4.15 SURFACE WATER

The San Francisco Bay is an important resource on which the redevelopment project area is located. The quality of the waters of the Bay is critical to its value.

Redevelopment would result in substantial benefits to surface waters, as well as potentially significant and significant impacts to them. With implementation of measures recommended in this section, all potentially significant and significant impacts would be mitigated to a level that is less than significant.

4.15.1 Study Area

The study area for surface water is the approximately 1,800-acre redevelopment project area, plus adjacent receiving waters.

4.15.2 Regulatory Setting

Federal

The Federal Water Pollution Control Act, as Amended by the Clean Water Act of 1977 (33 United States Code § 1251 *et seq.*). The objective of the CWA is to restore and maintain the chemical, physical, and biological integrity of the nation's waters. Specific sections of the CWA control discharge of pollutants and wastes into marine and aquatic environments.

Under Section 401 of the Act, water quality certification is required from the state for any activity that requires a federal permit or license that may result in discharge into navigable waters. The certification must indicate that the activity will comply with the applicable state water quality standards. Under Section 401, states are required to establish water quality standards for all state waters. To receive certification under Section 401, an application must demonstrate that activities or discharges into waters will not cause concentrations of chemicals to exceed state standards.

Section 404 of the CWA addresses permitting for discharge of dredged or fill material into navigable waters. This section of the CWA is administered by the U.S. Army Corps of Engineers. In conjunction with the Corps, the U.S. Environmental Protection Agency developed Guidelines for Specification of Disposal Sites for Dredged or Fill Material (40 CFR Part 230).

Under Section 402 of the CWA, discharges of dredged material into non-navigable waters and upland areas of the state are the responsibility of the EPA under the National Pollutant Discharge Elimination System (NPDES). In California, EPA has delegated responsibility for implementation of the NPDES program to the California State Water Resources Control Board (SWRCB). The SWRCB comprises nine Regional Water Quality Control Boards (RWQCB) responsible for implementation of statewide policy at the local level. The San Francisco RWQCB (Region 2) is responsible for activities occurring in the San Francisco Bay Basin.

Stormwater discharges associated with industrial and construction activities are regulated according to Section 402(p) of the CWA under the NPDES. Stormwater NPDES permitting for certain classes of industrial activities is regulated under the Industrial Activities General Permit adopted by the SWRCB April 17, 1997 (WQO 97-03-DWQ NPDES Permit No CAS000001). To comply with conditions of this permit, facility operators must submit a notice of intent (NOI), develop a stormwater pollution prevention plan, conduct stormwater monitoring, and submit annual reports by July 1 of each year.

Stormwater discharges associated with construction activities are regulated under the General Construction Activity Stormwater Permit adopted by the SWRCB (WQO 99-08 DWQ, NPDES Permit No. CAS000002). Under this permit, owners of land where a construction activity occurs that disturbs more than 5 acres of land must submit a NOI, develop a SWPPP, conduct monitoring and inspections, retain records of the monitoring, and report incidences of noncompliance.

State and Regional

Porter-Cologne Water Quality Control Act (California Water Code § 13000 *et seq.*; California Code of Regulations Title 23, Chapter 3, Subchapter 15). The Porter-Cologne Water Quality Control Act is the primary state law that addresses water quality. Requirements of the Act are implemented by the SWRCB at the state level and the RWQCBs at the regional and local level. The SWRCB, as authorized by the Act, promulgated regulations in CCR Subchapter 15, Title 23 designed to protect water quality from the effects of waste discharges to land (CCR Subchapter 15, Title 23). Under Subchapter 15, wastes that cannot be discharged directly or indirectly to waters of the state (and therefore must be discharged to land for treatment, storage, or disposal) are classified to determine specifically where such wastes may be discharged. This classification requirement would apply to dredged material or fill that would be disposed in an upland environment.

Water Quality Control Plan for the San Francisco Bay Basin. Under the provisions of the Porter-Cologne Act and CWA, the San Francisco RWQCB regulates water quality in the San Francisco watershed. The *Water Quality Control Plan* for San Francisco Bay Basin (the Basin Plan) describes water quality control measures that contribute to protection of beneficial uses of the San Francisco Bay watershed. The Basin Plan identifies beneficial uses for each segment of the Bay and its tributaries, water quality objectives for the reasonable protection of the uses, and an implementation plan for achieving these objectives. Beneficial uses for the Lower San Francisco Bay include:

- Ocean, commercial, and sport fishing;
- Estuarine habitat;
- Industrial service supply;
- Fish migration;
- Navigation;
- Preservation of rare and endangered species;
- Water contact recreation;
- Non-contact water recreation;
- Shellfish harvesting; and
- Wildlife habitat.

