11. HYDROLOGY AND WATER QUALITY

This chapter describes existing drainage and water quality characteristics in the project site vicinity, the potential impacts of the project on these conditions, and measures necessary to mitigate identified significant impacts.

11.1 SETTING

11.1.1 Drainage and Hydrology

(a) Citywide Drainage and Hydrology. Hercules is located primarily in the Refugio Valley along the western shore of San Pablo Bay, on the northeast side of the San Francisco Bay Area. The city is bounded by hills to the northeast and east and by Pinole Ridge to the south. Mean annual precipitation is approximately 20 inches, and mean annual runoff is about 3 inches. The general trend of drainage in the area is to the northwest into San Pablo Bay.[1]

Refugio Creek is the main drainage feature and surface water source in the city, with a western branch feeding into the main creek from the southwest. Refugio Creek flows into Hercules from the southeast. The creek travels along a 4.5-mile course that bisects the project site, ending in San Pablo Bay just north of the site. The westernmost portion of Refugio Creek (adjacent to the project site) is tidally influenced. Refugio Creek is fed by tides and surface water runoff as well as by groundwater discharge, due to the relatively shallow groundwater depths in the Refugio Valley.[2]

A tidal slough or tributary also drains a small watershed area on the west side of the Refugio Valley. This tidal slough originates above a roughly one-acre pond previously used as an industrial water supply source and wastewater conveyance system during early operations of the Hercules Powder Company plant.[3]

(b) Existing Storm Drainage in Project Site Vicinity. The following information is included here because the Refugio Creek restoration and drainage improvements proposed under the ITC project are considered supporting public facilities and infrastructure for the Hercules Bayfront Project (see EIR subsection 3.4.7 in chapter 3, Project Description).

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[1]ESA, City of Hercules General Plan Land Use and Circulation Elements Update and Redevelopment Plan Amendments Environmental Impact Report, *Volume I: EIR Text*, prepared for the City of Hercules, California, June 9, 1995, page IV.I-1.

[2]City of Hercules, Hercules General Plan, *Open Space/Conservation Element*, approved by the City Council on September 22, 1998, page V-12.

[3]ESA, City of Hercules General Plan Land Use and Circulation Elements Update and Redevelopment Plan Amendments Environmental Impact Report, *Volume I: EIR Text*, prepared for the City of Hercules, California, June 9, 1995, page IV.I-1.

The project site drains overland to Refugio Creek, which adjoins and bisects the site, and to the Union Pacific Railroad (UPRR) right-of-way immediately north of the site. The site contains no existing storm drainage pipelines.[1]

The existing Refugio Creek channel is a low-flow tributary of San Pablo Bay. The creek is no longer a natural channel, apparently having been straightened, deepened, and channeled by the Hercules Powder Company in the early 1900s.[2] Also, historical filling has occurred up to the creek edge, resulting in creek banks that have very steep to vertical profiles. The creek banks adjacent to the project site range in height from 8 to 14 feet from creek bed to top-of-bank. Part of the lower creek area is within the 100-year flood zone identified by the Federal Emergency Management Agency (FEMA) Flood Insurance Rate Map (FIRM) (see subsection 11.1.2 below).

Adjacent to the project site, the existing low-flow creek channel varies in width (top-of-bank to top-of-bank) from approximately 20 feet in the upstream portion to about 40 feet in the downstream portion. At the downstream end (nearest the bay), the creek flows through culverts under a service road and then under a railroad bridge to San Pablo Bay. A non-tidal tributary (referred to as the North Channel) enters the main creek channel from the northeast near the southern (upstream) boundary of the Hercules Bayfront Project. An additional non-tidal tributary (referred to as the Central Channel) enters the main creek channel from the south approximately in the middle of the main channel length that is adjacent to the project site.

In areas surrounding the project site, storm drainage is collected by a municipal storm drainage system and transported to Refugio Creek. The Refugio Creek drainage network includes a flow storage facility in the form of an on-stream reservoir located in Refugio Valley Park (approximately one mile south of the project site). The reservoir stores excess runoff water during storms and also serves as a local recreational and scenic amenity.[3] The City maintains the existing municipal storm drainage system within its incorporated area.[4]

11.1.2 Flooding and Flood-Prone Areas

(a) Flooding During Storms. Areas of Hercules that are subject to flooding during the 100-year storm (i.e., a storm with a likelihood of occurring once every 100 years) have been identified by the Federal Emergency Management Agency (FEMA) on Flood Insurance Rate Maps (FIRMs). The most recently adopted FIRMs (June 16, 2009) for the project site vicinity indicate that portions of Refugio Creek, which adjoins and bisects the project site, are within the 100-year

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[1]Brent Salmi, City of Hercules Contract City Engineer, written communication, January 12, 2010.

[2]ESA, City of Hercules General Plan Land Use and Circulation Elements Update and Redevelopment Plan Amendments Environmental Impact Report, *Volume I: EIR Text*, prepared for the City of Hercules, California, June 9, 1995, page IV.I-1.

[3]City of Hercules, Hercules General Plan, *Open Space/Conservation Element*, approved by the City Council on September 22, 1998, page V-11.

[4]City of Hercules, Hercules General Plan, *Growth Management Element*, approved by the City Council on September 22, 1998, page X-9.

flood zone. On the project site, the 100-year flood zone covers areas immediately adjoining the creek and immediately east of the creek.[1]

(b) Sea Level Rise. Rising sea levels in San Francisco Bay pose a threat of future flooding on bayside lands, as well as lands next to lowland creeks and rivers. Predictions of sea level rise due to global warming vary widely. See additional discussion in chapter 7, Climate Change, of this Draft EIR.

