FINAL

MISSION BAY SUBSEQUENT ENVIRONMENTAL IMPACT REPORT

CITY AND COUNTY OF SAN FRANCISCO PLANNING DEPARTMENT • SAN FRANCISCO REDEVELOPMENT AGENCY

PLANNING DEPARTMENT FILE NO. 96.771E
SAN FRANCISCO REDEVELOPMENT AGENCY CASE NO. ER 919-97
STATE CLEARINGHOUSE NO. 97092068

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VOLUME II: SETTING AND IMPACT ANALYSIS (CONTINUED FROM VOLUME I)

EIP
ASSOCIATES

SOURCE: San Francisco Redevelopment Agency

- COMMERCIAL INDUSTRIAL
- COMMERCIAL INDUSTRIAL / RETAIL
- MISSION BAY NORTH RETAIL
- MISSION BAY RESIDENTIAL
- MISSION BAY OPEN SPACE (allows recreation-serving retail building east of Terry A. Francois Blvd.)
- HOTEL
- UCSF (includes City school site)
- ADDITIONAL BAYFRONT OPEN SPACE (PORT PROPERTY)
- MISSION BAY PUBLIC FACILITIES
- PROPOSED BOUNDARIES OF MISSION BAY REDEVELOPMENT AREAS

COMBINATION OF PROJECT FEATURES AND VARIANTS AS ADOPTED

SEE INSIDE BACK COVER FOR THE LAND USE PROGRAM ANALYZED AS THE PROJECT IN THE DRAFT EIR

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VOLUME II
SETTING AND IMPACT ANALYSIS
(CONTINUED FROM VOLUME I)

● Indicates material that is new or has been revised since publication of the Draft SEIR.

This report has been prepared on post-consumer recycled paper.

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J. CONTAMINATED SOILS AND GROUNDWATER

SETTING

This section describes the available information about chemicals in soil and groundwater in the Project Area. It provides some basic definitions of terms, and background on physical conditions. Historic and current land uses are briefly summarized in this section, based on information in the 1990 FEIR. These land uses relate to the constituents detected in soil and groundwater. Since preparation of the 1990 FEIR, numerous investigations and various remedial activities have taken place in the Project Area. This section updates the information in the 1990 FEIR, and summarizes the results of comprehensive soil and groundwater investigations performed since then, including an evaluation of any potential for immediate hazards from chemicals detected in the Project Area. In addition, a description of regulatory requirements that provide for the management of soil or groundwater contamination in the Project Area is provided.

A number of acronyms are used throughout this section for both agency names and some chemical types. They are spelled out upon first use; a list with the full names or chemicals is provided at the end of the section, immediately before the endnotes, on p. V.J.100.

DEFINITIONS OF TERMS USED IN THIS SECTION

As used in this SEIR, the term "hazardous materials" refers to both hazardous substances and hazardous wastes. Hazardous materials are defined in California Health and Safety Code Section 25501:

> A hazardous material is any material that, because of its quantity, concentration, or physical, or chemical characteristics, poses a significant present or potential hazard to human health and safety or to the environment if released into the workplace or the environment. "Hazardous materials" include, but are not limited to, hazardous substances, hazardous waste, and any material which a handler or the administering agency has a reasonable basis for believing that it would be injurious to the health and safety of persons or harmful to the environment if released into the workplace or the environment.

Hazardous wastes are defined in Section 25117:

> Hazardous wastes are wastes that, because of their quantity, concentration, or physical, chemical, or infectious characteristics, may either cause, or significantly contribute to an increase in mortality or an increase in serious illness, or pose a substantial present or potential hazard to human health or the environment when improperly treated, stored, transported, disposed of, or otherwise managed.

The Regional Water Quality Control Board (RWQCB) has been designated as the "Administering Agency" for purposes of site investigation and remediation of the Project Area (please see the "Regulatory Framework" discussion presented at the end of Setting)./1/ Therefore, the following definitions of hazardous materials and hazardous wastes as established in Section 25260 are also applicable:

> Hazardous material means a substance or waste, that, because of its physical, chemical, or other characteristics, may pose a risk of endangering human health or safety or of degrading the environment. Hazardous material includes, but is not limited to, all of the following: (1) a hazardous substance, as defined in Section 25281 or 25316; (2) a hazardous waste, as defined in Section 25117; (3) a waste, as defined in Section 470 or as defined in Section 13050 of the Water Code.

Definitions of many technical terms used in this section are provided in a glossary at the end of the section, after the list of acronyms.

Hazard Versus Risk

Workers and general public health are potentially at risk whenever hazardous materials have been used or where there could be an exposure to such materials as the result of the presence of unidentified fill materials or historic uses of a site, such as at locations in the Project Area. Ecological communities, such as avian and terrestrial habitats and the aquatic environment, may also be at risk, depending on the type of populations and locations relative to potential exposure sources. Inherent in the setting and analyses presented in this section are the concepts of the "hazard" of these materials and the "risk" they pose to human health and the ecological environment. Terms pertaining to hazardous materials, toxicity, and hazardous wastes are briefly discussed below as they relate to soil and groundwater contamination issues associated with historic filling and industrial uses in the Project Area. For further information pertaining to hazardous materials use, storage, transport, and disposal as a result of occupancy of the proposed project, see Section V.I, Health and Safety.

Exposure to some chemical substances may harm internal organs or systems in the human body, ranging from temporary effects to permanent disability, or death. Aquatic, terrestrial, or avian species may also be similarly adversely affected. Hazardous materials that result in adverse effects are generally considered "toxic." Other chemical materials, however, may be corrosive, or react with other substances to form other hazardous materials, but they are not considered toxic because organs or systems are not affected. Because toxic materials can result in adverse health effects, they are considered hazardous materials, but not all hazardous materials are necessarily "toxic." For purposes of the information and analyses presented in this section, the terms hazardous substances or hazardous materials are used interchangeably and include materials that are considered toxic.

A hazard is any situation that has the potential to cause damage to human health and the environment. The risk to human health and the ecological environment is determined by the probability of exposure to hazardous material and severity of harm such exposure would pose. That is to say, the likelihood and means of exposure, in addition to the inherent toxicity of a material, are used to determine the degree of risk to human health or the ecosystem. For example, a high probability of exposure to a low toxicity chemical would not necessarily pose an unacceptable human health or ecological risk, whereas a low probability of exposure to a very high toxicity chemical might. Various regulatory agencies, such as the U.S. Environmental Protection Agency (U.S. EPA), State Water Resources Control Board (SWRCB) and the Regional Boards, the California Department of Toxic Substances Control (DTSC), and state and federal Occupational Safety and Health Administrations (OSHA) are responsible for developing and/or enforcing risk-based standards to protect the public and the environment. The "Regulatory Framework" discussion later in this section presents more detailed discussion.

SITE BACKGROUND

Hydrogeologic Conditions

The types of soil or rock material underlying sites where contaminants have been detected, the depth to groundwater, proximity to surface water relative to the contamination, and variations in groundwater or surface water levels are important factors governing the fate of contaminants in the environment. In the Project Area, Bay Mud, clay deposits with interbedded sand, and weathered Franciscan Formation bedrock underlie fill material. The thickness of the fill and underlying unconsolidated materials varies throughout the Project Area. The depth to bedrock varies from just below the ground surface in the southern part of the Project Area near Mariposa Street to approximately 200 feet below ground surface near China Basin Channel./2/

Groundwater south of the Channel generally ranges from 2 to 10 feet below ground surface and flows towards China Basin Channel or San Francisco Bay./3/ North of the Channel groundwater elevations range from 3 to 13 feet below ground surface./4/ Some fluctuation in groundwater levels due to tidal action has been identified in the Project Area. Groundwater levels are more highly influenced by tides as the distance to China Basin Channel or San Francisco Bay decreases, particularly within 50 feet of the water./5/

The results of a tidal influence study were used to calculate the potential reduction (attenuation) in chemical concentrations that could be predicted to occur in groundwater adjacent to China Basin Channel and San Francisco Bay as it moves toward tidally influenced areas in Mission Bay South. A one-dimensional model was used to predict the concentrations of chemicals in groundwater at the point of flow into saltwater bodies. The model assumes no dilution within the saltwater body. The model incorporated the periodic rise and fall of tides in San Francisco Bay, their cumulative effect on groundwater flow, and associated chemical transport within the local groundwater regime. The model does not account for lateral dispersion, dilution, sorption, or degradation that would naturally occur in a three-dimensional system. Therefore, the results of the modeling were considered conservative because they overestimated the concentrations of chemicals in groundwater./6/ The model used to calculate the attenuation factor is equally applicable to Mission Bay North because the hydraulic driving forces for the attenuation are common to both areas. The primary reason tidal-related attenuation occurs is that groundwater flows through a porous material (the fill materials) toward and into a tidally influenced surface water body (either China Basin Channel or the Bay). This process is active in both Mission Bay North and Mission Bay South; hence, the attenuation factor is equally applicable in both areas./7/

The results of the tidal influence model show an average 10-fold reduction (attenuations) in chemical concentrations as groundwater flows within the last 50 feet toward China Basin Channel and the San Francisco Bay. The 10-fold reduction represents a low-end estimate of the actual reduction. Consequently, actual reduction effects may be greater./8/ The tidal influence model is discussed in more detail in Appendix I under "Tidal Influence Study" under "Analysis of Potential Adverse Ecological Effects associated with Current Conditions in the Project Area." Note that groundwaer flowing to the Bay and Channel is a natural phenomenon; it is not considered to be a "point source"discharge to the Bay because the water does not enter the Bay at a single location like a sewer or stormwater discharge pipe.

In the late 1970s, two large subgrade box sewers were installed, one each north and south of China Basin Channel, to expand the City's combined storm and sanitary sewer system. The box sewers are constructed of poured-in-place reinforced concrete approximately 12 inches thick and supported by piles. The large box sewers are approximately parallel to China Basin Channel, as shown in Figure M.6 in Section V.M, Community Services and Utilities. On the north side of the Channel, the box sewer runs beneath portions of Sixth, Berry, Fourth, and King Streets and is more than 200 feet from the Channel. The 17½-foot-square concrete sewer extends to approximately 25 feet below the ground surface (bgs). On the south side of the Channel, the 13-foot-square box sewer runs beneath Channel Street and is approximately 18 feet bgs. The box sewer on the south side of the Channel is approximately 100 feet from the Channel. These box sewers appear to impede or slow the general flow of groundwater toward the Channel by reducing the amount of groundwater that enters the area between the box sewers and the Channel edge; they do not stop the flow, rather, groundwater flows around the sewers to the Channel. They do not appear to have a major influence in reducing chemical concentrations in groundwater in tidally influenced areas that principally occur within 50 feet of the shoreline./9/

The U.S. Geological Survey (USGS), in cooperation with the San Francisco Water Department, inventoried aquifers and water supply wells in San Francisco and reported no use of groundwater for water supply within the Mission Bay Project Area. There are no water production wells or aquifers used for water supply within the Project Area. The USGS also reported that sediments in areas on and near the Mission Bay Project Area have relatively limited water-producing capacity. Shallow groundwater in the Project Area contains high levels of total dissolved solids (TDS), which is a measure of salinity. The high TDS levels make it unsuitable for drinking water or industrial purposes./10/

See Section V.K, Hydrology and Water Quality, for more information regarding hydrological characteristics, and the Initial Study (Appendix A) for more information on geological characteristics.

Ecological Conditions

The Project Area is highly urbanized, except along China Basin Channel. It supports mainly urban landscaping and weedy vegetation with no terrestrial habitats containing rare, threatened, or endangered species. Therefore terrestrial vegetation and wildlife would not be affected by chemicals in soil or groundwater (see "Biology" in the Initial Study [Appendix A]). This section focuses on the effects of chemicals in soil and groundwater on near-shore aquatic habitats under existing conditions.

The Project Area does not include the Channel, except for a small amount of water surface at Channel edges. At the Bay entrance to the Channel, immediately east of the Project Area, there is a marine plant community indicative of native Bay conditions on the rocks and pilings that could be affected by chemicals in soil or groundwater. The Channel sides support salt marsh vegetation, including a narrow fringe of native pickleweed approximately 2 to 5 feet wide. Pickleweed is a dominant plant species of the northern coastal salt marsh community. This type of wetland is considered sensitive because it has generally high wildlife value; the amount of this type of wetland has declined substantially in the Bay region.

The bottom-dwelling (benthic) invertebrate community is comprised mainly of pollution-tolerant mollusks (such as mussels) and marine worms in the upper (western) part of the Channel, indicative of degraded ecological conditions. The degraded condition is likely to be primarily the result of former industrial and sewage discharges from sites in and near the Project Area. The Regional Water

Quality Control Board has included the Channel in its list of candidates for designation as a regional toxic hot spot that may need remediation, based on a limited screening level analysis, in a proposed regional toxic hot spots plan./11/ The proposed plan is preliminary and is subject to revision as new information becomes available. "Candidate" toxic hot spots are not considered "known" toxic hot spots without further study and a formal public review and approval by the RWQCB.

Pacific herring spawn near the mouth of the Channel during December through March. Trawl surveys in the Channel taken in 1979 and 1997 showed fish species common to the Bay. No threatened or endangered fish species are known to inhabit the Channel. No threatened or endangered bird species are known to nest in the Channel area, although it provides some foraging and resting habitat for a wide variety of waterfowl. The brown pelican is a listed species that has been found foraging in and near the Channel. The Channel provides resting and limited foraging habitat for the California sea lion and the harbor seal; neither is listed on state or federal Endangered Species Act lists, but both are protected by the Federal Marine Mammal Protection Act. More detail on the Channel habitat is provided in Section V.L, China Basin Channel Vegetation and Wildlife: Setting.

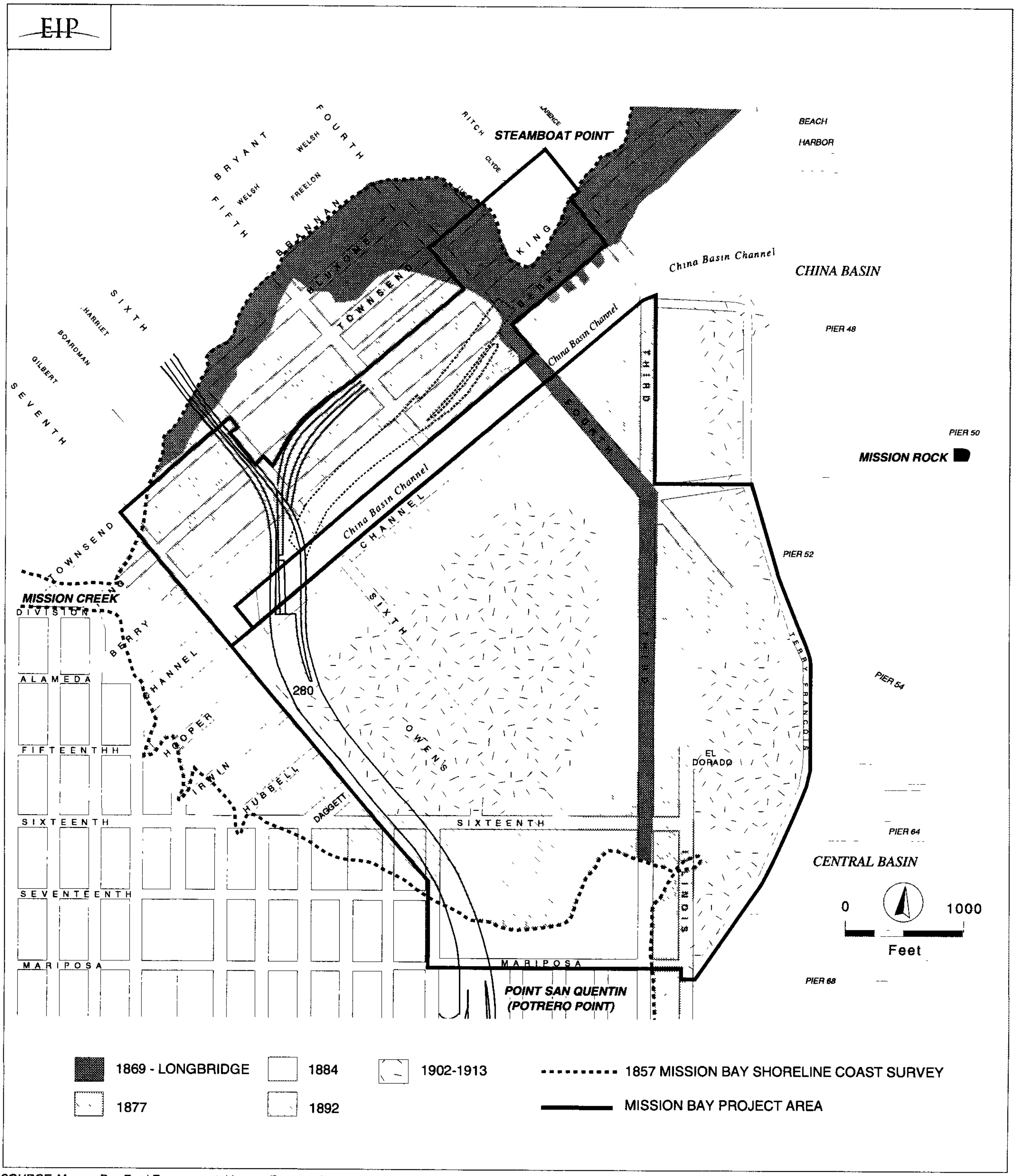
Historic and Current Land Uses

<u>Historic Land Uses</u>

As discussed in the 1990 FEIR, most of the Project Area was originally a bay covered by shallow waters. In 1859, filling began north of the Channel, continuing for approximately 50 years. In the late 1860s, railyards were constructed and operated for several decades. A wide variety of commercial businesses and industries have also been located in the Project Area throughout its history. Materials that were used to fill Mission Bay and numerous industrial uses have the potential to affect soil and groundwater conditions. These historic land uses are discussed in greater detail in this section.

Landfills and Industrial Uses

The Project Area was filled beginning in 1859 and continued for approximately 50 years./12/ The 1990 FEIR described the sequence of fill, which consisted primarily of earthquake rubble, municipal garbage, and rock and soil from other locations in San Francisco. The progression of fill in the Project Area is shown in Figure V.J.1 and is summarized below. The results of the additional investigations completed since 1990 are consistent with the site history discussion presented in the 1990 FEIR.



SOURCE: Mission Bay Final Environmental Impact Report, 1990

FIGURE V.J.1 PROGRESSION OF FILL

Filling of the area north of the Channel occurred between approximately 1859 and 1884. From about 1878 to 1895, the area south of Berry Street between Fifth and Seventh Streets was used as a municipal dump by the City of San Francisco. Once filled, various industrial activities were conducted. These included glass manufacturing; lumber yards; a cooperage (barrel making); a building material storage depot; an artificial stone company; asbestos storage; concrete mixer and sand and gravel bunkers; a box factory; and a vinegar works./13/

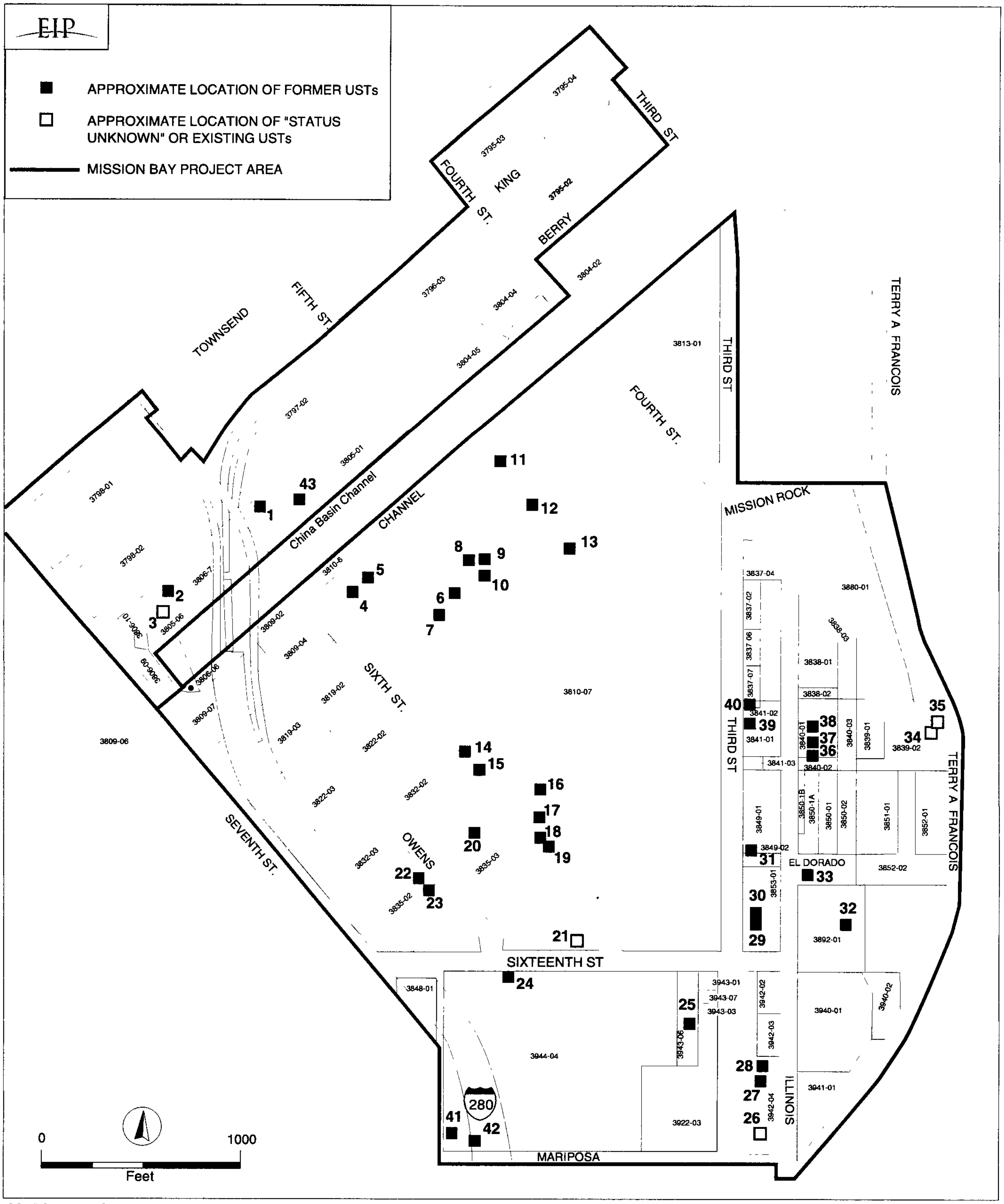
Filling of the area south of the Channel took place between approximately 1869 and 1913. Fill materials used from 1869 to 1892 included dirt and rock from the Second Street cut, and serpentine rock blasted from Irish Hill./14/ By 1892, Mission Bay was completely enclosed, shutting off the direct tidal flushing of San Francisco Bay. Filling of Mission Bay was completed following the earthquake and fire of 1906, when rail lines were used to transport building rubble and debris from downtown San Francisco to Mission Bay. The debris was used to fill the center of Mission Bay as well as to extend the eastern shoreline into San Francisco Bay. Once filled, industrial activities similar to those that occurred north of the Channel took place south of the Channel. In addition, rail yards and a roundhouse for locomotive repair occupied most of the central portion of the Project Area south of the Channel.

Appendix Table I.2 presents a summary of historical site usage for each of the Assessor's Blocks located in the Mission Bay Project Area. Assessor's Block locations for the Project Area are shown in Appendix Figure I.1.

Underground storage tanks (USTs) were used extensively throughout the Project Area, and Port property east of Illinois Street was an area of numerous petroleum-related activities such as fuel transfer and storage. Locations where these activities occurred in the past have been previously identified as potential sources of soil or groundwater contamination in the Project Area. The current status of investigation and cleanup efforts at these sites are described in greater detail below.

Underground Storage Tanks

At one time, there were thought to be about 100 known or suspected USTs in and near the Project Area, approximately 50 in the Project Area, and 50 nearby./15/ As a result of investigations carried out during the past 10 years, 43 USTs have been identified in the Project Area; the remaining 7 were determined not to exist or to be duplicate listings. Most of the Project Area USTs were located south of the Channel. The USTs typically contained fuel products such as oil, gasoline, or diesel, although some may have contained liquid chemical materials or wastes used in the various industrial operations that were present. Figure V.J.2 illustrates the approximate locations of the 43 identified USTs in the Project Area./16/



SOURCE ENVIRON International Corp

MISSION BAY SUBSEQUENT EIR

FIGURE V.J.2 LOCATION OF FORMER AND EXISTING UNDERGROUND STORAGE TANKS WITHIN THE PROJECT AREA

Landowners and tenants in the Project Area have been actively implementing programs since the early 1980s to remove USTs no longer in service or where removal has been determined to be necessary to mitigate identified or potential soil or groundwater contamination./17/ Appendix Table I.3 contains a summary of the status of USTs that are known or believed to have existed in the Project Area.

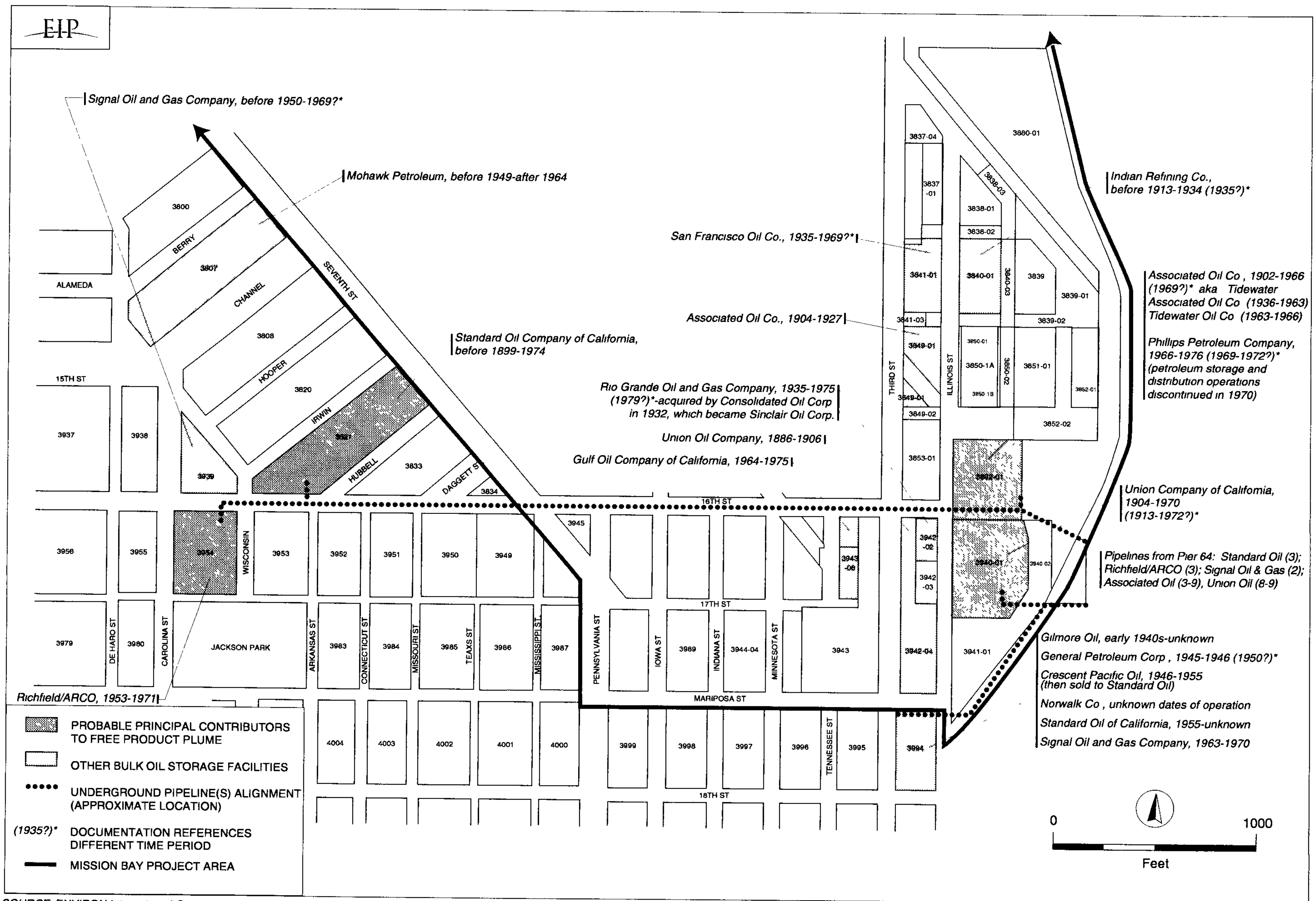
Of the 43 identified USTs, 38 have been removed and 2 have been closed in place. Three are still present in the Project Area: one active tank at Seventh and Berry Streets, and two inactive tanks near Fourth Street and Terry A. François Boulevard (locations 3, 34, and 35 on Figure V.J.2). The current status of the remaining two inactive USTs is unknown, according to information compiled by ENVIRON in 1997. Reports documenting the results of the petroleum hydrocarbon sampling at former UST locations addressed the extent of soil and/or groundwater contamination (if any was identified) and recommendations for further action, where necessary./18/ These reports are listed in Appendix Table I.1. Where contamination was identified, most results showed petroleum hydrocarbon in the form of diesel fuel and motor oil.

Bulk Petroleum Handling Facilities

Various oil companies operated on several parcels in the area south of the Channel, primarily on the Port property east of Illinois Street. Figure V.J.3 illustrates the past bulk oil storage facilities. On-site storage activities ceased during or soon after 1970. Operation of pipelines that carried oil in the area apparently ceased in the 1960's, with petroleum products apparently left in place within the lines. Oil companies that reportedly operated bulk storage facilities or operated the petroleum pipelines included ARCO, Chevron, Phillips, Texaco, and UNOCAL.

In July 1990, an investigation of the Esprit de Corp (Esprit) property located northwest of Mariposa and Third Streets was performed to assess the extent of potential petroleum hydrocarbon contamination from petroleum bulk storage and handling activities that took place at that location from 1904 to 1970. Petroleum hydrocarbons were detected in most of the soil and groundwater samples from the property. Approximately one foot of petroleum free product was found on groundwater at the northwest corner of the Esprit property, and trace amounts of free product were also detected at other sampling locations./19/ ("Free" product, defined in glossary, is petroleum not confined in a tank or pipeline, and can be found floating on groundwater.) Free product contamination at the Esprit site is currently under RWQCB oversight as part of a cleanup plan that addresses several parcels in that area, as described in more detail below.

In early 1991, two small spills from the pipelines occurred, releasing a total of approximately 50-60 gallons of oil (possibly weathered bunker fuel) into San Francisco Bay. Following the releases, with



SOURCE: ENVIRON International Corp

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FIGURE V.J.3 HISTORIC BULK OIL STORAGE FACILITIES IN AND NEAR THE PROJECT AREA

the approval of the U.S. Coast Guard, the Port of San Francisco sealed the ends of all the pipelines with concrete and pumped approximately 500 gallons of oil from pipes. After a third leak in 1991, the Port excavated the pipelines back from the shoreline approximately 20 feet, removed the remaining product from the pipelines, which was approximately 10,000 gallons, cut off and permanently capped all of the pipelines and constructed a containment vault around the capped pipelines. The U.S. Coast Guard approved the port actions. ARCO, Texaco, and UNOCAL all made financial contributions toward the remediation and fines associated with the pipeline leaks, spills, and emergency response./20/ As with the Esprit site, the area is under current RWQCB oversight.

An investigation was also conducted on port property at the former Atchison, Topeka and Santa Fe (ATSF) Railway Company China Basin Railyard, which encompasses much of the area east of Illinois Street in the south of Channel area. During the 1996 investigation, petroleum hydrocarbons were detected in soil and groundwater at the former railyard. Detections of petroleum hydrocarbons were mainly attributed to the upgradient former bulk storage facilities located immediately southwest and west. The subsurface pipelines along 16th Street to Pier 64 were identified as a potential source of petroleum hydrocarbons that could have been released to soil or groundwater./21/

Based on the findings of comprehensive investigations performed by ENVIRON during 1996-97 (presented later in this section) and the results of the Port, Esprit, and ATSF investigations summarized above, the Regional Water Quality Control Board, San Francisco Bay Region (RWQCB) requested that ARCO, Chevron, Phillips, UNOCAL, and Texaco prepare a work plan to address the contamination. The RWQCB considers the free product plume and pipelines as one "site" under RWQCB oversight. In response to the request from the RWQCB, ARCO, Chevron, Phillips, UNOCAL and Texaco submitted a Joint Assessment Work Plan to the RWQCB staff for review in November 1997. The initial proposed work is intended to verify the extent of the free product area and to determine if the hydrocarbon contamination could affect San Francisco Bay. According to the work plan, testing to adequately characterize the extent of contamination and completion of main remediation activities was expected to occur within approximately six months following completion of characterization studies./22/ The proposed work plan must be approved by RWQCB staff. In January 1998, RWQCB staff requested modification of the work plan to more fully address the abandoned pipelines. The consultant for the oil companies prepared a response to the RWQCB request in February 1998./23/ Site cleanup for the free product will take place irrespective of actions on the Mission Bay Redevelopment Plans and build-out of the Project Area.