State Water Resources Control Board Resolution 68-16: Statement of Policy with Respect to Maintaining High Quality of Waters in California. This policy establishes a non-degradation policy for the protection of water quality. The policy states that whenever the existing quality of water is better than needed to protect all existing and probable future uses of the water, such existing water quality will be maintained. If it is determined that some water quality degradation is in the best interests of the people of California, some increase in pollutant concentrations above background levels would be considered acceptable. However, in no case may such increases cause adverse impacts to existing or probable beneficial uses of groundwater.

Bay Protection and Toxic Hotspots Cleanup Program. In 1989, the California State legislature established the Bay Protection and Toxic Cleanup Program (BPTCP). The major goals of the program are as follows:

- Provide protection of present and future beneficial uses of the Bay and estuarine waters of California.
- Identify and characterize toxic hotspots.
- Plan for toxic hot spot cleanup or other remedial or mitigation actions.
- Develop prevention and control strategies for toxic pollutants to prevent creation of new hot spots and perpetuation of existing ones.

In 1997, the Proposed Regional Toxic Hot Spot Cleanup Plan was released by the San Francisco RWQCB. This proposed plan identifies and prioritizes toxic hotspots and presents cleanup plans for priority sites. Neither the Inner, Middle nor Outer harbors were identified as candidate or known toxic hotspots.

McAteer-Petris Act. The McAteer-Petris Act (PRC § 66600 *et seq.*) established the Bay Conservation and Development Commission (BCDC) as the agency responsible for maintaining and carrying out provisions of the Act. The Act directs BCDC to exercise its authority to issue or deny permit applications for placing fill, extracting minerals, or changing the use of any land, water, or structure within the area of its jurisdiction (*i.e.*, the Bay and its shoreline).

4.15.3 Regional Setting

The San Francisco Bay is a large, complex, and dynamic estuary. The Bay receives inputs from the ocean, rivers, and discharges from municipal and industrial sources that vary in their proportions depending on location and the seasonal weather patterns. Conomos (1979) divides the Bay into northern and southern reaches. These two reaches exhibit vastly different circulation and sedimentation patterns as a result of prevailing hydrodynamic conditions. Circulation is generally affected by the tides entering the Bay from the Pacific Ocean, local winds, basin geometry, and the local salinity field (SFEI 1997). The northern reach of the Bay

serves as the only drainage outlet for the Central Valley and accounts for 90 percent of the freshwater input to the Bay, while the southern reach receives the remainder. Most of the freshwater inputs occur during the winter and spring as a result of outflow from the Sacramento San Joaquin Delta. The southern reach receives the majority of the discharges to the Bay (more than 75 percent) and during the summer discharge inputs are larger than freshwater inflow from streams.

Density-salinity driven currents in the northern reach show an ebb dominance of the surface water (4 centimeters per second [cm/sec]) and a flood dominance of the bottom water (5 cm/sec). South Bay waters are influenced by density-driven currents during the winter months when low salinity waters move southward into the southern reach, displacing denser saline water northward. In the summer months, south Bay currents are largely influenced by the prevailing northwesterly winds that move the surface water southeast, causing the bottom water to move northwest. In each reach, narrow shipping channels are surrounded by extensive mudflats and shoals. Currents with the highest velocities are found in the channels. Lower current velocities are found in the shoals, where the majority of the sedimentation occurs (USGS 1984).

Tidal currents in the Bay consist of the semidiurnal and diurnal partial tides (USGS 1984). The Bay-wide tidal prism is large, representing 24 percent of the total volume (Conomos 1979; Conomos et al. 1985). The central Bay is often described as a distinct subunit of the northern reach of the Bay and is the most strongly influenced by the exchanging tides due to its close proximity to the Golden Gate and Pacific Ocean. The study area is located on the eastern edge of the interface of the central and south Bay.

The U.S. EPA identifies San Francisco Bay as a Clean Water Act Section 303(d) water body, meaning it does not achieve water quality standards (EPA 2001). The EPA lists 12 separate parameters of concern impairing the quality of Bay waters:

- Metals: copper, mercury, nickel;
- Polychlorinated biphenyls (PCBs);
- Dioxin-like PCBs;
- Pesticides: diazinon, chlordane, dichloro dipheunyl trichloroethane (DDT), dieldrin;
- Dioxin compounds;
- Furan compounds; and
- Exotic species.

The EPA identifies sources of these pollutants as atmospheric deposition, industrial and municipal point, non-point, natural, resource extraction, urban runoff/storm sewer, and ballast water (1998 California 303(d) List and TMDL Priority Schedule, San Francisco Regional Water Quality Control Board, approved by the U.S. EPA May 12, 1998). The RWQCB has determined

that the San Francisco Estuary does not have a capacity to assimilate exotic organisms. The RWQCB has committed to working with the State Board and the U.S. EPA to promote a national program to effectively address discharges of exotic species (RWQCB 2000).

In addition, California's Bay Protection and Toxic Cleanup Program classifies the entire San Francisco Bay as a High Priority Candidate Toxic Hot Spot. The reason for this classification is potential risk to human health from consumption of non-migratory aquatic wildlife, primarily due to elevated levels of PCBs and mercury in fish tissue.