(c) Tsunamis and Other Flooding Hazards. The Hercules General Plan Update EIR indicates that the city, bordered on the northwest by San Pablo Bay, is influenced by the bay's waves, tides, and salinity.[2] However, due to the rarity of tsunamis (earthquake-generated ocean waves) in San Pablo Bay, neither the Hercules General Plan nor the General Plan Update EIR identify any potential impacts due to tsunamis. The State of California Seismic Safety Commission has noted that the California Legislature has authorized the California Geological Survey to prepare tsunami hazard maps, but has not allocated funding.[3] The Association of Bay Area Governments (ABAG) website (www.abag.ca.gov) includes tsunami evacuation planning maps only for the ocean side of San Francisco and San Mateo counties.

The project site is not near any large enclosed bodies of water and therefore would not be subject to seiches (earthquake-generated waves in enclosed water bodies). According to dam inundation maps published by ABAG (www.abag.ca.gov), the site would also not be subject to flooding due to failure of a levee or dam, as there are no such structures near the site.

11.1.3 Water Quality

Hercules contains three major types of water movement systems--groundwater, surface water, and waters of San Francisco and San Pablo Bays--that may be subject to project-related water quality effects, as further described below. Other than current grading-related sedimentation, there are no known existing water quality issues on the project site.[4]

(a) Groundwater. In the low-lying valley areas, groundwater has been typically encountered at shallow depths from between the ground surface to approximately 7 feet.[5] No public water supply wells are located down-gradient of the project site. According to the Hercules General

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[1]Federal Emergency Management Agency (FEMA), Flood Insurance Rate Maps (FIRMs), map numbers 06013C0043F and 06013C0044F, available online at www.fema.gov.

[2]ESA, City of Hercules General Plan Land Use and Circulation Elements Update and Redevelopment Plan Amendments Environmental Impact Report, *Volume I: EIR Text*, prepared for the City of Hercules, California, June 9, 1995, page IV.I-3.

[3]State of California Seismic Safety Commission, *The Tsunami Threat to California*, December 2005.

[4]Salmi.

[5]ENGEO Incorporated, Preliminary Geotechnical Investigation, Hercules Property Inc. Site, Hercules, California, May 19, 1999, page 14.

Plan, monitored shallow groundwater quality in Hercules has been found to be brackish and non-potable, but not substantially affected by the area's previous industrial uses.[1]

(b) Surface Water. Surface water quality is largely dependent on the purity of storm water runoff. The City's municipal storm drainage system and local creeks carry runoff from areas throughout the city that contain industrial businesses. Many industries in Hercules use, handle, and store chemicals, and generate a variety of chemical wastes or by-products. Deposition of chemicals (solvents, fuels, waste materials) through accidental spills or storage and disposal may result in contamination of soils, groundwater, and surface runoff. Petroleum products are of concern, especially during fueling operations. Intentional and illegal dumping of chemicals also may have occurred. Materials may also leak into ground and surface waters from drain and sewer collection systems.

Streets are collection areas for pollutants that can contaminate runoff and receiving waters. Local soil erosion and motor vehicle emissions deposit pollutants on street surfaces. Most of these materials are carried by surface runoff to storm drains. As a result, storm water runoff from urban areas can potentially be contaminated with sediments from soil erosion and copper, nickel, zinc, and oil from motor vehicles.

Soil erosion occurs in exposed and steep areas throughout Hercules. Site clearing and cut-and-fill operations associated with construction can temporarily expose large land areas to erosion. Construction activity, including truck and heavy equipment traffic, tends to spread soil onto surrounding roads and walkways. Much of this material is washed into storm drains during rain storms or when water is used to wash down the area around building sites. Erosion can also occur if soil is stored on the site in piles or if surcharges are used. In the short term, such activities can increase suspended solids concentrations (turbidity) in the storm drain system, creeks, and the bay.

(c) Bay Waters. In addition to the factors noted above, long-term cumulative changes throughout the region have affected water quality in San Francisco and San Pablo Bays. Diking and filling have decreased wetland area by more than half, freshwater inflow from the Sacramento Delta has dramatically decreased due to water diversion projects in the Central Valley, and wastes have contaminated sediments and organisms.

The 2002 Clean Water Act Section 303(d) *List of Water Quality Limited Segments*, approved by the U.S. Environmental Protection Agency in June 2003, lists the waters of San Pablo Bay as impaired for the following constituents: pesticides (chlordane, dieldrin, diazinon and DDT); toxic organics (dioxin compounds, furan compounds and PCBs); and heavy metals (mercury, nickel and selenium). In addition, in annual monitoring reports published by the San Francisco Estuary Project, the Regional Monitoring Program has reported that samples taken in San Pablo Bay near Hercules regularly exceed water quality objectives established by the RWQCB, San Francisco Bay Region, in its Basin Plan for heavy metals (copper, chromium, lead, mercury, nickel and zinc) and polynuclear aromatic hydrocarbons.

[1]City of Hercules, Hercules General Plan, *Open Space/Conservation Element*, approved by the City Council on September 22, 1998, page V-8.

11.2 PERTINENT PLANS AND POLICIES

CEQA requires an EIR to identify the plan and policy setting within which the project is proposed and discuss any inconsistencies between the proposed project and these applicable plans and policies (CEQA Guidelines section 15125[d]). CEQA also indicates that this plan and policy consistency discussion should be limited to the context of evaluation and review of environmental impacts (CEQA Guidelines section 15124[b]).

11.2.1 Federal Regulations

The major federal legislation governing surface waters and water quality is the Clean Water Act as amended by the Water Quality Act of 1987. The objective of the Clean Water Act is "to restore and maintain the chemical, physical, and biological integrity of the Nation's waters." In general, implementation of many aspects of the Clean Water Act under the U.S. Environmental Protection Agency has been delegated to individual states.

The U.S. Army Corps of Engineers (Corps) has jurisdiction over projects involving "waters of the United States" and, under the federal Clean Water Act, would require review and possible permitting of any project involving construction in creeks or wetland areas. The Corps jurisdiction includes authority over all proposed discharges of dredged or fill material into waters of the United States. (See also chapter 6, Biological Resources.)