There is a variety of institutional and technical responses that could be used to manage the free product area. Remediation techniques vary in the amount of treatment, containment, and removal of the free product, and would result in varying degrees of risk reduction. There are at least nine options among the range of remedial actions that could be implemented, independently or in combination. Implementation of any one of these options will take place independent of future actions contemplated within the Mission Bay Project Area.

These options are listed here. An analysis of each is presented in ENVIRON's *Technical Memorandum #2, Development and Screening of Remedial Alternatives for Free Product Area in Region of Former Oil Storage Facilities*, April 1998. 1) A "no further action" option would continue the natural attenuation of the subsurface free product, with deed restrictions placed on the use of the property in the free product area. No further action would not immediately reduce the current distribution of free product, nor would it reduce the potential for free product or its constituents to migrate. 2) "Natural attenuation with monitoring" would be the same as the first option, but would record the progress of reduction in free product and its constituents. 3) "Investigation and closure" of the 14 oil pipelines in the vicinity of the free product plume would involve detailed investigations of the locations of the pipelines, removal of residual free product in groundwater and soil to the extent feasible, and either sealing the pipelines or excavation and removal of pipelines. 4) "Soil vapor extraction" would partially remediate the free product area. It reduces the amounts of the more volatile fractions of petroleum hydrocarbons. This method would result in limited reduction in risk to human health and the ecological environment because most of the free product is heavier crude oil that is not volatile. 5) "*In situ* bioremediation" involves enhancing existing natural biodegradation by adding more nutrients and/or adding microorganisms. This option may or may not be feasible, depending on whether the particular hydrocarbons found at this site are susceptible to this approach. It could potentially take tens of years to complete, but, if applicable, would be faster than natural processes. 6) "Containment barriers" could be used to prevent offsite migration of free product and its constituents. This option would not reduce risks for the properties under which the free product lies. Groundwater monitoring would be required to monitor the effectiveness of this approach. 7) "Capping" the free product area with clay, asphalt, concrete or synthetic membranes, or other similar materials, would prevent direct access to the free product by any construction or maintenance workers who might otherwise carry out excavation in the area. Capping could reduce leaching of hydrocarbons to groundwater but would not control potential migration of free product and the constituents of the free product to the aquatic environment. Capping could reduce or eliminate vapors from volatile compounds that could be released to the atmosphere depending on the composition of the cap. 8) "Extraction" of free product would physically remove groundwater and treat it to remove or reduce the constituents of free product. Chemicals in soil would remain. 9) "Excavation" would remove soils contaminated with free products and the constituents of free product for treatment or off-site disposal. This option could require excavation and transport or treatment of over 300,000 cubic yards of soil.

Excavation of soils or exposure of groundwater associated with any of the remediation options could result in potential short-term exposure of populations to the chemicals in the soil or groundwater; these exposures would need to be controlled. Long-term effects of any of the remediation options would vary, depending on the extent of removal or treatment of the free product and, therefore, the amount of risk reduction accomplished by the remediation effort. These options, or combinations of them, will be considered by the RWQCB; cleanup will be carried out pursuant to RWQCB requirements regardless of actions taken on the proposed project. Measures to protect human health and the environment during cleanup activities and that would be appropriate for the selected cleanup option(s) would also be identified prior to cleanup.

Current Land Uses In and Adjacent to Project Area

The Project Area is an industrial area primarily occupied by block-long warehouses, concrete and gravel processing facilities, and truck terminals, with large tracts of undeveloped land that previously contained rail lines and a rail yard. Rail tracks have been removed in some areas. There are two truck terminals and about 50 warehouses, buildings, other structures, and recreational uses including a golf driving range and in-line skating facility. Buildings range from small materials sheds to large warehouses. Building uses include distribution and storage facilities for food products, clothing, rental furniture and personal effects; light manufacturing; and some office use. Uses of undeveloped areas include maintenance yards, parking areas for container trucks and commercial buses, and storage areas for construction materials. Additional information on existing land uses within the Project Area is presented in "Existing Land Uses in the Project Area," in Section V.B, Land Use, and in Figure V.B.2.

The Caltrain terminal, China Basin Landing buildings, China Basin Channel, and Mission Creek houseboat community in the Central Bayfront Nearby Area are outside of and adjacent to the Project Area. The Caltrain rail rights-of-way run along the western border of the Project Area. As discussed in greater detail in "Existing Land Uses in Nearby Areas," in Section V.B, Land Use, other nearby land uses include the site of the San Francisco Giants Ballpark, the South End Historic District, the South Park and South Beach mixed-use neighborhoods, and residential, commercial, and industrial land uses associated with the Lower Potrero, North Potrero/Potrero Hill, and Showplace Square.

Potential Contaminants of Concern

As discussed in the 1990 FEIR, the potential for contamination by, and residual hazards from historic industries in the Project Area varies by the type of industry and the period in which it operated. The Project Area was occupied by a large variety of industries that could have used hazardous chemicals.

The bulk petroleum storage facilities typically handled products such as kerosene, gasoline, lubricating oil, crude oil, and bunker fuel oil. In addition, hazardous materials such as asbestos for fire-proofing and lead-based paints were commonly used in buildings.

Types of Contaminants

Based on these past uses and fill activities, potential types of chemicals associated with past land uses were identified in the 1990 FEIR as potential contaminants of concern that would require investigation because of their potential to adversely affect soil, groundwater, or surface water.

Soil and Groundwater

Based on historic uses, soil and groundwater could be contaminated with chemicals such as pesticides, petroleum hydrocarbons, asbestos, various metals, or various organic compounds. A detailed list of chemicals that could be found in soil and groundwater was prepared for the 1990 FEIR, based on block-by-block analysis of historic land uses. General categories of chemicals and examples are summarized in Table V.J.1./24/

Landfill Gas

In addition to the constituents shown in Table V.J.1, garbage dumps, such as the one that existed in the Project Area at the turn of the century, often contain organic matter that decomposes into landfill gas. This dump was in use before the adoption of most or all modern landfill environmental controls, including regulations requiring devices to control gas generation. Methane, the primary component of landfill gas, is a combustible gas that can explode when ignited in the presence of air when concentrations range from approximately 5% to 14% total landfill gas concentration. Over time, however, methane production from the buried refuse decreases, thus reducing the associated hazard. Because the landfilled materials are nearly 100 years old, methane concentrations would be expected to be very low.

Hazardous Building Materials

The project would include demolition of all existing buildings in the Project Area, with the possible exception of the old Fire Station No. 30 building. Building materials sometimes contain hazardous materials that could be released during demolition. The most common building hazards, which are described below, are asbestos, lead, polychlorinated biphenyls (PCBs), and mercury from old lighting fixtures. In addition, dusts containing metals (e.g., at the former Castle Metals warehouse) can also

**TABLE V.J.1
POTENTIAL CONTAMINANTS OF CONCERN BASED ON
HISTORICAL SITE USES**

Category	Examples of Chemicals or Products
acid and alkaline solutions	nitric acid and sulfuric acid
polycylic aromatic hydrocarbons (PAHs)	benzo(a) pyrene, naphthalene
volatile organic compounds (VOCs)	benzene, solvents, and glues
pesticides	DDT, chlordane
polychlorinated biphenyls (PCBs)	transformers, light ballast
total petroleum hydrocarbons (TPH)	gasoline, diesel, motor oil
wood treatment compounds	creosote, copper salts, pentachlorophenol
metals and metal salts	mercury, cadmium oxide
asbestos	insulation, fire-proofing material

Source: 1990 FEIR; 1997 Mission Bay North and 1998 Mission Bay South reports.

be present. These potential hazardous materials in buildings are described further below. The results of testing for these materials that could be present in soils in the Project Area are discussed in "Results of the 1997 Soil and Groundwater Investigation," below, and in Appendix I under "Summary of Soil and Groundwater Sampling Results."

Asbestos

Asbestos can be found in a variety of building materials and components. Loose insulation, ceiling panels, and brittle plaster are potential sources of friable (easily crumbled or pulverized) asbestos. Friable asbestos fibers from these materials are a health threat when they become airborne. Nonfriable asbestos is generally bound to other materials such that it does not become airborne under normal conditions. This kind of asbestos is usually found in building materials such as linoleum, flooring adhesives, and insulation. In some cases the asbestos is sealed within or mixed with another material and thus unable to present an exposure hazard. However, any activity that involves cutting, grinding, or drilling during building renovation or demolition could release asbestos fibers unless proper precautions are taken. Because of potential adverse health effects such as lung cancer and asbestosis, asbestos is regulated both as a hazardous air pollutant and as a potential worker safety hazard. Cal/OSHA regulations prohibit emissions of asbestos from asbestos-related demolition or construction activities and specify precautions and safe work practices that must be followed to minimize the potential for release of asbestos fibers (see "Regulatory Framework," below, for more information on Cal/OSHA regulations).

Friable and nonfriable asbestos were found in a 1992 survey of two buildings in the 1300 block of Sixth Street in Mission Bay South; the friable asbestos was detected primarily in linoleum flooring and drywall./25/ Additional sampling was recommended for these sites by the investigator prior to renovation or demolition; demolition would take place according to applicable laws and regulations. A site-wide survey has not been completed to determine the type and amount of asbestos that may be present in other Project Area buildings expected to be demolished. The survey is not warranted at this time because this SEIR has been prepared under the conservative assumption that asbestos is present in the building materials in most or all Project Area buildings due to their age.

Polychlorinated Biphenyls (PCBs) and Mercury

PCBs are organic chemicals, usually in the form of an oil, that were formerly used in electrical equipment, including transformers and capacitors, primarily as electrical insulators, in fluorescent light ballasts, and in hydraulic equipment in old elevator systems. Nearly all ballasts manufactured prior to 1979 contain PCBs. In California, PCB-containing materials must be managed and disposed of as hazardous waste. Heavy metals, such as mercury, are sometimes a component of older fluorescent light tubes and high-intensity discharge lamps. As with PCBs, mercury-containing materials must be managed and disposed of as hazardous waste.

A site-wide survey to determine the presence, if any, of PCB- or mercury-containing items or materials that may be present in buildings to be demolished has not been completed. As with asbestos, a site-wide survey of buildings is not warranted at this time, and it is assumed for purposes of this SEIR analysis that old transformers, capacitors, hydraulic lifts or other fixtures containing PCB oils are present in the building materials due to the age of the buildings.

Lead and Other Metals

Lead is a naturally occurring metallic element. Among its numerous uses and sources, lead is used in paint to increase its durability and can be found in water pipes, solder in plumbing systems, and in soils around buildings or structures coated with lead-based paint. Lead can also be found in dust inside buildings that had gasoline-powered equipment or included automobile repair activities; the lead in these buildings is from leaded gasoline that was in use until the 1980's. Lead, chromium, mercury and nickel were found in dust samples taken from the warehouse at 1900 Third Street (the Castle Metals site), associated with metal fabrication activities./26/ Other structures and buildings in the Project Area have not been tested for lead-based paints. Due to the age of the buildings, it is likely that lead-based paint is present in the building materials.

Because of its toxic properties, lead is regulated as a hazardous material. Inspection, testing, and removing (abatement) lead-containing building materials must be performed by state-certified contractors who are required to comply with applicable health and safety and hazardous materials regulations. Chapter 36 of the San Francisco Building Code requires contaminant barriers around sites where exterior lead paint is being disturbed.

Associated Human Health Effects

The chemicals and products listed in Table V.J.1 are considered contaminants of concern because, under certain conditions, adverse effects on human health and the environment can result from exposure to these compounds.

The types of health risks associated with exposure to such chemicals were summarized in the 1990 FEIR and described in greater detail in the Hazards Mitigation Program./27/ As noted in those documents, toxic or other harmful properties can vary greatly from one material to the next and from individual to individual. Whether the substance results in any damage also varies greatly and depends on such factors as the amount (dose), characteristics of the individual (e.g., age, gender, height/weight, general health), length of time the individual was exposed to the substance, and how the material enters the body. Potential health effects from exposure to the chemicals or products listed in Table V.J.1 may be short-term (acute) or long-term (chronic). Acute effects, which may result from a single exposure to a hazardous material, can include damage to organs or systems in the body, and possibly death, depending on the amount or type of material. Chronic effects, which may result from long-term exposure to a hazardous material, can also include organ or systemic damage; however, chronic effects of particular concern include birth defects, genetic damage, and cancer.

HISTORY OF SITE INVESTIGATIONS

Summary of 1990 FEIR Analysis

A detailed description of historic uses in the Project Area and potential soil and groundwater contamination issues associated with each parcel were presented in Section VI.N and Appendix L of the Mission Bay 1990 FEIR./28/ At the time the EIR was prepared, the analysis was qualitative in nature and assumed, based on similar historic uses in other locations in San Francisco, that soil and groundwater would contain concentrations of contaminants that would require remediation. In the absence of site-specific data to quantify the extent of contamination and potential risks to the public and the environment, a conservative, worst-case approach to the analysis was determined to be appropriate. Therefore, to address potential hazards that could be encountered during construction and occupancy of the project proposed under the 1990 FEIR, a Hazards Mitigation Program was developed as part of the FEIR to establish actions that could be implemented to reduce potential adverse effects to less-than-significant levels./29/ These actions included development of plans intended to identify the extent of soil and groundwater contamination that may have occurred within the Project Area, to evaluate possible health effects due to exposure to contaminants that might be present, and to generally identify the types of remedial actions that could be used to manage identified contamination so that it would not present an unacceptable health or ecological risk.

Investigations After 1990

The combination of individual and site-wide investigations performed subsequent to the 1990 FEIR has provided information to sufficiently identify potential soil and groundwater contamination hazards, including those areas that would be developed by Catellus, UCSF, or other entities, for the purposes of this SEIR analysis. Based on the results of these investigations, no new constituents of concern or unanticipated types or locations of soil or groundwater contamination were identified as a result of investigations performed subsequent to the 1990 FEIR. Studies conducted in 1997 (see Appendix Table I.1) more clearly delineated the location and extent of petroleum hydrocarbon contamination thought to exist in the area of former bulk petroleum handling facilities in the southeast part of the Project Area.

Two types of investigations have been carried out for individual sites in the Project Area since the 1990 FEIR was certified: specific studies of individual locations in the Project Area and a more comprehensive investigation of the entire Project Area as a whole. Reports and relevant public agency correspondence that describe the results of the individual investigations are listed in Appendix Table I.1.

The most comprehensive of the Project Area investigations completed since 1990 are the *Results of Investigation Mission Bay North of Channel, San Francisco, California* ("1997 Mission Bay North report") and *Site Investigation and Risk Evaluation Report, Mission Bay South of Channel, San Francisco, California* ("1998 Mission Bay South report") prepared for Catellus by ENVIRON Corporation (ENVIRON)./30/,/31/ These studies relied on a combination of an understanding of the fill history and subsequent historic and industrial uses in the Project Area and the results of previous site-specific investigations noted in Appendix Table I.1 to develop and implement site-specific testing and analysis plans that would identify significant source areas that could adversely affect human health or the ecological environment within the Project Area./32/ The scope of the 1997 ENVIRON investigations is presented in the following discussion based on the 1997 and 1998 reports and a number of technial memoranda prepared by ENVIRON in 1998, followed by a summary of analytical results and a discussion of the human health and ecological risks under existing (pre-development) conditions. Additional detail regarding the sampling program, analytical results, and methods ENVIRON used to evaluate the data is included in Appendix I under "Field Investigation and Sample Analysis Procedures."

SCOPE OF 1997 SOIL AND GROUNDWATER INVESTIGATIONS

The scope of the sampling programs for the Mission Bay areas north and south of the Channel were designed to be sufficiently comprehensive to characterize soils and groundwater conditions in the Project Area so that potential adverse effects to human health and the ecological environment and the appropriate risk management measures could be identified. The testing program was intended to identify significant contaminant source areas./33/

Work plans to guide the 1997 Mission Bay soil and groundwater investigations were prepared for the Mission Bay North and Mission Bay South areas./34/,/35/ (The areas north and south of the Channel are proposed to be two redevelopment areas—Mission Bay North and Mission Bay South—and are designated this way in discussing the proposed project in the Impacts sections.) As stated above, in developing the work plans for each area to be investigated, ENVIRON considered the results and conclusions of previous investigations (primarily associated with underground storage tank removals and soil remediation) as well as other site-specific assessments. From this information, the types of investigative methods that would effectively allow the collection data necessary to identify significant source areas and to evaluate potential health and ecological risks were determined. The RWQCB staff approved the work plan for Mission Bay North in November 1996. The Mission Bay South work plan was approved by the RWQCB staff in March 1997./36/

RESULTS OF THE 1997 SOIL AND GROUNDWATER INVESTIGATIONS

The following discussion is divided into two parts: the first summarizes the analytical results of the Mission Bay North and Mission Bay South investigations as presented in the two reports on the Project Area; the second part identifies potential human health and ecological risks associated with the concentrations of contaminants detected and an evaluation of the risk under existing (pre-development) conditions and establishes a baseline against which to compare the effects of the proposed project.

Analytical results for soil and groundwater sampling performed in the Project Area are presented in more detail in Appendix I under "Summary of Soil and Groundwater Results."

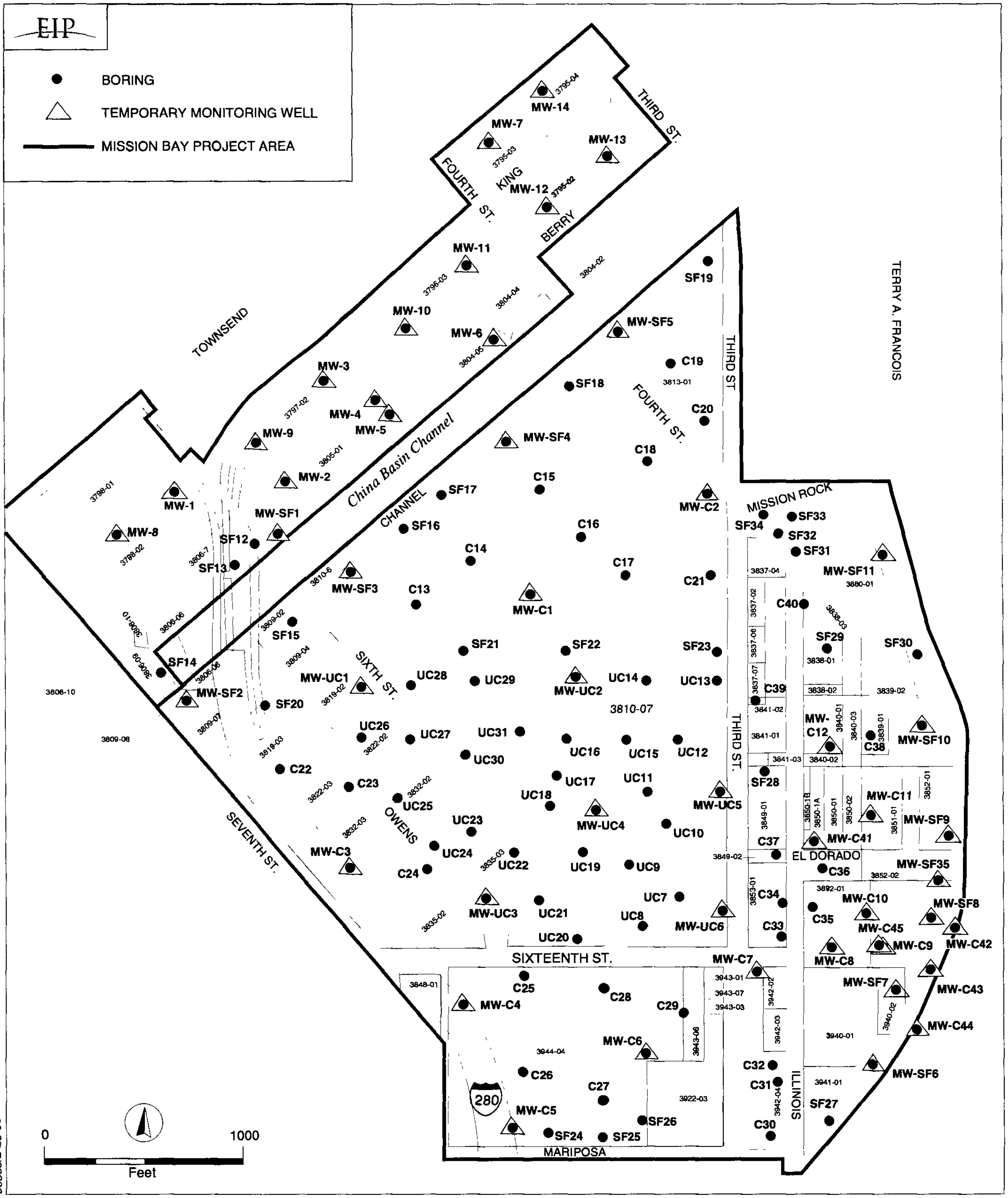
Sampling Program and Analytical Results

Mission Bay North

The Mission Bay North soil and groundwater investigation was conducted from December 5, 1996, monitoring to February 17, 1997. Soil and groundwater samples were collected from 14 borings and wells as shown in Figure V.J.4. Two soil samples from each boring, ranging in depth from 2.5 to 5.0 feet below the ground surface, were collected and analyzed. Soil samples were analyzed for volatile organic compounds (VOCs), semivolatile organic compounds (SVOCs), polycyclic aromatic hydrocarbons (PAHs, a type of SVOC), pesticides and polychlorinated biphenyls (PCBs), total petroleum hydrocarbons (TPH) as gasoline, diesel and motor oil fractions, metals, asbestos, fluoride, cyanide, sulfide, pH (measure of acidity or alkalinity), methane, and ignitability. The shallower of the two soil samples from each location was not tested for VOCs, as these compounds do not tend to persist in surface soils. The list of analytes includes those specified in Article 20 of the San Francisco Public Works Code, the Hazardous Waste in Soil Ordinance (described in "Regulatory Framework," below). Groundwater was tested for VOCs, SVOCs, metals, TPH, and pH. Testing requirements in Article 20 of the Public Works Code do not apply to groundwater. In addition, groundwater level data were collected to determine flow direction, the effects of tides on groundwater levels, and the extent to which the box culverts restrict groundwater flow toward China Basin Channel (for more information on this topic, see "Tidal Influence Studies" in Appendix I)./37/

The results of the Mission Bay North study are presented in the *Results of Investigation Mission Bay North of Channel, San Francisco, California*, prepared for Catellus by ENVIRON Corporation in April 1997./38/ Results of the Mission Bay North study were submitted to the RWQCB in April 1997.

The information presented in this section, supplemented with additional data in Appendix I in "Summary of Soil and Groundwater Sampling Results," is intended to summarize the key contaminants and locations of concern within Mission Bay North to support the impact analysis that follows.



96555/2-28-98

SOURCE ENVIRON International Corp

MISSION BAY SUBSEQUENT EIR

FIGURE V.J.4 LOCATIONS OF BORINGS AND TEMPORARY MONITORING WELLS

Mission Bay North Soil Results

Results of soil sampling in Mission Bay North are summarized in Appendix Tables I.4 through I.10. Each table lists the chemical detected, the range of concentrations, and the number of detections of each chemical compared to the number of total samples. In addition, Figures V.J.5 through V.J.8 show the locations of borings where various chemicals were detected and the concentrations of those chemicals. Overall the detections of chemicals in soil samples showed a variable spatial distribution with no contamination patterns indicative of a specific, identifiable source area in Mission Bay North./39/

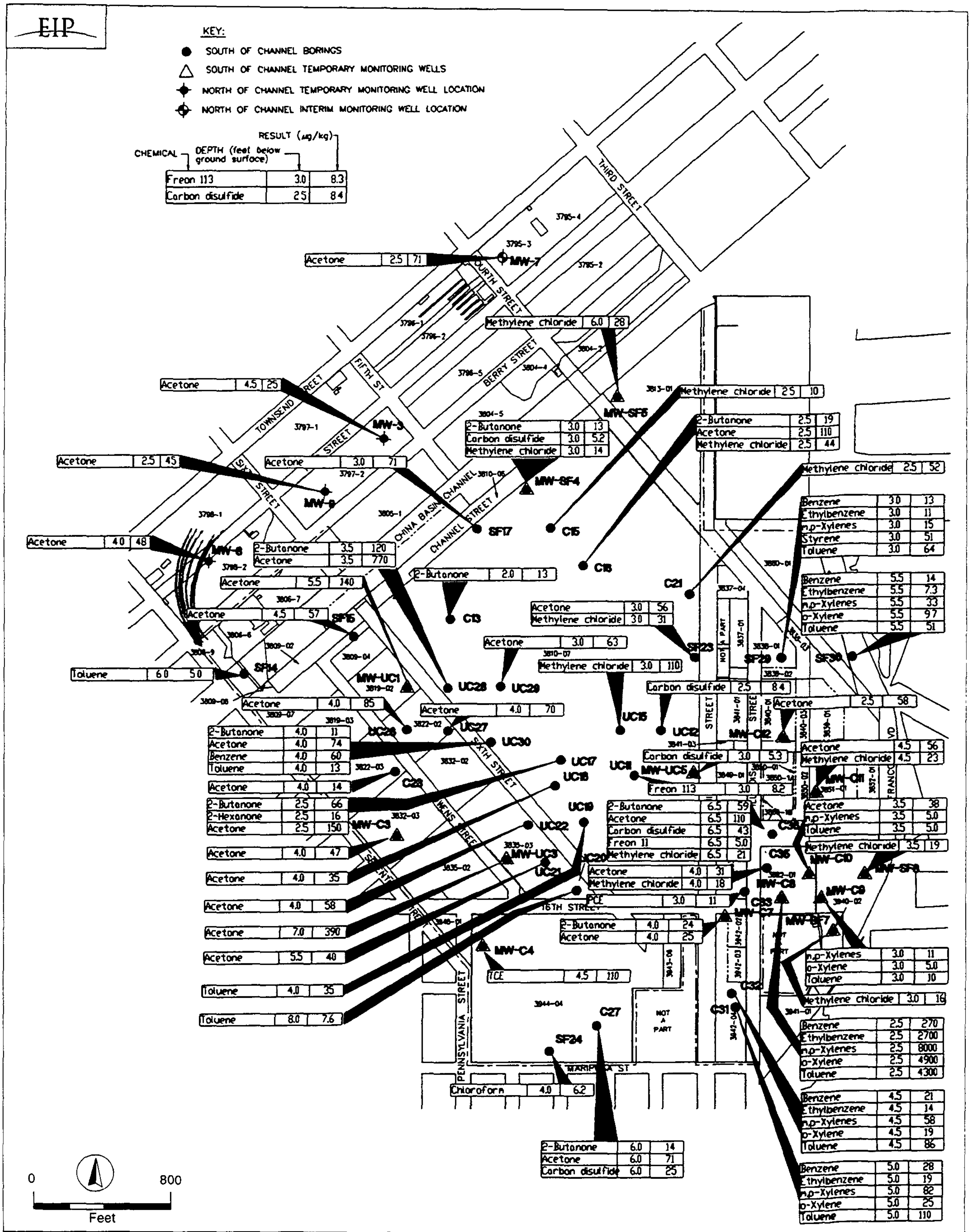
Acetone was the only VOC detected in soil in Mission Bay North; it was detected in 4 out of 14 soil samples collected. Acetone is a chemical used in analytical laboratory processes. It is possible that some of the acetone detections may be from the laboratory analyses, rather than actual detections in soil./40/ VOCs were not detected in soil borings adjacent to the China Basin Channel.

