, 2008, FEMA released preliminary drafts of revised FIRMs for San Mateo County. Because of changes in the methodology used to generate flood plain data, the revised maps show all of Foster City to be in a Special Flood Hazard Zone A: Areas subject to a 1 percent annual chance of flooding (100-year flood), for which no base flood elevations have been identified.

Prior to the current re-mapping, FEMA reviewed communities separately within their respective city limits to determine the flood ratings for each community. In the recent evaluation, the flood ratings do not consider city limits as the boundaries for potential flood impacts.

Foster City and San Mateo officials are working towards improving the levee to preclude the preliminary flood zone designation from becoming final in the Spring of 2010. This is important because special flood zone designation would result in the need for mandatory flood insurance and new development and some improvements to properties would need to be constructed to comply with specific flood hazard mitigation standards. Construction of levee improvements is expected to be finished by the summer of 2010, shortly after the effective date of the FIRMs. Construction of the improvements depends on the permitting processes of various regulatory agencies. Flood zone ratings can be modified once the levee is improved. Foster City and San Mateo officials are working with FEMA to minimize the time required to complete the project and avoid a Special Flood Hazard Zone designation, if possible.

Foster City undertook an approximately \$2 million project to improve its levees in the early 1990's when FEMA was proposing to reclassify all of Foster City into a Special Flood Hazard Zone. Upon completion of the project, the Foster City Levee was certified by FEMA as providing adequate protection, so that flood insurance was not mandatory. FEMA recertified the Foster City Levee in July 2007.

The project site could be subject to inundation in the event of a catastrophic failure of the Lower Crystal Springs Dam (LCSD), approximately 5.1 miles west of the site.<sup>8</sup> LCSD is owned by the City and County of San Francisco, and has a capacity of 57,910 acre-feet. The water level at LCSD has been lowered pending a major renovation designed to ensure that the dam would survive without failure during a major seismic and/or maximum probable flood event. Overland and creek channel flows from the west (the direction of LCSD) would be intercepted by the Marina Lagoon in San Mateo at the western edge of Foster City. The Foster City Public Works Department estimates that a failure of LCSD would result in a maximum flood height of about 2 feet at the County Fair Grounds

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<sup>6</sup> Federal Emergency Management Agency, 1995. Flood Insurance Rate Map (FIRM), City of Foster City, California, Community Panel Number 060318 0010 C. January 19. Accessed 8/11/08 at: [www.msc.fema.gov](http://www.msc.fema.gov).

<sup>7</sup> Foster City Press Release, 2008. Towne, Ray, Public Works Director, *Foster City Officials Take Action to Prevent Special Flood Zone Designation*. April 28. See: [www.fostercity.org/news/press\\_releases/](http://www.fostercity.org/news/press_releases/)

<sup>8</sup> Association of Bay Area Governments, 2008. *Foster City Inundation Map*. Website: [www.abag.ca.gov](http://www.abag.ca.gov).

in the City of San Mateo.<sup>9</sup> The estimated flood in the City of San Mateo would be below the crest height (6 feet) of a levee along Marina Lagoon in Foster City.<sup>10</sup> The San Mateo Pumping Station at the northern end of the Marina Lagoon is capable of moving 600,000 gallons per minute of water out of the lagoon and into San Francisco Bay.<sup>11</sup> The Foster City Lagoon is part of the Foster City storm water management system and is used by the city as a retention basin and to buffer the effects of large storms. At its closest, the Foster City Lagoon is approximately ½-mile east of the project site. Two diesel-powered pumps, each capable of moving approximately 125,000 to 140,000 gallons per minute, depending on tidal conditions,<sup>12</sup> lower the water level of the lagoon in anticipation of large storms, and/or the wet weather season.<sup>13</sup> Foster City maintains the lagoons with a surface elevation of minus 1 foot NGVD and routinely lowers the water level by an additional 1 foot to provide reserve storage capacity in the event of a storm. This can provide in excess of 138 million gallons (423.5 acre feet) of storage before the lagoon bulkhead is crested. The minimum elevation of the lowest living floor level within Foster City is several feet higher than the levee bulkhead elevation.<sup>14</sup>

**d. Coastal Hazards.** The location of the project site (near San Francisco Bay) and the elevation of the site (approximately 5 to 7 feet NGVD) may expose the site to coastal hazards, such as sea level rise, seiche, tsunami, or extreme high tides. The City of Foster City completed a Levee Improvement Program during 1993<sup>15</sup> and raised the City's Bay-facing levees to a crest height of approximately 10.0 feet NGVD.<sup>16</sup> In a letter dated July 23, 2007, FEMA notified the City of Foster City that it had certified the Foster City Levee, identified as levee P771, as meeting the criteria outlined in Title 44, Code of Federal Regulations Section 65.10.<sup>17</sup> As such, the area protected by the levee was classified as Zone X, protected by a levee from flood, and the latest Flood Insurance Rate Map reflects this finding, as noted above in the discussion regarding flooding.