11.2.2 State Regulations

California regulations that could affect hydrologic aspects of creeks and waterways in the project site vicinity include the Porter-Cologne Water Quality Control Act (Division 7 of the California Water Code), which provides the basis for water quality regulation in California. Under this Act, the project site lies within the jurisdiction of the Regional Water Quality Control Board (RWQCB), San Francisco Bay Region. (See subsection 11.2.3, "Regional Water Quality Control Board Regulations," below.)

In addition, the California Department of Fish and Game (CDFG) has jurisdiction over any activity that could affect the bank or bed of any stream that has value to fish and wildlife. If any changes are proposed along a creek or waterway within CDFG jurisdiction, a Streambed Alteration Agreement would be required under California Fish and Game Code sections 1601-1606. (See also chapter 6, Biological Resources.)

11.2.3 Regional Water Quality Control Board Regulations

As noted above, the project site is located within the jurisdiction of the San Francisco Bay Regional Water Quality Control Board (Water Board). The Water Board is responsible for the protection of beneficial uses of water resources within the San Francisco Bay Region. The Water Board uses planning, permitting, and enforcement authorities to meet this responsibility, and has adopted the Water Quality Control Plan (Basin Plan) to implement plans, policies, and provisions for water quality planning and management. The Basin Plan contains water quality objectives that are intended to protect the beneficial uses of the basin. The Water Board has set water quality objectives for all surface waters in the region. Water quality objectives are also listed for groundwater.

The Water Board administers the National Pollutant Discharge Elimination System (NPDES) storm water permitting program in the Bay Area. Storm water quality control regulations, effective August 2006, stipulate that construction activities that create or replace *more than 10,000 square feet of impervious area* (e.g., roofs, streets, patios, driveways, walks, and parking lots, but excluding a single-family residence not part of a larger project) are subject to revised permitting requirements--i.e., must apply for an NPDES General Permit for Discharges of Storm Water Runoff Associated With Construction Activity (General Construction Permit). The previous impervious area limit was one acre.

The required conditions of an NPDES permit include preparation of a Storm Water Pollution Prevention Plan (SWPPP). A SWPPP is a project-specific document that details the treatment measures and Best Management Practices (BMPs) that have been incorporated into the project to control pollutants that would be implemented during the construction and post-construction phases of project development. Generally, a project's erosion control plan forms a significant portion of the construction-phase controls required in a SWPPP. In addition to the erosion and sediment control measures, the SWPPP must include construction-phase housekeeping measures for control of contaminants such as petroleum products, paints and solvents, detergents, fertilizers, and pesticides typically stored on-site for equipment maintenance or for use at particular stages of project construction. The SWPPP must also describe the post-construction BMPs to minimize pollutant transport to wetlands and water bodies once the project is built or in operation, and set forth the BMP monitoring and maintenance schedule and responsible entities during both the construction and post-construction phases.

Development and submittal of a SWPPP to county or municipal public works staff is typically a condition for issuing a grading permit. Once grading begins, the property owner or operator must keep the SWPPP on-site and regularly update it as BMP types and configurations change during the different phases of project construction. A SWPPP covering all portions of the Waterfront District currently undergoing or proposed for development has already been developed and is being updated. This existing document provides developers within the Waterfront District with coverage under the state NPDES permit for General Construction Activities.

11.2.4 Contra Costa County Regulations

The Contra Costa County Public Works Department and Contra Costa County Flood Control and Water Conservation District (CCCFCWCD) oversee the development and implementation of drainage systems in the county that have regional drainages. The County also coordinates with the Corps for construction of large flood control improvement projects.

The project site is located entirely within unformed Drainage Area 112 as mapped by the CCCFCWCD and does not drain to Pinole Creek. The drainage area is located entirely within the City of Hercules and is under the City's jurisdiction. The CCCFCWCD has no facilities in the project vicinity, and no CCCFCWCD permit would be required for project-associated drainage improvements.[1]

[1]Letter from Jocelyn A. B. LaRocque, Engineering Staff, Contra Costa County Flood Control and Water Conservation District, to Steve Lawton, Community Development Director, December 2, 2004. Verified by BKF Engineers, June 2010.

11.2.5 City of Hercules General Plan

Those objectives, policies, and programs from the Hercules General Plan that are pertinent to consideration of proposed project and its potential hydrology and water quality impacts are listed below. Where any aspect of the proposed project is found in this EIR to be potentially inconsistent with one or more of these City-adopted objectives, policies, or programs, a potentially significant environmental impact and one or more associated mitigations are identified for incorporation into the project to reduce the impact and better implement the General Plan. Otherwise, the proposed project is considered to be consistent with the objectives, policies, and programs listed below.

The *Open Space/Conservation Element* of the Hercules General Plan contains the following objectives, policies, and programs relevant to consideration of the hydrology and water quality impacts of the proposed project:

- *Protect riparian and wetland communities from degradation through introduction of urban pollutants in stormwater runoff.* (Objective 4)
- *The City shall require project proponents to design facilities to prevent degradation of riparian and wetland communities from urban pollutants in storm runoff.* (Policy 4a)
- *To minimize pollution downstream from sedimentation, the City shall require installation of sedimentation and grease basins in the storm drain system in parking lots in accordance with NPDES regulations and shall require that property owners maintain the basins annually, or as required by NPDES regulations. Parking lots shall be swept periodically to decrease the amount of debris that could potentially contaminate the riparian or wetland habitat.* (Program 4a.1)
- *Improve surface runoff water quality.* (Objective 9)
- *Reduce flooding potential within floodprone areas.* (Objective 10)
- *Ensure that adequate drainage facilities and pollution prevention and control infrastructure are built [to] accommodate the increase in runoff from newly developed areas.* (Policy 10a)
- *For each proposed development project, runoff increase calculations for the parcel at full build-out shall be measured against estimates of existing runoff to ensure that no flooding will result. (See also Growth Management Element standards for on-site retention and finished floor elevation requirements.)* (Program 10a.2)