4.15.4 Local Setting

Oakland Harbor Hydrodynamic Conditions

Oakland Outer Harbor is influenced by the hydrodynamic conditions typical of the central Bay. Current measurements and modeling predictions made by the U.S. Army Corps of Engineers in the central Bay (Corps 1990) indicated that net tidal fluxes in the vicinity of the Outer Harbor were southerly along the east side of the Bay and northerly along the west side of the entrance to the south Bay.

In the Inner Harbor, current and wave patterns are largely generated by tides interacting with bottom and shoreline configurations. Field measurements of current speeds at the Inner Harbor entrance indicate velocities between approximately 25 to 50 cm/sec, with peaks up to 107 cm/sec.

Velocities measured in the Middle Harbor averaged between 3.5 and 4.5 cm/sec, with short duration peaks of 25 cm/sec. Current velocities were higher in the upper meter than at the bottom meter for both Inner and Middle harbors. An average tidal range of 2.5 meters was measured in June 1997 (Hartman 1997).

Oakland Harbor Water Quality

Little direct information is available on water quality in the Oakland Outer, Inner and Middle harbors. Information from regional characterization is used to represent water quality in the vicinity of the study area and to provide information on constituents of potential concern. Because the study area is located at the margins of the Bay and receives drainage from separate storm sewers, water quality near storm drain outfalls likely varies seasonally in a manner not fully reflected by the regional dataset.

The Regional Monitoring Program (RMP) administered by San Francisco Estuary Institute (SFEI) for the RWQCB conducts monitoring three times a year along the main spine of San Francisco Bay from the Delta to the South Bay. The RMP measures concentrations of trace constituents in water, sediment, and transplanted bivalves at various locations in the Estuary. Two sampling stations are located in the vicinity of the study area at Yerba Buena Island and Alameda.

A summary of relevant water quality parameters measured at these two stations during six sampling events (three sampling events in 1998 and three in 1999) is presented in Table 4.15-1. The table also provides a comparison of the concentrations with applicable water quality objectives in the proposed California Toxics Rule (CTR).

In general, trace toxics data from the stations located in the central Bay nearest the study area have lower concentrations and the fewest exceedances of guidelines than those measured at other stations in the Bay. Of the compounds measured by the RMP, only total PCB and total PAH concentrations were found to exceed water quality objectives at Yerba Buena Island and Alameda stations during both 1998 and 1999. It should be noted that PCB concentrations throughout the Bay generally exceed water quality objectives, and concentrations at the two stations were lower than other stations. Central Bay concentrations are probably lower due to the regular tidal flushing and greater water depth, which results in lower suspended sediment concentrations (SFEI 1997, 1998, 1999).

The RMP 1998 annual report provided a summary of contaminants of concern in the Bay in general (SFEI 1998). The findings of that report indicate that the contaminants measured by the RMP of the most concern are those shown to be related to bioaccumulation or adverse effects including:

- diazinon and chlorpyrifos (commercially available insecticides) in water;
- DDTs, chlordanes, and PAHs in sediments; and
- PCBs, cadmium, mercury, selenium, PAHs, chlordanes, dieldrin, and DDTs in bivalve and fish tissues.

The RMP 1998 annual report indicates that nickel, mercury, and chromium are the trace contaminants that most frequently exceeded water quality objectives, while PCBs, DDTs, chlordanes, and dieldrin also exhibited occasional exceedances.

Runoff and Drainage. Site topography is nearly flat due to its creation on tidal flats by fill using marine or terrestrial materials. Shorelines are protected in most areas by sheet piling, riprap, or other artificial shoreline protection structures. The site is largely paved with asphalt or concrete. No natural channels or ponds, or natural or channelized creeks are present in the study area. As discussed in Section 4.12: Biological Resources, two small urban wetlands exist in the Desert railyard within the Maritime sub-district.

Annual precipitation in the study area averages about 17.5 inches per year, falling mostly between October and April. Drainage from the OARB and Maritime sub-district storm drains into the Middle Harbor will be equipped with treatment systems as part of the 50-Foot Channel Deepening Project. Localized ponding of runoff has occurred in the southern portion of the Berths 55-58 area when storm drainage systems were overloaded or clogged. Although the ponding has been substantial, it has not resulted in flooding of buildings. Other areas in the vicinity of Berths 55-58 have occasionally experienced ponding due to storm drain blockages.

These historical drainage problems have been corrected by the Port. In addition, Southern Pacific has rerouted a portion of its storm drainage to bypass the Berths 55-58 area and connect directly with the Oakland main storm drainage system.