SVOCs were detected in five borings in Mission Bay North. With the exception of two compounds, the SVOCs detected were carcinogenic and noncarcinogenic PAHs. The number of samples in which the PAHs were detected as compared to the number of total detections expressed as a percent ("frequency of detection") was relatively low (less than 20%). Neither the detection frequency nor the distribution pattern of SVOCs in soils indicated a specific, identifiable source of SVOCs./41/ PAHs are typically associated with heavy-end fuels and the combustion of organic material (such as coal and gas) and are pervasive at industrial sites. They are generally found tightly bound to soils./42/

In soil samples tested for TPH-gasoline, -diesel, and -motor oil fractions, TPH-gasoline was not detected in any soil sample analyzed. TPH-diesel and TPH-motor oil were detected in every soil boring in Mission Bay North. Many of the detections of TPH-diesel and TPH-motor oil are likely attributable to the presence of natural oils that were not filtered out during the laboratory analytical process./43/

One PCB (Arochlor 1254) was detected in one soil boring sample. No PCBs were detected in a deeper sample from that boring or at any of the other boring locations. Components of the pesticide DDT (4',4-DDD and 4',4-DDT) were detected in one sample taken from two soil sample locations in Mission Bay North./44/

All metals that were included in the list of analytes tested were detected in all soil samples in throughout Mission Bay North. Arsenic, barium, chromium, cobalt, copper, lead, nickel, vanadium,



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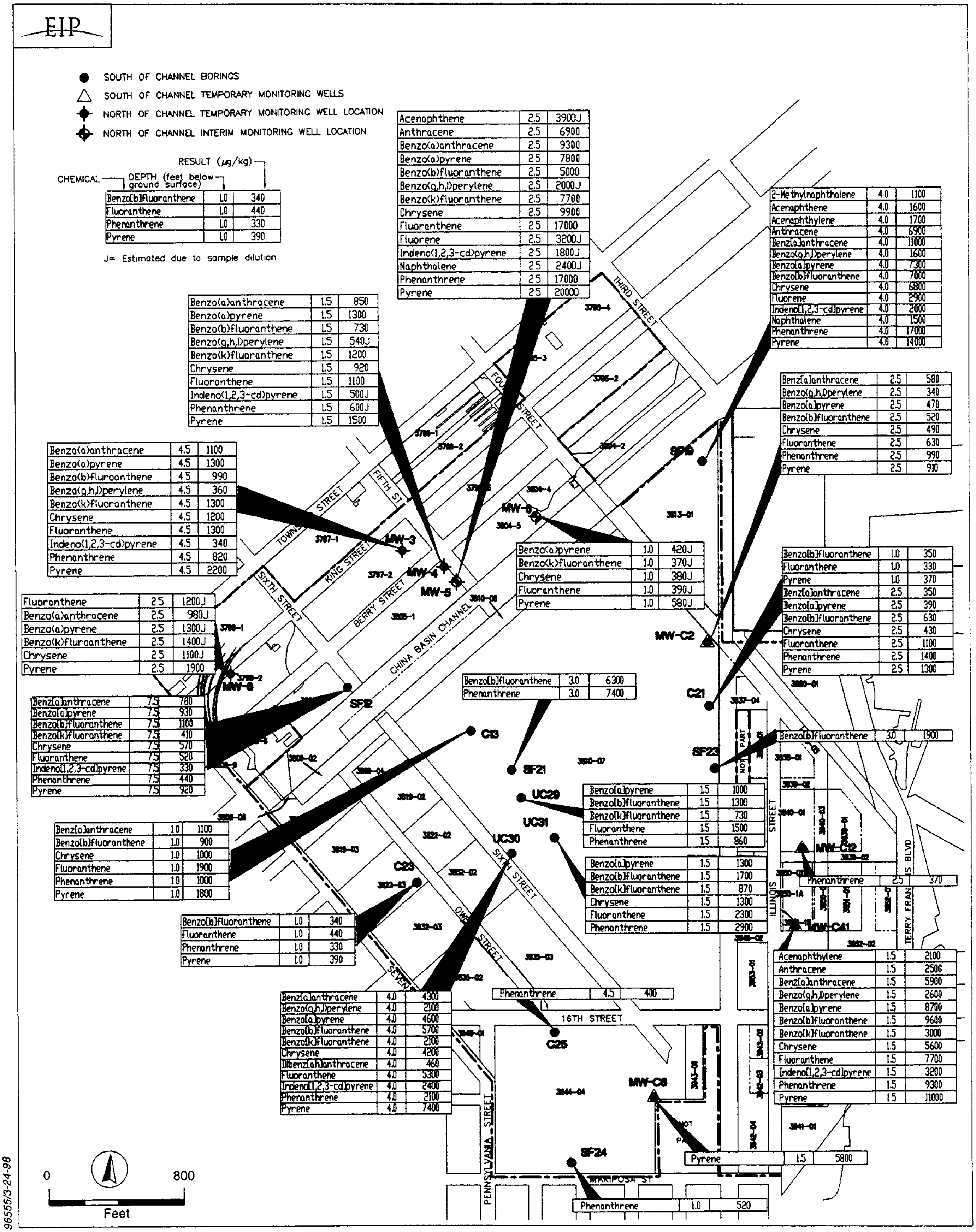
SOURCE: ENVIRON International Corp

MISSION BAY SUBSEQUENT EIR

FIGURE V.J.5 DETECTIONS OF VOLATILE ORGANIC COMPOUNDS IN SOIL



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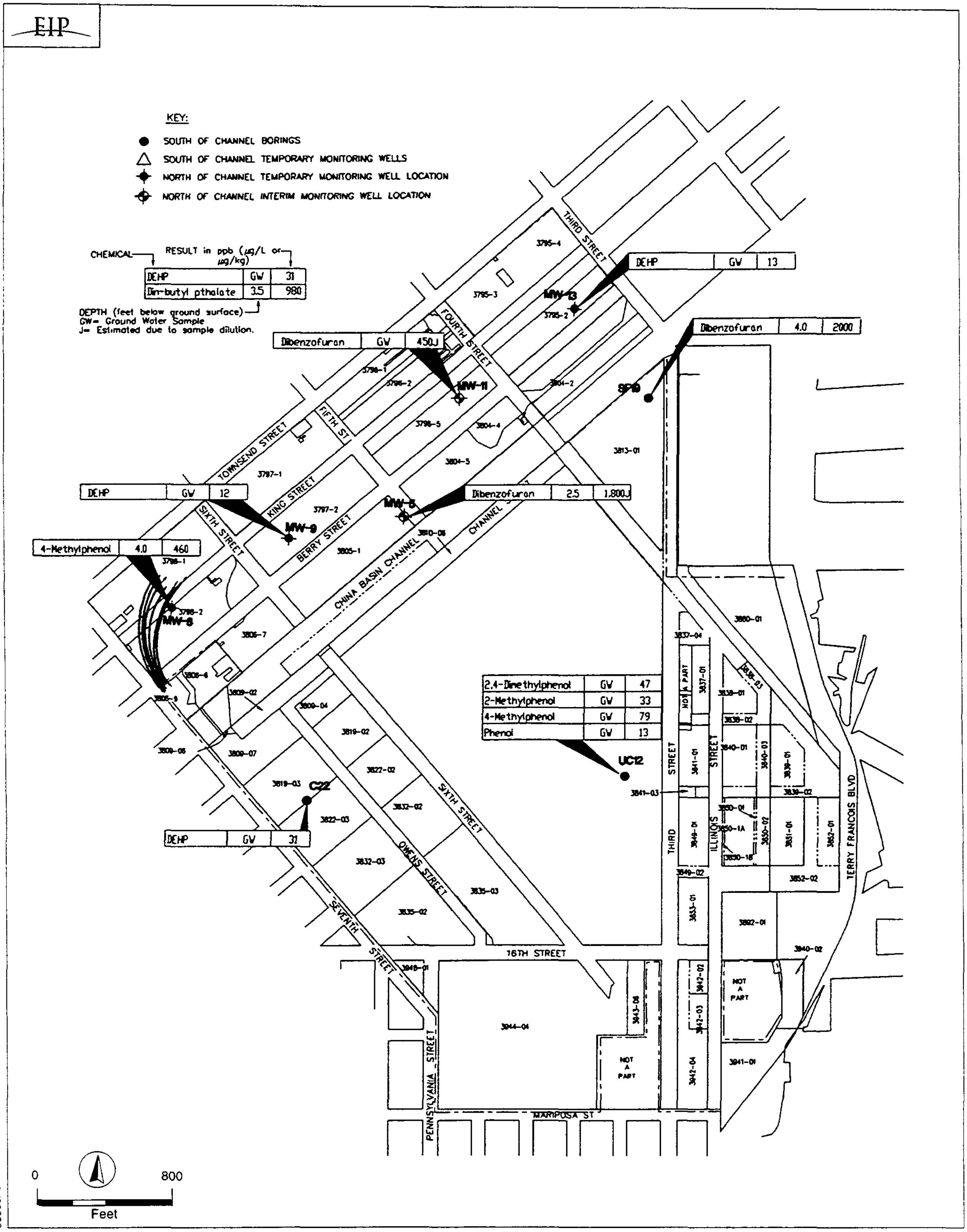
SOURCE ENVIRON International Corp

MISSION BAY SUBSEQUENT EIR

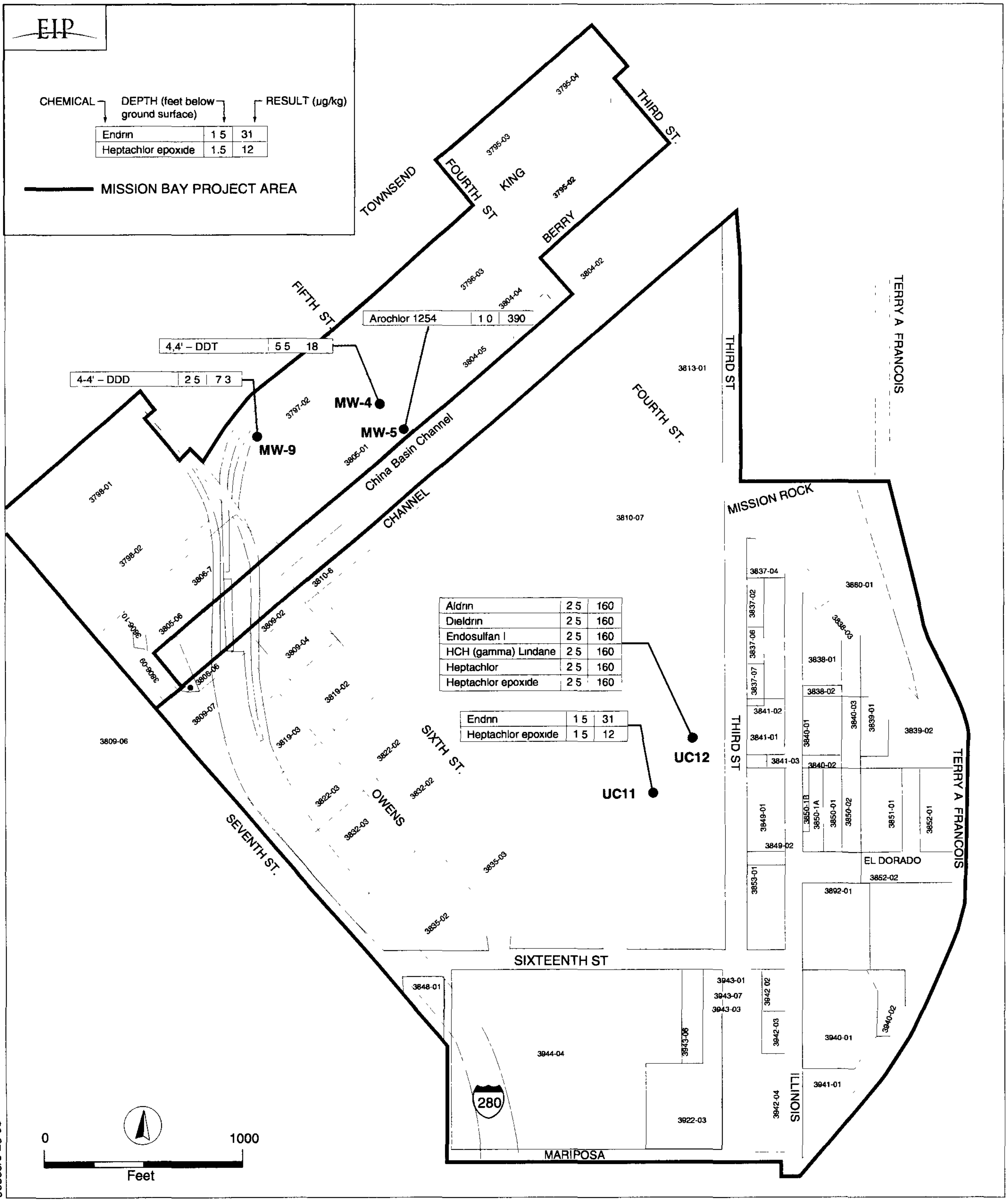
FIGURE V.J.6 DETECTIONS OF PAHs IN SOIL



SOURCE: ENVIRON International Corp

MISSION BAY SUBSEQUENT EIR

FIGURE V.J.7 DETECTIONS OF OTHER SEMIVOLATILE ORGANIC COMPOUNDS IN SOIL AND GROUNDWATER



SOURCE. ENVIRON International Corp.

MISSION BAY SUBSEQUENT EIR

FIGURE V.J.8 DETECTIONS OF PESTICIDES AND PCBs IN SOIL

and zinc were detected most frequently. The absence of geographic pattern to the detections suggests there is no specific identifiable source area, but that the concentrations are more likely representative of background conditions for Mission Bay fill materials./45/

Sulfide and cyanide, analyzed as part of the Article 20 list of chemicals to be tested, were not detected in any soil samples collected during the investigation. Chrysotile asbestos was detected in one sample. The asbestos was believed to be related to pieces of roofing material contained in the sample rather than to the soil. Soil samples were also tested for flammability (ignitability) and methane. The results indicated that the material would not be classified as ignitable, and reported concentrations of methane were well below the explosive range for methane./46/

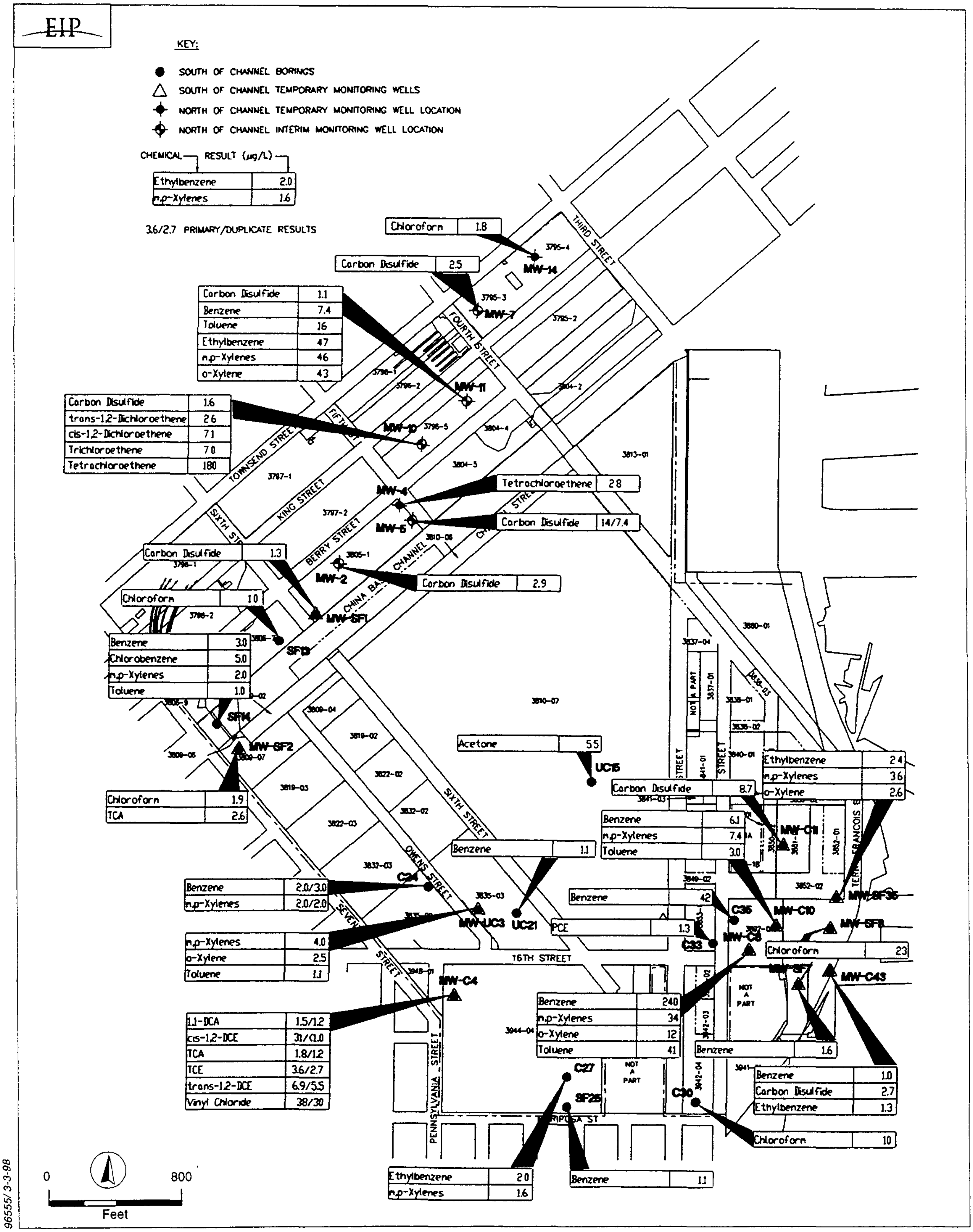
Mission Bay North Groundwater Results

Results of groundwater sampling performed in Mission Bay North are summarized in Appendix Tables I.11 through I.15. Each table lists the chemical detected, the range of concentrations, and the number of detections of each chemical compared to the number of total samples. In addition, Figures V.J.6, and V.J.9 through V.J.13 show the location of monitoring wells where some chemicals were detected and the concentrations of those chemicals.

VOC concentrations in groundwater were not widespread. There appeared to be no pattern in levels of contamination, and the VOC concentrations did not correlate well with chemical concentrations in soil. This suggests that there is no specific identifiable source area for VOC contamination in Mission Bay North. The one location where BTEXs were detected in groundwater is likely attributable to the former UST on the Caltrain property located upgradient of Mission Bay North. VOCs near the Channel were found in low concentrations or were not detected./47/

SVOCs in the groundwater in Mission Bay North are not widespread, and the locations and concentrations of SVOCs suggest there is no identifiable source area in Mission Bay North. SVOCs were not detected in samples collected from wells located next to China Basin Channel. The one location where PAHs (one kind of SVOC) were detected in groundwater is likely attributable to the former UST on the Caltrain property located upgradient of Mission Bay North./48/

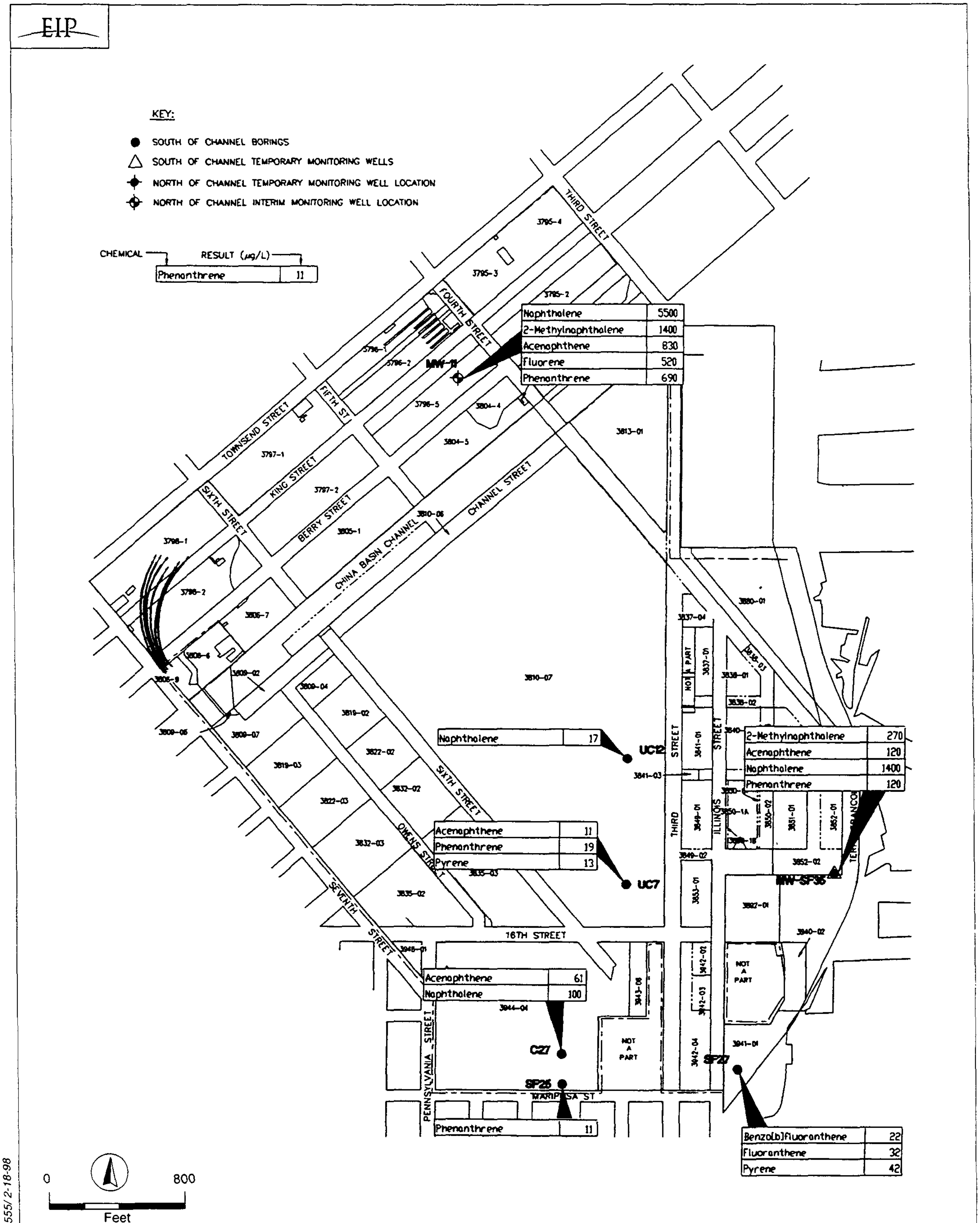
TPH-gasoline was detected in one well downgradient of a former UST on the Caltrain property near Fourth and King Streets. TPH-diesel was detected in groundwater at all monitoring well locations, with the highest concentration near the location of the former UST. TPH-motor oil was detected at low concentrations in 7 of the 14 monitoring wells. TPH concentrations in wells near the Channel were generally lower than in other locations./49/



SOURCE ENVIRON International Corp

MISSION BAY SUBSEQUENT EIR

FIGURE V.J.9 DETECTIONS OF VOLATILE ORGANIC COMPOUNDS IN GROUNDWATER



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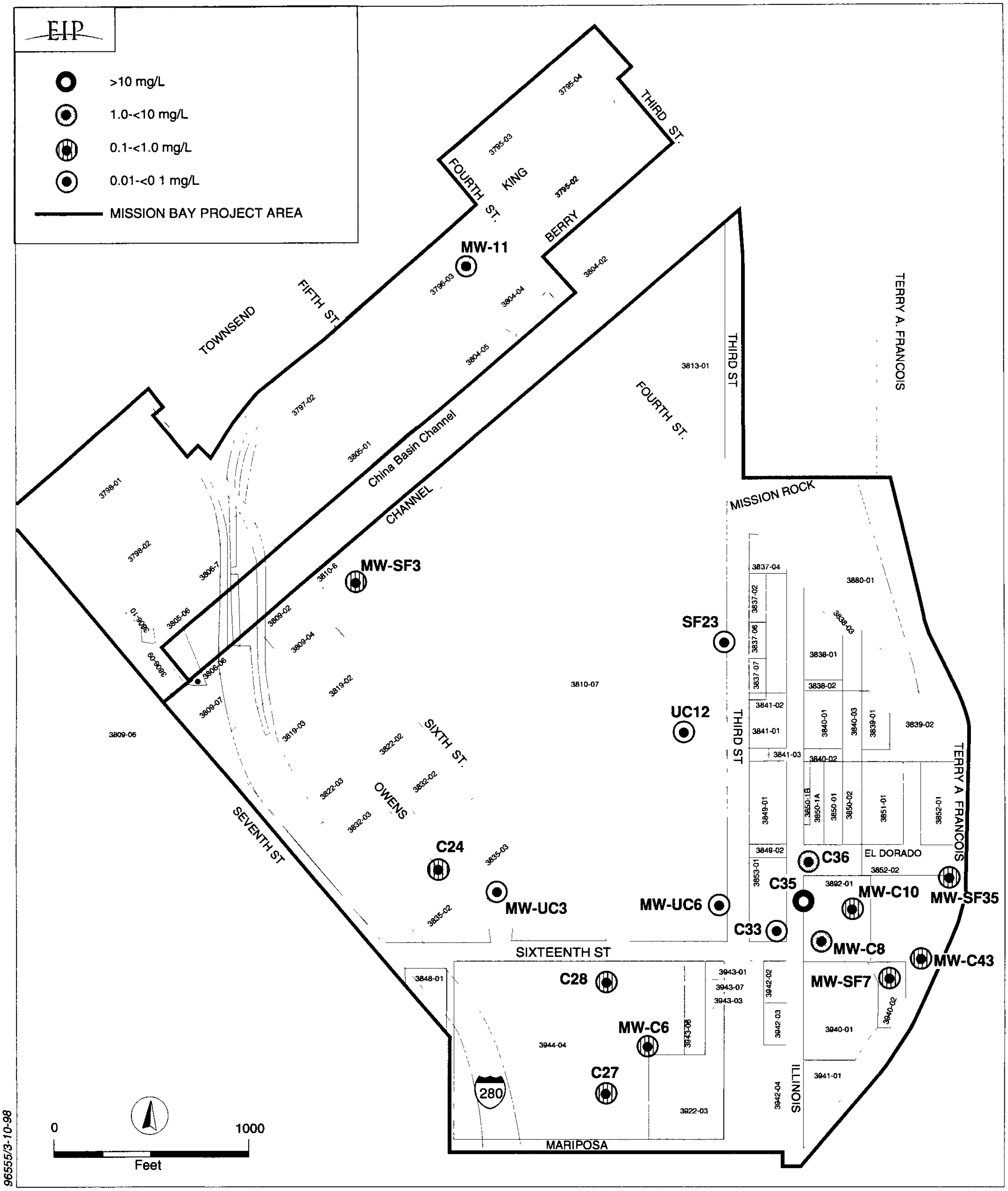
SOURCE ENVIRON International Corp

MISSION BAY SUBSEQUENT EIR

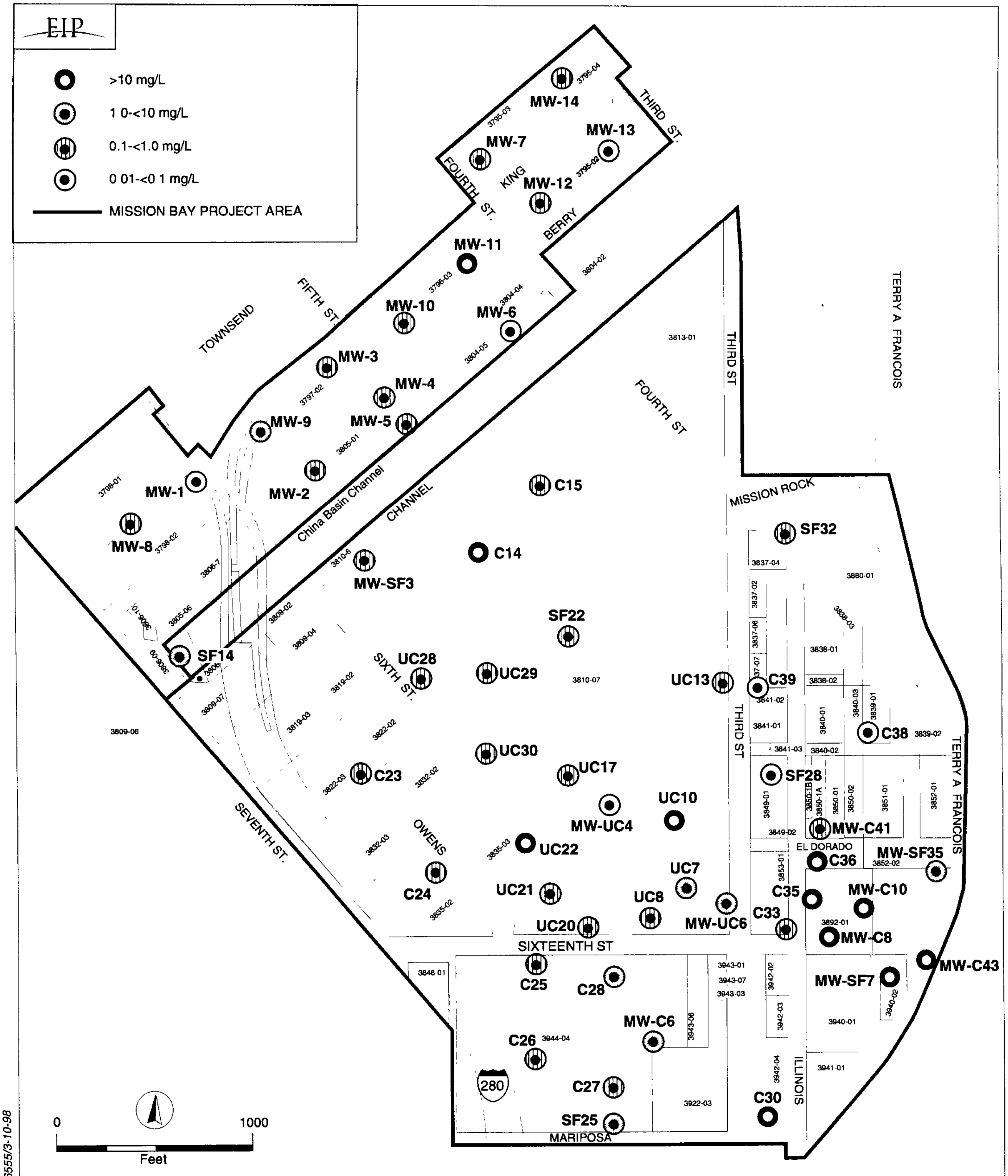
FIGURE V.J.10 DETECTIONS OF PAHS IN GROUND WATER



SOURCE. ENVIRON International Corp

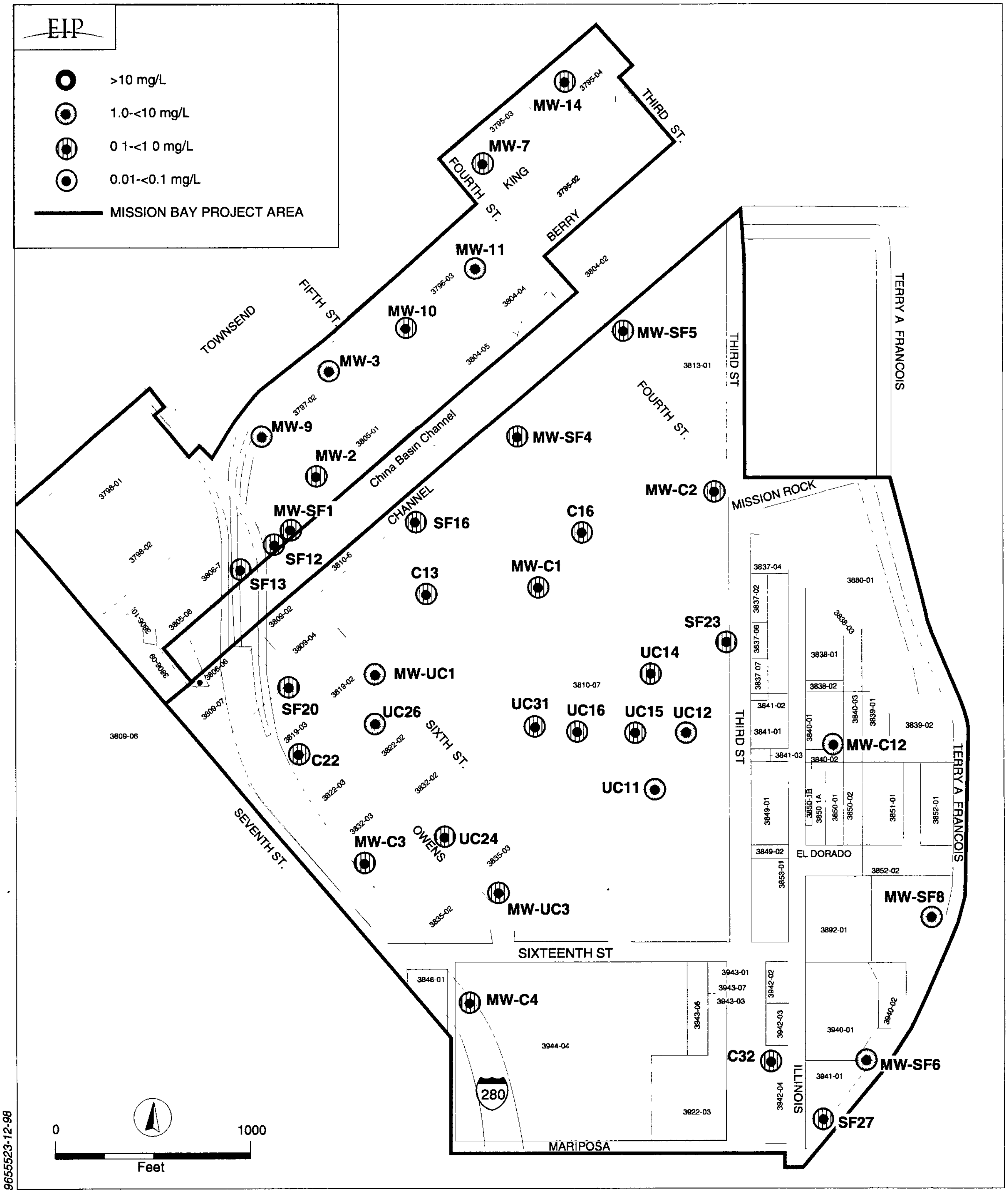
MISSION BAY SUBSEQUENT EIR

FIGURE V.J.11 RANGE OF DETECTIONS OF TPH GASOLINE IN GROUNDWATER



SOURCE ENVIRON International Corp

FIGURE V.J.12 RANGE OF DETECTIONS OF TPH DIESEL IN GROUNDWATER



SOURCE. ENVIRON International Corp.

MISSION BAY SUBSEQUENT EIR

FIGURE V.J.13 RANGE OF DETECTIONS OF TPH MOTOR OIL IN GROUNDWATER

Twelve metals (antimony, arsenic, barium, chromium, cobalt, lead, mercury, molybdenum, nickel, thallium, vanadium, and zinc) were detected in groundwater in Mission Bay North. The data indicate that there is no specific pattern of metals in groundwater that would indicate a specific, identifiable source area in Mission Bay North./50/

Status of RWQCB Review

Results of the Mission Bay North study were submitted to the RWQCB staff in April 1997. In June 1997, the RWQCB staff responded with a letter indicating concurrence with the conclusions presented in the report, citing the low concentrations and lack of specific sources of contaminants in Mission Bay North as the basis for concurrence./51/ The RWQCB staff suggested that localized, elevated concentrations of TPH-diesel and SVOCs in two monitoring wells in the vicinity of a former UST be managed to mitigate potential health and safety hazards at that location. As a condition for no further investigation or remediation, the RWQCB staff assumed that a Risk Management Plan (RMP) or health and safety plan would be developed and implemented to manage environmental conditions in Mission Bay North, including construction and maintenance worker activities at that location. RWQCB staff also noted that should groundwater extraction at the site occur due to future development, an analysis of the effect of that extraction on the localized TPH-diesel contamination may be required.

<u>Mission Bay South</u>

The Mission Bay South investigation was conducted from April 21 to June 24, 1997, including the Atcheson, Topeka and Santa Fe Railroad area. The study area included all Mission Bay South parcels owned by Catellus or by City agencies except the Channel Pump Station site. Parcels owned or operated by Esprit and Castle Metals were investigated independently; the results of those investigations were considered in the overall evaluation of the Project Area.

The results of the Mission Bay South study are presented in the *Site Investigation and Risk Evaluation Report, Mission Bay South of Channel, San Francisco, California* ("1998 Mission Bay South report") prepared for Catellus by ENVIRON in April through September 1997. The report was submitted to the RWQCB staff in February 1998/52/ and is currently being reviewed by RWQCB staff.