**(1) Sea Level Rise.** The earth has gone through several cycles of cooling and warming over recent geologic time, resulting in periods of glaciation with an associated sea level reduction, and warming with sea level rise. The most recent cycle of global climate change (GCC) may be attributable to a warming trend of the earth's atmosphere (an increase of approximately 1.8°F in the last 100 years) which could result in sea level rise. Based on long-term monitoring of stationary tidal gauges around the world, it is estimated that the current background rate of sea level rise is 0.07 to 0.08 inches per year.<sup>18</sup> Rates of sea level rise may vary at specific locations, as local subsidence or uplift affects the relative change in sea level between land masses and the ocean. In the San Francisco Bay area, the background rate of sea level rise has been estimated to be approximately 0.085 inches

<sup>9</sup> City of Foster City, 1993. *General Plan, Chapter 7: Safety Element*, adopted October 1995.

<sup>10</sup> *Ibid.*

<sup>11</sup> *Ibid.*

<sup>12</sup> City of Foster City, 2005. *Press Release: Foster City Levee Provides Solid Protection*. September 7.

<sup>13</sup> Towne, Ray, 2007. Director of Public Works, Foster City. Personal Communication with Baseline Environmental Consulting. August 22.

<sup>14</sup> *Ibid.*

<sup>15</sup> City of Foster City, 2005. *op. cit.*

<sup>16</sup> Towne, Ray, 2007. *op. cit.*

<sup>17</sup> U.S. Department of Homeland Security, 2007. *op. cit.*

<sup>18</sup> Titus, James G. and Narayanan, Vijay, 1995. *The Probability of Sea Level Rise*, U.S. Environmental Protection Agency, Washington, D.C., 186 pp. EPA 230-R95-008. October.

per year over the past 100 years.<sup>19</sup> The exact contribution of man-made effects over and above the background GCC warming cycle is still under debate.<sup>20,21</sup> Refer to Section V.K for additional information about global climate change.

**(2) Seiche.** A seiche is the oscillation of a body of water. Seiches occur most frequently in enclosed or semi-enclosed basins such as lakes, bays or harbors. They can be triggered in an otherwise still body of water by strong winds, changes in atmospheric pressure, earthquakes, tsunami or tides. Triggering forces that set off a seiche are most effective if they operate at specific frequencies relative to the size of an enclosed basin. Coastal measurements of sea level often show seiches with amplitudes of a few centimeters and periods of a few minutes due to oscillations of the local harbor, estuary, or bay, superimposed on the normal tidal changes. Detailed tidal records for the Bay have been maintained for approximately 100 years, and during that time, a damaging seiche has not occurred. A seiche of approximately 4 inches occurred during the 1906 earthquake. It is unlikely that the Bay region will experience a larger earthquake than the 1906 event, and therefore a seiche larger than 4 inches is unlikely.

**(3) Tsunami.** Tsunamis are long period water waves caused by underwater seismic events, volcanic eruptions, or undersea landslides. Tsunamis affecting the San Francisco Bay region would most likely originate west of the Bay, in the Pacific Ocean. Areas that are highly susceptible to tsunami inundation tend to be low-lying coastal areas, such as tidal flats, marshlands, and former bay margins that have been artificially filled. Inundation or damage caused by a tsunami may disrupt highway traffic in those low-lying areas. Tsunamis entering San Francisco Bay through the relatively narrow Golden Gate would tend to dissipate as the energy of the wave spreads out as the Bay becomes wider and shallower.<sup>22</sup> Predicted wave run-up at Foster City from the 100-year tsunami event is estimated to be 4.2 feet.<sup>23</sup>

**(4) Extreme High Tide.** Extreme high tides in San Francisco Bay result from the combined effects of astronomical high tides (related to the lunar cycle) and other factors, including winds, barometric pressure, ocean temperatures, and freshwater runoff. In California, the highest astronomical tides occur in the summer and winter, and therefore extreme high tides are most likely to occur during these times. Based on the 129-year record of daily high tides, the U.S. Army Corps of Engineers has developed an estimated 100-year high tide elevation for various locations in the Bay (an extreme high tide with a probability of occurrence every 100 years). The elevation of the estimated 100-year tide at Foster City is approximately 7.1 feet.<sup>24</sup>