Table 4.15-1
Concentrations of Trace Substances in Bay Water Located Near the Study Area
1998 and 1999

Parameter[a]	Lowest WQO of Proposed CTR[a,b]	Yerba Buena Island[c]		Alameda[d]	
		1998	1999	1998	1999
Temperature (^{o}C)		13.3-17.3	11.4-16.5	13.4-17.5	10.8-19.7
Salinity (ppt)		17.6-25.0	16.7-29.1	21.0-27.9	21.9-28.7
Total Suspended Solids (mg/L)		4-23	3.8-19.2	1-17	11.1-55.7
Dissolved Oxygen (mg/L)		6.8-13.1	7.2-9.2	6.5-11.1	6.8-9.3
PH		7.9-8.3	7.9	7.9-8.3	7.9
Nitrate (µg/L)		200-400	10-400	200-300	190-420
Nitrite (µg/L)		6-38	1-15	6-39	4-19
Ammonia (µg/L)		30-140	20-130	20-160	50-140
Phosphate (µg/L)		20-170	10-180	20-170	40-220
Silicates (mg/L)		2-4	1.05-3.7	1-3	1.03-2.53
Total Metals (µg/L)					
Arsenic	36	1.52-1.98	1.11-2.14	1.44-2.09	1.54-2.64
Cadmium	2.2	0.02-0.07	NA	0.04-0.07	NA
Chromium	11	0.71-3.05	NA	0.50-2.84	NA
Copper	3.7	1.3-2.2	1.6-2.3	1.2-1.9	1.9-3.0
Lead	2.5	0.16-0.67	0.29-0.63	0.13-0.43	0.37-1.29
Mercury	0.012	0.0023-0.0055	0.0035-0.007	0.001-0.0049	0.0044-0.0135
Nickel	8	1.6-3.5	2.2-3.7	1.4-2.9	2.6-5.7
Selenium	5	0.12-0.19	0.02-0.11	0.10-0.19	ND-0.07
Silver	1.9	0.0040-0.010	0.005-0.012	0.0030-0.0090	0.008-0.020
Zinc	81	2.0-4.2	2.3-3.9	1.5-3.1	2.8-6.8
Organics (pg/L)					
Total PAHs	31,000	S-53,000[e]	17,000-34,000	S-28,000	47,000-70,000
Total PCBs	170	250-1000	258-386	150-250	409-941
Total DDT	590	S-190	150-221	S-190	171-347
Total Chlordanes	590	97-140	38-49	S-130	43-96

Source: SFEI 1998 and 1999.

Notes:

[a] CTR – California Toxics Rule
DDT – 1,1,1-trichloro-2,2-bis(p-chlorophenyl)ethane
mg/L – milligrams per liter
µg/L– micrograms per liter
NA – not analyzed
WQO – Water Quality Objective
ND – not detected
PAH – polynuclear aromatic hydrocarbons
PCB – polychlorinated biphenyls
pg/L – picograms per liter
ppt – parts per thousand

[b] Lowest water quality objective in the proposed California Toxics Rule.

[c] Sampling Station No. BC10

[d] Sampling Station No. BB70

[e] S – Compounds generally comprising a significant portion of sum not quantifiable, sum not calculated.

Flood Hazards. The OARB sub-district and most of the Maritime sub-district have not been mapped by FEMA for flood hazards. The portions that have been mapped, including the 16th/Wood sub-district and a portion of the Maritime sub-district, are not located within either a 100- or 500-year flood hazard area (ESRI and FEMA 2002). The project area is not near surface drainage channels, and is therefore not subject to flooding from over-bank spillage. Anecdotal information exists that flooding has historically occurred within the study area in the Burma Road area and near Berths 8 and 9 (old Wharf 6). Also, according to the Land Use and Transportation Element (LUTE) of the Oakland General Plan, the entire area west of Maritime Street in both the OARB and Maritime redevelopment sub-districts is a potential tsunami inundation zone.

No known natural surface streams exist in the study area. Additionally, no portion of the project area is below the coastal base flood elevation (6.6 feet above mean sea level [msl]) identified for the Oakland Harbor. The estimated stillwater elevation during a 100-year flood at high tide in the area is 7.0 feet National Geodetic Vertical Datum (NGVD) (FEMA 1982).

The storm drain system, installed mostly during World War II, collects surface water runoff using catch basins and approximately 16 miles of underground pipe, and drains into San Francisco Bay. Pipe up to 27 inches in diameter is made of vitrified clay, and larger pipe is made of reinforced concrete. Most of OARB is covered with either buildings or pavement. Roads are crowned and other paved areas are sloped to facilitate stormwater flow to the catch basins and collection pipes. However, soil subsidence has created pipe separations, reverse flows, and shallow ponding areas at some locations. Catch basins and inlets have been added to the system to correct these problems, but some localized flooding still occurs, causing temporary closure of some roadways. The primary cause of flooding appears to be outfalls located below the tide level. While the localized temporary flooding limits use of a few roads for short periods of time, it is not a significant factor in limiting use of the Base. Moreover, problematic portions of the storm drain system in the OARB sub-district will be replaced.