In addition, the *Safety Element* contains the following relevant objectives, policies, and programs:

- *Consider potential …flood …hazards and introduce adequate safety measures in development plans and proposals.* (Objective 1)
- *Planned development plans must be prepared and adopted for all new development projects. Safety measures will be incorporated into these planned development plans to provide adequate protection from seismic, geologic, flood and fire hazards.* (Program 1A.1, Item 1)

- *The review and approval of zoning applications, tentative maps and planned development plans shall include consideration of safety policies and standards contained in the General Plan and other area plans.* (Program 1A.1, Item 2)

- *The subdivision, zoning and grading regulations govern the subdivision of land, and the design and construction of site improvements…Seismic, geologic, flood and fire hazards shall be considered in the review and approval of tract maps, grading and improvement plans.* (Program 1A.2, Item 1)

- *Applications for subdivision and development projects shall include site specific erosion control and hillside drainage plans, which shall address the following standards. These standards shall be implemented through adoption as conditions of approval for the project.*

  1) *The use of silt fencing, sediment trapping basins, runoff diversion devices and hydroseeding of barren slopes shall be required to minimize or prevent erosion impacts.*

  2) *Grading in the City shall occur with no increase in discharge of sediments to wetlands, Refugio Creek, or San Pablo Bay.* (Program 2D.2)

- *Reduce flood hazards through flood channel improvements and development standards.* (Objective 4)

- *Refugio Creek Channel should be improved to provide adequate capacity for expected flood flows.* (Policy 4A)

- *Development projects along the stream channel shall include plans to improve drainage flows consistent with protection of riparian habitats and wetlands as approved by the California Department of Fish and Game and the US Army Corps of Engineers. (Note: see Open Space and Conservation Element.)* (Program 4A.1)

- *New development shall be located and designed to minimize generation of and exposure to flood hazards.* (Policy 4B)

- *Subdivision and planned development plan applications shall include measures to promote flood safety. These measures shall be evaluated during application review and implemented through adoption as conditions of approval for the project.*

  1. *Review of any significant project proposals for areas which are not presently in flood zones should include an evaluation of increased downstream flows resulting from the project.*

  2. *Finished floor elevation of all developments must be one foot above the 100 year flood elevations prescribed on the Flood Insurance Rate Map. (See also Growth Management Element standard III.E.7)*

  3. *In order to protect lives and property, intensive development should not be permitted in reclaimed areas unless flood protection in such areas is constructed to the standards of the Flood Disaster Protection Act of 1973.* (Program 4B.1)

In addition, the *Growth Management Element* (page X-11) contains the following relevant standards, policies, and programs:

Performance Standards:

- *Stormwater Drainage: Meet federal NPDES requirements for stormwater runoff.*
- *Flood Control: All new structures shall be located outside the Flood Zones A & B as designated by the Flood Insurance Rate Map (prepared by the Federal Emergency Management Agency (FEMA); or, insure that the finished floor elevation is at least 1 foot above the flood elevation as determined by FEMA.*

  Development of any property shall not significantly increase the flooding potential at downstream areas, or otherwise significantly impact or aggravate a flooding problem at downstream properties.

Implementing Policies and Programs:

- *The City shall review all new development plans for conformance with the performance standards in this Element. The City will approve a development application only after making findings that one or more of the following conditions are met:*

  a. *Assuming participation in adopted mitigation programs, performance standards will be maintained following the project occupancy; or,*

  b. *Because of the characteristic of the development project, project specific mitigation measures are needed in order to insure maintenance of standards, and such measures will be required of the project sponsor; or*

  c. *Capital projects in the Capital Improvements Program (or planned by service-providing special districts) will result in maintenance of performance standards.*

- *The City will establish and implement a development mitigation program to insure that new growth is paying its share of the cost associated with the maintenance of these standards.*
- *The City shall require all new development to contribute to or participate in the improvement of the above-mentioned facilities and systems in proportion to the demand generated by project occupants and users.*
- *Fees collected pursuant to these policies shall be deposited in special funds, and shall be used to support construction or improvements to the above mentioned facilities improvements, as programmed through the City's Capital Improvement Program and budget.*

11.2.6 City of Hercules Waterfront District Master Plan (WDMP)

The Waterfront District Master Plan (WDMP) contains no policies or other provisions specifically relevant to hydrology and water quality.

11.2.7 City of Hercules Storm Water Management and Discharge Control Ordinance

The City's storm water management and discharge control ordinance (Title 5, Chapter 8 of the Hercules Municipal Code) protects and enhances water quality in the city's watercourses pursuant to and consistent with the Porter-Cologne Water Quality Control Act (Water Code Section 13000 et seq.) and the Federal Clean Water Act (33 U.S.C. Section 1251 et seq.). It also carries out mitigation requirements set forth in the City's National Pollutant Discharge Elimination System (NPDES) permit.

The ordinance requires that every application for a development project subject to the development runoff requirements in the City's NPDES permit be accompanied by a storm water control plan that meets the criteria in the most recent version of the Contra Costa Clean Water Program Stormwater C.3. Guidebook. The ordinance establishes best management practices and standards that address both short-term construction activities and long-term, ongoing operations. The ordinance also establishes prohibitions against unlawful discharges into receiving waters. (For additional City provisions that protect water quality, see discussion of the City of Hercules grading ordinance in subsection 9.2.4 [Geology and Soils--City of Hercules Grading Ordinance] of this EIR.)

11.2.8 City of Hercules Flood Damage Prevention Ordinance

The City's flood damage prevention ordinance (Title 10, Chapter 7 of the Hercules Municipal Code) seeks to protect public health, safety, and general welfare and to minimize public and private losses due to flood conditions in specific areas through legally enforceable regulations applied uniformly to flood-prone, mudslide (i.e., mudflow), or flood-related erosion areas.