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<sup>19</sup> National Oceanic & Atmospheric Administration (NOAA), 2007. Mean Sea Level Trend (station) 9414290 San Francisco, California, accessed 6/12/07 at: [tidesandcurrents.noaa.gov/sltrends/sltrends\\_station.shtml?stnid=9414290](http://tidesandcurrents.noaa.gov/sltrends/sltrends_station.shtml?stnid=9414290).

<sup>20</sup> Titus, James G. and Richman, Charlie, 2001. *Maps of Lands Vulnerable to Sea Level Rise: Modeled Elevations along the U.S. Atlantic and Gulf Coasts*, Climate Research, CR 18:205-228.

<sup>21</sup> Thieler, E. Robert, and Hammar-Klose, Erika S., 2000. *National Assessment of Coastal Vulnerability to Sea-Level Rise: Preliminary Results for the U.S. Pacific Coast*, U.S. Geological Survey Open-File Report 00-178, available at: [pubs.usgs.gov/of/2000/of00-178/](http://pubs.usgs.gov/of/2000/of00-178/).

<sup>22</sup> Houston, J. R., Garcia, A.W., 1975. Type 16 Flood Insurance Study: *Tsunami Predictions for Monterey and San Francisco Bays and Puget Sound*, Technical Report H-75-17. November.

<sup>23</sup> Ritter, J., Dupre, W., 1972. *Maps Showing Areas of Potential Inundation of Tsunamis in the San Francisco Bay Region, California*, Department of the Interior, U.S. Geological Survey, Misc. Field Studies, MF480.

<sup>24</sup> United States Army Corps of Engineers (COE), 1984. *San Francisco Bay Tidal Stage vs. Frequency Study*.

**e. Groundwater.** The project site is within the Santa Clara Valley Groundwater Basin in the San Mateo Plain sub-basin, which is bounded by San Francisco Bay to the east, the Westside basin to the north (also referred to as Merced Valley basin), the Santa Cruz Mountains to the west, and San Francisquito Creek to the south. The basin is composed of alluvial fan deposits formed by tributaries to San Francisco Bay. The water-bearing formations comprise two groups; the Santa Clara Formation of the older Plio-Pleistocene age and the Quaternary age alluvial deposits. The alluvial deposits overlie the Santa Clara Formation and have a maximum depth of about 1,250 feet. The alluvial deposits thin out in the upland areas rising into the Santa Cruz Mountains. A geotechnical investigation prepared for the southern portion the project site notes that groundwater was encountered at a depth of 3 feet below ground surface (bgs) in the borings conducted as part of the field exploration.<sup>25</sup> The groundwater depths may vary due to seasonal precipitation, infiltration rates, and tidal influences due to the proximity of San Francisco Bay.

**f. Water Quality.** The quality of surface water and groundwater in the vicinity of the project site is affected by past and current land uses at the site and the quality of San Francisco Bay in areas where groundwater is affected by tides. Water quality within the watershed is also affected by the composition of local geologic materials. Water quality in surface and groundwater bodies is regulated by the State Water Resources Control Board and Regional Water Quality Control Boards. The project site is under the jurisdiction of the San Francisco Bay Regional Water Quality Control Board (Water Board), which is responsible for implementation of State and federal water quality protection statutes, regulations, and policies in the vicinity of the project site. The Water Board implements the Water Quality Control Plan (Basin Plan),<sup>26</sup> a master policy document for managing water quality in the region. The Basin Plan establishes beneficial water uses for waterways and water bodies within the region. The San Mateo Plain groundwater sub-basin underlies the project site and is listed in the Basin Plan as providing the beneficial uses of municipal and domestic water supply, industrial process water supply, industrial service water supply, and agricultural water supply.