Stormwater Runoff Water Quality

OARB Sub-District. According to a Pipeline Investigation conducted in 1999 by the Army (I.T. Corporation 1999), two conditions at the OARB have the potential to affect water quality, potentially exceeding standards:

- storm drain sediments contain elevated concentrations of metals, pesticides, and PCBs; and
- elevated concentrations of metals may be present in stormwater.

Maritime Sub-District. Stormwater runoff quality is managed in the Maritime sub-district through implementation of Best Management Practices (BMPs) at each of the currently occupied facilities, as required under the Industrial Activities Stormwater General Permit. Each tenant is responsible for complying with the requirements of the permit, which include development and implementation of a stormwater pollution prevention plan, monitoring, and quarterly inspections of facilities for non-stormwater discharges. The Port has developed a

regional SWPPP, which it uses and supplies to tenants as a model that is to be tailored to each particular facility by each tenant. The regional SWPPP outlines the steps needed to develop a SWPPP, and lists generic BMPs that are to be considered by the tenants when preparing SWPPPs for the individual facilities. The BMPs are designed to reduce the quantities of materials used that may produce pollutants, change the way various products and materials are handled or stored, employ various structural and nonstructural devices to catch and restrict the release of pollutants, set out appropriate responses to spills and leaks, and monitor the effectiveness of the BMPs. They include recommendations to perform vehicle maintenance indoors or under cover, minimize the use of hazardous materials, properly store and dispose of hazardous waste, prepare spill response plans, train employees in spill response and hazardous materials handling, and to practice good housekeeping. Supplementary site-specific information to be supplied by the tenants includes the following:

- site map;
- pollution prevention team;
- description of potential pollutant sources;
- list of significant materials;
- summary of industrial activities, pollutant sources, and potential pollutants;
- records of hazardous material spills;
- assessment of potential pollutant sources; and
- site-specific BMPs.

Industrial facilities in the Maritime sub-district participate in a Group Stormwater Monitoring Program (GMP). The Port serves as the group leader for this program, arranges sampling and analysis of stormwater discharges as required, and prepares annual group monitoring reports as required. The tenants serve as group members and are responsible for making quarterly periodic non–storm event observations; conducting monthly observations of stormwater discharge during the wet period (October through May); conducting an annual site inspection, maintaining appropriate records, and preparing the facility Annual Comprehensive Site Compliance Evaluation and Annual Report.

Surface runoff from representative Port facilities has been sampled as a part of the GMP. Facility activities are assigned to five categories for assessment of potential pollutants: Vehicle and Equipment Maintenance; Vehicle Generator Maintenance; Vehicle Fueling; Container Freight Yards; or Break Bulk Storage. Potential pollutants associated with these activities include petroleum products (gas, diesel, motor oil, hydraulic fluid), solvents (VOCs, aromatics), metals (cadmium, copper, lead, nickel, zinc), antifreeze, and surfactants. In general, runoff samples from the vehicle/generator maintenance areas contained higher concentrations of petroleum and metals than samples from other areas. There are no effluent limitations for

industrial stormwater runoff; rather, compliance with the industrial stormwater NPDES permit is achieved through implementation of the SWPPP.

16th/Wood Sub-District. This sub-district, historically dedicated to industrial uses, is now generally underutilized. The large historic Amtrak station building remains, but is boarded up in a derelict state. Non-smokestack industrial and light industrial uses, such as warehousing/distribution centers, waste recycling facilities, and truck repair businesses are located in or adjacent to this sub-district, as are miscellaneous businesses located in older buildings. Commercial and industrial tenants must comply with the Industrial Activities Stormwater General Permit. The permit requires development and implementation of a SWPPP, monitoring, and quarterly inspections of facilities for non-stormwater discharges.

4.15.5 Impact Analysis Methodology

The analysis of surface water impacts resulting from redevelopment is consistent with the level of information available regarding redevelopment elements and activities, and based on the criteria described below:

Significance Criteria

Redevelopment would have a significant impact on the environment if it would:

- Violate any water quality standards or waste discharge requirements;
- Result in substantial erosion or siltation on or off site that would affect the quality of receiving waters;
- Result in flooding on or off site;
- Create or contribute runoff which would exceed the capacity of existing or planned stormwater drainage systems;
- Create or contribute runoff that would be an additional source of polluted runoff;
- Otherwise substantially degrade water quality;
- 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 that would impede or redirect flood flows;
- Expose people or structures to a substantial risk of loss, injury, or death involving flooding, inundation by seiche, tsunami, or mudflow; or
- Fundamentally conflict with elements of the City of Oakland Creek Protection Ordinance intended to protect hydrologic resources. Although there are no specific, numeric/quantitative criteria to assess impacts, factors considered in determining significance include whether there is substantial degradation of water quality through:

- discharging a substantial amount of pollutants into a creek;
- significantly modifying the natural flow of the water or capacity;
- depositing substantial amounts of new material into a creek or causing substantial bank erosion or instability; or
- substantially endangering public or private property or threatening public health or safety.