Soil and groundwater samples were collected from a total of 111 borings and temporary monitoring wells as shown in Figure V.J.4. Two soil samples from each boring, ranging in depth from 0.5 to 8 feet below the ground surface, were collected and analyzed. All soil samples were analyzed for VOCs; SVOCs including PAHs; pesticides and PCBs; TPH gasoline, diesel, and motor oil fractions;

metals; and asbestos. Groundwater from each soil boring that was converted into a temporary monitoring well approximately 15 feet deep or collected from a Hydropunch™ boring was tested for VOCs, SVOCs, metals, TPH, and pH. The metals sampling program included antimony, arsenic, barium, beryllium, cadmium, chromium, cobalt, copper, lead, mercury, molybdenum, nickel, selenium, silver, thallium, vanadium, and zinc. In addition, groundwater level data were collected to determine flow direction, the effects of tides on groundwater levels, the extent to which the box culverts could restrict groundwater flow toward China Basin Channel, and for use in modeling the potential reduction in chemical concentrations that could occur in groundwater as it moves toward tidally-influenced areas in Mission Bay South./53/

The information presented in this section, supplemented with additional data in Appendix I under "Summary of Soil and Groundwater Sampling Results," summarizes the results of soil and groundwater testing within Mission Bay South as presented in the 1998 Mission Bay South report./54/ Results of other site-specific studies on the Esprit and Castle Metals sites are summarized briefly at the end of this section.

Mission Bay South Soil Results

Results of soil sampling in Mission Bay South are summarized in Appendix Tables I.4 through I.10. Each table lists the chemical detected, the range of concentrations, and the number of detections of each chemical compared to the number of total samples. In addition, Figures V.J.5 through V.J.8 show the locations of soil borings where various chemicals were detected and the concentrations of these chemicals.

VOCs were detected in nearly one-half of the soil borings in Mission Bay South (see Figure V.J.5). Most of the soils containing VOCs are generally located close to former USTs or to the former bulk petroleum storage, pipelines, and transfer facilities previously located in the southeast portion of the Mission Bay South area (UST locations are shown in Figure V.J.2, petroleum facilities in Figure V.J.3)./55/ As shown in Appendix Table I.4, among the VOCs detected most frequently were acetone, 2-butanone, carbon disulfide, methylene chloride, benzene, toluene, ethylbenzene, and xylenes (the last four are collectively referred to as "BTEX" compounds). As with acetone, methylene chloride is another chemical used in analytical laboratory processes. It is possible that some of the acetone and methylene chloride detections may be from the laboratory analyses, rather than actual detections in soil./56/

SVOCs were detected in 16 borings in Mission Bay South. All but one of the SVOCs detected were PAHs. Based on the low frequency of detections, it appears that there is no pattern associated with the PAH detections, which indicates there is no specific, identifiable source of PAHs detected in soil in Mission Bay South./57/

Diesel and motor oil fractions of TPH were detected in varying concentrations in about one-fourth and one-half of the samples analyzed, respectively. Relatively few (less than 10%) of the soil samples contained detectable levels of TPH-gasoline./58/

Organochlorine pesticides were detected in two soil borings on the UCSF site. Pesticides were not detected in any other soil sample collected from Mission Bay South. PCBs were not detected in any soil sample in Mission Bay South./59/

All 17 metals that were included in the list of analytes tested (antimony, arsenic, barium, beryllium, cadmium, chromium, cobalt, copper, lead, mercury, molybdenum, nickel, selenium, silver, thallium, vanadium, and zinc) were detected in varying concentrations in soil throughout Mission Bay South. Evaluation of the data indicates that there is no specific pattern of metals in soil. The widespread detection of metals indicates that the concentrations are likely associated with the composition of the fill, rather than a specific, identifiable source area in Mission Bay South./60/

Asbestos was detected in approximately one-third of the borings in Mission Bay South. The detections are believed to be attributable to the construction debris and fill placed in Mission Bay South and are randomly distributed throughout the Project Area./61/ Serpentinite, one of several rock types surrounding and underlying the Project Area, is a constituent in some of the material used to fill Mission Bay. Consequently, the presence of chrysotile asbestos in soil from naturally occurring chrysotile fibers in serpentinite fill material is not unexpected.

Mission Bay South Groundwater Results

Results of groundwater sampling performed in Mission Bay South are summarized in Appendix Tables I.11 through I.15. Each table lists the chemical detected, the range of concentrations, and the number of detections of each chemical compared to the number of total samples. In addition, Figures V.J.6, and V.J.9 through V.J.13 show the locations of monitoring wells where chemicals were detected and the concentrations of the chemical. A summary of this information is provided below.

Volatile organic compounds (VOCs), semivolatile organic compounds (SVOCs), PAHs, metals, and total petroleum hydrocarbons (TPH) in gasoline, diesel, and motor oil fractions were detected in Mission Bay South groundwater samples. In addition, petroleum free product was found floating on top of the groundwater in the an area east of Illinois and Third Streets. This is discussed in more detail, below.

Detections of VOCs occur throughout Mission Bay South, but tend to be concentrated near the former bulk petroleum storage, pipelines, and transfer facilities previously located near the area east of Illinois Street on the port property. Aside from the VOCs associated with petroleum contamination, most of the other VOCs were detected in one monitoring well and comprise a small percentage of all VOCs detected.

SVOCs were detected in groundwater samples. The pattern of detections, concentrations of SVOCs, and low frequency of detections indicate that there are no specific, identifiable sources of contamination in the Project Area that could be attributed to the presence of these chemicals in Mission Bay South groundwater./62/

Total petroleum hydrocarbons (TPH) in the diesel, gasoline, and motor oil fractions were detected at varying concentrations. The TPH gasoline detections were located on or near Assessor's Block 3892, lot 1, near former petroleum bulk storage, pipelines and transfer facilities (see Figure V.J.3 for locations of bulk storage facilities, and Appendix Figure I.1 for a map showing Assessor's Blocks and lots). Detections of TPH-diesel and TPH-motor oil in groundwater were scattered through the investigation area. Most of the higher concentrations were detected in the former petroleum bulk storage, pipelines, and transfer facilities./63/

All metals except beryllium and thallium were detected in one or more of the groundwater samples in Mission Bay South. Arsenic, barium, chromium, copper, lead, and nickel were detected most frequently and at low concentrations./64/ A statistical analysis of upgradient versus downgradient concentrations of metals indicated that arsenic, barium, chromium, copper, lead, mercury, and nickel are not substantially higher downgradient than upgradient. This suggests that there is no significant contribution of these metals from a specific, identifiable source area within Mission Bay South and no net gain of these dissolved metals as groundwater migrates under the Project Area. Thus, the source of metals detections in groundwater appears to be related to the fill materials placed in Mission Bay South rather than releases from specific, identifiable sources such as industrial waste disposal or releases./65/

Petroleum Free Product

In general, no single contaminant source areas were identified in Mission Bay South, with the exception of an area of petroleum free product in the southeast portion of Mission Bay South. The chemicals detected in that area appear to be primarily related to former petroleum bulk storage, pipelines, and transfer facilities formerly located on port property on or near Assessor's Block 3892, lot 1, and the Esprit site on Assessor's Block 3940 (see Appendix Figure I.1 for a map showing

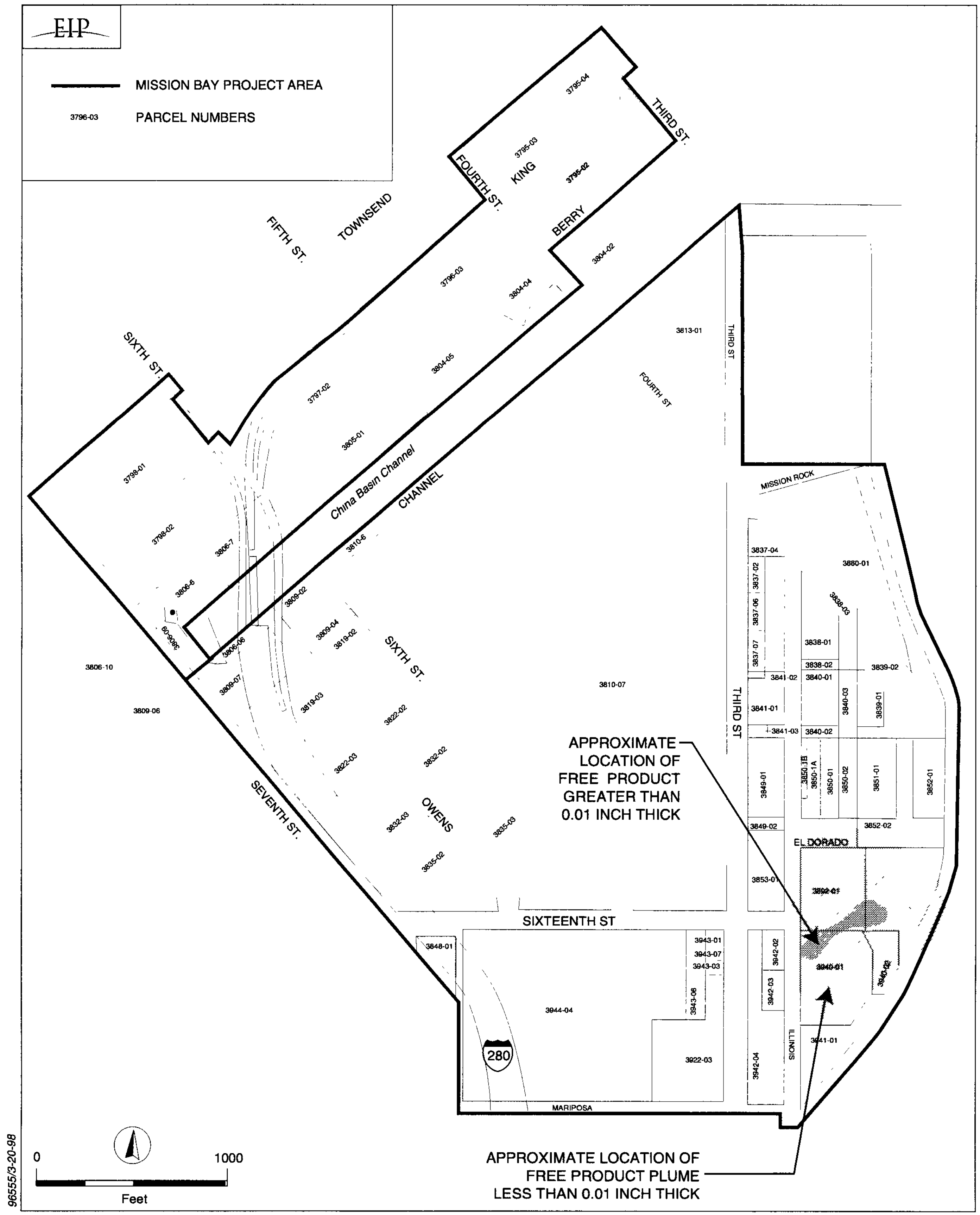
Assessor's Blocks and lots). Chemicals found in other areas of Mission Bay South are likely attributable to the various fill materials used to fill in the former shallow bay. Some could be the result of former industrial activities in Mission Bay South.

As discussed above, under "Bulk Petroleum Handling Facilities," based on observations made during drilling and sampling activities, a petroleum free product area was identified in the southeast portion of Mission Bay South. The approximate horizontal extent of free product with a measurable thickness greater than 0.01 inch is shown in Figure V.J.14. A free product thickness of 1.6 feet was measured by ENVIRON in monitoring well MW-C9, about 300 feet east of Illinois Street approximately in line with the extension of 16th Street (near the pipelines shown in 16th Street in Figure V.J.3)./66/

Chemical analysis indicates that the free product is most likely weathered crude oil that had undergone moderate biodegradation. Some volatile (lighter end) hydrocarbons were also present in the free product. The chemical characteristics of the weathered crude oil are believed to be consistent with a release that may have occurred over 10 years ago. The presence of free product is likely related to the former petroleum bulk storage, pipelines and transfer facilities previously located on Assessor's Block 3892, lot 1, and on the Esprit site near the 16th and Illinois Streets intersection (Assessor's Block 3940), as well as the underground petroleum pipelines used by these facilities that run beneath 16th Street to Pier 64./67/ These facilities, which handled products such as diesel, kerosene, gasoline, lubricating oil, crude oil, and bunker fuel oil, were active from the early 1900's to the 1960's and early 1970's./68/

Status of RWQCB Review

The final report describing the results of the 1997 investigation for Mission Bay South was submitted to the RWQCB staff in February 1998 and is currently under review. Based on preliminary information provided to RWQCB staff in June 1997, the RWQCB staff indicated in August 1997 that they would not refer any portion of Mission Bay South to the U.S. EPA as a Superfund site or to the California Environmental Protection Agency to be managed under the Hazardous Substances Account Act./69/ As discussed in greater detail in Contaminated Soils and Groundwater: Impacts, an RMP for the Project Area, or RMPs for each development site or phase, is proposed that would specify actions to be implemented during and after project completion to ensure that construction workers, future occupants, workers, and visitors would not be adversely affected by chemical contaminants that have been detected in Project Area soil or groundwater. The RMP would include a determination of whether contaminant concentrations in soil or groundwater would pose an adverse risk to people exposed to the contaminants. If an adverse risk is possible, the RMP would identify measures that would be implemented to reduce such risk. The RMP would be submitted to the Regional Board



SOURCE. ENVIRON International Corp

MISSION BAY SUBSEQUENT EIR

FIGURE V.J.14 APPROXIMATE LOCATION OF PETROLEUM FREE PRODUCT PLUME IN AND NEAR THE PROJECT AREA

staff, as Administering Agency, for review and approval. Preparation and subsequent RWQCB staff approval of the RMPs would occur independent of the California Environmental Quality Act (CEQA) process under the administrative jurisdiction of the RWQCB.

Other Investigations in Mission Bay South

Soil and groundwater were tested by ENSR Consulting and Engineering (ENSR) on the property at 499 Illinois Street in 1990 for Esprit de Corp. The results of that study showed that petroleum hydrocarbons were in soil and in groundwater on the property and that petroleum free product was found on groundwater in the western, southern, and eastern portions of the property./70/ This information was incorporated and accounted for in the ENVIRON studies described above for Mission Bay South.

Property located northwest of the intersection of Third and Mariposa Streets (1900 Third Street) was evaluated in 1993, 1994, and 1996 by LAW Engineering and Environmental Services, Inc. (LAW) to identify the potential for contamination or other hazardous materials-related issues that could affect future development of the site./71/,/72/ The site and surrounding area had previously been used for industrial purposes, including fuel oil storage, since the early 1900's. The site is currently occupied by a warehouse and attached offices and an asphalt parking lot. Castle Metals occupied a portion of the warehouse until about 1996 and carried out some metal cutting and shaping on the site.

Site reconnaissance, geophysical testing, and regulatory file review activities performed during the assessments indicated that USTs had been removed from the site. Soil samples were also collected from eight borings and analyzed for VOCs, SVOCs, TPH, and metals. Metals, oil, and grease were detected in soils at about 4 to 5 feet below ground surface in a few locations and were attributed to fill materials or historical railyard activities to the north. No specific potential off-site sources of contamination that could affect the site were identified. Based on the results of the three assessments, LAW did not recommend additional investigation or remediation, except in association with Article 20 site development requirements./73/

Conditions Related to Potential Sources of Contamination Outside the Project Area

In order to determine whether off-site sources are impacting the Project Area, soil and groundwater samples were collected and analyzed for a wide range of chemical constituents from locations across the Project Area. Results of the 1997 Mission Bay North and Mission Bay South investigations indicate that, except for metals and chemicals detected in the vicinity of the Caltrain property, none of the chemicals detected along the upgradient sides of the Project Area illustrated patterns of detection that suggest that their origin was from off-site areas. Metals in soil and groundwater occur naturally both on-site and off-site. Some metals in the Project Area may have migrated from off-site but if so, the data do not suggest a specific source area.

TPHs and SVOCs appear to have been released to the subsurface in the vicinity of the former UST on Caltrain property north of the Project Area. These releases appear to have migrated into the Project Area in Mission Bay North. As discussed in "Status of RWQCB Review" in "Sampling Program and Analytical Results" for Mission Bay North, above, no further investigation or remediation has been requested by RWQCB staff, but the contaminants must be effectively managed during Project Area development so they do not present a hazard. In other locations, where elevated concentrations of petroleum hydrocarbons were detected in samples collected from within the Project Area but near the upgradient Project Area boundaries, they were associated with historic site uses that occurred within the Project Area. Other chemicals detected in soil and groundwater samples collected from within the Project Area along its upgradient boundaries were not substantially elevated, indicating a lack of migration of chemicals from off-site areas into the Mission Bay Project Area./74/

Summary of Existing Human Health and Ecological Risks from Contaminants Detected in Soil and Groundwater in the Project Area

This section identifies current potential human health and ecological risks associated with the concentrations of contaminants detected in soil and groundwater in the Project Area and summarizes the significance of the risk under existing (pre-development) conditions. This discussion also establishes the baseline against which to compare the effects of the proposed project.

Existing Human Health Risks

Based on current uses within and adjacent to the Project Area, individuals that could be exposed to potential health risks due to the presence of chemicals detected in soil or groundwater include existing commercial and industrial tenants and their employees, visitors, and nearby residents. Additionally, transient populations occasionally occupy portions of the Project Area.

Extended periods (several months or years) of direct contact with exposed soil could result in an increased potential for various adverse human health effects if the exposed soils contain sufficiently elevated levels of chemicals, such as metals, PAHs, or TPHs. The primary routes of exposure would be via inhalation of dust containing the contaminants or inhalation of volatile constituents in the vicinity of the free product area that could migrate into indoor or ambient air. Ingestion or dermal (skin or eye) contact with soils containing contaminants could also occur. Direct contact with groundwater is not considered a pathway through which current populations could be exposed to chemicals in the groundwater because shallow groundwater is not used for domestic or industrial purposes and no excavations to groundwater depth exist or are planned in the short-term future. It is possible that some individuals involved in the free product remediation efforts in the southeastern portion of the Project Area could come into contact with the free product or groundwater contaminated with petroleum hydrocarbons as part of the selected remedial action. This would not represent a significant source of exposure to current populations because site controls and cleanup methods would be implemented that would restrict access to and prevent contact with contaminated soil, groundwater, or the free product itself./75/

The Risk Management Plans (RMPs) would evaluate further the potential for the current conditions on undeveloped parcels to pose a risk to populations in the interim period between now and when the site development is expected to be complete, and identify measures that could be required or recommended to address these potential impacts. Since the RMP is not expected to be prepared, submitted, and approved by the RWQCB staff prior to mid-1998, ENVIRON evaluated the need for the implementation of immediate risk management measures to protect human health.

The agencies responsible for overseeing site remediation have not developed specific risk assessment guidelines to identify sites that require an immediate response. To determine the need for immediate control measures in the absence of specific regulatory criteria, ENVIRON developed a tiered approach, which is presented in *Technical Memorandum #1, Approach to a Plan for Risk Management, Mission Bay Project Area*. The process consisted of identifying chemicals of potential immediate concern (COPIC), identifying the levels of COPIC to which individuals could potentially be exposed, and then evaluating whether the potential for the levels of COPIC to which individuals may actually be exposed would represent a potential human health threat sufficient to warrant the implementation of immediate risk management measures. The evaluation of the potential immediate human health impacts was based on the potential for the short-term exposure to the COPIC present in the Project Area to cause cancer, noncancer, or acute health effects in the potentially exposed populations. The tiered approach consisted of two steps, identification of chemicals of concern and analysis of COPIC.

ENVIRON compared the maximum concentration of chemicals detected in the soil anywhere in the Project Area to the risk-based preliminary remediation goals (PRGs) developed by U.S. EPA Region IX for the protection of industrial land uses (Region IX Industrial PRGs). (Additional information on PRGs is presented in "Analysis of Potential Adverse Human Health Effects Associated with Current Conditions in the Project Area," in Appendix I.) The maximum concentrations of arsenic, beryllium, lead, and various carcinogenic PAHs exceeded the Region IX Industrial PRGs and were, therefore, identified as COPICs. The upper numerical limit of a calculated statistical average of the concentration of each COPIC in the exposed soils was compared with Region IX Industrial PRGs to determine if any PRGs were exceeded. An exceedance would indicate that there would be a potential for that COPIC to cause adverse health effects./76/ Specific assumptions and the methodology that were used in the evaluation of COPICs are also presented in "Analysis of Potential Adverse Human Health Effects Associated with Current Conditions in the Project Area" in Appendix I.

Based on that evaluation, none of the chemicals detected in the exposed surface soils in either Mission Bay North or Mission Bay South were detected at levels that would indicate that any immediate risk management measures are necessary or would be otherwise required prior to approval of the RMP in mid- to late 1998. Each of the COPIC are below Region IX Industrial PRGs adjusted to account for a limited six-month exposure period (for potential carcinogenic compounds) and are also below the Region IX Industrial PRGs developed to protect against noncarcinogenic effects. Further, the maximum concentrations of COPIC detected in the exposed soils are below the acute threshold criteria, suggesting that even high-level, short-term exposure to child populations would not pose any acute health risks./77/

The presence of the free product in the southeastern portion of the Project Area has not been identified as an immediate human health hazard. As discussed previously, additional investigation is underway, and remediation of the free product area may be necessary to minimize it as a potential source of contamination that could adversely affect near-shore aquatic environments. Remediation of the free product, for which risk management measures would also be implemented, will take place irrespective of whether Mission Bay redevelopment projects occur and regardless of future actions associated with implementation of risk management measures.

Existing Ecological Risks

As described in Section V.L, Vegetation and Wildlife: Setting, the Project Area is primarily industrial and does not provide habitat for any rare or endangered terrestrial species. Therefore, the following discussion of existing conditions pertains only to marine aquatic organisms in the near-shore environment.

The potential for chemicals detected in groundwater to pose a risk to the near-shore aquatic organisms present in either China Basin Channel or San Francisco Bay under existing conditions was also evaluated as part of the 1997 investigations. Results of the assessment for Mission Bay North were presented in *Technical Memorandum #3, North of Channel Screening-Level Ecological Risk*

Evaluation, Mission Bay Project Area, prepared by ENVIRON in 1998. Results of the evaluation for Mission Bay South were presented in the 1998 Mission Bay South report.

Chemicals in soil in the Project Area could impact aquatic species if chemicals are released to water bodies through surface water runoff. As indicated in Section V.K, Hydrology and Water Quality: Impacts, under "Volume and Quality of Direct Stormwater Discharge to Bay," no direct measurements of runoff quality from the Project Area are available. Reasonable estimates of pollutant concentrations are discussed in "Construction Activity Pollutants," in Section V.K, Hydrology and Water Quality: Impacts. This section discusses potential ecological effects of chemicals in groundwater in the Project Area.

A screening-level process similar to that used to assess human health effects was used to determine the effect, if any, that chemicals in groundwater of potential ecological concern (COPECs) could have on the ecological environment in Mission Bay North and Mission Bay South. The process included identifying the COPECs, determining potential pathways for those chemicals to migrate to groundwater or surface water, identifying appropriate criteria for comparison, and evaluating whether the COPECs could be released at concentrations sufficient to pose a potential risk to the aquatic organisms at the present time./78/ The methodology used in selecting the COPEC and in evaluating the significance of each COPEC, including aquatic criteria used, is described in Appendix I in "Analysis of Potential Adverse Ecological Effects Associated with Current Conditions in the Project Area." The results of the analysis for Mission Bay North and Mission Bay South are presented below.

Using the process described in Appendix I, VOCs, metals, all three fractions of TPH (diesel, gasoline, and motor oil), BTEX compounds, and naphthalene were identified as COPECs in Mission Bay North and Mission Bay South./79/ The importance of each of these compounds relative to potential risk to the near-shore aquatic environment of China Basin Channel and San Francisco Bay is discussed below.

Volatile Organic Compounds

The maximum detected concentrations of VOCs detected anywhere in Mission Bay North or Mission Bay South do not exceed the U.S. EPA acute and chronic ambient water quality criteria. Although water quality criteria have not been established by the U.S. EPA for some of the VOCs detected, the low concentrations of the VOCs, combined with the low frequency of detections, location of detected VOCs relative to surface water, and tidal flushing action, indicate that VOCs in groundwater are not adversely affecting the near-shore aquatic environment./80/

Metals

As previously noted, metals were detected in groundwater throughout the Project Area. Several metals were detected at a frequency greater than 50% of the samples. The consistent detection of metals in groundwater, with no apparent pattern in the distribution of detections, is considered representative of background conditions. According to ENVIRON's analysis, the data also suggest that the metals in groundwater are related to fill materials placed around the turn of the century rather than specific point-source releases from past commercial or industrial activities (such as USTs or the petroleum free product area).

In the 1997 Mission Bay North investigation, two metals (mercury and nickel) were detected in groundwater at average concentrations above chronic water quality criteria for the marine aquatic environment. The average concentrations of mercury and nickel exceed the chronic water quality criteria (without taking the calculated attenuation into account) by factors of 5.6 and 3.1, respectively. None of the chemicals are present at average concentrations that exceed the acute water quality criteria. In the 1997 Mission Bay South investigation, four metals (copper, lead, mercury, and nickel) were detected in groundwater at average levels above the chronic water quality criteria. The average concentrations of copper, lead, mercury, and nickel detected in the 500-foot zone adjacent to the China Basin Channel exceed the chronic water quality criteria (without taking the calculated attenuation into account) by factors of 2.9, 9.2, 5.4, and 1.8, respectively. None of the chemicals are present at average concentrations that exceed the acute water quality criteria. Similarly, the average contentrations of copper, lead, mercury, and nickel detected in the 500-foot zone adjacent to the Bay exceed the chronic water quality criteria (without taking the calculated attenuation into account) by factors of 1.2, 1.3, 4.8, and 2.1, respectively. None of the chemicals are present at average concentrations that exceed the acute water quality criteria.

As discussed under "Toxic Substances," and under "Impairment of Central San Francisco Bay," in Section V.K, Hydrology and Water Quality: Setting, San Francisco Bay is considered "impaired" for copper and mercury, indicating that Bay water quality exceeds acceptable limits. In the past, groundwater from the Project Area may have contributed to the overall concentrations of copper and mercury in the Bay, although any contribution would be too small to be individually measured at the regional monitoring stations located in the center of the Bay.

The continued presence of those metals in groundwater is not considered to be adversely affecting aquatic organisms near the shore in China Basin Channel or San Francisco Bay for several reasons. First, the tidal influence study predicts that tidal flushing action in groundwater within the last 50 feet toward China Basin Channel and San Francisco Bay reduces the average concentrations of metals in the groundwater adjacent to the Channel and the Bay approximately 10-fold. Consequently, the average concentration of all metals in groundwater prior to entering China Basin Channel or San Francisco Bay are lower than the chronic aquatic criteria. Second, the concentrations of metals in groundwater that enter and persist in the marine environment may be lower than the concentrations predicted by the tidal influence model (see "Hydrogeologic Conditions," above for more discussion of the tidal influence model). Many metals will form complexes with naturally occurring organic material and, thus, will be less biologically available to the aquatic organisms than the dissolved concentrations in groundwater. In addition, the box sewer likely acts as a partial barrier to groundwater flow toward the Channel. As discussed previously, metals detected in groundwater appear to be the result of metals present in fill materials placed around the turn of the century rather than specific, identifiable source releases from past commercial or industrial activities./81/

Petroleum Hydrocarbons

Petroleum hydrocarbons characterized in the TPH-gasoline, TPH-diesel, and TPH-motor oil ranges as well as BTEX compounds and naphthalene were identified as COPECs in groundwater./82/ Unlike the metals, detections of TPH are associated with specific uses, such as USTs or bulk petroleum handling facilities. Because the releases of these chemicals appear to be localized, the concentrations in monitoring wells directly adjacent to China Basin Channel and San Francisco Bay were compared to available water quality standards and toxicity guidelines derived from peer-reviewed scientific literature, as described in more detail in Appendix I in "Evaluation of Potential Ecological Risks." A comparison of groundwater TPH concentrations to aquatic toxicity values, combined with tidal flushing action and the box sewer that restricts flow towards the Channel, indicates that, with the possible exception of the free product area, the near-shore aquatic community is not at risk from TPH compounds./83/

TPHs, particularly in the TPH-diesel range, were detected in greater concentrations to the east along the San Francisco Bay fringe than along the Channel edge. The TPH-diesel concentrations along the Bay exceed toxicity values; those locations are in the free product area that is already under investigation and is expected to be remediated independent of the Mission Bay redevelopment project./84/

BTEX compounds were detected infrequently in groundwater in the San Francisco Bay waterfront area in Mission Bay South. All detections of BTEX compounds were less than the estimated lowest chronic concentration for marine organisms, and PAHs (e.g., naphthalene) were not detected in any of the groundwater samples from the China Basin Channel area. The levels of TPH in the monitoring wells adjacent to China Basin Channel are all well below toxicity criteria developed in recent studies described in Appendix I in "Evaluation of Potential Ecological Risks." Therefore, neither TPH nor the petroleum constituents BTEX and naphthalene present a risk to aquatic organisms in the China Basin Channel area under existing conditions. Because the concentrations did not exceed water quality criteria, those compounds are not considered to represent a significant risk to the aquatic community./85/

The single detection of naphthalene in the San Francisco Bay waterfront area exceeded the estimated lowest chronic aquatic criterion by a factor of 3. The estimated chronic criterion is considered conservative, and the detected naphthalene concentration in groundwater prior to entering the Bay would be reduced 10-fold or greater due to tidal influences, which would further minimize the potential for adverse aquatic effects./86/

Summary

In summary, based on the analytical results and the screening process described above, no contaminants detected in Mission Bay North or Mission Bay South groundwater are adversely impacting the aquatic community in the near-shore habitats of China Basin Channel and San Francisco Bay, with the potential exception of the petroleum free product plume in the southeastern portion of the Project Area. As previously described, that area is under additional study./87/ The groundwater samples collected to date do not indicate that significant concentrations of COPEC in the soil are being dissolved and leaching into the groundwater.

REGULATORY FRAMEWORK

The management of hazardous materials is regulated independently of the CEQA process at federal, state, and local levels through programs administered by the U.S. EPA, agencies within the California Environmental Protection Agency(Cal/EPA) such as the Department of Toxic Substances Control (DTSC) and the RWQCB, U.S. Department of Transportation (DOT), California Highway Patrol, federal and state Occupational Safety and Health agencies (OSHA), and the City and County of San Francisco Departments of Public Health and Public Works. In 1981, the California Legislature enacted "State Superfund" legislation to establish a regulatory process to address the release of hazardous substances that may be harmful to public health and the environment. This process requires responsible parties to cleanup contamination and enables persons or parties injured by these hazardous materials releases to be compensated for their injuries./88/ The Mission Bay property is not a Superfund site; however, many of the regulatory guidelines, standards, and methods established as part of the Superfund process to evaluate potential risks and identify the need for remedial action at

Superfund sites are relevant and were used to support the conclusions regarding existing and potential future risks to human health and the environment in the Project Area.

Key Terms

Some of the key terms used in the management of hazardous materials and the context within which they apply to sites where contaminants have been identified in soil or groundwater are presented below.

The definitions of hazardous material and hazardous waste found in "Definitions of Terms," at the beginning of this Setting section, are derived from the California Health and Safety Code and are consistent with those found in the federal Clean Water Act, Resource Conservation and Recovery Act, and Clean Air Act. Crude oil and petroleum products are specifically excluded by law from these definitions, although from a practical standpoint, contamination caused by these products may be treated as a hazardous substance./89/

A "hazardous materials release site" refers to any area, location, or facility where a hazardous material has been released or threatens to be released to the environment./90/

"Remedial action" or "remediation" refers to actions required by state or local laws, ordinances, or regulations necessary to prevent, minimize, or mitigate damage that may result from the release or threatened release of a hazardous material./91/ These actions include the cleanup of the site, monitoring, testing and analysis of site conditions, site operation and maintenance, and placing conditions or restrictions on the land use of the site upon completion of remedial actions.

Oversight of Hazardous Materials Release Sites

Regional Water Quality Control Board as Administering Agency

The oversight of hazardous materials release sites often involves several different agencies that may have overlapping authority and jurisdiction. The DTSC and RWQCB are the two primary state agencies responsible for issues pertaining to hazardous materials release sites. Therefore, the California Legislature enacted AB 2061 in 1993 to create a process for designating a single administering agency that takes preemptive authority over cleanup of a site./92/

Under AB 2061, a single agency is designated to supervise all aspects of the investigation and remedial action ("Administering Agency"). That agency is granted jurisdiction over all activities necessary to respond to hazardous materials releases, investigation and remedial action. The Administering Agency must consult with other agencies ("Appropriate Agencies" or "Support Agencies") when issuing permits or other authorizations not normally within its jurisdiction.