**(1) Storm Water Quality.** Runoff water quality is regulated by the National Pollutant Discharge Elimination System (NPDES) Program (established through the Clean Water Act). The NPDES program objective is to control and reduce pollutants to water bodies from surface water discharges. Locally, the program is administered by the Water Board. The Water Board issued the City/County Association of Governments of San Mateo County a municipal NPDES permit (Water Board Order No. 99-059, NPDES Permit No. CAS0029921) (County Permit). The San Mateo Countywide Water Pollution Prevention Program (SMCWPPP)<sup>27</sup> maintains compliance with the NPDES Stormwater Discharge Permit and promotes storm water pollution prevention within that context. Compliance with the NPDES Permit is mandated by State and federal statutes and regulations.<sup>28</sup> Participating agencies (including the City of Foster City) must comply with the provisions of the County permit and its amendments by ensuring that new development and

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<sup>25</sup> Lowney Associates, 2005. *Geotechnical Investigation Gilead Sciences Research Expansion: NRB1, NRB2, and Annex Buildings, Foster City*. Report No. 347-66A. November 8.

<sup>26</sup> San Francisco Bay Regional Water Quality Control Board, 1995 as appended through 2007. *Water Quality Control Plan*. See: [www.waterboards.ca.gov/sanfranciscobay/basin\\_planning.shtml](http://www.waterboards.ca.gov/sanfranciscobay/basin_planning.shtml)

<sup>27</sup> City/County Association of Governments of San Mateo County, 2008. *National Pollutant Discharge Elimination System Technical Advisory Committee*, Website: [www.ccag.ca.gov/npdes\\_tac.html](http://www.ccag.ca.gov/npdes_tac.html).

<sup>28</sup> San Mateo Countywide Water Pollution Prevention Program, 2003. *Stormwater Management Plan, April 2004 to June 2010*. November 4. Website: <http://www.flowstobay.org/>.

redevelopment mitigate, to the maximum extent practicable, water quality impacts to storm water runoff both during construction and operation periods of projects. Required permit provisions are detailed in Water Board Orders R2-2003-0023 and R2-2007-027, which amend Order No. 99-059 (NPDES Permit No. CAS0029921). The proposed project would be subject to Provision C.3 of the County Permit, which requires:

- **Numeric Sizing Criteria for Pollutant Removal Treatment Systems.** A development project must include source controls, site design measures, and treatment controls to minimize storm water pollutant discharges. Pollution treatment controls shall be sized to treat the volume of annual runoff required to achieve 80 percent or more capture of average annual runoff (in the Bay Area this is equivalent to having the capacity to repetitively treat storm events of about 1 inch of precipitation).
- **Operation and Maintenance of Treatment Measures.** Treatment controls often do not work unless adequately maintained. The permit requires an operations and maintenance (O&M) program.
- **Limitation on Increase of Peak Storm Water Runoff Discharge Rates.** Hydromodification is a general term that encompasses effects of projects on the natural hydrologic, geochemical and physical functions of streams and wetlands that maintain or enhance water quality. Urbanization creates impervious surfaces that reduce the landscape's natural ability to absorb water and release it slowly to creeks. These impervious surfaces increase peak flows in creeks and can cause erosion and other hydromodification impacts. Project sponsors must evaluate the potential for this to occur and provide mitigation, as necessary.

In addition, projects disturbing more than 1 acre of land during construction are required to file a Notice of Intent (NOI) with the Water Board to be covered under the State NPDES Construction General Permit (CGP) for discharges of storm water associated with construction activity. A project sponsor must implement control measures that are consistent with the CGP. A Storm Water Pollution Prevention Plan (SWPPP) must be developed and implemented for each site covered by the CGP. A SWPPP must include Best Management Practices (BMPs) designed to reduce potential impacts to surface water quality during the construction of the project.<sup>29</sup>

**(2) Groundwater Quality.** Groundwater quality in the project area is characterized as slightly alkaline (mean pH of 7.3) with a hardness of 471 milligrams per liter (mg/L) of calcium carbonate (CaCO<sub>3</sub>), classifying it as "very hard." In some areas, water quality may be impaired due to high concentrations of sodium, due to tidal influence.<sup>30</sup>

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<sup>29</sup> The State Water Resources Control Board, Water Quality Order 99-08-DWQ, National Pollutant Discharge Elimination System (NPDES), General Permit for Storm Water Discharges Associated with Construction Activity (Construction General Permit or CGP) states that: The regulations provide that discharges of stormwater to waters of the United States from construction projects that encompass five or more acres of soil disturbance are effectively prohibited unless the discharge is in compliance with an NPDES Permit. Regulations (Phase II Rule) that became final on December 8, 1999 expand the existing NPDES program to address stormwater discharges from construction sites that disturb land equal to or greater than 1 acre and less than 5 acres (small construction activity). The regulations require that small construction activities, other than those regulated under an individual or Regional Water Quality Control Board General Permit, must be permitted no later than March 10, 2003.