The ordinance establishes a procedure by which a floodplain administrator (the City's public works director) reviews applications for development in flood hazard areas identified on FEMA's Flood Insurance Rate Maps (FIRMs) to verify that local, state, and federal permit requirements have been met; that the site is reasonably safe from flooding; and that the proposed development would not adversely affect carrying capacities (i.e., that the cumulative effect of the proposed development when combined with all other existing and anticipated development would not increase the water surface elevation of the base flood more than one foot at any point within the City of Hercules).

The ordinance also establishes specific construction standards for various types of development in flood hazard areas.

11.3 IMPACTS AND MITIGATION MEASURES

11.3.1 Significance Criteria

Based on the CEQA Guidelines,[1] the project would have a significant drainage or water quality impact if it would:

(a) violate any water quality standards or waste discharge requirements;

[1]CEQA Guidelines, Appendix G, Items VIII(a-j) and XVI(c).

(b) substantially deplete groundwater supplies or interfere substantially with groundwater recharge such that there would be a net deficit in aquifer volume or a lowering of the local groundwater table level;

(c) substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river, in a manner that would result in substantial erosion or siltation on- or off-site;

(d) substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river, or substantially increase the rate of amount of surface runoff in a manner that would result in flooding on- or off-site;

(e) create or contribute runoff water that would exceed the capacity of existing or planned storm water drainage systems or provide substantial additional sources of polluted runoff;

(f) otherwise substantially degrade water quality;

(g) place housing within a 100-year flood hazard area as mapped on a federal Flood Hazard Boundary or Flood Insurance Rate Map or other flood hazard delineation map;

(h) place within a 100-year flood hazard area structures that would impede or redirect flood flows;

(i) expose people or structures to a significant risk of loss, injury or death involving flooding, including flooding as a result of the failure of a levee or dam;

(j) expose people or structures to inundation by seiche, tsunami, or mudflow; or

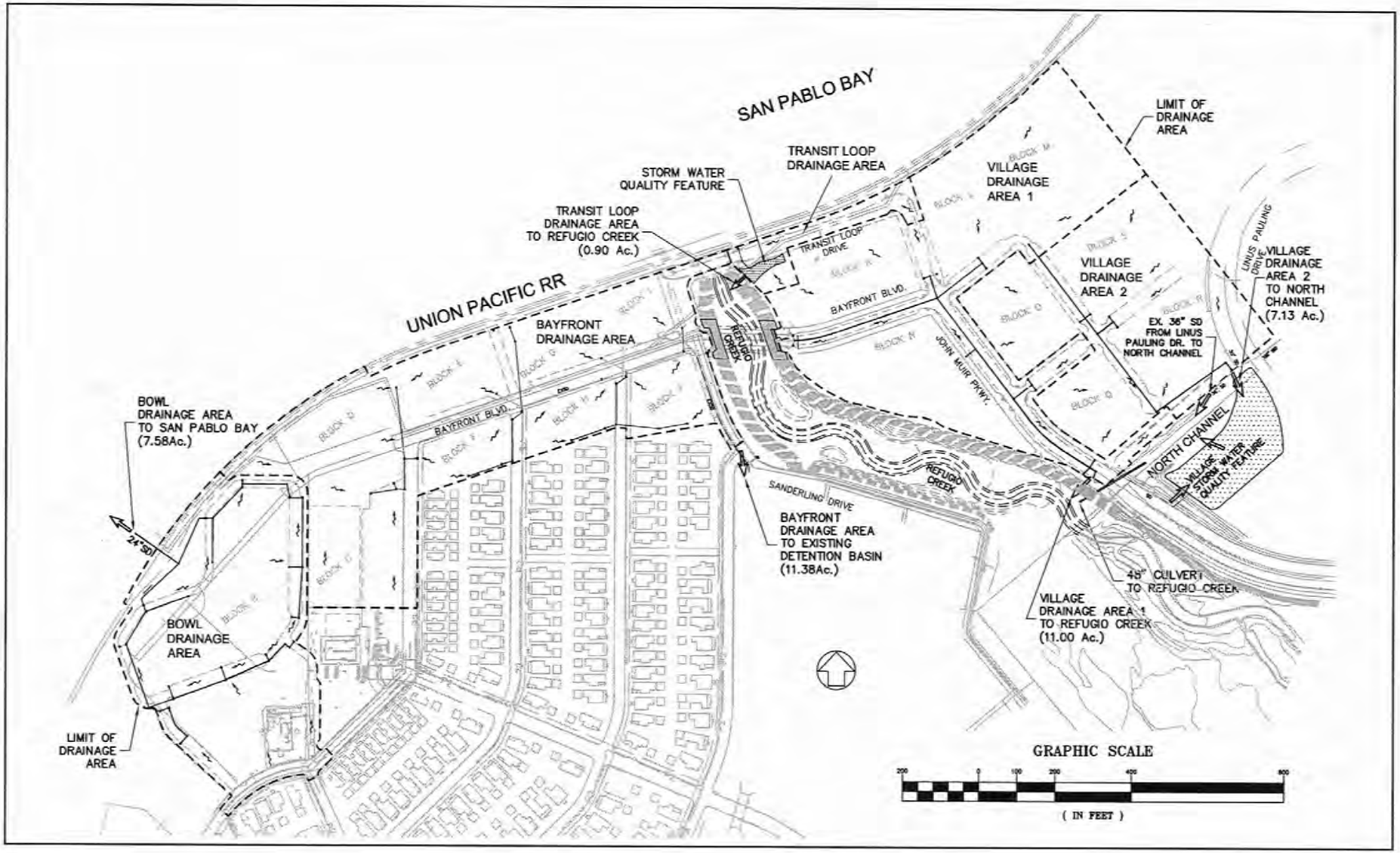
(k) require or result in the construction of new storm water drainage facilities or expansion of existing facilities, the construction of which could cause significant environmental effects.

Criterion (i) would only partially apply to the project since, as discussed in subsection 11.1.2(c) above, the project site is not subject to flooding due to levee or dam failure. The project would have no impact in relation to criterion (j) since, as discussed in subsection 11.1.2(c) above, the project site is not subject to any significant hazards from tsunamis or seiches.