The investigation and remediation of hazardous material releases in the Mission Bay Project Area will be overseen by the RWQCB. On July 15, 1997, the California Environmental Protection Agency (Cal/EPA) designated the RWQCB as the Administering Agency for the site investigation and remediation of the Project Area (Resolution No. 97-10, Cal/EPA July 14, 1997). The designation was made after application and public hearing under the requirements of Assembly Bill 2061 (Health and Safety Code, Division 20, Chapter 6.65, Section 25260 *et seq.*). The Support Agencies are: Cal/EPA, DTSC, Air Resources Board, Office of Environmental Health Hazard Assessment, Department of Fish and Game, and State Water Resources Control Board.

When the RWQCB decides to take action as Administering Agency, it may convene an advisory committee meeting of the involved Support Agencies as well as local agencies. The public may be invited to attend particular meetings as appropriate. Because of its role as the Administering Agency, the RWQCB and its staff will have the lead regulatory role in deciding whether and how the ecological and health risks at the Mission Bay Project Area would be managed under RMPs. The RWQCB staff would specifically approve each RMP and would be responsible for ensuring compliance with each RMP.

Once site assessment activities and/or remedial actions have concluded, the RWQCB staff may issue a "certificate of completion" detailing the extent of contamination and the attainment of standards and objectives if remediation was necessary./93/

Regulatory Process for Determining Need for Remediation

The current regulatory view of site redevelopment where chemical constituents are present in the soil or groundwater is that the decisions regarding cleanup and future site use should be based on actual and reasonably projected risks presented by individual sites. This site-specific, risk-based decision making process is often referred to as "Risk Based Corrective Action," or RBCA. Prior to the development of the concept of RBCA, the goal at sites undergoing corrective action was to restore the sites either to pristine conditions or to achieve conservative generic concentration levels set in advance by the regulatory oversight agency. The levels established by the regulatory agency were the same at every site, regardless of possible indirect environmental effects (e.g., hazardous waste disposal site capacities or availabilities) or the potential future use of the property. The RBCA approach is marked by a focus on planned land uses, a recognition that all sites do not present the same risk, the understanding that the actual risks posed by a site are a function of the populations that could be present and the activities they could be engaged in, and an acknowledgment that many risks can be reduced and/or eliminated through the implementation of a risk management plan.

The risk estimates that are identified through the RBCA process take into consideration such factors as the concentration and further migration of contaminants, potential hazards to remediation workers and nearby populations, and potential exposures to the public, based on future land use. The risk-based decision-making relies on the preparation of risk-based evaluations to quantify potential exposures and resultant adverse health effects. For instance, in an area of contamination where a building is to be constructed, once the building is in place it would provide a barrier to prevent direct access to the contamination. However, volatile chemicals that may be present in the soil or groundwater underneath the building may volatilize and migrate through the soil column into indoor air. Thus, although building occupants would not have direct contact with the soils under the buildings, they could be exposed to volatile constituents that have migrated into indoor air.

Depending on the types of chemicals present and potential pathways through which individuals might be exposed to the chemicals, contaminants in soil or groundwater can often be left in place or cleaned up to a degree that does not pose a threat to human health or the environment. For sites contaminated by petroleum products from underground storage tanks, the RWQCB has drafted investigation and corrective action guidelines./94/

Many risks identified through the RBCA process can be safely managed through the implementation of risk management plans. These plans describe how risks to the public and environment can be reduced to levels that are considered insignificant./95/ In addition, they describe mechanisms to ensure successful implementation, enforcement and monitoring necessary to continuously manage these risks. RMPs are used to outline the processes and procedures that would be followed by owners of sites to reduce any risks identified in the RBCA process.

Hazardous Wastes in Soil

Hazardous wastes in soil are regulated at federal, state, and local levels. At the state level, the Cal/EPA Department of Toxic Substances Control administers hazardous waste laws and regulations pursuant to Division 20, Chapter 6.5 of the California Health and Safety Code and Title 22 of the California Code of Regulations, respectively. The Cal/EPA Department of Toxic Substances Control regulations list state-designated hazardous chemicals. Certain specific wastes because of their concentrations (e.g., a site on the National Priorities List) or inclusion on federal lists of wastes (such as RCRA Section 3001 hazardous wastes list or the toxic pollutants list established pursuant to Section 307 of the Federal Clean Water Act), are also regulated as federal hazardous wastes by U.S. EPA. The Regional Water Quality Control Board is concerned with contaminated soils that may impact groundwater.

In San Francisco, Article 20, Section 1000 *et seq.*, of the San Francisco Public Works Code, entitled "Analyzing the Soil for Hazardous Waste," commonly known as the Maher Ordinance, requires building permit applicants proposing to disturb 50 cubic yards of soil or more on sites located bayward of the San Francisco 1851 high tide line to conduct environmental assessments of that soil for possible hazardous waste. Soil samples must be collected at the depths and locations of site excavations, including basements, utility trenches, elevator pits, and foundations. Where hazardous wastes are found in excess of state or federal standards, the permit applicant is required to submit a site mitigation plan prepared by a qualified expert to the Director of Public Health and the Director of Public Works, and must implement the site mitigation plan and certify completion prior to issuance of any building permit. Where hazardous wastes are found for which no standards are established, the permit applicant must request a determination from the Director of Public Health as to whether a site mitigation plan is needed. The Project Area is within the geographic area covered by this ordinance, and all development that would disturb 50 cubic yards of soil or more must comply with Article 20.

Air Quality Controls

The Bay Area Air Quality Management District (BAAQMD) is primarily responsible for planning, implementing, and enforcing federal and state ambient air quality standards in the San Francisco Bay Area. BAAQMD regulates both criteria air pollutants and toxic air contaminants (see "Regulatory Framework" in Section V.F, Air Quality: Setting). Particulate matter from construction activities is regulated by BAAQMD. In addition, volatiles and any toxic air contaminants generated by excavation or remediation of contaminated soil in the Project Area would be regulated by the BAAQMD.

Construction-Generated Dust

BAAQMD requires the implementation of various dust control measures in order to keep the small-diameter particulates, or $PM_{10,}$ levels to a minimum. BAAQMD's Regulation 6-305 prohibits visible particles from falling on real property other than that of the person responsible for the emission. The BAAQMD's approach to CEQA analyses of construction impacts is to emphasize implementation of effective and comprehensive control measures rather than detailed quantification of emissions./96/

Toxic Air Contaminants

As described in "Summary of Existing Human Health and Ecological Risks from Contaminants Detected in Soil and Groundwater in the Project Area," above, remediation of contaminated soil or groundwater is not currently anticipated in the Project Area, except in the free product area. It may, however, be necessary to remediate contaminated soil and/or groundwater in the Project Area if unexpected chemicals or sources of hazardous materials are found during the development of the Project Area or Article 20 testing. If a device or process employed for on-site treatment of a hazardous substance in soil has the potential to emit toxic air contaminants (TACs), a permit from the Bay Area Air Quality Management District may be required./97/ As part of the permit process, a risk screening evaluation may be required to determine the potential risks attributable to emissions from a particular process or device./98/ For instance, soil vapor extraction is routinely employed to remove volatile chemicals from soil. A similar method can be used to treat contaminated groundwater. Volatile substances (e.g., benzene) are usually transferred to carbon adsorption devices that are then managed as hazardous waste. Use of these and similar remediation techniques would require a BAAQMD permit.

Underground Storage Tanks

Chapter 6.7 of the California Health and Safety Code addresses the removal and cleanup of hazardous substance contamination resulting from leaking underground storage tanks. Title 23 of the California Code of Regulations provides the implementing procedures for this law. The law and regulations require that operational tanks have valid permits, inactive or unused tanks be properly abandoned, and that contaminated soils and/ or groundwater caused by leaking tanks be abated.

While statewide oversight of the UST program is assigned to the various Regional Water Quality Control Boards, most regulatory and permit functions are handled by county health departments, which in San Francisco is the Department of Public Health, Environmental Health Services Division. UST removal is the responsibility of the Hazardous Materials Unified Program Agency. Under contract with the RWQCB, the Local Oversight Program oversees the cleanup of any contamination associated with USTs that may have leaked. The contract with the RWQCB provides that the RWQCB may oversee any tank site in lieu of the Local Oversight Program. The RWQCB has chosen to oversee all tank cleanup in Mission Bay; therefore the Local Oversight Program has not been associated with UST work in the Project Area.

Contaminated Groundwater

It may be necessary to pump groundwater or "dewater" areas to facilitate construction. Discharges to the sewerage system related to these activities are regulated by the San Francisco Department of Public Works through Article 4.1, the Industrial Waste Ordinance, of the Public Works Code. Groundwater from dewatering and/or cleanup activities must meet specific treatment standards before being discharged to the City sewage system under permits issued by the Department of Public Works (see "Water" in the Initial Study [Appendix A]). Permittees/dischargers must also monitor the groundwater discharged to the sewer system and report regularly to the Department of Public Works.

If groundwater were to be pumped directly into the Bay, the discharger would be required to obtain a National Pollutant Discharge Elimination System (NPDES) permit from the RWQCB, as described in "Stormwater Pollution Prevention Plan," in Section V.K, Hydrology and Water Quality: Impacts. Any groundwater proposed for discharge from the Project Area into the Bay must meet strict water quality standards established by NPDES permits, and may have to be treated before discharge into the Bay to avoid degradation of the Bay's water quality. Furthermore, dischargers are required to meet stringent monitoring standards established by NPDES permits to assure compliance under this permitting system.

Hazardous Waste Handling Requirements

As a result of demolition activities or remedial actions determined to be necessary as a result of Article 20 testing or that would otherwise be required, hazardous waste may be generated from the Project Area and would need to be transported to a facility permitted to accept such waste. Management of specific hazardous wastes is addressed at the federal, state and local levels. The federal Resource Conservation and Recovery Act/99/ (RCRA) is administered by the U.S. EPA, and the California Environmental Protection Agency (Cal/EPA) Department of Toxic Substances Control (DTSC) administers the state's Hazardous Waste Control Law./100/ Under state law, DTSC has adopted extensive regulations governing the generation, transportation, treatment and disposal of hazardous wastes, also referred to as "cradle to grave." State requirements differ little from federal laws; both RCRA and the Hazardous Waste Control Law impose regulatory systems for handling hazardous wastes in a manner that protects human health and the environment, including use of hazardous waste "manifests" used to track hazardous wastes from the point of generation to the disposal site. Hazardous waste manifests describe the waste and regulatory information about it.

As discussed in more detail in "General Soil Movement and Transport During Construction," below, DTSC has determined that soils excavated during construction in the Mission Bay Project Area can be moved around and reused in the Project Area without triggering hazardous waste management requirements, provided the soils are managed in accordance with RMP measures. However, DTSC's determination does not apply to building demolition debris or waste soils or other waste materials from any necessary remediation activities. In the event these wastes contain levels of constituents that would result in their classification as hazardous waste, the hazardous waste regulations described above would apply to those materials.

Hazardous Materials Transportation

Hazardous materials that could possibly be excavated from construction and/or remediation activities in the Project Area may require offsite transportation for disposal and/or treatment. Transportation and disposal of soil that is classified as hazardous waste (described in the "Hazard Versus Risk" subsection, above) would be subject to applicable federal and state regulations. The U.S. Department of Transportation regulates hazardous materials transportation, including contaminated soil, between states. The California Highway Patrol and the California Department of Transportation (Caltrans) are the state agencies with primary responsibility for enforcing federal and state regulations related to transportation within California. These agencies respond to hazardous materials (contaminated soil) transportation emergencies. Together, these agencies determine container types to be used and license hazardous waste haulers for hazardous waste transportation on public roads.

Worker Safety

Occupational safety standards exist in federal and state laws to minimize worker safety risks from both physical and chemical hazards in the workplace. California Department of Occupational Safety and Health Administration (Cal/OSHA) and the federal Occupational Safety and Health Administration are the agencies with primary responsibility for assuring worker safety in the workplace. Cal/OSHA has primary responsibility for developing and enforcing standards for safe workplaces and work practices in California. A Site Health and Safety Plan (HASP) must be prepared prior to commencing any work at a contaminated site or involving disturbance of building materials containing hazardous substances, to protect workers and the public from exposure to potential hazards. As described in "Regulatory Framework," in V.I, Health and Safety: Setting, there are several workplace safety requirements. There are several Cal/OSHA regulations specified in Title 8 of the California Code of Regulations (CCR). Title 8 comprises the "General Industry Safety Orders," which contain numerous workplace-safety requirements that would be implemented in conjunction with the RMP to protect construction workers from residual contaminants that may be present in soil or groundwater. For example, under 8 CCR 5194 (Hazard Communication Standard), workers must be informed about hazardous substances that may be encountered in the workplace. Compliance with Injury Illness Prevention Program requirements (8 CCR 3203) would ensure that workers are properly trained to recognize workplace hazards and to take appropriate steps to reduce potential risks due to such hazards. This would be particularly important if previously unidentified contamination or buried hazards are encountered. If additional investigation or remediation is determined to be necessary, then compliance with Cal/OSHA standards for hazardous waste operations (Title 8 CCR, Section 5192) would be required for those individuals involved in the investigation or cleanup work. Please refer to "Health and Safety Laws and Regulations" in Section

V.I, Health and Safety: Setting, and Appendix H, Health and Safety, for more detail on worker safety and health plan requirements and regulations.

Building Demolition and Renovation

Most of the existing structures and buildings in the Project Area are proposed for demolition. As such, hazardous wastes may be generated in the form of asbestos from friable building materials, lead paint on building surfaces, and lighting fixtures. In addition, previously unknown contamination, possibly the result of improper disposal or housekeeping activities, may be discovered as structures are demolished.

Asbestos

Inhalation of airborne fibers is the primary mode of asbestos entry into the body, making friable (easily crumbled) materials the greatest health threat. For this reason, asbestos is regulated both as a hazardous air pollutant under the Federal Clean Air Act regulations and as a potential worker safety hazard under the authority of Cal/OSHA./101/ These regulations prohibit emissions of asbestos from asbestos-related manufacturing, demolition, or construction activities; require medical examinations and monitoring of employees engaged in activities that could disturb asbestos; specify precautions and safe work practices that must be followed to minimize the potential for release of asbestos fibers; and require notice to federal and local government agencies prior to beginning renovation or demolition that could disturb asbestos. The agencies with primary responsibility for asbestos safety are the BAAQMD, Cal/OSHA and OSHA, and U.S. EPA./102/ Some state regulations addressing asbestos-containing materials are more stringent than federal regulations. For example, California requires licensing of contractors who conduct asbestos abatement activities.

Lead

Federal, state, and local laws and regulations govern handling of building materials that contain lead-based paint. OSHA's Lead Construction Standards/103/ establish a maximum safe exposure level for the following types of construction work where lead exposure may occur: demolition or salvage of structures where lead or materials containing lead are present; removal or encapsulation of materials containing lead; and, new construction, alteration, repair or renovation of structures or materials containing lead. Typically, building materials with lead-based paint attached are not considered hazardous waste (Chapter II, Division 4.5, Title 22, CCR) unless the paint is chemically or physically removed from the building debris.

Chapter 36 of the San Francisco Building Code establishes requirements for removal of lead-based paint on the exteriors of buildings. It is implemented by the Department of Building Inspection. The ordinance contains performance standards, including a requirement to establish containment barriers that are at least as effective at protecting human health and the environment as those in the most recent *Guidelines for Evaluation and Control of Lead-Based Paint Hazards* promulgated by the U.S. Department of Housing and Urban Development.

Lighting Wastes and PCBs

Spent fluorescent light tubes and high intensity discharge (HID) lamps contain heavy metals which, if disposed of in landfills, can leach into the soil and groundwater. Fluorescent light ballasts may also contain PCBs (see below). These lighting tubes typically contain concentrations of mercury which may exceed federal and state regulatory thresholds and as such must be managed as hazardous waste. Lighting wastes may be classified as a Resource Conservation and Recovery Act (RCRA) hazardous waste if they contain concentrations of mercury or lead which exceed the toxicity characteristic (TC) as measured by the Toxicity Characteristic Leaching Potential (TCLP) pursuant to Title 22, California Code of Regulations./104/ The California Department of Toxic Substances Control has classified PCBs as a hazardous waste when the concentrations exceed specified limits in liquid or nonliquid substances./105/ At concentrations greater than the state levels, PCBs may be regulated as a federal RCRA waste./106/

PCBs may also be found in lighting wastes. Fluorescent light ballasts that contain PCBs, regardless of size or quantity, are regulated as hazardous waste and must be transported and disposed of as hazardous waste. Ballasts manufactured after January 1, 1978, do not contain PCBs and are required to have a label clearly stating that PCBs are not present in the unit.

Reporting Releases to Environmental Agencies

At any time prior to, during, and following development, certain releases of hazardous substances at the Mission Bay Project Area must be reported to federal, state, and local environmental agencies, depending on the quantity and the type of substance released. Parties operating at the Mission Bay Project Area would be responsible for knowledge of and carrying out their release reporting responsibilities. The release reporting requirements include the following:

- Any non-emergency, unauthorized release of a reportable quantity of a hazardous substance must be reported within 30 days in writing to DTSC by the owner of the property and the person responsible for the release, unless the release occurred prior to January 1, 1994, or was otherwise already reported to DTSC, the State Office of Emergency Services, or was required to be reported under federal law (Health and Safety Code 25359.4). The statute also requires that any owner of nonresidential real property who knows or has reasonable cause to believe that any release of a hazardous substance has come to be located on or beneath that real property must give notice to the buyer, lessee or renter of the property, prior to the sale, lease, or rental of the property (Health and Safety Code Section 25359.7).

- Any person that causes or permits the release or discharge of established amounts of hazardous substances or oil into a water of the State of California, such as China Basin Channel or San Francisco Bay, must report this release to the State Office of Emergency Services in compliance with Sections 13271 and 13272 of the California Water Code.

- In addition, to the extent that any activity entails certain types of hazardous materials management activities, if any release occurs that could threaten human health or the ecological environment outside of the facility handling the materials, the owner or operator of the facility, or the generator of the hazardous materials, must immediately report the required information to the State Office of Emergency Services, and submit the required information in writing within 30 days to DTSC. 22 Cal Code Reg. Section 66265.56.

The owners, operators, generators and persons responsible for any release would be required to ascertain whether these or other release reporting laws apply and to submit a report to an environmental agency.

IMPACTS

This section addresses the potential impacts to construction workers, the public, and the ecological environment from exposure to potentially hazardous chemicals that have been identified in the Mission Bay Project Area soils and groundwater. The presence of these compounds is related to both the history of filling of Mission Bay as well as former industrial and rail activities. As stated in the Setting, above, no *immediate* adverse health effects to current human populations have been identified in the Project Area. At the time of publication of this SEIR, no *adverse* ecological effects to aquatic communities from chemicals present in groundwater have been identified in the near-shore areas of China Basin Channel or San Francisco Bay that require management, with the possible exception of the petroleum free product area. The free product area is under continuing investigation to determine appropriate solutions to protect the aquatic environment. Reasonable estimates of pollutants contained in urban stormwater runoff are discussed in "Volume and Quality of Direct Stormwater Discharge to Bay," in Section V.K, Hydrology and Water Quality: Impacts. The existing conditions, as described, provide the baseline against which to compare the effects of the proposed project.

Due to the presence of contaminants in soil and groundwater, the potential exists for construction workers, future occupants, or visitors to be exposed to these chemicals during and after development of the Project Area. Therefore, the following impact analyses focus on the potential human health and ecological effects associated with chemicals identified in soil and groundwater that could be encountered during construction and gradual, new occupancy (project development), and at full build-out (post-development) of the proposed project.

The analysis also evaluates potential health effects due to materials such as asbestos, lead, or PCBs that could be present in buildings that would be demolished or renovated. The potential for previously unidentified contamination to be encountered and possible adverse effects, if any, are qualitatively analyzed as well.

The analysis presented in this section is based on conditions as they exist in 1997-1998. To the extent that changes could occur and can be reasonably evaluated, the analysis also considers potential effects due to changed circumstances (e.g., if the project is not completely built out or if the RWQCB or other agency requires new or additional remediation other than that assumed for this SEIR).

As described in the Setting, the RWQCB staff has determined that additional investigation is necessary and potential remediation may be required in the free product area located in the southeast portion of Mission Bay South. The requirements for additional characterization and potential remediation are based on the potential for the free product area to adversely impact the nearby aquatic environment. An evaluation of the risks under future development plans has indicated that the existing conditions in the free product area would not adversely impact human health, even if one were to build directly over the free product area./107/ The compounds that are present in the free product area are generally weathered, and the constituents that remain are relatively nonvolatile and of low toxicity. Potential human health impacts associated with remediation of the free product area would be controlled through the development and implementation of health and safety measures that would be required as a component of the remediation plan for the free product area. Accordingly, although remediation of the free product area would not be necessary to protect human health, the potential impacts on nearby human populations from the implementation of the remediation activities could be effectively controlled and would thus not limit the ability to develop in the free product area (see "Additional Remediation Requirements," below). However, since the specific remediation measures for the free product area are not yet known, development in that area would occur in a manner that would not preclude the RWQCB from selecting and implementing the appropriate solution for the free product area.

The free product area is an existing condition. Remediation is expected to occur irrespective of whether or not the Mission Bay project is implemented. The remediation of the free product area is not expected to affect nor be affected by project development, assuming coordination of development and free product remediation occurs. Therefore, analysis of the free product investigation and cleanup, as it is currently envisioned by the affected oil companies and the RWQCB, is not necessary in this SEIR.

The following impact analyses assume compliance with applicable site development regulations including, but not limited to, the requirements of Article 20, OSHA standards, and Cal/EPA laws and regulations. In addition, RMPs would be implemented to minimize potential adverse effects to human health or the ecological community from exposure to contaminated soils or groundwater during and after development. Implementation of the RMPs during and after site development is assumed as part of project implementation. A summary of the scope of the RMPs is presented below in "Approach to Analysis of Potential Effects During Project Development" and "Approach to Analysis of Potential Effects After Build-Out (Post-Development)." In addition, a discussion illustrating how the RMPs would reduce potential human health and ecosystem hazards during and after construction is presented within each of the specific impact topics. The measures that would be included in the RMPs are described in mitigation measures in Section VI.J, Mitigation Measures: Contaminated Soils and Groundwater.

Managing environmental conditions in the Mission Bay Project Area using RMPs would effectively control potential risks to human health and the environment through all phases of the development. Other approaches that might attempt to manage site environmental conditions through measures such as removal of large amounts of soils and groundwater or the construction of subsurface barriers would not result in more effective control of potential risks to human health and the environment over that already provided by RMPs. Instead, these alternative control measures would be less practical to implement, would come with greater cost, and would cause substantial disturbance to the local community during their installation. Additionally, some alternative approaches may increase the risks to human health and environment during their implementation by creating potentially significant exposures beyond those that currently exist within the Mission Bay Project Area./108/

The Impacts section for Contaminated Soils and Groundwater is organized differently from other sections of the SEIR; for other sections, the analyses of potential impacts of phased development and of interim uses are presented separately, near the end of the impact discussion because, for the most part, the potential impacts at full build-out would be greatest and are presented first. In the Impacts section, existing uses remaining in the Project Area and new interim uses in the Project Area during development present issues similar to those of phased development. The issues would be whether there would be potentially significant impacts to people occupying sites in the Project Area 1) while some sites with chemicals in soil and groundwater remained vacant and exposed, and 2) while development that would disturb soils was occurring at adjacent or nearby sites in the Project Area. These impacts would be more important than impacts following build-out, because exposure to chemicals in soil and groundwater would be more likely to occur during, rather than after, development. Thus, the analysis of potential human health and ecological effects that could occur during construction applies to existing remaining and to interim uses, and to permanent uses occupied in early or middle phases of development, and is presented before the analysis of the project at build-out.

STANDARDS OF SIGNIFICANCE

The City has not adopted any formal standards of significance for environmental analysis of contaminated soils or groundwater. Generally, an impact would be considered significant if the presence of chemicals in soil or groundwater or in existing building materials, or disturbance of these chemicals during construction, were to create a substantial potential public health hazard or a substantial hazard to important animal or plant populations in the Project Area.

APPROACH TO ANALYSIS OF POTENTIAL EFFECTS DURING PROJECT DEVELOPMENT

Because development is proposed to occur in phases over a period of 17 or more years, development and occupancy of some portions of Mission Bay would occur at the same time as demolition and construction would occur in other portions of the Project Area in which contaminated soils or groundwater have been identified. Because there are no residents in the Project Area and much of the property is vacant or used for truck parking, relatively few individuals would be exposed to the potential contaminated material during the initial construction phases. During later phases of construction, existing uses may remain, some interim uses may be occupied, and some of the proposed commercial, industrial, and residential uses would be completed and occupied.

Consequently, an increasingly greater number of people would be affected by chemicals in soil or groundwater on vacant sites and by construction activities involving the disturbance of contaminated soil or groundwater during later phases of development. This would be a particular issue in the residential portions of the Project Area, where construction in contaminated soils could occur near occupied residential units.

Thus, the analyses of impacts during construction is divided into a discussion of effects from vacant sites in the Project Area and effects from construction activities in the Project Area. Both could expose the same site occupants to chemicals in the soil. For both sources of exposure, ranges of measures would be presented in an area-wide RMP or in RMPs prepared for a development site or phase.

The potential effects that could occur during phased development of the proposed project are qualitatively evaluated based on information presented in the 1997 Mission Bay North report and the 1998 Mission Bay South report and on a technical memorandum entitled *Technical Memorandum #1, Approach to a Plan for Risk Management, Mission Bay Project Area* prepared by ENVIRON in April 1998.

Information presented in these reports and considered in the analysis includes, but is not limited to, historic and proposed land uses, sampling results, anticipated construction activities, and conceptual development phasing. The analysis contemplates potential health effects on construction personnel, workers, or visitors in the Project Area who may be exposed to contaminants during excavation, grading, dewatering, building demolition, or other site preparation activities, as well as potential effects on the ecological community.

RMPs that would be developed for each site or group of sites are proposed to be used to identify specific potential health effects during project development and to establish means to reduce these effects. The mitigation measures described in the RMP to reduce health risks are presented in Measures J.1d through J.1k in Section VI.J, Mitigation Measures: Contaminated Soils and Groundwater. The following section describes the process that would be used in the RMP to analyze further whether conditions during the interim period between now and when development is complete would pose a risk to potentially exposed populations due to the presence of contaminants in soil and groundwater in the Project Area.

Risk Management Plan for Project Area Development

The RMP for development of the Project Area would identify specific measures to reduce potential risks to human and ecological populations during construction of the proposed project for each site or group of sites to be developed. The RMP will be submitted to the RWQCB for review by staff. The RMP must be approved by the RWQCB staff prior to site preparation for the first site that would be developed in the Project Area. As noted in the Setting, above, preparation of the RMPs and subsequent RWQCB staff approval would occur independent of the CEQA process under the administrative jurisdiction of the RWQCB.

If a single RMP is prepared for all of the Catellus property in the Project Area, all risk management measures would be presented in the RMP and submitted to the RWQCB staff for approval. If additional or alternative risk management measures are identified by RWQCB staff, then the RMP would be revised and resubmitted to the RWQCB for its approval. RMPs prepared for areas larger than a single site would include ranges of measures; for a particular site, specific measures appropriate to the types of chemicals and activities proposed for the site would be selected from the range of measures. If multiple RMPs were prepared for development of Catellus property, appropriate ranges of risk management measures would be presented to RWQCB staff for review and approval for each development area. RMPs would also be prepared for sites under other ownership in the Project Area.

The RWQCB has stated that it follows U.S. EPA guidelines for risk management. The DTSC has also adopted the U.S. EPA's policy of using a risk range of 1×10^{-4} to 1×10^{-6}; on a site-specific basis DTSC has made risk management decisions, with community input, to use 1×10^{-5}. Consistent with U.S. EPA guidelines, RWQCB staff has advised ENVIRON that, for the Mission Bay Project, it will evaluate the potential risks to human health considering a 1×10^{-5} cumulative carcinogenic risk level and a noncarcinogenic Hazard Index of 1./109/ U.S. EPA and DTSC guidelines divide potential human health risks associated with exposure to chemicals into cancer risks and noncancer hazard indices. The calculated cancer risk characterizes health risks as a result of exposure to carcinogenic substances by using estimated or measured concentrations and risk/potency factors. The calculated cancer risk is an approximation of the probability of an individual developing cancer over the course of a lifetime as a result of exposure to a particular cumulative dose of a potential carcinogen.

Unlike cancer risk estimates, the measure used to describe the potential for noncarcinogenic toxic effects to occur is expressed in terms of a Hazard Index (HI), which is calculated as the ratio of the predicted acute or chronic exposure (dose) of a noncarcinogenic substance to that chemical's toxicity threshold (often referred to as the reference dose). The HI assumes that there is a level of exposure below which it is unlikely, even for sensitive populations, to experience adverse health effects. Because there are inherent uncertainties and assumptions used in the modeling, the final calculated risk value should, therefore, be viewed as a very conservatively estimated probability of occurrence.

Enforcement and Regulatory Oversight of Risk Management Plan During Project Development

The interim measures specified in the RMP must be adhered to in order to ensure that the conditions in the Project Area remain protective of human health and the environment during site development. Each owner of any portion of the Project Area with responsibility for development would be apprised of the RMP and its contents, and would be required to comply with them (or cause others to comply with them) through a number of mechanisms. Four mechanisms would provide a structure for risk management measures applicable to the Project Area to be in place and effective during construction. These mechanisms, which would also apply to long-term management after project completion, include:

- As applicable, contractual obligations would be used to notify all owners of the RMP and its requirements;

- Use restrictions in the RMP would be recorded and enforced against owners and occupants as an environmental restriction and covenant under Civil Code Section 1471;
- The RWQCB would maintain residual enforcement authority against all owners and occupants with control over affected portions of the Project Area; and
- Portions of the RMP would be enforced through Article 20 during the process of obtaining building permits from the City.

The first two mechanisms are features of the project. The second two mechanisms are regulatory in nature and would be enforceable by the RWQCB and the City, respectively.

IMPACTS DURING PROJECT DEVELOPMENT

As discussed in the Setting, various organic substances, metals, and petroleum products and related chemicals have been detected in soil and groundwater throughout the Project Area. The following analysis evaluates the potential effects on human health and the ecological environment that could occur during construction due to the presence of residual contaminants in soil or groundwater.

Overview of Site Development Exposure Scenarios and Potential Effects

As described in the 1990 FEIR, without mitigation, construction activities could pose some potential risk to receptors in the Project Area from contaminants that have been detected in soil or groundwater./110/ All individuals, whether in existing remaining activities, interim new uses, or early permanent residential or nonresidential uses or visitors, would be subject to two conditions during development: 1) vacant parcels with exposed soil that may contain chemicals, and 2) construction sites with disturbed soil and exposed groundwater that may contain chemicals. These conditions would be managed somewhat differently. Therefore, they are discussed separately in the sections that follow. In addition, people in commercial and industrial areas immediately adjacent to the Project Area, as well as individuals in residential and other mixed-use areas not immediately adjacent to the Project Area (e.g., Potrero Hill) theoretically could also be exposed to risks identified for the project. The degree of risk would vary in relation to the distance from the site being disturbed, wind speeds and directions, the activity being performed, among other factors. In the impact discussions that follow, individuals present outside the Project Area are also considered in the analysis.

Most development sites in the Project Area are not expected to include basements, and would not disturb or excavate large amounts of soil. However, the Redevelopment Plans for Mission Bay North and Mission Bay South do not prohibit excavation for basements, and Catellus has indicated that it wishes to reserve the opportunity to construct basements for parking on some sites in the Project Area. Installation of utilities and site preparation for buildings with or without basements would also involve soil disturbance that could encounter groundwater. Unless properly managed, these activities also have the potential both to release chemicals found in soil and groundwater to the air, groundwater, or surface water, and to expose construction workers, residents and employees in the Project Area and visitors to the Project Area to hazardous materials. Exposure of construction workers, residents, or employees in existing or new buildings in the Project Area during the course of development to some of these chemicals could cause adverse health effects if exposures occurred for a sufficient length of time to cause these effects.

Unless properly managed, human exposure to contaminants in the soil or groundwater could occur through inhalation of vapors from petroleum products or related compounds such as benzene that may have accumulated in the soils, from inhalation of soil particles or dust containing elevated concentrations of metals, PAHs, or asbestos, or from direct contact with contaminants (e.g., petroleum free product, or exposed or stockpiled soils). Since long-term health effects, including cancer, generally occur with exposures continuing over many years, it is more likely that adverse health effects from construction activities would be acute in nature. Adverse acute health effects, for example, could range from respiratory irritation to kidney disease.