<sup>30</sup> California Department of Water Resources, 2004. California's Groundwater: Santa Clara Valley Groundwater Basin, San Mateo Subbasin, Bulletin 118. February 27.

**g. Regulatory Considerations.** Applicable regulations related to hydrology and water quality are described below.

**(1) Foster City Standard Conditions of Approval.** Foster City has adopted Standard Conditions of Approval (COA) for large development and redevelopment projects. The following COAs related to storm water drainage and infrastructure would apply to the proposed project. Other COAs may also apply to the project.<sup>31</sup>

- A hydrology/hydraulic analysis shall be completed on the existing storm drain system to verify it is adequately sized to handle the runoff from the project. The existing storm drains shall be cleaned as necessary.
- Pre-construction and post-construction survey reports shall be completed on the existing storm drain system. Any necessary repairs to restore the facilities shall be an element of the report.

**(2) Foster City General Plan.** The following goals, policies, and programs from the Foster City General Plan Safety Element related to hydrology and water quality pertain to the proposed project.

- **Safety Goals:**
  - *S-B Protect From Flood Waters.* Protect the community from unreasonable risk to life and property caused by flood hazards.
- **Safety Policies:**
  - *S-4 Flood Protection.* The City will maintain the City's levees and lagoon system for flood protection.
  - *S-5 Flood Plain Regulations.* The City will control development to minimize risks to persons and property within any special flood hazards area through flood plain regulations.
- **Safety Program:**
  - *S-G Maintain Levees and Lagoon for Flood Protection.* The City (Public Works) will maintain the City's levees and lagoon for flood protection pursuant to the "Operation and Maintenance Manual, Foster City Levees and Pump Station" and the "Lagoon Management Plan."
  - *S-H Flood Plain Regulations.* The City (Community Development Department) will evaluate any proposed development within special flood hazard areas for conformance with the City's flood plain regulations as contained in Chapter 15.36 of the Foster City Municipal Code.

## 2. Impacts and Mitigation Measures

This section analyzes the impacts related to hydrology and water quality that could result from implementation of the Master Plan. The section begins with criteria of significance, which establish the thresholds for determining whether a project impact is significant. The latter part of this section presents the potential hydrology and water quality impacts associated with the proposed project. Mitigation measures are provided as appropriate and feasible.

**a. Significance Criteria.** The project would have a significant effect on hydrology or water quality if it would:

- Violate any water quality standards or waste discharge requirements;

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<sup>31</sup> Towne, Ray, 2007. op. cit.

- Create or contribute a substantial amount of runoff that would be an additional source of water quality degradation;
- Result in substantial erosion or sedimentation on- or off-site that would affect the quality of receiving water;
- Create or contribute runoff that would exceed the capacity of existing or planned storm water drainage systems and/or increase upstream or downstream flooding and require or result in the construction of new storm water drainage facilities or expansion of existing facilities, the construction of which could cause significant environmental effects;
- Place housing within a 100-year flood hazard area as mapped on a federal Flood Hazard Boundary or Flood Insurance Rate Map or other flood hazard delineation map;
- Place within a 100-year flood hazard area structures which would impede or redirect flood flows;
- Expose people or structures to a substantial risk of loss, injury, or death involving flooding, including flooding as a result of the failure of a levee or dam;
- Expose people or structures to a substantial risk of inundation by seiche, tsunami, extreme high tides, and/or sea level rise;
- Substantially deplete groundwater supplies or interfere substantially with groundwater recharge such that there would be a significant net deficit in aquifer volume or a lowering of the local groundwater table level;
- Substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river, in a manner which would result in substantial erosion or siltation on- or off-site;
- 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 which would result in flooding on- or off-site; or
- Otherwise substantially degrade water quality.

**b. Less-than-Significant Hydrology and Water Quality Impacts.** Based on the Master Plan and information provided by Foster City<sup>32</sup> the project would increase impervious coverage on the site from approximately 72 percent of the site to approximately 81 percent of the site, and would provide associated upgrades to drainage infrastructure and storm water conveyances. This relatively minor increase in impervious surfaces, combined with new drainage infrastructure, would not be expected to substantially increase storm water runoff from the site. Therefore, the project would not be expected to result in downstream flooding or require an extensive upgrade to storm water infrastructure that would itself result in significant environmental effects. The City of Foster City requires that grading and drainage plans be reviewed for compliance with the requirements of the Public Works Department and/or Building Inspection Division and the City can require any improvements to the storm drainage system deemed necessary (including improvements to storm water conveyance pipes and other off-site improvements) to be incorporated into the conditions of approval for the project. The proposed project is within an area explicitly exempted from the hydromodification management plan requirements of the SMCWPPP program due to close proximity to the Bay and the