11.3.2 Proposed Drainage Improvements

(a) Hercules Waterfront Storm Drainage Plan. A conceptual storm drainage plan for the Hercules waterfront, which would apply to both the Hercules Bayfront Project and the ITC project, is illustrated on Figure 11.1 and described below. The conceptual plan has been formulated for the project applicant and the City by BKF, consulting civil engineers.

(b) ITC Project Drainage Components. Refugio Creek would collect runoff from a portion of the proposed Hercules Bayfront Project. The proposed adjacent ITC project includes realignment and restoration of Refugio Creek from San Pablo Bay upstream approximately 1,000 feet to the existing restored segment of the creek. The realignment would require construction of a new, higher capacity outlet to San Pablo Bay. The rerouting of the terminus of Refugio Creek would also require construction of a new channel undercrossing of the new UPRR bridge right-of-way, as part of the ITC project. The existing Refugio Creek and culverts



SOURCE: BKF

Figure 11.1

STORM DRAINAGE PLAN FOR HERCULES WATERFRONT (A PORTION OF CONTRA COSTA COUNTY UNFORMED DRAINAGE AREA 112)

near the existing rail bridge would be filled. The new railroad bridge would be supported by a concrete pile. Bridge abutments would be constructed outside of the creekbed and banks. New riprap slope protection would be installed to protect the bridge abutments through the UPRR prism.

The channel area realignment component of the ITC project would include construction of the new Transit Loop Bridge and Bayfront Bridge. The creek upstream of these two new bridges would be improved by cutting back the existing slopes and constructing a new creek embankment to the west. The existing creek culverts and bends near the existing rail bridge would be eliminated, the creek straightened, and the new higher capacity outlet to San Pablo Bay constructed.

On the upstream side of the existing UPRR bridge, there are currently three 72-inch-diameter culverts at the proposed location of the new Transit Loop bridge. These culverts restrict the flood events and result in overtopping of the railroad tracks. Sharp bends in the existing channel segments upstream of the culverts further reduce the channel conveyance. As part of the ITC project, these culverts and bends would be eliminated, the creek straightened, and the new outlet to San Pablo Bay would be constructed.

A new meandering low-flow channel of Refugio Creek and enlarged marsh would be incorporated as part of the creek channel realignment, restoration and enhancement program in order to improve hydraulic and ecological function. The enlarged marsh would increase the floodplain width to a maximum of approximately 200 feet upstream of the proposed Bayfront Bridge. These ITC project channel restoration and flood control improvement components would connect with the portion of Refugio Creek upstream of the Waterfront District that was similarly restored in December 2000.

Also as part of the ITC project, the North Channel adjacent to Refugio Creek would also be improved to accommodate the proposed project, address storm water quality control, mitigate wetland impacts, and enhance the hydraulic and ecological function of the North Channel.

An earthen-bottom drainage culvert under John Muir Parkway would be installed with the extension of the roadway. At the same time, hydraulic function would be restored and affected riparian and wetland areas within the North Channel would be restored and integrated with those created to mitigate the roadway extension. A bio-retention storm water treatment system to comply with City requirements (see section 11.2, Pertinent Plans and Policies, of this chapter) would be installed.

As shown on Figure 11.1, a detention basin ("village storm water quality feature") would be constructed as part of the North Channel modifications to receive storm water runoff from the Bayfront Boulevard-John Muir Parkway extension, Blocks K through R of the Hercules Bayfront Project, and streets related to Blocks K through R of the Hercules Bayfront Project. The feature would be constructed as a phased expansion with the John Muir Parkway extension. The storm water quality feature would be bounded by the proposed extension of Linus Pauling Drive to John Muir Parkway.

Additional wetland mitigation would be considered on the north side of the restored North Channel. An earth retaining structure may be required adjacent to the wetland to provide appropriate grade separation for adjacent uses.

The biological resource components of the proposed creek realignment and restoration are discussed in chapter 6 (Biological Resources) of this Draft EIR.

(c) Hercules Bayfront Project Interim Drainage Concept. As explained in section 3.6, the assumption in this Draft EIR is that the ITC project will be constructed prior to the Hercules Bayfront Project. As noted in section 3.5.6 (Proposed Project Storm Drainage Components) of this Draft EIR, the Hercules Bayfront Project includes a proposed interim creek restoration and enhancement concept for implementation in the event that the Hercules Bayfront Project is constructed prior to the ITC project. The proposed interim creek realignment and restoration grading concept extends from the existing restored creek segment terminus south of the North Channel to a proposed tie-in to the existing channel at a point approximately 90 feet south of the proposed new Bayfront Bridge. The plan is intended to provide interim flood control and wetland enhancement to serve the mitigation needs of Hercules Bayfront Project buildout without realignment of the two downstream 90 degree "dog legs" and without the replacement of the three existing 72-inch culverts.

11.3.3 Impacts and Mitigation Measures

Impact 11-1: On-Site Construction Period Impacts on Water Quality. Surface water pollutants associated with project onsite grading and other construction activity could significantly degrade the quality of receiving waters in Refugio Creek and, ultimately, San Pablo Bay, representing a ***potentially significant impact*** (see criteria [a], [c], [e], and [f] in subsection 11.3.1, "Significance Criteria," above).

Project onsite construction activities involving soil disturbance, excavation, cutting/filling, and grading could result in increased erosion and sedimentation to surface waters. Project construction could expose site soils to erosion from rainwater runoff and wind, which could carry sediment into downstream receiving waters, including San Pablo Bay.