Construction activities also could pose some potential ecological risks. Construction dust, dewatering activities, and surface water runoff from construction sites could potentially impact terrestrial and avian wildlife and aquatic organisms through contact with contaminants in soil or groundwater.

As discussed below, mitigation, in the form of the RMP, would be implemented to reduce exposure of people and terrestrial, avian, and aquatic organisms to potential construction-related effects (see also Measures J.1d through J.1k in Section VI.J, Contaminated Soils and Groundwater).

Exposure from Vacant, Undeveloped Sites

Uncovered soils, if not properly managed at vacant, undeveloped sites, could expose people to contaminants present in the soils during development of the project. Individuals who could be affected would include Project Area residents, workers, or visitors at developed parcels adjacent to the vacant, undeveloped sites, or trespassers at the vacant, undeveloped location. As discussed in "Overview of Site Development Exposure Scenarios and Potential Effects," above, exposure to contaminants could result in adverse human health effects. To reduce the risk of adverse health effects, appropriate risk reduction measures identified in the RMP or RMPs would be implemented, as noted in "Risk Management Plan for Project Area Development," above. The following discussion describes the process by which health risks to the public from vacant, undeveloped parcels would be identified and presents a range of actions that could be used to reduce identified risks, if any, to less-than-significant levels.

The RMP would first identify all areas where exposed soils currently exist. The identification of the current areas that are uncovered, and the assumption that they could remain uncovered for the entire time of Project Area development, is considered conservative because the amount of exposed soils would decrease as development progresses. Consequently, such an assumption would conservatively estimate the exposures that individuals could incur from these soil areas.

The RMP would then identify specific constituents that have been detected in the exposed soils that could potentially pose a risk to people during site development. Interim Target Levels (ITLs) for chemicals in soil would then be developed for those populations that could be exposed to chemicals present in the exposed surface soils over time until development is complete. The ITLs would provide a means for evaluating whether the concentration of chemicals detected in the soils on the vacant, undeveloped parcel could present an adverse health risk and where interim risk management measures are appropriate. The approach used to develop the ITLs would be consistent with standard risk assessment approaches and would be presented to the RWQCB staff for consideration as an appropriate method for identifying areas where interim risk management measures could be warranted./111/ For purposes of this discussion, the interim period is defined as the period of time between initial project approval and complete build-out. Based on the results of the soil and groundwater investigations conducted in the Project Area described in the Setting section, above, and the evaluations of human health risk that have been conducted to estimate the risks to future occupants in the Project Area, the constituents present in the exposed soils for which interim target levels would be developed include metals, PAHs and TPH constituents. ITLs would not be developed for the pesticides or other SVOCs due to the infrequent detection of these chemicals, in addition to the low concentrations at which they were detected. Further, ITLs would not be developed for the volatile constituents for two reasons. One, VOCs do not persist in surface soils. Therefore, direct contact with the surface soils is not likely to result in any incremental exposure to volatile constituents. Two, the pathway through which exposure to the VOCs present in deeper soils and groundwater could occur is through the inhalation of vapors that might have migrated up through the soil column into either the ambient or indoor air. An evaluation of this potential pathway was conducted, as discussed under "Post-Development Impacts," to determine whether the VOCs present in the deeper soils and groundwater would pose a risk to the future occupants of, and visitors to, the Project Area. That evaluation did not assume a soil cap or other post-development measures that would reduce exposure to VOCs./112/ Thus, the analysis of VOCs is applicable to both the post-development and interim period scenarios. The evaluation concluded that the VOCs do not pose a health risk for the planned long-term occupancy including populations such as park visitors, or shoppers who may visit the Project Area. Therefore, the presence of VOCs in the subsurface soils and groundwater would also not pose a risk over the shorter-term interim period./113/

The RMP would also identify the populations most likely to be exposed to the soils during development of the project. As currently envisioned, the exposed populations are likely to include the following:

- Adult and child visitors/trespassers
- Nearby residents (both adults and children)
- Workers (on-site and adjacent to the Project Area)

Once the populations who could come in contact with the exposed soils have been identified, the RMP would then describe the pathways through which the populations could be exposed to the constituents present in exposed soils prior to project completion. The specific exposure assumptions would be based on existing U.S. EPA- and DTSC-recommended exposure assumptions. If the agency guidance does not contain specific exposure assumptions for the populations, site-specific exposure assumptions would be developed based on the expected patterns of exposure and assumptions that have been used and approved at other similar sites, particularly sites in the Bay Area. All exposure assumptions would be developed in consultation with the RWQCB, prior to the completion of the RMP.

Using the specific exposure information that would be developed as described in the preceding paragraphs, combined with toxicity values developed by the U.S. EPA and Cal/EPA, ITLs would then be developed for each of the individual constituents that are identified as chemicals of potential concern. Consistent with the human health evaluation standard set by the RWQCB for the Project Area, calculation of the ITLs would assume a cancer risk criterion of 1×10^{-5} and a Hazard Index of 1. The methodology that would be used in the development of the ITLs would follow the standard regulatory risk assessment guidelines promulgated by the DTSC and the U.S. EPA./114/ This basic approach has also been approved by the RWQCB for use in evaluating the impact of various USTs in Mission Bay South./115/ Any ITLs developed for the Project Area would be presented to RWQCB staff for consideration and approval.

Once developed, the chemical-specific ITLs would then be compared to the concentrations detected in the exposed soils. Areas where the concentration in the exposed soil exceed the ITLs would be identified. This comparison would provide the basis for identifying specific sites that could require interim risk management measures. To reduce the potential for uncontrolled exposures to impact the health of individuals in the Project Area, and to reduce the potential for existing or future tenants to engage in activities that could impact their health or the health of those in the vicinity during site development, the RMP would present a range of interim risk management measures for areas where concentrations of chemicals in soils exceed ITLs. These measures are listed in Measure J.1c in Section VI.J, Contaminated Soils and Groundwater. The range of measures that could be used to reduce risk include, among other actions, the following:

- Limit direct access to uncovered soil on undeveloped portions of the Project Area, where site evaluations show elevated risks.
- Hydroseed or apply other vegetative cover to large uncovered areas.
- Include safety notices in leases for tenants of occupied portions of the Project Area notifying them of risks involved in disturbing existing ground covers (hard-scape or plantings).
- Conduct periodic inspections of open areas to reduce the illegal occupancy by transient populations, and to reduce the potential for illegal dumping by unauthorized occupants or off-site populations within the Project Area.
- Conduct periodic monitoring to verify that the risk management measures that are implemented remain effective in controlling exposure during development of the Project Area.

The actual control measure(s) that would be implemented would be developed to account for the specific characteristics of each site, contaminant concentrations, potential exposure pathways, and populations that could be at risk. Implementation of these measures, if necessary, would be adequate to control exposure from vacant, undeveloped sites. Therefore, chemicals in soil and groundwater are not proposed to be removed prior to construction activities.

Exposure from Construction Activities

There are three general types of construction activity that would involve the potential exposure of construction workers and the public to hazardous materials due to soil disturbance. These activities include: 1) excavation, grading and trenching where workers and the public would potentially be exposed to dust containing contaminants or to soil gases; 2) installation of building foundation piles for structural support where workers would potentially be exposed to soil; and 3) identification and removal of USTs where workers and the public would potentially be exposed to contaminated material including the tank, vapors, or soil.

Construction-related impacts could also result from moving soil, both on and off site; installing piles for building foundations; installing utilities; and dewatering during excavation. Surface runoff from construction sites during rainy weather could affect the City's sewer system or the nearby Channel and Bay. Also, subsurface hazards that have not been identified by the various studies of soil and groundwater carried out for the Project Area could be encountered during construction. This description is necessarily generalized in nature; potential hazards would depend on the nature of building or site preparation activities and the type and amount of chemical constituents at each location, as discussed in greater detail in each of the impact analyses that follow.

Construction-Generated Dust Effects

Construction of the proposed project would involve site preparation activities such as excavation, trenching, or grading that would result in soil disturbance. Various organic substances, metals, and petroleum products and related chemicals have been detected in soil throughout the Project Area. Exposure of construction workers, or of residents or employees in existing or new buildings in the Project Area, to some of these chemicals could cause adverse health effects. The concentrations of chemicals are greater in some locations in Mission Bay North and Mission Bay South than in others. For example, high concentrations of some metals and PAHs were found in Mission Bay South soils. In addition, petroleum hydrocarbons were found floating on groundwater ("free product") in the southeast corner of Mission Bay South. The potential exists during construction for exposure to dust contaminated with toxic materials.

Construction workers, persons currently working in the Project Area, or visitors could be exposed to potential hazards associated with the chemicals detected in Project Area soils when those soils are disturbed during development. The concurrent development of some portions of the Project Area and simultaneous occupancy of other portions of the Project Area could result in potential exposure of new residents and/or employees in the area to contaminants that could be released during construction.

Potential Effects on Human Health

A screening risk assessment was prepared to assess the potential human health risks associated with construction-generated dust if dust control measures were not implemented./116/ The screening-level evaluation assessed the types of impacts that could be encountered as a result of chemicals in soil adhering to dust particles in a reasonable worst-case uncontrolled dust emission scenario. That evaluation, which is presented in *Approach to a Plan for Risk Management* prepared by ENVIRON in April 1998, concluded that risks to nearby populations (i.e., populations directly adjacent to construction areas where dust levels would be highest), even if continuously exposed to dust generated for 20 years, would be below the target levels specified by the RWQCB for the Project Area./117/ The risk evaluation was conducted following standard regulatory risk assessment guidelines developed by the DTSC/118/ and U.S. EPA/119/,/120/, and is summarized in Appendix I under "Methodology to Evaluate Human Health Risk Due to Exposure to Uncontrolled Construction-Generated Dust." To estimate the theoretical risk of an adverse health effect due to construction dust that could contain contaminants, risk values were quantified using mathematical modeling.

The screening-level cancer risk estimates developed for potential exposure to dusts generated during excavation activities, if control measures were not implemented, indicate the total cancer risks calculated for nearby worker and residential populations are 9 in 1 million (9×10^{-6}) and 4 in 1 million (4×10^{-6}), respectively./121/ These values are below the cancer risk criterion of 10 in 1 million (10×10^{-6}) approved by the RWQCB for the Mission Bay Project Area./122/ These values are also below the project significance threshold level of 1×10^{-5} (which is the same as 10×10^{-6}) defined by BAAQMD for CEQA analysis purposes, as described in more detail under "Standards of Significance" in Section V.F, Air Quality./123/

The total estimated noncancer Hazard Indices for the nearby worker and resident populations are 0.11 and 0.08, respectively/124/, which are both less than the HI criterion of 1, approved by the RWQCB for the Project Area/125/, and recommended by the U.S. EPA as the level below which adverse noncancer health effects are not expected to occur./126/ A Hazard Index of 1 is also the threshold level for projects defined by the BAAQMD for CEQA purposes; concentrations which would result in a HI of greater than 1 are considered to represent a significant air quality impact./127/

Human Health Impacts of Lead Exposure from Construction Dust

Because DTSC has established a specific guidance for evaluating potential adverse health effects resulting from exposure to lead in the environment that differs from the screening health risk assessment methodology described above, an analysis of the potential health risks associated with exposure to lead in construction-generated dust was also prepared by ENVIRON./128/ Consistent with U.S. EPA risk assessment guidance, ENVIRON calculated a specific lead concentration that would represent, with a high degree of certainty, the reasonable maximum exposure of lead that would be expected to occur over the exposure period. That value was determined to be 926 milligrams per kilogram (mg/kg) of lead for all soils in Mission Bay South./129//130/

ENVIRON assessed two scenarios using DTSC estimated blood-level concentrations guidance: 1) the blood-lead levels that could result from exposure to naturally-occurring background levels of lead that individuals could be exposed to in the air, food and drinking water (default background levels defined by DTSC /131/); and 2) the blood-lead levels that could result from exposure to the lead that could become airborne during the construction activities in the Project Area. The difference between these two scenarios is the incremental increase in blood-lead levels due to the contribution of the construction activities.

Based on DTSC information, the blood concentration of concern in children and adults is 10 micrograms (μg) of lead (Pb) per deciliter (dl) of whole blood (Pb/dl)./132/ The stated goal of DTSC is to ensure that 99% of the population has blood-lead levels less than 10 μg Pb/dl blood. Using DTSC-recommended default exposure parameters, the 99th percentile blood-lead level associated with natural background sources in air, food and drinking water is 7.7 and 4.6 μg Pb/dl blood, for children and adults respectively. Using the reasonable maximum exposure value for Mission Bay South of 926 mg/kg of lead, the 99th percentile blood-lead level in children and adults from exposures to dust generated during construction-related activities is estimated to be 8.7 and 5.4 μg Pb/dl blood, respectively. In other words, under both scenarios, 99% of the residents, exposed as described in ENVIRON's evaluation, are predicted to have blood-level levels below 8.7 μg Pb/dl blood, which is below the 10 μg/dl level of concern. Therefore, exposure to lead that could be present in dusts, assuming the conservatively high levels of dust generated during construction activities described earlier, would not result in any significant incremental increase in blood-lead levels over those resulting from background exposures. The incremental blood-lead levels contributed by emissions from the dusts generated during construction are 1.0 and 0.8 μg Pb/dl blood, for the children and adults, respectively. These concentrations represent a worst-case exposure under uncontrolled construction dust conditions./133/ Exposure to lead in construction-generated dust would, therefore, be a less-than-significant impact, even if dust control measures are not implemented.

Construction Dust Controls

To reduce exposure to construction workers and new occupants of the Project Area, the RWQCB-approved RMP for each site would contain the health and safety training and health protection objectives for workers who may directly contact the contaminated soil or dust during construction. In the event that prescribed exposure levels are exceeded, personal protective equipment would be required in accordance with Cal/OSHA regulations. If hazardous levels of constituents are encountered, a HASP would also be prepared for each development site in accordance with state standards for workers engaged in activities in which hazardous waste is present.

ENVIRON's *Technical Memorandum #1, Approach to a Plan for Risk Management*, also presents control measures to reduce potential exposure to dusts generated during construction activities. The BAAQMD suggests implementation of various dust control measures in order to keep the PM_{10} (small-diameter particulate matter) levels, irrespective of the chemicals that could be adsorbed to the

PM_{10}, to a minimum. All dust control measures would be detailed in the RMP, which would be reviewed for approval by the RWQCB staff, and would be adequate to reduce dust-related impacts to less-than-significant levels. The BAAQMD's approach to CEQA analyses of construction impacts is to emphasize implementation of effective and comprehensive control measures rather than detailed quantification of emissions.

BAAQMD has identified a set of feasible PM_{10} control measures for construction activities. These control measures are listed as Mitigation Measure F.2 in Section VI.F, Mitigation Measures: Air Quality, and are assumed to be part of the project to reduce the PM_{10} air quality impact to a less-than-significant level.

Implementation of these measures would control dust generated from demolition and excavation activities, truck traffic, wind traversing the soil stockpiles, and loading of transportation vehicles.

Effective control of the dust would prevent nuisance dust and dust containing inorganics, PAHs, and other constituents from migrating off-site and impacting nearby populations. Implementation of the dust control methods would also reduce impacts to the on-site construction workers. Furthermore, implementation of the dust control measures would control any potential impacts associated with emissions of respirable asbestos that could be present in soils disturbed during construction. According to BAAQMD guidelines, compliance with the BAAQMD recommended dust control measures would reduce temporary impacts associated with dusts to insignificant levels./134/ Controlling exposure to dusts would simultaneously control exposures to the chemicals adsorbed to the dust particles.

The RMP developed for each site or group of sites would also contain a program for off-site dust monitoring. The monitoring program would be used to demonstrate that the health and safety of individuals not engaged in construction activities (e.g., visitors, workers, and future residents) would not be adversely affected by chemicals (e.g., metals) that could be contained in dust generated by soil-disturbing activities. The monitoring program would consist of real-time monitoring for PM_{10} concentrations. As discussed in Appendix I under "Dust Level Generated During Construction Activities," as long as off-site dust concentration are 250 $\mu g/m^3$, or lower (where off-site refers to areas directly outside of the construction zone), the risks to nearby populations exposed continuously for a 20-year period to chemicals adsorbed to particulates generated from construction of the Project Area would be within the range of levels considered acceptable by the U.S. EPA and would be below the level defined by BAAQMD to represent a significant threshold. If dust levels exceeded these levels, additional dust control measures could be implemented. Monitoring equipment locations would be established based in part on expected localized wind conditions.

Implementation of the RWQCB-approved RMP measures described above, in combination with BAAQMD-suggested controls and OSHA requirements, would be adequate to ensure that there would be no significant risk to people due to project-generated construction dust.

Potential Dust-Related Effects on Aquatic and Terrestrial Environment

The potential impacts of construction-related dusts on the ecological environment could include potential exposure to terrestrial and avian wildlife, as well as potential exposure to aquatic organisms through deposition of particulates onto the surface water bodies if dust control measures were not implemented. Although the pathways through which the terrestrial, avian, and aquatic species could be exposed to dusts are potentially complete pathways, the exposures are not expected to provide a significant dose to any of the ecological receptors. Accordingly, the generation of dusts that could occur during the construction and development of the Project Area would not represent a significant impact on the ecological environment. The rationale for this conclusion is provided below.

Terrestrial and avian species could potentially be exposed to windblown dust through inhalation, and ingestion during preening and prey consumption. As discussed in the 1990 FEIR, the primary reason that such exposures do not represent a significant impact on terrestrial species is that the current and future conditions within the Project Area do not provide habitat capable of supporting an important terrestrial wildlife community. Further, although various avian species use the area around China Basin Channel for loafing and foraging, the mobility of the bird species results in their use of a relatively large home range and foraging range. Because the types of resources are limited along China Basin Channel and San Francisco Bay, the avian species are expected to make use of foraging habitats, such as mudflats, over a large home range area, and would not be present in one foraging area for an extended period of time. Due to their mobility, and their use of a relatively large home range and foraging range, it is unlikely that avian species could be exposed to significant exposures of dusts, and the chemicals adsorbed to the dusts, during the construction of the Project Area./135/ Therefore, potential dust-related effects on terrestrial or nesting avian species would be less than significant.

Under uncontrolled conditions, impacts on the aquatic environment from windblown dust depositing onto the water bodies could occur through direct exposure to filter feeding molluscs, and other aquatic species. Additionally, excessive deposition of dust onto the water bodies could potentially increase the turbidity in these water bodies, which in turn could decrease the light penetration into the water bodies and the available oxygen. However, even if dust control measures were not implemented, it is anticipated that dusts potentially generated during construction would be dispersed by the wind over a relatively large area, with no one area receiving sufficient dust to generate a significant exposure to species./136/ Thus, potential impacts on the aquatic environment from uncontrolled dusts blowing from the construction zone and depositing onto surface water would be less than significant, even if dust control measures were not implemented. With implementation of BAAQMD dust control measures, impacts would be further reduced to levels considered insignificant.

Potential Health and Safety Effects on Construction Workers

The workers engaged in the construction activities in the Project Area could be exposed to chemicals detected in the soil or ground water if direct contact with either soils or ground water were to occur. Exposures could occur through direct contact (dermal absorption and incidental ingestion) and through the inhalation of particulates and vapors. Further, the construction worker could be exposed to the potential physical and chemical hazards associated with identifying unknown structures, sumps, or USTs, as discussed in more detail in the "Previously Unidentified Subsurface Hazards Encountered During Construction" impact presented later in this section. To protect construction workers from potential adverse health impacts associated with exposure to any of the compounds present in the Project Area, workers engaged in subsurface activities where direct contact with subsurface soils or groundwater could occur, would conduct the work in accordance with specific health and safety training and worker protection objectives. The types of protective measures that could be implemented to protect the health and safety of those workers involved in the construction at the Project Area are described below and would be delineated in the RMP.

Worker exposure to contaminated soils or vapors that could be inhaled would be subject to monitoring and personal safety equipment requirements established in Cal/OSHA regulations that specifically address airborne contaminants. Potential effects related to dusts or vapors that could be inhaled, and applicable safety regulations, are discussed in the "Construction-Generated Dust Effects" section, above. Site controls pertaining to asbestos and lead exposure during construction activities are also included in Cal/OSHA regulations (in Title 8). While the primary intent of the Title 8 requirements is to protect workers, compliance with some of these regulations would also reduce potential hazards to non-construction workers and Project Area occupants, because required site monitoring, reporting, and other controls would be in place.

Compliance with regulations described in "Regulatory Framework," would ensure that workers that could directly contact soil or the ground water containing hazardous levels of constituents would perform all activities in accordance with a hazardous operations site-specific Health and Safety Plan (HASP). Consistent with the Cal/OSHA standards, a HASP would not be required for workers such as heavy equipment operators, carpenters, painters, or other construction workers who would not be performing investigation or remediation activities where direct contact with materials containing hazardous levels of constituents could occur. However, elements of the HASP would protect those workers who may be adjacent to cleanup activities because it would establish engineering controls, monitoring, and security measures to prevent unauthorized entry to cleanup sites and to reduce hazards outside the investigation/cleanup area. A site-specific HASP would be developed, as necessary, by an environmental contractor prior to the commencement of any investigation or cleanup activities. The RMP would specify developer notification procedures to ensure appropriate coordination and timing of site investigation/cleanup activities and routine construction.

Implementation of required safety laws and regulations, described above in conjunction with the RWQCB-approved RMP, would be adequate to ensure that risks to construction workers would not be significant.

General Soil Movement and Transport During Construction

Various construction activities in the Mission Bay Project Area, such as grading, trenching, compacting and excavating, would result in soil being excavated, handled and moved. Most excavated soil is expected to be used elsewhere in the Project Area. When soil is required to be disposed of outside the Project Area, trucks would be routed down major arterial streets to the nearest freeway access ramps—via Third, Brannan, and Fifth Streets to the Bay Bridge/I-80 ramp at the intersection of Fifth and Bryant Street, or via the King Street or Mariposa Street ramps to I-280. Construction activities in the Project Area would expose soils that are now covered, potentially require movement of soils within the Project Area, and could import new soil to some parts of the Project Area. These types of activities could cause localized erosion and would likely spill soil on streets in the Project Area, unless effectively managed. These soils may contain chemicals that could be washed into the Channel or Bay, possibly affecting the aquatic environment in the Channel and the Bay. Potential effects related to dusts containing contaminants that could be released during soil movement are discussed in "Construction-Generated Dust Effects."

The general protocols for managing soil movement and transport during the development of the Project Area are summarized below. These protocols would be included in the RMP in addition to the specific dust-control measures described in the next subsection. As described previously, the RMP would be reviewed by the RWQCB staff for approval prior to the initiation of construction.

As stated in the Setting, building permit applicants proposing to disturb 50 cubic yards or more of soil at sites located bayward of the San Francisco 1851 high tide line are required by Article 20 of the San Francisco Public Works Code to conduct environmental assessments of that soil for hazardous constituents and, if detected, to prepare a site-specific mitigation plan. All of the Project Area is located bayward of the 1851 high tide line, and thus is subject to Article 20. Compliance with the Article 20 requirements is another mechanism, in addition to the RMPs, that could control potential risks to human health and the ecological environment associated with handling of the soils in the Project Area. The site-specific mitigation required by Article 20 could be satisfied by the RMP prepared for the site, plus any additional measures as necessary to address chemical levels found in the soil.

Surface materials and materials for landscaped areas would consist of approved imported fill or excavated material. The minimum depth of approved fill that could be required for different landscaped areas, as well as the specific threshold levels of chemicals that would be appropriate, would be determined in the RMP and would be reviewed for approval by the RWQCB staff.

The DTSC has determined that soils in the Mission Bay Project Area can be moved around, managed, and reused on-site without triggering hazardous waste management requirements./137/,/138/ The RWQCB and DTSC concurred that reuse of soils in the Mission Bay Project Area would be acceptable if conducted in accordance with RWQCB-approved RMPs that specify soil management procedures. If excavated soil remains within the Project Area, it could be placed under buildings or other covered areas such as parking lots or paved walkways to prevent human exposure. If excavated soil is to be used on-site in any manner that could result in direct human exposure, the RMP would call for characterization of the soil excavated to confirm that it meets the appropriate standards (including City requirements) and would be approved by the RWQCB as appropriate for the intended use.

Transportation of soil from one area to another would be carefully controlled to reduce the potential for human or ecological exposure to the soil. Dust control measures could include placing covers on the trucks to reduce the potential for spreading material from one area to another. Further, whenever workers could be exposed to hazardous levels of chemicals, a site-specific HASP would be prepared by the contractor prior to construction and would contain a section regarding decontamination of both personnel and equipment. These actions would prevent soil from migrating off-site.

The potential for trespassers or visitors to gain access to construction sites and come into direct contact with contaminated soils would be minimal because access to construction sites would be controlled through the implementation of the HASP for applicable sites. While the HASP is primarily intended to protect construction workers from potential hazards, it would also specify measures to prevent unauthorized entry into the construction site and provide appropriate monitoring/enforcement procedures to ensure the effectiveness of site security. Measures that would be implemented as part of the RMP are presented in Measures J.1d, J.1e, and J.1f in Section VI.J, Mitigation Measures: Contaminated Soils and Groundwater.

Compliance with the procedures described above and other specific risk management measures that would be included in the RMP would be adequate to ensure that soil movement within the Project Area would not present a significant risk to human health and the ecological environment, and would also reduce the potential for inadvertent exposure of adults and children to contaminated soils to less-than-significant levels. In addition, additional testing would be conducted on any soil disposed of outside the Project Area. Any soil disposed outside the Project Area is subject to all applicable federal and state regulations, which would minimize potential environmental effects of disposing the soil at those locations. Therefore, impacts would be less than significant.

Effect on Groundwater of Foundation Pile Installation

Foundation support piles would be driven from the surface to various depths within the Project Area to provide structural support for various building and structure features. (The discussion that follows is related to pile driving on land; pile driving in the Channel is discussed in "Turbidity From Construction Activities," in V.L, China Basin Channel, Vegetation and Wildlife.) Unless properly managed and depending on the depth and location of the support piles, shallow groundwater could be encountered as a result of this activity. Piles installed in locations where contaminants have been identified could, under certain soil conditions, create a vertical conduit for chemicals occurring in shallow groundwater to move along the pile to deeper groundwater zones, causing degradation of the deeper groundwater.

The Project Area is principally underlain by fill materials that overlie a thick sequence of Bay Mud. Additional clay units and bedrock underlie the Bay Mud. When piles are installed in the Project Area, they would generally extend far into the Bay Mud and, in certain locations, could extend to the clays and bedrock that underlie the Bay Mud. During pile installation, a borehole would first be drilled through the artificial fill materials. The borehole would be drilled so that the pile can be started without being damaged or vertically misaligned from debris and rubble that is commonly encountered in the fill materials, which would prevent artificial fill materials or other materials in the upper intervals from pushing through to Bay Mud or lower depths. It is presumed that predrilling the bore hole is the only appropriate technique for drilling in unengineered fill material. All excess fill or native soil materials generated during pile driving would be managed consistent with the procedures in the RMP. The pile would move downward through the predrilled borehole to a pre-determined depth into the Bay Mud layer. From that depth, it would be driven through the Bay Mud sequence into underlaying soils or bedrock below.

Because Bay Mud is soft, cohesive, and has a low permeability/139/, the materials encountered during pile installation would adhere to the sides of piles during and after placement. This action would form a seal that would prevent the formation of conduits for shallow groundwater to migrate downward into deeper water-bearing zones. Therefore, natural conditions would prevent the creation of a vertical conduit for chemicals moving from shallow intervals to deeper ones, even in the free product area. While no water production wells or aquifers used for water supply have been identified in the Project Area, the natural sealing action would ensure that if water supplies were developed in the future, construction of foundation support piles would not affect these groundwater uses. Therefore, no significant groundwater quality impacts would occur from piledriving.

Utility Trench Excavation

Utility trenches would be constructed within the Project Area for the installation of underground utilities along alignments in the streets and on individual parcels. The trench depths could vary from approximately 2 to 10 feet below ground surface. Typical underground utility construction would include the placement of permeable backfill immediately surrounding the utility pipes along the entire horizontal alignment. For most typical utility installations, a six-inch layer of sand would be placed at the bottom of the trench, and the utility pipe would rest on top of the first sand layer. Additional sand would then be placed around the sides of the pipe at least six inches to one foot above the pipe. Pipe bedding material is more permeable than the surrounding fill, creating a potential conduit for horizontal migration of fluids. These conditions could create a horizontal conduit for chemical contaminants contained in soil vapors or shallow groundwater to migrate along the permeable soils that would be placed as trench backfill.

To reduce these risks, the remainder of the open trench could be backfilled with sand or other suitable engineered fill (such as a sand, gravel and clay mixture). Where horizontal migration of fluids is undesirable, as in areas like the free product area, material that is less permeable than the surrounding soil would be placed through a variety of methods at intervals along the trench to disrupt the flow within the trench backfill. One method during initial trench backfilling could be the construction of a short section backfilled with a concrete or cement and bentonite mixture. Another method could be the creation of a clay plug by compacting clay around the pipe for an approximately 5-foot section of trench. A third method could be the installation of barrier collars around the pipes by forming and pouring concrete in place. These engineering techniques or other similar methods identified in the RMP would be effective in preventing horizontal conduits. This would minimize the potential for horizontal migration of contaminants in the Project Area, which would reduce effects to less-than-significant levels.

Construction Dewatering

Extensive subsurface excavation is not anticipated as part of the proposed project; however, there may be some sites where some dewatering may be necessary. Because contamination has been detected in a number of monitoring wells at various locations throughout the Project Area, below-grade soil excavation or trenching activities that require dewatering to maintain adequate construction conditions could potentially encounter contaminated groundwater, if contaminants are present. It is possible that pumping water from excavation pits or dewatering wells at construction sites could release contaminated groundwater or draw a contaminant plume towards or into the excavation. Groundwater extracted in these areas could contain toxic chemicals that could expose construction workers, wastewater treatment system workers (if the water is discharged to the sewer), or the public to hazardous situations or contaminated groundwater, if direct or indirect contact were to occur. In addition, dewatering activities could influence localized groundwater gradient(s) and contribute to the spread of contaminated groundwater in the Project Area, particularly in and near the areas with petroleum free product on the groundwater in Mission Bay South.

Methods to control water removed from excavations and trenches would be specified in the RMP. Such measures would include, but would not be limited to, site-specific analysis and identification of contaminants and appropriate construction and wastewater discharge methods. For example, prior to dewatering, the amount of water that would need to be removed would be estimated using quantitative hydrogeologic calculations to identify appropriate dewatering methods. Selecting and implementing appropriate dewatering methods would prevent uncontrolled releases of contaminated groundwater and prevent uncontrolled alterations in the flow rate or direction of groundwater that could exacerbate existing conditions, including conditions in the free product area.

If appropriate for deeper excavations, the excavations would first be encircled with sheetpiles or a similar process would be used, to limit the volume of water that could enter an excavation or trench. Dewatering wells could be installed inside the area surrounded by sheetpiles to lower the groundwater level. Properly installed sheetpiles that are interlocked and driven through dense clay materials would effectively limit groundwater flow through the piles installed in the Project Area. Consequently, any contaminants in groundwater would not flow toward the excavation or trench. This would minimize the potential for groundwater containing residual contaminants to degrade groundwater in other locations which did not contain contaminants. Where shallower excavation or trenching would occur within the artificial fill layer, sump pumps could be used for localized dewatering. Under this condition, there would be no widespread effect on groundwater flow patterns or distribution of contaminants in adjacent groundwater at those locations; therefore impacts would be less than significant.

It is anticipated that most groundwater removed during dewatering activities would be discharged into the City's combined sewer system. As described in "Contaminated Groundwater" in "Regulatory Framework," above, discharge of dewatered groundwater into the City's combined sewer system would require a discharge permit from the City. Compliance with the discharge permit, which would be specified in the RMP, would ensure that contaminant levels would be reduced to the extent required by the City./140/ If direct discharge to surface water is determined to be the appropriate method for disposal of groundwater removed during dewatering, permits issued by the RWQCB under the National Pollution Discharge Elimination System would be required (see "Other Construction-Related Pollutants," in Section V.K, Hydrology and Water Quality: Impacts). In either case, the types and amounts of contaminants that could be released to surface water either indirectly through the combined sewer system or as a result of direct discharge would be minimized to the extent required by law. Based on the need for discharge permits, potential effects on the aquatic environment would be reduced to acceptable levels.