Not all criteria above apply. There are no creeks in or near the project area, and conditions do not exist that could cause a conflict with the City's Creek Protection Ordinance. The only residential or quasi-residential (live/work) uses would be located in the 16th/Wood sub-district, which is not within the 100-year flood hazard zone. Therefore, no housing would be placed within a 100-year flood hazard area.

4.15.6 Impacts

Impacts related to the risk of introduction of exotic invasive species in Bay water are evaluated in Section 4.12: Biological Resources.

Benefits

Several redevelopment elements, activities, and design features would result in substantial benefit to surface water quality. Some existing storm sewers in the OARB sub-district are in disrepair, allowing contaminated sediment and water to be discharged to the Bay. These storm sewers would be capped in place or removed during redevelopment, which would improve the quality of stormwater discharge to the Bay. BMPs implemented in the course of development would lead to better maintained storm drain systems and ultimately reduce the mass of pollutants released into stormwater from storm drains. Inclusion of post-construction stormwater controls in design and operation of redevelopment elements, which are not currently present in the redevelopment area, would improve the quality of stormwater runoff from the site. Finally, redevelopment would result in a reduction of routine maintenance dredging of the Outer Harbor channel and Berths 7 and 9, 10, 20 and 21, due to the creation of New Berth 21. This reduction in dredging would in turn reduce dredge-associated turbidity.

Impacts

Impact 4.15-1: In-water construction or remediation would increase turbidity, and could release contaminants, affecting water quality.

Significance: Significant (turbidity); potentially significant (contaminants)

Mitigation 4.15-1: Prior to in-water construction, the contractor shall prepare a water quality protection plan acceptable to the RWQCB, including site-specific best management practices for protection of Bay waters, and shall implement this plan during construction.

Mitigation 4.15-2: Contractors and developers shall comply with all permit conditions from the Corps, RWQCB, and BCDC.

Residual Significance: Less than significant

Shoreline excavation, construction, and maintenance dredging activities would disturb sediments, creating turbidity in the Bay. Should disturbed sediments be contaminated, they could release contaminants to Bay waters. Substantial turbidity would be expected to result from in-water activities, and is considered a significant impact. Release of contaminants may or may not occur, and is considered a potentially significant impact. With implementation of Mitigation Measures 4.15-1 and 4.15-2, the impact would be minimized, and the residual impact is considered less than significant.

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Impact 4.15-2: Under certain circumstances, disturbance of soils during construction could result in erosion, which in turn could increase sediment loads to receiving waters.

Significance: Potentially significant

Mitigation 4.15-3: Prior to ground-disturbing activities, the contractor shall develop and implement a Stormwater Pollution Prevention Plan to be reviewed by the City or the Port, including erosion and sediment control measures.

Residual Significance: Less than significant

Construction activities can result in mobilization of soil that can become entrained in stormwater. Should this polluted stormwater reach receiving waters, it could affect their quality through increased turbidity and associated pollutant loads. Should this occur, it would be considered a significant impact. Because the occurrence of this impact depends on rainfall that may or may not occur, the impact is considered potentially significant. With implementation of Mitigation Measure 4.15-3, the impact would be avoided or minimized, and the residual impact is considered less than significant.

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Impact 4.15-3: During construction or remediation, shallow groundwater may be encountered that could be contaminated with sediment or chemicals, and could enter nearby receiving waters as could contaminated stormwater.

Significance: Potentially significant

Mitigation 4.15-4: Prior to construction or remediation, the contractor shall develop and implement a Stormwater Pollution Prevention Plan, including protocols for determining the quality and disposition of construction water which includes shallow groundwater encountered during construction/remediation.

Residual Significance: Less than significant

Groundwater underlying the project area is shallow, particularly in the near-shore areas. Contamination of groundwater by chemicals has been identified within the OARB and Maritime sub-districts (see Section 4.7: Hazardous Materials). During construction excavation (for foundations, underground utilities, remediation, etc.), the contractor could encounter shallow groundwater, which is generally removed from the excavation by pumping, a practice termed dewatering. Depending on location, the shallow groundwater encountered could contain sediment, or it may be contaminated by chemicals. Because the occurrence of this impact depends on several circumstances that may or may not occur, it is considered potentially significant. With implementation of Mitigation Measure 4.15-4, the impact would be avoided or minimized, and the residual impact is considered less than significant.

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Impact 4.15-4: Net changes in impervious surface could result in higher pollutant loads to receiving waters.

Significance: Potentially significant

Mitigation 4.15-5: Post-construction controls of stormwater shall be incorporated into the design of new redevelopment elements to reduce pollutant loads.