During construction and grading, erosion and sediment control measures would be conducted in accordance with City storm water management requirements and best management practices for the reduction of pollutants in runoff. Discretionary development would be subject to National Pollutant Discharge Elimination System (NPDES) provisions and associated City NPDES permit issuance requirements (including C.3 requirements). As discussed in subsection 11.2.3 above, NPDES permit issuance requires the preparation of a Storm Water Pollution Prevention Plan (SWPPP). A SWPPP is an operational plan that identifies and describes the best management practices (BMPs) to be implemented by the NPDES permit holder to reduce impacts on water quality and aquatic habitat.

Mitigation 11-1. The project applicant shall comply with all applicable current state, regional, and City water quality provisions and, in particular, comply with the process of development plan review established in the City's storm water management and discharge control ordinance and associated NPDES permit issuance requirements instituted to address short-term and long-term water quality issues, including construction period activities.

The applicant shall prepare to City satisfaction an updated Storm Water Pollution Prevention Plan (SWPPP) for the project site. Construction Best Management Practices (BMPs) shall include erosion control and dust control measures (also see *Mitigation 9-2* in chapter 9, Geology and Soils, herein). To implement these measures, the construction contractors shall train all site employees in proper construction BMPs prior to beginning construction activity. In addition, the project applicant shall retain a construction manager familiar with National Pollutant Discharge Elimination System (NPDES) permit requirements (including applicable C.3 requirements) to monitor construction activities. The site owners shall bear ultimate responsibility for compliance with the terms and conditions of the NPDES General Construction Activity Stormwater Permit.

Implementation of these requirements would reduce this impact to a ***less-than-significant level.***

Impact 11-2: Project-Related Dredging Impacts on Refugio Creek Water Quality. Project-related dredging of Refugio Creek could impact water quality through mobilization of contaminated sediment, representing a ***potentially significant impact*** (see criteria [a], [c], and [f] in subsection 11.3.1, "Significance Criteria," above).

The Hercules Bayfront Project interim drainage plan includes the realignment and restoration of Refugio Creek from an existing channel "tie-in" point approximately 90 feet downstream of the new Bayfront Bridge, upstream to the existing restored creek segment. Because the interim drainage plan excludes any channel modification or dredging in open water downstream of the tie-in, no sediment "toxic hot spots" that have been identified in San Francisco Bay by the Bay Protection and Toxic Cleanup Program (BPTCP) would be disturbed. Nevertheless, before any project-related dredging takes place within the upper reaches of Refugio Creek, sampling and testing of proposed bottom sediments for contamination would be warranted in accordance with San Francisco Bay Dredged Material Management Office (DMMO) guidelines. The San Francisco DMMO includes representatives from the Corps, Water Board, BCDC, USEPA, and other resource agencies.

Mitigation 11-2. Any project-related Refugio Creek dredging will require issuance of a Dredging/Dredge Material Reuse/Disposal Permit from the U.S. Army Corps of Engineers (Corps). The Corps permit process typically requires completion of a sampling analysis of proposed dredged materials. A Sampling and Analysis Plan (SAP) detailing sediment sampling and analysis is typically submitted to the San Francisco Bay DMMO. If the results of the SAP indicate that water quality will not be impacted by dredging, a consolidated Dredging/Dredge Material Reuse/Disposal permit can be issued by the Corps. The permit would cover both Section 404 of the Clean Water Act and Section 10 of the Rivers and Harbors Act. If contaminated sediment is encountered, further sediment characterization and a sediment removal plan (including upland disposal or beneficial reuse) would be required by the Corps as a condition of permit issuance.

Project interim drainage plan compliance with Corps dredging permit requirements would reduce associated water quality impacts to a ***less-than-significant level.***

Impact 11-3: Ongoing Impacts on Water Quality. Ongoing activities associated with operation of the project could increase the level of contaminants in receiving waters. Sources of pollutants could include (a) runoff from new roadways, parking areas, and other paved areas; and (b) herbicides, pesticides, and fertilizers used in new domestic landscaping. These factors could combine to significantly degrade the quality of receiving waters in Refugio Creek and, ultimately, San Pablo Bay, representing a ***potentially significant impact*** (see criteria [a], [c], [e], and [f] in subsection 11.3.1, "Significance Criteria," above).

Increased uses of herbicides, pesticides, and fertilizers associated with new domestic landscaping could add to contamination of receiving waters. Urban debris and oil and grease that collect on new paved surfaces could be washed into drainages and further impair runoff water quality and, ultimately, water quality in downstream receiving waters.

Mitigation 11-3. Pursuant to the federal Clean Water Act, the quality of storm water runoff discharging into creeks and sloughs is governed by the National Pollutant Discharge Elimination System (NPDES). NPDES permit issuance requires the preparation of a Storm Water Pollution Prevention Plan (SWPPP). As a condition of project approval, the City shall ensure that the project applicant complies with applicable City storm water control plan and NPDES permit requirements (including applicable C.3 requirements). Implementation of this measure would reduce the impact to a ***less-than-significant level.***

See the discussion under *Impact 11-1* above.

Impact 11-4: Long-Term Refugio Creek Flooding Impacts. The project could result in the placement of housing and other development within a 100-year flood hazard area, with associated risks to public safety and property damage, and could result in the placement of structures that would impede or redirect flood flows. These possible effects represent a ***potentially significant environmental impact*** (see criteria [d], [e], [g], [h], and [i] in subsection 11.3.1, "Significance Criteria," above).

The westernmost portion of Refugio Creek adjoins and bisects the project site, separating the Historic Town Center sub-district from the future Transit Village (now referred to as "The Village") sub-district, as these areas are identified in the Hercules Waterfront District Master Plan (WDMP). The most recently adopted Federal Emergency Management Agency (FEMA) Flood Insurance Rate Maps (FIRMs) for the area indicate that portions of the project site (corresponding roughly to portions of proposed project Blocks I through P) are in the 100-year floodplain of Refugio Creek.

A conceptual drainage plan for the project is shown in Figure 11.1 above. More detailed plans may be required at later stages of the development process (e.g., at the time that tentative and final subdivision maps are reviewed).