Measures identified in the RMP would restrict unauthorized access to construction sites where contaminated soils are present. This would effectively reduce the potential for direct human contact with contaminated groundwater. Therefore, impacts would be less than significant.

Surface Runoff from Construction Sites

Construction activities, such as the compaction and installation of fill, grading, and other geotechnical work, have the potential to remove the vegetative cover from the site, spill soils onto roads, or otherwise create the potential for erosion or movement of soils from the project site and potentially into surface waters during rain storms, absent implementation of management measures. Soils could include chemicals such as metals or petroleum hydrocarbons, contributing to pollution in the Channel or Bay. Implementation of measures to control stormwater runoff during construction would also control discharge of potential chemicals adhered to soil in the runoff. These measures are described under "Construction Activity Pollutants" in Section V.K, Hydrology and Water Quality: Impacts, and include implementation of a Stormwater Management Program and best management practices for construction sites. See also Mitigation Measure K.5 in Section VI.K, Mitigation Measures: Hydrology and Water Quality.

Previously Unidentified Subsurface Hazards Encountered During Construction

Underground Storage Tanks, Buried Debris, or Unidentified Contamination

As noted in the Setting subsection, there have been a number of investigations and actions to identify and remove old USTs from the Project Area where the tanks were no longer needed, and to manage identified contamination from UST leakage. Although these efforts have been extensive, the potential still exists for unidentified old or abandoned USTs to be present at sites to be developed in the Project Area; in particular, physical investigation or comprehensive soil testing to determine the presence of USTs or the extent, if any, of soil contamination under buildings has been infeasible on sites occupied by existing buildings or structures. Similarly, some debris in the old dump areas could contain hazardous constituents that, because of their quantity or form, could present a hazard, and would be difficult to identify from surface investigations. Other hazardous substances could be present that were not indicated in previous studies that have been carried out to date. The results of soil and groundwater investigations in Mission Bay North and Mission Bay South suggest that the likelihood of encountering many unidentified hazards is not great, however, because specific, identifiable source areas, with the exception of the petroleum free product area, have not been identified. Therefore, if such debris is present, it is likely to be localized and limited in extent. If, however, an unidentified UST containing hazardous materials or vapors or buried hazardous debris were uncovered or disturbed during excavation, construction workers, visitors, or occupants could experience adverse health effects associated with an inadvertent release of hazardous substances from the USTs or from the debris itself, as noted in the 1990 FEIR./141/

Inadvertent discovery of an unidentified UST could pose a possible explosion hazard or result in the release of stored materials (such as fuels or solvents). Hazardous fumes, mists, or vapors could be emitted, or releases could contaminate soil or shallow groundwater. If an unidentified UST were discovered during construction activities, it would have to be closed in place or removed. Removal activities could pose both health and safety risks, such as the exposure of workers, tank handling personnel, and the public to tank contents or vapors. Similarly, the discovery of buried debris that could be hazardous could also present an increased risk of adverse health or environmental effects, similar to those described for USTs.

The theoretical health risks associated with unidentified subsurface hazards would potentially affect the same populations as would be exposed to other health risks associated with the project, such as construction-generated dust, if uncontrolled. The risk associated with unidentified subsurface hazards cannot be quantified, as the nature and extent of exposure are unknown. However, the identification and release of unknown volatiles, if uncontrolled, could result in an additional incremental exposure to nearby populations.

The likelihood that significant adverse effects from unidentified USTs would occur would be minimal because risk management measures outlined in the RMP would be implemented. Such measures would include, but would not be limited to, compliance with Article 20, RWQCB and San Francisco Department of Public Health UST removal and site cleanup requirements, implementation of contingency monitoring procedures and RWQCB notification (as necessary), and implementation of a site-specific HASP prepared in accordance with Cal/OSHA regulations. Implementation of Measures J.1i and J.1j, presented in Section VI.J, Contaminated Soils and Groundwater, as well as legal and regulatory requirements, would be adequate to ensure that potential adverse effects on human health and the ecological environment from unidentified subsurface hazards would not be significant.

In the event additional investigation or remediation is necessary as result of the discovery of potentially hazardous buried debris, USTs, or other previously unidentified conditions, potential risks associated with such activities would be mitigated as discussed in the "Additional Investigation or Hazards Remediation" section, below.

Landfill Gas

As discussed in the Setting, methane, the primary component of landfill gas, is a combustible gas that can explode under certain conditions. Methane gas migrates through the soil column and can accumulate in enclosed structures, where it can present an explosion hazard.

Soil samples from all borings collected in Mission Bay North were classified as non-ignitable; therefore, the potential for hazardous concentrations of methane to be present in sufficient quantities to accumulate in enclosed structures and present an explosion hazard would be negligible and is not considered significant. The methane content of soils in Mission Bay South is believed to be extremely small since the soils were placed as fill nearly 100 years ago./142/ Further, the area where dump fill materials were placed in locations south of Berry Street, between Sixth and Seventh Streets, between 1878 and 1895 has been undeveloped for many years, allowing any methane generated to escape to the atmosphere so that buildup would not occur. Methane and ignitability would be analyzed in soil samples from Mission Bay North and Mission Bay South as a part of Article 20 compliance prior to construction. Implementation of Article 20 testing requirements would confirm that risks to people or the environment due to the possible presence of methane gas would not be significant. In the unlikely event that methane is present at levels of concern, standard building construction techniques, such as installation of an aggregate sub-base material for venting, could be used to ensure safe construction and building occupation.

Building Demolition

Implementation of the proposed project could involve construction activities that would require demolition of existing structures, some of which contain or may contain friable asbestos material, lead-based paint, PCB- or mercury-containing materials. There is no indication, based on soils testing results, that existing buildings or facilities that could contain these materials have resulted in any releases resulting in soil contamination in the Project Area. However, as discussed in the Setting under Hazardous Building Materials, buildings that would be affected by project development have not been comprehensively tested for the presence of such materials.

Inadvertent releases of friable asbestos, lead, or PCBs contained in materials or items removed during demolition activities could expose construction workers, occupants, or visitors to these hazardous materials, which could result in various adverse health effects if exposures were of sufficient quantity. To reduce potential human exposures to acceptable levels and to protect the environment, several regulations and guidelines pertaining to abatement of and protection from exposure to asbestos and lead, as discussed in the Setting under "Regulatory Framework" will be complied with, as appropriate (e.g., Cal/OSHA has regulations on worker exposure to both chemicals). Although a similar abatement program has not been adopted by the state for PCB or mercury testing and cleanup/143/, items containing PCBs, mercury, or other hazardous substances that are intended for disposal must be managed as hazardous waste and must be handled in accordance with OSHA worker protection requirements.

Implementation of applicable regulations and standards would ensure that potential health and environmental hazards associated with asbestos, lead, or PCBs in buildings and structures to be demolished would be minimized to the extent required by law. Therefore, impacts would be less than significant.

APPROACH TO ANALYSIS OF POTENTIAL EFFECTS AFTER BUILD-OUT (POST-DEVELOPMENT)

The discussion of potential human health and ecological effects at buildout is based on conclusions presented in the 1997 Mission Bay North and 1998 Mission Bay South reports, *North of Channel Screening-Level Ecological Risk Evaluation, Mission Bay Project Area*, and *Approach to a Plan for Risk Management, Mission Bay Project Area*, prepared by ENVIRON International Corporation. The analysis assumes implementation of post-development measures identified in the RMP for post-development conditions, which is described below.

A quantitative human health and ecological risk assessment was prepared by ENVIRON to evaluate potential effects on human and aquatic populations upon project completion. A description of the methods used for each evaluation is presented below. Additional details are included in "Post-Development Risk Evaluation Methodology," in Appendix I.

For both Mission Bay North and Mission Bay South, the risk evaluation assumed that any locations with identified contamination ultimately would be covered with pavement, buildings, landscaping, or fill. In addition, site development conditions, covenants, deed restrictions, or other appropriate post-development measures identified in the RMP would be imposed where necessary. The combination of these physical and administrative controls would substantially limit public exposure to remaining contaminants. As stated in the Setting, the near-shore ecosystem of China Basin Channel and San Francisco Bay, with the possible exception of the free product area in the southeastern portion of the Project Area, are not affected under existing conditions. Potential effects on the ecosystem have been evaluated as part of the analysis to account for post-development conditions.

Human Health Risk Assessment

The human health risk evaluation was conducted by developing site-specific target levels (SSTLs) for each of the chemicals present in the soil and groundwater to which humans may be exposed. The SSTLs were developed using standard risk assessment techniques and regulatory assumptions; they represent the concentrations of individual chemicals that could be present in the soil or groundwater that are protective of the human populations that might be present in Mission Bay South. A comparison of the concentration of chemicals detected in the soil and groundwater to the health-based SSTLs provides the basis for determining whether the chemicals present in the Mission Bay South area would pose a risk to human health and provides a basis for identifying areas where risk management measures may be needed. The SSTLs developed for Mission Bay South were applied also to Mission Bay North because the populations that would be present in Mission Bay North at build-out and the type of development would be generally the same as that proposed for Mission Bay South./144/

The SSTLs were developed using methods consistent with the Risk-Based Corrective Action (RBCA) methodology, as developed by the American Society for Testing and Materials (ASTM) and described in ASTM E-1739, *"Standard Guide for Risk-Based Corrective Action Applied at Petroleum Release Sites, 1995."* RBCA represents a streamlined process for assessing and responding to releases of chemicals, including hydrocarbons and, therefore, is appropriate for assessing potential risk due to contaminants that have been detected in soil and groundwater in the Project Area. The RBCA approach integrates U.S. EPA risk assessment practices with traditional site investigation and remedy selection activities in order to determine cost-effective measures for protection of human health and environmental resources. ENVIRON used the RBCA Guidance, combined with specific methods and assumptions developed and/or recommended by U.S. EPA, RWQCB, and DTSC in the development of SSTLs.

The human health risk evaluation was conducted under the assumption that RMPs would be used to guide the development and subsequent management of activities in the Project Area with respect to contaminated soil and groundwater. The RMPs would provide a framework to manage residual chemicals in soil and groundwater in a manner consistent with intended land use and to be protective of both human health and the environment.

For the purposes of the quantitative human health risk analysis, SSTLs developed to be protective of the cancer and chronic noncancer health risks were calculated for potentially exposed populations based on exposure pathways and exposure assumptions identified for all chemicals of concern. The approach used in the development of SSTLs was based on health-protective agency guidelines and criteria that are specifically designed to overestimate risk. Risk criteria used in the development of the SSTLs were 10 excess cancer cases per 1 million (1×10^{-5}) and a Hazard Index of 1, consistent with policies of the RWQCB and CalEPA; DTSC has deferred to the RWQCB's decision on this matter./145/ Based on the contaminants identified in the Project Area, the RWQCB staff has formally concurred with these levels as the acceptable risk levels for the evaluation of human health effects in Mission Bay./146/ These risk criteria are also consistent with risk management levels used in such programs as the state's Proposition 65 program and the BAAQMD Risk Management Policy for controlling toxic air contaminants./147/ For estimated risk values above these levels, risks would be considered significant. Appendix I contains additional information about the methodology used to develop the SSTLs for the health risk evaluation under "Development of Health-Based Site-Specific Target Levels."

Ecological Risk Assessment

As discussed in the Setting (see "Existing Ecological Risks"), contaminants identified in groundwater do not currently pose an adverse risk to the near-shore aquatic environment, with the possible exception of the petroleum free product area. "Analysis of Potential Adverse Ecological Effects Associated with Current Conditions in the Project Area," in Appendix I, contains additional information about the quantitative risk assessment process used to support that conclusion. The approach used to determine ecological impacts for post-development conditions is based on the evaluation of existing ecological risks.

The Project Area does not provide habitat for any rare or endangered terrestrial or nesting avian species that could be affected by project development. Therefore, the following analysis of ecological effects focuses on potential effects on the near-shore aquatic environment during post-development conditions. Potential effects are qualitatively evaluated based on anticipated future land uses, compared to existing conditions, and assumes implementation of post-development RMPs.

Risk Management Plan for Post-Development Conditions

The analysis of post-development effects assumes that RMPs prepared for site development construction activities would also include measures that would be implemented after project development is complete. All relevant risk management measures would be presented in the RMP and submitted to the RWQCB staff for review and approval. If additional or alternative risk management measures are identified by the RWQCB staff, then the RMP would be revised and resubmitted to the RWQCB staff for its consideration.

As with project construction, implementation of specific measures identified in the RMP is expected to be required as a condition of project occupancy and is assumed for purposes of the following analyses. The measures specified in the RMP must be adhered to in order to ensure that the conditions in the Project Area remain protective of human health and the environment after project development. The main components of the post-development RMP are:

- Covering of the Project Area;
- Limitations on future development within the Project Area specifying that no residences with unrestricted access to soil in single-family residences with frontyards or backyards would be allowed;
- Prohibition of use of shallow groundwater within the Project Area for domestic, industrial, or irrigation purposes; and
- Establishment of protocols for future subsurface activities by workers involved in maintenance, construction, or repair.

Additional detail regarding these mechanisms as they would apply after project completion is presented in Measures J.11 through J.1o in Section VI.J, Contaminated Soils and Groundwater.

POST-DEVELOPMENT IMPACTS

The following analysis evaluates potential human health and ecological risks from residual chemical constituents in the soil and groundwater within the Project Area after development is complete.

Potential Effects on Human Health After Development

Based on the planned uses of Mission Bay Project Area, the human populations who could be present once development has occurred include:

- On-site and off-site retail and commercial workers (including maintenance and construction workers);
- Visitors to and shoppers at commercial and retail establishments;
- Child care and school facility attendees (both adults and children);
- Students, faculty, and support staff of UCSF;
- On-site and off-site residents (both adults and children); and
- Park visitors (both adults and children).

Potential human health impacts could occur in the future if these populations were exposed to elevated levels of constituents present in the soil and groundwater. The pathways through which exposure to the constituents in the soil and groundwater could occur include the following:

- Building occupants (which includes on-site and off-site retail and commercial workers; child care and school facility attendees; and students, faculty, and support staff of UCSF): inhalation of soil and groundwater vapors that have migrated into the indoor environment;
- Park and open space visitors: inhalation of soil and groundwater vapors, and direct contact with soils or groundwater;
- Visitors to and shoppers at commercial and retail establishments: inhalation of soil and groundwater vapors that have migrated into the indoor environment;
- On-site residents: inhalation of soil and groundwater vapors, and direct contact with soils or groundwater; and
- Construction and subsurface workers: inhalation of soil and groundwater vapors, and direct contact with soils or groundwater.

After development, the Project Area would be covered by buildings, structures, parking areas and roadways, and parks and landscaping. Accordingly, direct access to the existing soil by workers, residents, or visitors in the Project Area would be precluded. There would be no single-family residences with front yards or back yards where soil disturbance and direct contact with the native subsurface soil could occur.

As noted in "Approaches to Analysis of Potential Effects After Build-out (Post Development)," a human health risk evaluation was conducted to determine whether the levels of chemicals measured in the soil and groundwater in Mission Bay South would pose a risk to the human populations that could be present once the development of the Project Area is complete. The human health risk evaluation is presented in the 1998 Mission Bay South report./148/ As further noted in the analysis approach discussion, the SSTLs developed for Mission Bay South are also applicable to Mission Bay North.

A comparison of the soil and groundwater SSTLs to the concentrations detected in the soil and groundwater in the Project Area provides the basis for determining whether the levels of constituents present in the Project Area would pose a risk to the populations that may be present in the area under future development plans.

The future residents of the Mission Bay Project Area were assessed using the longest time period of exposure (assumed to be 30 years) of any of the risk analyses, and represents the population most vulnerable to long-term exposure effects. Therefore, they have the lowest SSTLs. Other future populations that may be present in the Mission Bay Project Area, such as on-site commercial workers or park visitors, have higher SSTLs because they would be less likely to receive long-term exposures.

As previously stated, the SSTLs developed for and conclusions of the risk evaluation for Mission Bay South are equally applicable to Mission Bay North. Overall, the maximum concentrations of chemicals detected in the soils and groundwater in the Project Area were found to be well below the calculated SSTL chemical concentrations that would present a risk to future residents, commercial workers, or park visitors. One exception is in boring C35 (northeast of 16th and Illinois Streets, in Mission Bay South), where the maximum levels of TPH-gasoline (36 mg/L) detected in the groundwater exceeds the SSTL developed for the on-site child resident (29 mg/L). However, that portion of Mission Bay South is proposed for commercial/industrial, retail, and open space land uses rather than residential development and is located in an area that would be remediated as part of the free product study already underway. The maximum level of TPH-gasoline detected in groundwater is below the concentration that would present a risk to the commercial workers, park visitors, or off-site residents who may be exposed to chemicals present in the vicinity of boring C35./149/

The levels of chemicals detected throughout the area and the pattern of the locations where they were detected are such that the cumulative exposures for all populations considered in the risk assessment are well within EPA's defined acceptable risk range, and are below the cancer risk level established for the Mission Bay Project Area.

As part of the proposed project, the following components of the RMP would be implemented for long-term risk management of the Project Area: covering of the Project Area; limitations on future residential development of the Project Area; restricting the future use of groundwater; providing protocols for future subsurface activities; and developing and implementing a long-term compliance program. These components of the post-development RMP are presented in greater detail in Measures J.1a, and J.1l to J.1o in Section VI.J, Mitigation Measures: Contaminated Soils and Groundwater.

In summary, the RMP would specify that any changes in development plans maintain the result that direct contact with existing native soil by humans be prohibited or obstructed, by using buildings, pavement or appropriate fill for landscaping. The RMP would specify that no single-family residences with unrestricted access to soils in front yards or backyards would be allowed anywhere in the Project Area, and residents would not have access to the soils underneath the privately owned landscaped areas. If the proposed land uses in the Redevelopment Plans were to change, further analysis would be conducted before residences could be built in areas currently planned for commercial uses. The RMP would also specify a process to be used to assess potential location before child care facilities or schools could be built in nonresidential areas (see discussion below in "Process for Selecting and Approving a Child Care Center and/or School Location"). The RMP would prohibit the use of shallow groundwater within the Project Area for domestic, industrial, or irrigation purposes. Groundwater wells would not be installed within the Project Area except for environmental monitoring purposes. Environmental wells installed within the Project Area would be secured and locked to prevent unauthorized access to the groundwater. The shallow groundwater within the Project Area would remain unused unless at some point in the future an assessment of the risks from direct exposure to the groundwater is evaluated and the RWQCB and other appropriate regulatory agencies approve the use of the shallow water. If disturbance of subsurface soil is necessary for maintenance or repair, activities would be conducted in accordance with the worker training and health and safety requirements meeting Cal/OSHA standards, as outlined in the RMP.

Future human populations in the Project Area could only be exposed to residual contaminants through the inhalation of vapors that have migrated from the soil or groundwater, up through the soil column, into the indoor or outdoor air. The SSTLs were developed assuming that the Project Area would not have any special barriers such as paving or buildings in order to present a conservative approach. Using these SSTLs, VOCs were not shown to pose a human health risk. Based on the proposed uses for the Project Area, other potential exposure routes such as direct contact with soils or groundwater would be eliminated through implementation of the RMP. Therefore through implementation of the RMP, potential adverse human health risks after project completion would not be significant.

Process for Selecting and Approving a Child Care Center and/or School Location

The Redevelopment Plans allow for the siting of child care centers in each of the major land use districts. In addition, it is anticipated that a single site could be developed as a school, most likely a primary school.

As described in the 1998 Mission Bay South report and in Appendix C of *Technical Memorandum #1, Approach to a Plan for Risk Management, Mission Bay Project Area*/150/, environmental conditions in areas proposed for residential development have been evaluated and have been shown to be safe for future children and adult residential populations. Children present at a child care center or school could be exposed to chemicals in the soils and groundwater through the same exposure pathways as the child residents evaluated in the human health risk assessment. The primary difference in assessing potential risk for child residents as compared to children present at a child care center or school is that the residential children are assumed to be present in their home 24 hours per day, whereas the children that could be present at the child care center or school are assumed to be present at the child care center or school only a fraction of the day. Therefore, SSTLs established as protective of child residents would also be protective of children that could be enrolled at the child care center or school. Because the portions of the Project Area planned for residential development have been shown to be safe for on-site residents, including on-site children, any of the residential areas would also be considered safe for children that could be enrolled in the child care center or school.

If a child care center or school were to be proposed within an area designated other than residential, the RMP would call for additional risk analyses to be conducted to evaluate the appropriateness of the proposed location for that use (see Measure J.2 in Section VI.J, Mitigation Measures: Contaminated Soils and Groundwater). Once a specific location has been proposed, the chemical concentrations detected in local soil and groundwater would be compared to the risk-based residential SSTLs. If the cumulative exposures resulting from the presence of chemicals in both the soil and groundwater around the proposed location were below the residential SSTLs, then the proposed location would be appropriate for the children at the child care center or school. If the cumulative exposures were above the residential SSTLs, then other approaches, such as the development of SSTLs specific for a child at a child care center or a child at a school, could also be used to assess whether the use of a particular nonresidential area for either a child care center or a school would be safe for the proposed use. Risk evaluations conducted to support the use of a particular area for either a child care center or a school would be submitted to the RWQCB staff for review and approval.

If the evaluation of the site-specific SSTLs for children at a child care center or school indicates that the proposed site would pose an unacceptable risk to child populations, the proposed site could either be: 1) remediated so that contaminant concentrations would not pose a risk to child populations, based on the SSTL criteria; or 2) another site would need to be selected. In the event remediation is determined to be appropriate, cleanup levels appropriate to the intended use would be established for review and approval by the RWQCB based on the SSTLs established for the site's proposed use. For a discussion of potential effects related to investigation and remediation, please see the "Additional Investigation or Hazards Remediation" section below. In addition, relevant elements of the project development RMP, discussed above under "Approach to Analysis of Potential Effects during Project Development," would also be implemented to ensure that potential construction-related effects were minimized.

Potential Effects on the Ecological Environment

The potential for chemicals in soil and groundwater in the Project Area to pose a risk to aquatic organisms through the flow of groundwater to the adjacent water bodies was evaluated as part of the Project Area investigations, as discussed in "Existing Ecological Risks " in the Setting subsection, above. Except possibly in the free product area, the continued presence of these chemicals in the groundwater is not considered to be adversely affecting aquatic organisms at the present time./151/ Chemicals evaluated included VOCs, metals, and petroleum hydrocarbons (naphthalene, BTEX compounds, TPH-gasoline, TPH-diesel, and TPH-motor oil). A reasonable estimate of the characteristics of stormwater runoff from the Project Area is discussed under "Volume and Quality of Direct Stormwater Discharge to Bay," in Section V.K, Hydrology and Water Quality: Impacts.

Once development of the Project Area was complete, areas with currently exposed soils would be covered. Thus, exposure of terrestrial and avian species to any remaining soils containing elevated levels of contaminants would be eliminated. In addition, covering of the soils in the Project Area either with pavement or buildings or placement of additional soil layers in new landscaped areas would reduce the amount of rainwater infiltration through the soils into the underlying groundwater. A reduction in infiltration would reduce the potential for chemicals present in existing soils to migrate down through the soil column into groundwater. To the extent infiltration would be reduced, the potential for chemicals to migrate to nearby surface water bodies would be reduced. Further, the potential for chemicals in soil to migrate to aquatic habitats through surface water runoff would be eliminated. Depending on the development that would occur on each site, the proposed project could result in the removal of some soil and fill materials. New fill material would be placed in some areas, as described in "General Soil Movement and Transport During Construction" section, above. Removing old fill and replacing it with building foundations or new fill would remove or reduce the older metals-containing materials that have been identified as likely sources of metals in groundwater in the Project Area. Because metals concentrations would be reduced in subsurface materials, there would be a commensurate reduction in metals that could migrate to groundwater under future conditions.

Long-term management measures identified in the RMP would ensure that there would be no adverse effects on the ecological environment due to project occupancy and maintenance.

CHANGED CONDITIONS

The following subsection addresses potential changes in circumstances or conditions which could affect the project-related impacts previously addressed in this section. This subsection discusses how various scenarios would change the impacts of contaminated soil or groundwater in the Project Area.

Additional Investigation or Hazards Remediation

Change in Nature and Extent of Free Product Cleanup

In the event that subsequent site investigations reveal that remediation activities are required on-site in the free product area, such activities would not substantially alter the human health risks in the Project Area. This is due to the extensive regulatory structure governing clean-up activities. The primary health risk from remediation activities would come from exposure to toxic air contaminants (TACs) generally in the form of volitile organic compounds generated by remediation activities. TACs are regulated by BAAQMD. Remediation of contaminated soils is regulated by source specific rules. BAAQMD Regulation 8, Rule 40 sets standards for aeration of contaminated soils and removal of underground storage tanks. Regulation 8, Rule 47 sets standards for air stripping and soil vapor extraction operations. These rules limit the emissions of organic compounds from the remediation process and also reduce the risk associated with TAC emissions. In addition to these source specific rules, BAAQMD has a Risk Management Policy that sets limits on acceptable risk from toxic air contaminants. BAAQMD may deny a permit to a proposed operation that would create risks above significance thresholds, defined as an increased cancer risk greater than 10 in 1 million or acute or chronic noncancer risks with Hazard Indices greater than 1./152/ For a project with potentially significant risks, BAAMQD requires Toxic Best Available Control Technology (TBACT), and may approve a project with an increased cancer risk between 1 in 1 million and 10 in 1 million, if TBACT is used. (An increased cancer risk of less than 1 in 1 million is insignificant.) An increased cancer risk of 10 in 1 million is the same risk level approved by the RWQCB for the Project Area. In addition to the BAAQMD requirements, the RWQCB sets health-based standards and standards for ecological risk for remediation activities. Based on these requirements, remediation activities in the free product area would not substantially alter the human health effects and would, therefore, not change the conclusions of the impact analysis prepared for the project.

Additional Remediation Requirements

The 1990 FEIR assumed that remediation would be necessary within the Project Area to reduce contaminant levels in soils in some locations prior to development, to protect residents, workers, and visitors. The impact analysis presented in the 1990 FEIR recognized that remediation could result in adverse human health or environmental effects, if not properly managed./153/ Such activities could include excavation and transport of contaminated soils to an off-site treatment or disposal facility, in-situ treatment of soils (e.g., soil vapor extraction or bioremediation), or groundwater extraction and treatment. Table V.J.2, modified slightly from Table XV.L.1 in the 1990 FEIR, provides an overview of the types of remediation activities and potential human health and environmental effects associated with each activity. In addition, site controls that could be implemented to minimize the potential hazards associated with the effects are also shown. The analysis of potential impacts related to remediation activities assumed under the 1990 FEIR would still be applicable to remediation activities that could be implemented in conjunction with project construction because the types of cleanup methods that could be used would not be expected to vary substantially from those noted in the 1990 FEIR.

As discussed in the Setting and in the "Impacts During Project Development" subsections, above, with the exception of potential ecological impacts associated with the petroleum free product in the southeast portion of Mission Bay South, subsequent studies have established that there are no immediate risks to human health that require immediate corrective action. Further, no ecological effects to aquatic communities from chemicals in the groundwater have been identified in the near-shore areas of China Basin Channel or San Francisco Bay that require remediation, with the possible exception of the free product area. As further described in that subsection, however, the potential exists for some soils or groundwater to contain hazardous materials in amounts that could present an increased risk to construction workers or future site occupants, visitors, or workers in the event the soils were disturbed during construction in the Project Area. Site-specific investigations required by the Article 20 requirements or performed as part of RMPs may identify the need to perform remediation activities for certain development sites in the Project Area.

If additional subsurface sampling in the Project Area, in accordance with Article 20 requirements or as part of RMP implementation, revealed contamination that would require risk management to ensure public safety during construction, remediation of soil or groundwater could be necessary in certain locations to reduce contaminant levels so that they would not present a human health hazard during

TABLE V.J.2
POTENTIAL ENVIRONMENTAL EFFECTS AND SITE CONTROLS ASSOCIATED WITH REMEDIATION TECHNIQUES

Types of Remediation Techniques	Potential Environmental Effects	Site Controls
Soils Remediation		
Excavation and Treatment and/or Off-Site Disposal	Short-term air emissions during excavation	Air monitoring and engineering controls, dust control
Temporary Stockpiling	Short-term air emissions	Covering the pile with low-permeability liners
	Contact with soils	Secured fencing, covering the pile, posting warning signs
	Leaching to groundwater	Liners and monitoring
	Visual	Contouring and fencing
Treatment		
Aeration	Air emissions	Aerating only when wind is blowing away from sensitive receptors
		Controlling emission rate by limiting amount of soil aerated per BAAQMD rule
	Contaminated dust	Dust control and air monitoring
Landfarming (Bioremediation)	Same as those for aeration	Same as those for aeration
Extraction and Filtration	Water use	Using engineering design to minimize water use
	Noise	Temporary noise berms or portable sound barriers
	Visual	Fencing
Combustion	Air emissions	Efficient design, controls, and monitoring
	Energy	Efficient design, controls, and monitoring
	Noise	Portable sound barriers
	Visual	Fencing
Off-Site Disposal	Truck traffic	Selecting best truck route
	Contaminated dust	Dust control measures including underfilling and tarping of trucks
	Spreading contamination	Decontaminating equipment leaving the site

(Continued)

TABLE V.J.2 (Continued)

Types of Remediation Techniques	Potential Environmental Effects	Site Controls
In Situ Treatment		
Soil-Gas Extraction	Noise	Using mufflers on equipment
	Air emissions	Using filtration equipment to comply with BAAQMD standards
Flushing as Part of Groundwater Treatment	Area kept wet by recharge	Recharging several feet below ground surface to keep surface dry
Capping or Containment Wall	Area with restricted use	Notifications required by law
	Noise/dust associated with construction activities	Same as regular excavation activities
Groundwater Remediation		
Monitoring Wells	Potential conduit for contaminant migration	Proper installation of wells
	Visual and noise	Short-term (one day per well)
Treatment System		
Activated Carbon for Some Organics	Transport of used carbon replacements	Using Department of Transportation-approved transportable carbon vessels
	Visual	Fencing
	Noise	Walls or other noise barriers around system
Ion Exchange for Some Metals	Generation of liquid waste	Infrequent; using licensed haulers to remove liquid wastes for treatment and/or disposal
Ultraviolet Light and Ozone or Peroxide	None	None
Air Stripping for Some Volatiles	Transport of used carbon replacements	Using Department of Transportation-approved transportable carbon vessels
	or	
	Carbon regeneration would yield a liquid waste requiring removal	Infrequent; using licensed to remove liquid wastes
Precipitation and Filtration	Disposal of hazardous sludge	Appropriate off-site disposal, probably at a Class I facility

Source: 1990 FEIR, Volume Four, pp. XV.L.14-XV.L.15.

construction. In that case, additional measures beyond those identified in the RMP would be developed and implemented. The RMP would be revised to reflect such changes and be re-submitted to the RWQCB staff for approval. The RWQCB staff has the authority to impose additional measures or to modify them as necessary, applying the same standards — a cancer risk below 1×10^{-5} and a Hazard Index of 1.

Potential construction-related effects on the aquatic environment would be minimized through the implementation of Stormwater Permit Stormwater Pollution Prevention Plans (SWPPPs). Measures specified in the SWPPPs would establish controls to minimize sediment from stockpiled soils, dust, or other exposed soils that could contain elevated levels of contaminants in construction site runoff, so that surface water quality and the aquatic environment in China Basin Channel or San Francisco Bay would not be adversely affected.

The type of remediation and methods, site controls, and monitoring activities appropriate to a specific remedial activity would be included in individual plans developed for remedial activities. Remedial activities would be subject to various laws and regulations. Depending on the remedial action being undertaken, these statutes and regulations would include, but would not be limited to, hazardous waste management laws and regulations administered by the DTSC, water quality protection laws and regulations under the jurisdiction of the SWRCB and RWQCB, air quality management regulations administered by the BAAQMD, OSHA workplace safety requirements, hazardous waste transportation regulations and standards, and others that may apply. Similar to RMPs, each remediation plan developed to meet Article 20 requirements or to achieve RMP risk-reduction objectives would include an assessment of the potential hazard and would describe the health and safety measures designed to protect the construction workers and general public who could be exposed to potential hazards associated with the type of remedial activity at that particular location. Methods to control site access, to minimize airborne contaminants, to reduce the potential for spills or inadvertent releases of contaminated soil or groundwater, transportation and disposal (e.g., if excavated materials are to be removed from the Project Area), and emergency procedures would be specified in the plans. The remediation plans would be required to fulfill the provisions of Article 20, and would require RWQCB review, as appropriate, prior to implementing the remedial action plan. Further, all remedial actions would be required to comply with applicable federal, state, and city laws and regulations. As described in "Change in Nature and Extent of Free Product Cleanup," the regulatory requirements of the BAAQMD and RWQCB would sufficiently protect human health and the ecological environment from any additional remediation activities. Risk-based standards would be enforced on any new remediation activities. Therefore, there would be no significant effect on people or the environment.