Residual Significance: Less than significant

Redevelopment would result in a change (increase or decrease) in impervious surface area. At some currently undeveloped sites, impervious cover is likely to increase with redevelopment. Increases in impervious area could result in more stormwater runoff, higher velocities, and larger pollutant loads to receiving waters. Because design details are not developed, and the occurrence and magnitude of the effect is not known, the impact is considered potentially significant. With implementation of Mitigation Measure 4.15-5, the impact would be avoided or minimized, and the residual impact is considered less than significant.

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Impact 4.15-5: Use of recycled water for non-potable purposes could lead to degradation of surface water quality.

Significance: Potentially significant

Mitigation 4.15-6: Site-specific design and best management practices shall be implemented to prevent runoff of recycled water to receiving waters.

Residual Significance: Less than significant

EBMUD intends to provide recycled water to the redevelopment project area for non-potable purposes as part of its East Bayshore Recycled Water Project. Title 22 of the California Code of Regulations does not allow runoff of recycled water to surface waters. Because occurrence of this impact depends on design that is not yet developed, the impact is considered potentially significant. With implementation of Mitigation Measure 4.15-6, the impact would be avoided or minimized, and the residual impact is considered less than significant.

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Impact 4.15-6: New construction could result in changes in localized flooding.

Significance: Potentially significant

Mitigation 4.15-7: New development shall conform with the policies of the City of Oakland's Comprehensive Plan Environmental Health Hazards Element regarding flood protection.

Mitigation 4.15-8: The City and the Port shall complete flood hazard mapping in the project area, where necessary and applicable to delineate 100- and 500-year flood hazard zones.

Residual Significance: Impact avoided

Much of the project area is not mapped for flood hazards: the entire OARB sub-district and most of the Maritime sub-district are not currently included on FEMA flood hazard maps. The portion of the project area that is mapped, the 16th/Wood sub-district and a portion of the Maritime sub-district, is not located within either a 100- or 500-year flood hazard zone. The project area is not near any surface drainage channels and is therefore not subject to flooding from over-bank spillage.

Once flood hazard mapping is complete, development on portions of the study area that fall within 100- or 500-year flood hazard zones would be required to comply with National Flood Insurance Program policies set by the FEMA. Because the flood hazard area has not been delineated, and because redevelopment elements are not definite, the impact is considered potentially significant. With implementation of Mitigation Measures 4.15-7 and 4.15-8, the impact would be avoided.

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Impact 4.15-7: Potential inundation by seiche or tsunami.

Significance: Less than significant

Mitigation: Mitigation is not warranted.

The largest seiche recorded in San Francisco Bay was in 1906, measured at four inches. This would have little or no effect on study area flooding. Calculations of the theoretical tsunami run-up in the San Francisco Bay near the project area range from 4.7 to 5.5 feet above mean sea level (msl) (Houston and Garcia 1975). The elevation of land within the project area exceeds 5.5 msl, except the armored slopes of shorelines and the beach of the Middle Harbor Shoreline Park. Because no non-beach areas would be subject to inundation, the impact is considered less than significant.

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4.15.7 Mitigation

Implementation of the following mitigation measures will avoid, minimize, reduce, rectify, or compensate for significant impacts of redevelopment.

Mitigation 4.15-1: Prior to in-water construction, the contractor shall prepare a water quality protection plan acceptable to the RWQCB, including site-specific best management practices for protection of Bay waters, and shall implement this plan during construction.

This measure applies to Impact 4.15-1 and Cumulative Impact 5.15-1.

BMPs to effectively control turbidity and/or contaminant suspension and migration would be site-specific. They may include, and are not limited to, the following:

- Use environmental or clamshell dredges or hydraulic cutterhead dredges designed to reduce release of solids.
- Reduce or eliminate overflow of decant water from barges used to transport material.
- Use silt curtains or other specialized equipment to reduce dispersion of material during dredging and filling operations.

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Mitigation 4.15-2: Contractors and developers shall comply with all permit conditions from the RWQCB, Corps, and BCDC.

This measure applies to Impact 4.15-1 and Cumulative Impact 5.15-1.

This measure shall be enforced on Contractors by contract specifications.

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Mitigation 4.15-3: Prior to ground-disturbing activities, the contractor shall develop and implement a Stormwater Pollution Prevention Plan that is acceptable to the RWQCB, including erosion and sediment control measures.

This measure applies to Impact 4.15-2 and Cumulative Impact 5.15-1.

All construction activities shall be undertaken in accordance with requirements of the National Pollutant Discharge Elimination System (NPDES) General Permit for Stormwater Discharges Associated with Construction Activity (General Permit). The General Permit requires that all dischargers develop and implement a SWPPP that specifies BMPs that would prevent construction pollutants from contacting stormwater with the intent of keeping products of erosion from moving off site into receiving waters.