Mitigation 11-4. The Hercules General Plan Update EIR identified a significant impact associated with the placement of structures and population in areas subject to 100-year flooding from Refugio Creek. Mitigation identified in the General Plan Update EIR included constructing finished floor elevations at least one foot above the flood elevation as determined by FEMA, along with improvements to Refugio Creek and review of individual development proposals to ensure that future development does not contribute to increased downstream flows. These requirements are reflected in Hercules General Plan policies and the City's flood damage prevention ordinance (Title 10, Chapter 7 of the Hercules Municipal Code) (see subsection 11.2, Pertinent Plans and Policies, above).

Through its review of detailed storm drainage plans, the City shall ensure that the project complies with (a) Hercules General Plan policies related to flood hazard protection (including *Open Space/Conservation Element* policy 10A and program 10a.2, *Safety Element* policy 4B and program 4B.1, and *Growth Management Element* provisions related to flood control), and (b) all relevant provisions of the City's flood damage prevention ordinance (Title 10, Chapter 7 of the Hercules Municipal Code). Implementation of this measure would reduce the impact to a ***less-than-significant level.***

The project applicant has submitted a drainage plan for the project that shows connections to the storm drain system that include an outfall to San Pablo Bay, as well as storm water quality features adjacent to Refugio Creek and the North Channel. The plans indicate that City of

Hercules design policy standards and details and C.3 requirements have served as design criteria for the storm drain concept.[1]

The proposed adjacent ITC project would construct several public facilities necessary to implement both the Hercules Bayfront Project and the ITC project (see subsection 3.4.6, Supporting Public Service Facilities and Infrastructure, in chapter 3, Project Description, of this EIR). Some of these public facilities (e.g., Bayfront Bridge, Refugio Creek restoration, North Channel improvements) would encroach into the FEMA-designated 100-year flood hazard area, which would require processing of a Conditional Letter of Map Revision (CLOMR) through FEMA prior to issuance of a grading permit for these supporting facilities. After construction of the identified supporting facilities, a final Letter of Map Revision (LOMR) would be required.

Impact 11-5: Interim Refugio Creek Flooding Impacts. Construction of the adjacent Hercules Intermodal Transit Center (ITC) project is anticipated to commence prior to the Hercules Bayfront Project, including restoration and enhancement of Refugio Creek from the existing restored creek segment terminus south of the North Channel to the creek's San Pablo Bay outfall. The Hercules Bayfront Project includes a proposed interim creek restoration and enhancement concept for implementation in the event that the Hercules Bayfront Project is constructed prior to the ITC project. The proposed interim Refugio Creek realignment and grading concept extends from the existing restored creek segment terminus south of the North Channel to a proposed tie-in to the existing channel at a point approximately 90 feet south of the proposed new Bayfront Bridge. Preliminary hydrologic modeling by the applicant's consulting civil engineer/hydrologist indicates that this interim drainage concept could provide interim flood control and wetland loss performance sufficient to serve the mitigation needs of Hercules Bayfront Project buildout without improvement to the channel downstream of the proposed tie-in point--i.e., without realignment of two downstream 90 degree "dog legs" and without the replacement of three existing downstream 72-inch culverts. Until it is demonstrated to City satisfaction that this substantial alteration in the course of Refugio Creek, without improvement to the channel downstream of the proposed tie-in, would not exceed the capacity of the existing downstream drainage system, would not result in flooding on- or off-site, and/or would not expose people or structures to a significant flooding risk, a potential adverse flooding effect is assumed, representing a ***significant environmental impact*** (see criteria [d] and [e], in subsection 11.3.1, "Significance Criteria," above).

[1]BKF, Exhibit SD-1 ("Conceptual Storm Drainage Plan for Hercules Waterfront, The Bowl and Bayfront Areas"), Exhibit SD-2 (Conceptual Storm Drainage Plan for Hercules Waterfront, The Village Area"), and Exhibit MD-4 ("Conceptual Details for Storm Drainage Areas, Hercules Waterfront, The Village Area"), updated November 25, 2009.

Mitigation 11-5. If the Hercules Bayfront Project construction is ultimately proposed to commence prior to the adjacent ITC project, the following mitigation requirement will apply:

As a condition of tentative map or final development plan approval, the applicant's civil engineer/ hydrologist shall demonstrate to City Engineer satisfaction, including final hydrologic monitoring, that the proposed interim Hercules Bayfront Project creek channel grading plan, with tie-in and without replacement of the existing downstream dog-leg and culverts, will adequately protect the structure and operation of the new Bayfront Bridge and proposed Transit Loop Bridge and Railroad Bridge against damage from the 100-year flood, and ensure that people and structures in surrounding existing neighborhoods (which cannot be raised) are protected from significant flood risk. Implementation of this requirement would reduce this impact to a ***less-than-significant level***.

Impacts on Groundwater Recharge. The construction of additional impervious surfaces on the project site could reduce the amount of groundwater recharge; however, as described in subsection 11.1.3(a) of this EIR chapter, no public water supply wells are located down-gradient of the project site. Therefore, the project's impact on groundwater recharge would therefore be considered ***less-than-significant***. (See chapter 9, Geology and Soils, for discussion of groundwater impacts related to slope stability.)

Mitigation. No significant groundwater recharge impact has been identified; no mitigation is required.

Cumulative Hydrology and Water Quality Impacts. In addition to the project, other development unrelated to the project would continue to occur elsewhere in the city, county, and subregion. Hydrology-related impacts from future development would include impacts associated with construction of on-site storm drain systems, site-specific flooding and groundwater conditions, and site-specific construction period and ongoing impacts on water quality. In some areas, the capacity of existing or proposed storm drain systems to handle cumulative flows may be a concern. Development on each site would be subject to uniform site development and construction standards that are designed to prevent flooding and protect water quality. The mitigation measures identified above would ensure that the project's contribution to cumulative hydrology and water quality impacts would be ***less-than-significant***.

Mitigation. No significant cumulative hydrology or water quality impact has been identified; no mitigation is required.