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<sup>32</sup> City of Foster City, 2008. op. cit.

predominance of engineered hardened drainage conveyances.<sup>33</sup> As a result, the Master Plan is unlikely to result in erosional or hydromodification effects (as defined above, hydromodification refers to the effects of projects on the natural hydrologic, geochemical, and physical functions of streams and wetlands that maintain or enhance water quality). The proposed project would not substantially alter the existing drainage pattern of the site or area; the drainage pattern of the site with the proposed project would be similar to that under existing conditions, although with a slightly increased proportion of impervious surfaces. No natural streams or rivers are located in the vicinity of the project site. Thus the project would result in no changes that could generate substantial erosion or flooding either on- or off-site. The project would contain no unusual or unique features that would substantially degrade water quality; common construction and operational period impacts typical to this class of development are discussed below in Impact HYDRO-1.

Residential structures are not a part of the proposed project; as a result, the project would not place housing within a 100-year flood zone. The project site is served by a gravity storm water drainage system that flows to the Foster City storm sewer system, which is managed by the Foster City Public Works Department. The proposed on-site storm water conveyance system would be designed under Foster City Design Criteria and reviewed and approved by the Public Works Department and/or Building Inspection Division to ensure that the storm water conveyance system would perform in accordance with City requirements to protect the property from storm flooding.

Currently, the cities of San Mateo and Foster City are working together with FEMA to resolve potential flooding hazards related to a substandard levee in San Mateo. As of the summer of 2008, the two cities have agreed upon the scope of the necessary improvement, but funding for the project has not been identified. The substandard levee would be upgraded as part of a project independent of the Master Plan. Certification of that levee, and issuance of an updated evaluation by FEMA that avoids a special flood zone designation, is anticipated in 2010. Although the initial phase of the Master Plan may be underway while the flood hazard issue is unresolved, buildout of the entire Master Plan is not anticipated for at least 10 years, significantly after the anticipated resolution of the levee issue.

Once FEMA's preliminary FIRMs for San Mateo County, including the project site, become effective in the spring of 2010, property owners in Foster City with federally insured liens or mortgages will be required to purchase flood insurance. In addition, proponents of development projects will be required to comply with Chapter 15.36, Floodplain Management Regulations of the Foster City Municipal Code. Therefore, structures built as part of the project would not impede or redirect flood flows.

However, the levee improvement planned for certification in 2010 would avert the need for a special flood zone designation of areas protected by the levee, including Foster City and the project site. With the completion of levee improvements and anticipated certification of the levees, flood zone ratings could be modified by FEMA back to Zone X, as described above, and the need for flood-related development requirements would be eliminated, along with issues regarding changes to flood flows. As a result of this process, the substandard levee is not expected to expose people or structures on the project site to a substantial long-term risk of loss, injury, or death involving flooding. However, even without the levee improvement, there is a low potential for flooding of the site that would substantially threaten human safety or property. Design of the drainage system and storm water

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<sup>33</sup> San Mateo Countywide Water Pollution Prevention Program, 2005. *Hydromodification Management Plan*. May 12. Website: <http://www.flowstobay.org/>

management plans, as required and approved by Foster City, would drain the site and channel storm water to the Foster City Lagoon system and from there to San Francisco Bay via the City's lagoon pump stations. Adherence to existing requirements, including those governing design and placement of structures in flood zones, would reduce the potential flooding impact to a less-than-significant level.

The project site is located within a mapped dam failure inundation area for the Lower Crystal Springs Dam (LCSD).<sup>34</sup> Dam failure is a low probability event that can be caused by earthquakes or overflow. The LCSD is under the jurisdiction of State of California, Division of Safety of Dams and is currently planned for seismic upgrade by the San Francisco Public Utilities Commission. This seismic retrofit project is funded and estimated for completion in 2011. Existing dams under State and federal jurisdiction are periodically inspected to ensure that they are adequately maintained and to direct the owner to correct any identified deficiencies. Regular inspections and required maintenance of the dams substantially reduce the potential for catastrophic failure. The hazard from flooding due to dam failure inundation would be less than significant because the water level at LCSD has been lowered pending a major seismic retrofit. The lowering of the water level would ensure that the dam would not fail during a major earthquake or flood, and water behind the dam would not substantially affect the project site.