The contractor shall prepare and implement a site-specific SWPPP. The SWPPP shall be reviewed by either the City or Port, and shall be available for review by the RWQCB. While erosion/sediment/pollution control measures included in the plan would be site-specific, they must be effective at prevention of accelerated erosion by the following: minimizing the length of time soils are exposed; reducing total area of exposed soil during the rainy season; protecting critical areas (the Bay); and monitoring before and after each rain storm to assess control measure effectiveness. SWPPP erosion and sediment control measures may include, and are not limited to, the following:

- Schedule construction to occur during dry season;
- Avoid run-on (divert run-off from up-slope sites so it does not enter construction zone);
- Preserve existing vegetation;
- Seed and mulch, or hydromulch;
- Dust control;
- Blankets, geotextiles, fiber rolls; and
- Tire washers at exits.

Additional SWPPP sediment control measures may include, and are not limited to, the following:

- Stabilize the construction entrance;
- Silt fencing;
- Temporary straw bale dike;
- Sand/gravel bag;
- Brush/rock filter;
- Inlet protection;
- Catch basin inlet filter; and

- Sediment basin or trap.

SWPPP pollution control measures generally are "good housekeeping" BMPs, and may include, and are not limited to, establishing practices and protocols for the following:

- Solid and demolition waste management;
- Hazardous materials and waste management;
- Spill prevention and control;
- Vehicle and equipment maintenance;
- Covered materials storage;
- Handling and disposal of concrete/cement;
- Pavement construction management;
- Contaminated soil and water management; and
- Sanitary/septic waste management.

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Mitigation 4.15-4: Prior to construction or remediation, the contractor shall develop and implement a Stormwater Pollution Prevention Plan, including protocols for determining the quality and disposition of construction water, which includes shallow groundwater encountered during construction.

This measure applies to Impact 4.15-3 and Cumulative Impact 5.15-2.

The contractor's SWPPP shall include a RWQCB-acceptable protocol and BMPs for handling construction water. The SWPPP shall include methods for visual inspection, triggers for laboratory testing, and appropriate use/disposal of the water.

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Mitigation 4.15-5: Post-construction controls of stormwater shall be incorporated into the design of new redevelopment elements to reduce pollutant loads.

This measure applies to Impact 4.15-4 and Cumulative Impact 5.15-2.

NPDES permitting requires that BMPs to control post-construction stormwater be implemented to the maximum extent practicable. Analysis of anticipated runoff volumes and potential effects to receiving water quality from stormwater shall be made for specific redevelopment elements, and site-specific BMPs shall be incorporated into design. BMPs shall be incorporated such that runoff volume from 85 percent of average annual rainfall at a development site is pre-treated prior to its discharge from that site, or a pre-treated volume in compliance with RWQCB policy in effect at the time of design.

Non-structural BMPs may include and are not limited to good housekeeping and other source control measures, such as the following:

- Stencil catch basins and inlets to inform the public they are connected to the Bay;
- Sweep streets on a regular schedule;
- Use and dispose of paints, solvents, pesticides, and other chemicals properly;
- Keep debris bins covered; and
- Clean storm drain catch basins and properly dispose of sediment.

Structural BMPs may include and are not limited to the following:

- Minimize impervious areas directly connected to storm sewers;
- Include drainage system elements in design as appropriate such as:
  - infiltration basins
  - detention/retention basins
  - vegetated swales (biofilters)
  - curb/drop inlet protection.

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Mitigation 4.15-6: Site-specific design and best management practices shall be implemented to prevent runoff of recycled water to receiving waters.

This measure applies to Impact 4.15-5.

Design of subsequent redevelopment activities shall ensure recycled water does not leave the site and enter receiving waters. Best management practices shall be implemented to prevent runoff of recycled water. These BMPs may be either structural or non-structural in nature and may include but are not limited to the following:

- Preventing recycled water from escaping designated use areas through the use of:
  - berms
  - detention/retention basins
  - vegetated swales (biofilters)
- Not allowing recycled water to be applied to irrigation areas when soils are saturated.
- Plumbing portions of irrigation systems adjacent to receiving waters with potable water.

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Mitigation 4.15-7: New development shall conform with policies of the City of Oakland's Comprehensive Plan Environmental Health Hazards Element regarding flood protection.

This measure applies to Impact 4.15-6.

The Hazards Element includes development controls that place the burden of demonstrating flood safety upon the individual developer. In addition, the Hazards Element includes policies regarding support of flood control and management programs of other agencies, maintenance of the natural character of creeks to the maximum extent possible, and City participation in the federal Flood Insurance Program.

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Mitigation 4.15-8: The City and the Port shall complete flood hazard mapping in the project area, where necessary and applicable, to delineate 100- and 500-year flood hazard zones.

This measure applies to Impact 4.15-6.

The City and Port shall determine with the appropriate federal agencies (FEMA, Corps) the necessity and process for mapping flood hazard zones within the non-mapped portions of the project area. If necessary and applicable, the City and/or Port shall cause a flood hazard delineation for the 100-year and 500-year flood hazard zones to be prepared, which would submit the delineation to the Corps for verification. Once verified, the delineation would be submitted to FEMA, for inclusion to the Flood Insurance Program.

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