Estimates for sea level rise by 2050 in San Francisco Bay range from approximately 0.33-foot to 1.25-foot. The 100-year extreme high tide at Foster City is estimated to be 7.1 feet.<sup>35</sup> The cumulative extreme high tide combined with potential sea level rise by 2050 could crest at 8.35 feet (7.1 feet plus 1.25 feet) NGVD. The existing Foster City levees, recertified in 2007, with an elevation of approximately 10 feet NGVD or higher, would be expected to provide adequate protection from sea level rise, extreme high tides, seiches, and tsunamis, all of which tend to present hazards for sites at elevations lower than 10 feet NGVD.<sup>36</sup> See also the discussion, above, regarding anticipated levee upgrades and the resolution of related FEMA Special Flood Zone issues. Coastal hazard threats to the project site are therefore considered less than significant.

Master Plan development would not use local groundwater supplies; therefore, implementation of the proposed project would not contribute to depletion of groundwater supplies or reduce the amount or quality of water available for public water supplies.

No streams or rivers cross the project site. Therefore, no streams or rivers would be modified as part of the proposed Master Plan.

**c. Significant Hydrology and Water Quality Impacts.** Development of the Master Plan could result in a significant impact related to water quality, as described below.

**Impact HYD-1: Construction period and operation period Master Plan activities could result in degradation of water quality in Vintage Lake and the Bay by reducing the quality of storm water runoff. (S)**

<sup>34</sup> ABAG, 2008. *Foster City Inundation Map*. Website: [www.abag.ca.gov](http://www.abag.ca.gov).

<sup>35</sup> COE, 1984, op. cit.

<sup>36</sup> Titus, James G. and Narayanan, Vijay, 1995. op. cit

**(1) Construction-Period Impacts.** Demolition, excavation, grading and construction on the project site would require temporary disturbance of surface soils and removal of existing pavement and buildings. During the construction period, excavation and grading activities would result in exposure of soil to runoff, potentially causing erosion and entrainment of sediment in the runoff. Soil stockpiles and excavations on the project site would be exposed to runoff and, if not managed properly, the runoff could cause erosion and increased sedimentation in water courses outside of the project site. The accumulation of sediment could result in blockage of flows, potentially resulting in increased localized ponding or flooding.

The potential for chemical releases is present at most construction sites. Once released, substances such as fuels, oils, paints, and solvents could be transported to nearby surface waterways and/or groundwater in storm water runoff, wash water, and dust control water, potentially reducing the quality of the receiving waters.

**(2) Operation-Period Impacts.** New construction and intensified land uses at the project site would result in increased personnel on the site, with attendant vehicle use and the potential discharge of associated pollutants. Leaks of fuel or lubricants, tire wear, brake dust, and fallout from exhaust contribute petroleum hydrocarbons, heavy metals, and sediment to the pollutant load in runoff being transported to receiving waters. Runoff from the proposed landscaped areas may contain residual pesticides and nutrients. Long-term degradation of runoff water quality from the site could adversely affect water quality in the receiving waters (including Vintage Lake) and San Francisco Bay.

Implementation of the following three-part mitigation measure would reduce construction- and operation-period impacts to water quality to a less-than-significant level:

Mitigation Measure HYD-1a: In compliance with the terms of the Construction General Permit, the project sponsor shall prepare a Storm Water Pollution Prevention Plan (SWPPP) designed to reduce potential impacts to surface water quality through the construction period of an individual development project, or group of projects, built as part of the Master Plan. It is not required that the SWPPP be submitted to the Regional Water Quality Control Board (Water Board), but must be maintained on-site and made available to Water Board staff upon request. The SWPPP shall include specific and detailed Best Management Practices (BMPs) designed to mitigate construction-related pollutants. At a minimum, BMPs shall include practices to minimize the contact of construction materials, equipment, and maintenance supplies (e.g., fuels, lubricants, paints, solvents, and adhesives) with storm water. The SWPPP shall specify properly-designed centralized storage areas that keep these materials out of the rain.

BMPs designed to reduce erosion of exposed soil may include, but are not limited to: soil stabilization controls, watering for dust control, perimeter silt fences, fiber rolls, and sediment basins. The potential for erosion is generally increased if grading is performed during the rainy season because disturbed soil can be exposed to rainfall and storm runoff. If grading must be conducted during the rainy season, the primary BMPs selected shall focus on erosion control (i.e., keeping sediment on the site). End-of-pipe sediment control measures (e.g., basins and traps) shall be used only as secondary measures. Ingress and egress from construction sites shall be carefully controlled to minimize off-site tracking of sediment. Vehicle and equipment wash-down facilities shall be designed to be accessible and functional during both dry and wet conditions.

To educate on-site personnel and maintain awareness of the importance of storm water quality protection, site supervisors shall conduct regular tailgate meetings to discuss pollution prevention. The frequency of the meetings and required personnel attendance list shall be specified in the SWPPP.

The SWPPP shall specify a monitoring program to be implemented by the construction site supervisor, and shall include both dry and wet weather inspections. In addition, in accordance with State Water Resources Control Board Resolution No. 2001-046,<sup>37</sup> monitoring shall be required during the construction period for pollutants that may be present in the runoff that are “not visually detectable in runoff.”<sup>38</sup> The project sponsor shall retain an independent monitor to conduct weekly inspections and provide written monthly reports to the City Planning and Code Enforcement Division to ensure compliance with the SWPPP. Water Board personnel, who may make unannounced site inspections, are empowered to levy considerable fines if it is determined that the SWPPP has not been properly prepared and implemented.

Mitigation Measure HYD-1b: The project sponsor shall fully comply with the San Mateo Countywide Water Pollution Prevention Program, which maintains compliance with the NPDES Stormwater Discharge Permit. Responsibilities include, but are not limited to, designing Best Management Practices (BMPs) into project features and operations to reduce potential impacts to surface water quality associated with operation of specific development projects undertaken as part of the Master Plan. These features shall be included in the drainage plan and final development drawings for individual projects. Specifically, the final design shall include measures designed to mitigate potential water quality degradation of runoff from all portions of the completed development.

All requirements of the San Mateo Countywide Water Pollution Prevent Program, previously called the San Mateo Water Pollution Prevention Program – Part C. 3, as outlined in the San Mateo County Stormwater Handbook, shall be incorporated. The final design team for each development project shall also review and incorporate as many concepts as practicable from *Start at the Source, Design Guidance Manual for Stormwater Quality Protection*.<sup>39</sup> Passive, low-maintenance BMPs (e.g., grassy swales, porous pavements) are preferred in all areas. Higher-maintenance BMPs may only be used if the development of at-grade treatment systems is not possible, or would not adequately treat runoff. Funding for long-term maintenance of all BMPs must be specified (as the City will not assume maintenance responsibilities for these features). The project sponsor shall establish a self-perpetuating drainage system maintenance program for the life of the project (to be managed by a business and/or homeowners association or similar entity) that includes annual inspections of any storm water detention devices and drainage inlets. Any accumulation of sediment or other debris would need to be promptly removed. In addition, an annual report documenting the inspection and any remedial action

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<sup>37</sup> State Water Resources Control Board, 2001. Modification of Water Quality Order 99-08-DWQ State Water Resources Control Board (SWRCB) National Pollutant Elimination System (NPDES) General Permit for Stormwater Discharges Associated with Construction Activity.

<sup>38</sup> Construction materials and compounds that are not stored in water-tight containers under a water-tight roof or inside a building are examples of materials for which the discharger may have to implement sampling and analysis procedures.

<sup>39</sup> Bay Area Stormwater Management Agencies Association, 1999. *Start at the Source, Design Guidance Manual for Stormwater Quality Protection*. Website: [www.basmaa.org](http://www.basmaa.org).

conducted shall be submitted to the Public Works Department and/or Building Inspection Division for review and approval.

The SWPPP and drainage system maintenance plan must be approved by the City prior to approval of the grading plan.

Mitigation Measure HYD-1c: The project sponsor shall comply with all requirements of the City's Standard Conditions of Approval (COA). At a minimum, in accordance with the COAs, a hydrology/hydraulic analysis shall be completed on the existing storm drain system to verify it is adequately sized to accommodate the runoff from the project. The existing storm drains shall be cleaned as necessary. Pre-construction and post-construction survey reports shall be completed on the existing storm drain system. Any necessary repairs to restore the facilities shall be an element of the report.

Required pre-construction reports documenting work performed in compliance with the COAs shall be submitted to the Public Works Department and/or Building Inspection Division for review and approval prior to the issuance of grading and building permits. Required post-construction reports shall be submitted to the Public Works Department and/or Building Inspection Division for review and approval prior to the issuance of occupancy permits. (LTS)