Delay of Build-out or Incomplete Build-out

The analysis in this SEIR assumes that the project is built out by the year 2015. It is possible that build-out could take longer than the approximately 20 years assumed, or that some sites would remain vacant for the foreseeable future. These changes in circumstances would not change the impact of contaminated soils in the Project Area.

One of the risk assessments prepared for the project was conducted to determine whether the current conditions that exist in the Project Area would pose an immediate risk to human populations in the area (see "Summary of Existing Human Health and Ecological Risks from Contaminants Detected in Soil and Groundwater in the Project Area," in the Setting). Based on that evaluation, existing conditions do not pose an immediate risk to human populations./154/

Although areas that are presently covered by buildings, paving, or other materials could become exposed during the course of the development, exposure to each of the areas under construction would be controlled through the implementation of risk management measures. The process that would be used in implementing the RMP to analyze whether the presence of vacant, uncovered areas during the period between the existing situation and full build-out would pose a risk to potentially exposed populations would protect human health regardless of the duration of development. Development of the ITLs and implementation of management practices described above under "Exposure from Vacant, Undeveloped Sites" are not dependent on a specific duration of construction of development activity but are based in part on the length of time an individual may be present in the Project Area and exposed to the chemicals on the vacant undeveloped parcels. For ITLs, this reasonable maximum exposure is assumed to be 30 years, and would be sufficient to establish approaches that protect human health while a site was uncovered regardless of the length of time that a new site was uncovered. Further, the 20-year exposure assumption used in assessing construction dust impacts would remain appropriate for a longer build-out period because the construction dust analysis assumes continuous exposure to dust over the entire 20 years, while under the extended scenario there would be some periods when no construction was occurring, such that the total exposure would be reasonably likely to be 20 years. Therefore, if a delay of build-out or incomplete buildout occurred, implementation of the RMP would reduce human health risk to less-than-significant levels.

Changes in Land Use

Throughout the life of the project, uses in the Project Area may change from those that were originally approved such that the applicability of the SSTLs to support the conclusion that a particular area would not pose a risk may no longer be valid. For example, residential uses could be proposed to be extended into areas now designated for commercial/industrial use. Location of residential uses in nonresidential areas would not have been assumed for the evaluation of human health effects under post-development conditions.

Changes in land use that would cause exposure to soil or groundwater contaminants at levels above those expected based on the 1997 Mission Bay North and Mission Bay South reports and above those assumed in analyses carried out under the project development and post-development RMPs, could cause impacts not analyzed in this SEIR. Proposals to amend the Redevelopment Plan, or otherwise approve a use in a location for which an appropriate site-specific target level has not been established and applied to the proposed new occupancy, should not be approved without a review of the potential effects on human health associated with the new use at the location.

GLOSSARY AND ACRONYMS

BAAQMD	Bay Area Air Quality Management District
BTEX	benzene, toluene, ethylbenzene, and xylenes
Cal/EPA	California Environmental Protection Agency
COPEC	chemical of potential ecologic concern
COPIC	chemical of potential immediate concern (human health effects)
DTSC	Department of Toxic Substances Control
HASP	Health and Safety Plan
HI	Hazard Index
ITL	interim target level
MEI	maximally exposed individual
PAH	polycyclic aromatic hydrocarbon
PCB	polychlorinated biphenyl
PRG	Preliminary Remediation Goal
RBCA	Risk-Based Corrective Action
RMP	Risk Management Plan
RWQCB	Regional Water Quality Control Board
SSTL	site-specific target level
SVOC	semivolatile organic compound
TAC	toxic air contaminant
TBACT	toxics best available control technology
TDS	total dissolved solids
TPHs	total petroleum hydrocarbons
UCL	upper confidence limit
U.S. EPA	U.S. Environmental Protection Agency
UST	underground storage tank
VOC	volatile organic compound

Acute exposure: One-time or very limited exposure to a substance over a relatively short period of time (i.e., a few days versus many years).

Attenuation: Decrease in the concentration or quantity of a substance resulting from physical, chemical, and/or biological reactions or processes that act on the substance.

Bioaccumulation: An increase in the concentration of a substance in living tissue relative to the exposure concentration when the rate of intake into the organism is greater than the rate of excretion or metabolism.

Cancer risk: Calculated approximation of the probability of an individual developing cancer as a result of exposure to a cumulative dose of a potential carcinogen based on estimated or measured concentrations in soil, groundwater, or air and a potency factor specific to that carcinogen.

Carcinogen: Cancer-causing.

Chronic exposure: Repeated doses of or exposure to a substance over a relatively prolonged period of time (i.e., many years versus a few days).

Cumulative exposure: Exposure to multiple chemicals that may be present in both soil and groundwater.

Dose: The amount of a chemical substance to which an organism is exposed.

Downgradient: Groundwater water surface levels that are lower in elevation relative to areas with higher water surface elevation, as measured against a standard datum (e.g., mean sea level). Similar to downstream in the context of surface water movement, the term can also be used to refer to a groundwater flow direction.

Exposure pathway: The course a chemical or pollutant takes from the source to the organism exposed. A complete exposure pathway consists of four elements: chemical sources, migration routes (i.e., transport in the environment), an exposure point for contact (i.e., soil, air, or, water); and exposure routes. An exposure pathway is not complete unless all four elements are present.

Exposure route: The way a chemical or pollutant enters the organism after contact. Four exposure routes are recognized in risk evaluation methods - ingestion, inhalation, dermal (skin and eye), and injection.

Free product: Petroleum not confined in a tank or pipeline that can be found floating on groundwater. The free product includes both visible project (a sheen on the water surface) that is not of measurable thickness (i.e., less than 0.01 inches) and product that is present in measurable depths (greater than 0.01 inches thick).

Hazard: Any situation that has the potential to cause damage to human health or the environment.

Hazard Index (HI): The calculated ratio of predicted acute or chronic exposure of noncarcinogenic substance to a toxicity reference dose level for that particular substance. A Hazard Index (HI) threshold of 1 has been established by most regulatory agencies, including the RWQCB and BAAQMD for comparison purposes. Adverse health effects are not anticipated when chronic and acute hazard indices are less than one.

Hazardous material: Any material that, because of its quantity, concentration, or physical, or chemical characteristics, poses a significant present or potential hazard to human health and safety or to the environment if released into the workplace or the environment. "Hazardous materials" include, but are not limited to, hazardous substances, hazardous waste, and any material which a handler or the administering agency has a reasonable basis for believing that it would be injurious to the health and safety of persons or harmful to the environment if released into the workplace or the environment (California Health and Safety Code, Section 25501).

Hazardous materials release site: Any area, location, or facility where a hazardous material has been released or threatens to be released to the environment (California Health and Safety Code, Section 25260(e)).

Hazardous substance: See "hazardous material."

Hazardous waste: Waste that, because of its quantity, concentration, or physical, chemical, or infectious characteristics, may either cause, or significantly contribute to an increase in mortality or an increase in serious illness, or pose a substantial present or potential hazard to human health or the environment when improperly treated, stored, transported, disposed of, or otherwise managed (California Health and Safety Code, Section 25117.

Interim target level: Calculated site-specific concentration of a chemical in soil that would be used to identify locations in the Project Area that could require risk management measures during project development.

Maximally exposed individual: Person exposed for a finite amount of time to airborne contaminant emissions at a location where the maximum ground-level concentrations of the emissions would occur.

Native soil: Soil that exists in Project Area prior to project approvals.

Point source: Any discernible, confined, and discrete discharge from a pipe, channel, or other conveyance to a waterway.

Polycyclic aromatic hydrocarbon: Organic chemical byproduct formed by the incomplete combustion of raw fuel materials, typically present as a constituent of heavy-end fuels (e.g., diesel) or other petroleum-based products such as asphalt.

Preliminary Remediation Goal: Concentrations of chemicals in soil that are protective of humans, including sensitive groups such as children, over a lifetime. PRGs were developed by U.S. EPA Region IX and they combine current U.S. EPA toxicity values for chemicals with "standard" exposure factors.

Reasonable maximum exposure: The maximum exposure that is reasonably expected to occur. As an example, the reasonable period of time that one individual would be likely to remain in one location and could be exposed to chemicals in the Project Area is 30 years.

Remedial action or **remediation**: Actions required by state or local laws, ordinances, or regulations necessary to prevent, minimize, or mitigate damage that may result from the release or threatened release of a hazardous material (California Health and Safety Code, Section 25260(g)). These actions include the cleanup of the site, monitoring, testing and analysis of site conditions, site operation and maintenance, and placing conditions or restrictions on the land use of the site upon completion of remedial actions.

Risk: The probability of exposure to hazardous material and severity of harm that exposure would pose to human health or the environment, where the degree of risk is a function of the means of exposure, in addition to the inherent toxicity of the material.

Semivolatile organic compound: An organic chemical that readily, but only partially, evaporates or changes from a liquid to gas at temperatures normally found at the ground surface and at shallow depths.

Site specific target level: Calculated site specific maximum concentration of an individual chemical in the soil or groundwater based on potential exposure pathways and duration of exposure that would be protective of human populations that could be present in the Project Area after project completion.

Total petroleum hydrocarbons: Fuel products such as diesel, gasoline, and motor oil containing organic chemical compounds of varying types and concentrations that are specific to type product.

Toxic: Concentration of a substance that would be lethal or produce other adverse responses detrimental to the health of an organism.

Upgradient: Similar to upstream in the context of surface water movement. Upgradient refers to water surface levels in groundwater that are higher in elevation relative to areas with lower water surface elevations, as measured against a standard datum (e.g., mean sea level).

Volatile Organic Compound: An organic chemical that readily evaporates at temperatures normally found at the ground surface and at shallow depths.

NOTES: Contaminated Soils and Groundwater

1. Val F. Siebal, Chair, Site Designation Committee, Cal EPA, letter to James Adams, Director of Environmental Services, Catellus Development Corporation, July 15, 1997.

2. ENVIRON International Corporation, *Site Investigation and Risk Evaluation Report, Mission Bay South of Channel, San Francisco, California*, February 1998, p .2-8.*

3. ENVIRON International Corporation, *Site Investigation and Risk Evaluation Report, Mission Bay South of Channel, San Francisco, California*, February 1998, p .2-8.*

4. ENVIRON International Corporation, *Results of Investigation Mission Bay North of Channel, San Francisco, California,* April 1997, p. 3-2.*

5. ENVIRON International Corporation, *Technical Memorandum #3, North of Channel Screening-Level Ecological Risk Evaluation, Mission Bay Project Area,* April 1998, Section 4.2.

6. ENVIRON International Corporation, *Site Investigation and Risk.Evaluation Report, Mission Bay South of Channel, San Francisco, California*, February 1998, p. 5-21.

7. ENVIRON International Corporation, *Technical Memorandum #3, North of Channel Screening-Level Ecological Risk Evaluation, Mission Bay Project Area,* April 1998, Section 4.2.

8. ENVIRON International Corporation, *Site Investigation and Risk Evaluation Report, Mission Bay South of Channel, San Francisco, California*, February 1998, Appendix G.

9. ENVIRON International Corporation, *Technical Memorandum #3, North of Channel Screening-Level Ecological Risk Evaluation, Mission Bay Project Area*, April 1998, Section 4.2.

10. ENVIRON International Corporation, *Technical Memorandum #1, Approach to a Plan for Risk Management, Mission Bay Project Area*, April 1998, Section 6.2.3.

11. Regional Water Quality Control Board, San Francisco Bay Region, *Proposed Regional Toxic Hot Spot Cleanup Plan*, December 1997.

12. San Francisco Planning Department, *Mission Bay Final Environmental Impact Report*, Planning Department File No. 86505E, State Clearinghouse No. 86070113, certified August 23, 1990, Volume Two, p. VI.N.7.*

13. 1990 FEIR, Volume Two, pp. VI.N.7-VI.N.8.*

14. 1990 FEIR, Volume Two, pp. VI.N.7-VI.N.8.*

15. 1990 FEIR, Volume Two, p. VI.N.8; Environmental Science Associates, *Mission Bay Hazards Mitigation Program*, Volume I Final Report, August 1990, p. 27.*

16. Of the approximately 50 USTs listed in the 1990 FEIR as being located in the Project Area, several were found to be duplicate listings or are in properties no longer included in the Project Area. Therefore, Figure V.J.2 and Appendix Table I.3 show the status of the 43 USTs known or suspected to be in the Project Area.

17. 1990 FEIR, Volume Two, pp. VI.5-VI.9, and Volume Three, Table XIV.L.2, pp. XIV.L.10.*

18. Copies of these reports are available for review at the San Francisco Planning Department, 1660 Mission Street.

19. ENVIRON International Corporation, *Technical Memorandum #2, Development and Screening of Remedial Alternatives for Free Product Area in Region of Former Oil Storage Facilities*, April 1998, Section 2.3.2.

20. Roberta Jones, Manager, Environmental and Safety Section, Port of San Francisco, personal communication with EIP Associates, August 1997; ENVIRON International Corporation, *Technical Memorandum #2, Development and Screening of Remedial Alternatives for Free Product Area in Region of Former Oil Storage Facilities*, April 1998, Section 2.3.2.

21. ENVIRON International Corporation, *Technical Memorandum #2, Development and Screening of Remedial Alternatives for Free Product Area in Region of Former Oil Storage Facilities*, April 1998, Section 2.3.3.

22. ENVIRON International Corporation, *Technical Memorandum #2, Development and Screening of Remedial Alternatives for Free Product Area in Region of Former Oil Storage Facilities*, April 1998, Attachment C.

23. Loretta K. Barsamian, Executive Officer, and Stephen I. Morse, Chief, Toxics Cleanup Division, San Francisco Bay Regional Water Quality Control Board, "Request for Revised Work Plan and Project Schedule for Environmental Activities in the Vicinity of Pier 64, San Francisco, California," letter to various oil companies, January 9, 1998; Michael Hurd, Senior Geologist, Pacific Environmental Group, Inc., "Response to Comments on Joint Assessment Work Plan," letter to various oil companies, February 5, 1998.

24. 1990 FEIR, Volume Two, p. VI.N.19.*

25. Acumen Industrial Hygiene, Inc., *Asbestos Survey Report,* prepared for Levine-Fricke, May 29, 1992.

26. Law/Crandall, Inc., *Report of Phase II Environmental Site Assessment, Castle Metals, 1900 Third Street, San Francisco, California*, January 20, 1994, p. 12 and Appendix F.

27. 1990 FEIR, Volume Two, pp. VI.N.21-VI.N.26, and Volume Three, Appendix L.*

28. 1990 FEIR, Volume Two, pp. VI.N.5-VI.9, and Volume Three, Table XIV.L.2, p. XIV.L.10.*

29. Environmental Science Associates, *Mission Bay Hazards Mitigation Program, Volume I Final Report,* August 1990, pp. 28-29.*

30. ENVIRON International Corporation, *Site Investigation and Risk Evaluation Report, Mission Bay South of Channel, San Francisco, California,* February 1998.

31. ENVIRON International Corporation, *Results of Investigation Mission Bay North of Channel, San Francisco, California,* April 1997.

32. ENVIRON International Corporation, *Technical Memorandum #1, Approach to a Plan for Risk Management, Mission Bay Project Area*, April 1998, Section 2.3.1.

33. ENVIRON International Corporation, *Technical Memorandum #1, Approach to a Plan for Risk Management, Mission Bay Project Area*, April 1998, Section 2.3.1.

34. ENVIRON International Corporation, *Work Plan for Preliminary Survey, Mission Bay North of Channel, San Francisco, California,* October 24, 1996.

35. ENVIRON International Corporation, "Sampling Program for Subsurface Investigation Mission Bay: Area South of Channel, San Francisco, California," letter submitted to Vic Pal and Mark Johnson, California Regional Water Quality Control Board San Francisco Bay Region," April 9, 1997.

36. ENVIRON International Corporation, *Technical Memorandum #1, Approach to a Plan for Risk Management, Mission Bay Project Area*, April 1998, Section 2.3.1.

37. ENVIRON International Corporation, *Results of Investigation Mission Bay North of Channel, San Francisco, California*, April 1997, pp. 2-1 to 2-3; see also ENVIRON International Corporation, *Technical Memorandum #3, North of Channel Screening-Level Ecological Risk Evaluation, Mission Bay Project Area*, April 1998, for more information on this topic.

38. ENVIRON International Corporation, *Results of Investigation Mission Bay North of Channel, San Francisco, California,* April 1997.

39. ENVIRON International Corporation, *Results of Investigation Mission Bay North of Channel, San Francisco, California*, April 1997, p. 4-1.

40. As discussed in Section 2.3.3.3 of *Technical Memorandum #1, Approach to a Plan for Risk Management*, prepared by ENVIRON in April 1998, the detection of acetone (or methylene chloride, another common laboratory chemical) in field and laboratory control samples does not compromise the accuracy or precision of any other analytical result for any other chemical constituent.

41. ENVIRON International Corporation, *Technical Memorandum #1, Approach to a Plan for Risk Management, Mission Bay Project Area*, April 1998, Section 2.3.3.2.

42. ENVIRON International Corporation, *Results of Investigation Mission Bay North of Channel, San Francisco, California*, April 1997, p. 3-8.

43. ENVIRON International Corporation, *Technical Memorandum #1, Approach to a Plan for Risk Management, Mission Bay Project Area*, April 1998, Section 2.3.3.4.

44. ENVIRON International Corporation, *Results of Investigation Mission Bay North of Channel, San Francisco, California*, April 1997, p. 3-12.

45. ENVIRON International Corporation, *Technical Memorandum #1, Approach to a Plan for Risk Management, Mission Bay Project Area*, April 1998, Section 2.3.3.5.

46. ENVIRON International Corporation, *Results of Investigation Mission Bay North of Channel, San Francisco, California*, April 1997, pp. 3-12 to 3.13.

47. ENVIRON International Corporation, *Results of Investigation Mission Bay North of Channel, San Francisco, California*, April 1997, p. 3-5; ENVIRON International Corporation, *Technical Memorandum #1, Approach to a Plan for Risk Management, Mission Bay Project Area*, April 1998, Section 2.3.3.2.

48. ENVIRON International Corporation, *Results of Investigation Mission Bay North of Channel, San Francisco, California*, April 1997, p. 3-9.

49. ENVIRON International Corporation, *Results of Investigation Mission Bay North of Channel, San Francisco, California*, April 1997, pp. 3-6 to 3-7.

50. ENVIRON International Corporation, *Results of Investigation Mission Bay North of Channel, San Francisco, California*, April 1997, pp. 3-10 to 3-11; ENVIRON International Corporation, *Technical Memorandum #1, Approach to a Plan for Risk Management, Mission Bay Project Area*, April 1998, Section 2.3.3.4.

51. Loretta K. Barsamian, Executive Officer, and Stephen I. Morse, Chief, Toxics Cleanup Division, California Regional Water Quality Control Board, San Francisco Bay Region, "Mission Bay, North of China Basin Channel, San Francisco," letter to Jim Adams, Catellus Development Corporation, June 8, 1997.

52. ENVIRON International Corporation, *Site Investigation and Risk Evaluation Report, Mission Bay South of Channel, San Francisco, California,* February 1998.

53. ENVIRON International Corporation, *Site Investigation and Risk Evaluation Report, Mission Bay South of Channel, San Francisco, California*, February 1998, pp. 3-2 to 3-6.

54. ENVIRON International Corporation, *Site Investigation and Risk Evaluation Report, Mission Bay South of Channel, San Francisco, California,* February 1998.

55. ENVIRON International Corporation, *Site Investigation and Risk Evaluation Report, Mission Bay South of Channel, San Francisco, California*, February 1998, p. 4-7.

56. As discussed in Section 2.3.3.3 of *Technical Memorandum #1, Approach to a Plan for Risk Management* prepared by ENVIRON in April 1998, the detection of acetone (or methylene chloride, another common laboratory chemical) in field and laboratory control samples does not compromise the accuracy or precision of any other analytical result for any other chemical constituent.

57. ENVIRON International Corporation, *Site Investigation and Risk Evaluation Report, Mission Bay South of Channel, San Francisco, California*, February 1998, p. 4-5.

58. ENVIRON International Corporation, *Site Investigation and Risk Evaluation Report, Mission Bay South of Channel, San Francisco, California*, February 1998, pp. 4-11 to 4-12.

59. ENVIRON International Corporation, *Site Investigation and Risk Evaluation Report, Mission Bay South of Channel, San Francisco, California*, February 1998, p. 4-4.

60. ENVIRON International Corporation, *Site Investigation and Risk Evaluation Report, Mission Bay South of Channel, San Francisco, California*, February 1998, pp. 4-9 to 4-10.

61. ENVIRON International Corporation, *Site Investigation and Risk Evaluation Report, Mission Bay South of Channel, San Francisco, California*, February 1998, p. 4-16.

62. ENVIRON International Corporation, *Site Investigation and Risk Evaluation Report, Mission Bay South of Channel, San Francisco, California*, February 1998, pp. 4-5 and 4-6.

63. ENVIRON International Corporation, *Site Investigation and Risk Evaluation Report, Mission Bay South of Channel, San Francisco, California*, February 1998, pp. 4-12 to 4-13.

64. ENVIRON International Corporation, *Site Investigation and Risk Evaluation Report, Mission Bay South of Channel, San Francisco, California*, February 1998, p. 4-10.

65. ENVIRON International Corporation, *Site Investigation and Risk Evaluation Report, Mission Bay South of Channel, San Francisco, California*, February 1998, pp. 5-28 to 5-29.

66. ENVIRON International Corporation, *Site Investigation and Risk Evaluation Report, Mission Bay South of Channel, San Francisco, California*, February 1998, p. 4-13.

67. ENVIRON International Corporation, *Site Investigation and Risk Evaluation Report, Mission Bay South of Channel, San Francisco, California*, February 1998, p. 4-14.

68. Andrew Detsch/Landscape Studies, *Petroleum Facility History, Mission Bay; Site History, Parcel #3940-1*, July 1997.

69. Loretta K. Barsamian, Executive Officer, and Stephen I. Morse, Toxics Cleanup Division, San Francisco Bay Regional Water Quality Control Board, "Mission Bay, South of China Basin Channel, San Francisco, California," letter to Douglas Stimpson, Catellus Development Corporation, August 12, 1997.

70. ENSR Consulting and Engineering, *Esprit de Corp Phase II Site Investigation, 499 Illinois Street*, September 1990.

71. LAW/Crandall, Inc., *Report of Phase II Environmental Site Assessment, Castle Metals, 1900 3rd Street, San Francisco, California*, January 1994. This report summarized the results of the Phase I Environmental Site Assessment prepared in 1993.

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73. LAW Engineering and Environmental Services, Inc., *Report of Phase I Environmental Site Assessment Update, 1900 3rd Street, San Francisco, California*, November 1996, pp. 23 through 25.

74. ENVIRON International Corporation, *Technical Memorandum #1, Approach to a Plan for Risk Management, Mission Bay Project Area*, April 1998, Section 2.3.

75. ENVIRON International Corporation, *Technical Memorandum #1, Approach to a Plan for Risk Management, Mission Bay Project Area*, April 1998, Section 4.1.

76. ENVIRON International Corporation, *Technical Memorandum #1, Approach to a Plan for Risk Management, Mission Bay Project Area*, April 1998, Section 4.2.1.

77. ENVIRON International Corporation, *Technical Memorandum #1, Approach to a Plan for Risk Management, Mission Bay Project Area*, April 1998, Section 4.2.1.3.

78. ENVIRON International Corporation, *Site Investigation and Risk Evaluation Report, Mission Bay South of Channel, San Francisco, California*, February 1998, pp. 5-17, 5-18; and ENVIRON International Corporation, *Technical Memorandum #3, North of Channel Screening-Level Ecological Risk Evaluation, Mission Bay Project Area*, April 1998, Section 2.

79. ENVIRON International Corporation, *Site Investigation and Risk Evaluation Report, Mission Bay South of Channel, San Francisco, California*, February 1998, pp. 5-17, 5-18; and ENVIRON International Corporation, *Technical Memorandum #3, North of Channel Screening-Level Ecological Risk Evaluation, Mission Bay Project Area*, April 1998, Section 3.5.

80. ENVIRON International Corporation, *Site Investigation and Risk Evaluation Report, Mission Bay South of Channel, San Francisco, California*, February 1998, pp. 5-26, 5-27. ENVIRON International Corporation, *Technical Memorandum #3, North of Channel Screening-Level Ecological Risk Evaluation, Mission Bay Project Area*, April 1998, Section 4.1; and ENVIRON International Corporation, *Addendum 2 to the Site Investigation and Risk Evaluation Report, Mission Bay South of Channel, San Francisco, California*, April 1998.

81. ENVIRON International Corporation, *Site Investigation and Risk Evaluation Report, Mission Bay South of Channel, San Francisco, California*, February 1998, pp. 5-27-5-29; ENVIRON International Corporation, *Technical Memorandum #3, North of Channel Screening-Level Ecological Risk Evaluation, Mission Bay Project Area*, April 1998, Section 4.2.

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83. ENVIRON International Corporation, *Site Investigation and Risk Evaluation Report, Mission Bay South of Channel, San Francisco, California*, February 1998, p. 5-30; ENVIRON International Corporation, *Technical Memorandum #1, Approach to a Plan for Risk Management, Mission Bay Project Area*, April 1998, Section 4.3.

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87. ENVIRON International Corporation, *Site Investigation and Risk Evaluation Report, Mission Bay South of Channel, San Francisco, California*, February 1998, p. 5-39, ENVIRON International Corporation, *Technical Memorandum #3, North of Channel Screening-Level Ecological Risk Evaluation, Mission Bay Project Area, April 1998, Section 5.0.*

88. California Health and Safety Code, Section 25300 *et seq*.

89. California Health and Safety Code, Section 25317(a).

90. California Health and Safety Code, Section 25260(e).

91. California Health and Safety Code, Section 25260(g.)

92. California Health and Safety Code, Section 25260-25268.

93. California Health and Safety Code, Section 25264(b).

94. State Water Resources Control Board, Petition No. 01-02-97, Draft Policy for Cleanup of Petroleum Discharges to Soil and Ground Water.

95. The common risk level used is 10 excess cancer cases in one million. This risk level is used in such programs as California's Proposition 65 and the state's Air Toxics "Hot Spots" program.

96. Bay Area Air Quality Management District (BAAQMD), *Bay Area Air Quality Management District CEQA Guidelines: Assessing Air Quality Impacts*, p.13, 1996.

97. BAAQMD, Regulations, Rule 2-1-301, June 7, 1995.

98. BAAQMD, District Staff Risk Management Procedure, May 9, 1991.

99. Resource Conservation and Recovery Act, United States Code, Title 42, Part 6901 *et seq*, Code of Federal Regulations, Title 40, Part 260 and 261. Revised as of July 1, 1996.

100. California Health and Safety Code, Chapter 6.5, California Code of Regulations, Title 22.

101. The Clean Air Act asbestos regulations are found in Code of Federal Regulations, Title 40, Part 61, Subpart M (November 20, 1990); Cal/OSHA asbestos regulations are in California Code of Regulations, Title 8, Part 5208 *et seq.* Revised as of July 1, 1996.

102. Code of Federal Regulations, Title 40, Section 61.150(a). Revised as of July 1, 1996.

103. Federal OSHA lead standards are found in Code of Federal Regulations, Title 29, Section 1926.62. Revised as of July 1, 1996; Cal-OSHA lead standards are in 8 CCR 1532.1.

104. California Code of Regulations, Title 22, Section 66261.24(a)(1).

105. These limits are 5 ppm for liquids, 50 ppm for nonliquids. Code of California Regulations, Title 22, Section 66261.24.

106. Code of Federal Regulations, Title 40, Part 761, Subpart G. Revised as of July 1, 1996.

107. ENVIRON International Corporation, *Technical Memorandum #1, Approach to a Plan for Risk Management, Mission Bay Project Area*, April 1998, Section 7.3.

108. ENVIRON International Corporation, *Technical Memorandum #4, Application of Risk-Based Corrective Action at Mission Bay*, April 1998, Section 3.6.

109. Stephen I. Morse, Regional Water Quality Control Board, letter to Phillip L. Fitzwater, ENVIRON International Corporation, January 16, 1998.

110. 1990 FEIR, Volume Two, pp. VI.N.27-VI.N.28.*

111. As discussed in Section 4.2.2.4 of *Technical Memorandum #1, Approach to a Plan for Risk Management Mission Bay Project Area*, prepared by ENVIRON, ITLs would be developed using conservative reasonable maximum exposure (RME) assumptions recommended by U.S. EPA for estimating the length of time that an individual may be present in the Project Area and may be exposed to chemicals present on the vacant undeveloped parcels. Because the U.S. EPA-recommended RME assumption for the length of time that an individual may be living in the same location is 30 years, this is the assumption that will be used in developing the ITLs for the undeveloped parcels and determining the need for interim risk management measures.

112. ENVIRON International Corporation, *Technical Memorandum #1, Approach to a Plan for Risk Management, Mission Bay Project Area*, April 1998, Section 4.2.2.2; ENVIRON International Coroporation, *Site Investigation and Risk Evaluation Report, Mission Bay South of Channel, San Francisco, California*, February 1998, p. 5-9.

113. ENVIRON International Corporation, *Technical Memorandum #1, Approach to a Plan for Risk Management, Mission Bay Project Area*, April 1998, Section 4.2.2.2.

114. Various DTSC and U.S. EPA guidelines are cited in ENVIRON International Corporation's "*Technical Memorandum #1, Approach to a Plan for Risk Management, Mission Bay Project Area*," April 1998, Section 4.

115. See, for example, ENVIRON International Corporation, "*Risk Management Plans, Six Former Underground Storage Tank Sites at the Mission Bay Site*," October 29, 1996.

116. ENVIRON International Corporation, *Technical Memorandum #1, Approach to a Plan for Risk Management, Mission Bay Project Area*, April 1998, Section 6.2.1.

117. Stephen Morse, Chief, Toxics Cleanup Division, San Francisco Bay Regional Water Quality Control Board, Regional Water Quality Control Board (RWQCB), letter to Mr. Phillip Fitzwater, Principal at ENVIRON, Subject: Risk Management Levels for the Mission Bay Development Project, January 16, 1998.

118. ENVIRON used the following document in the preparation of the risk assessment presented in *Technical Memorandum #1, Approach to a Plan for Risk Management, Mission Bay Project Area*, Section 6. Department of Toxic Substances Control. *Supplemental Guidance for Human Health Multimedia Risk Assessments for Hazardous Waste Sites and Permitted Facilities*, Sacramento, California, July 1992.

119. ENVIRON used the following document in the preparation of the risk assessment presented in *Technical Memorandum #1, Approach to a Plan for Risk Management, Mission Bay Project Area*, Section 6. U.S. Environmental Protection Agency, Office of Emergency and Remedial Response, *Risk Assessment Guidance for Superfund, Volume 1: Human Health Evaluation Manual (Part A), Interim Final*, EPA/540/1-89/002, Washington, D.C., December 1989.

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121. ENVIRON International Corporation, *Technical Memorandum #1, Approach to a Plan for Risk Management, Mission Bay Project Area*, April 1998, Section 6.2.1.2.5.

122. Stephen Morse, Chief, Toxics Cleanup Division, San Francisco Bay Regional Water Quality Control Board, Regional Water Quality Control Board, letter to Mr. Phillip Fitzwater, Principal at ENVIRON, Subject: Risk Management Levels for the Mission Bay Development Project, January 16, 1998.

123. Bay Area Air Quality Management District, *Bay Area Air Quality Management District CEQA Guidelines: Assessing the Air Quality Impacts of Projects and Plans*, April 1996.

124. ENVIRON International Corporation, *Technical Memorandum #1, Approach to a Plan for Risk Management, Mission Bay Project Area*, April 1998, Section 6.2.1.2.5.

125. Stephen Morse, Chief, Toxics Cleanup Division, San Francisco Bay Regional Water Quality Control Board, Regional Water Quality Control Board, letter to Mr. Phillip Fitzwater, Principal at ENVIRON, Subject: Risk Management Levels for the Mission Bay Development Project, January 16, 1998.

126. As discussed in Section 6.2.1.2 of *Technical Memorandum #1, Approach to a Plan for Risk Management, Mission Bay Project Area*, ENVIRON used the following document in preparing the risk assessment. U.S. Environmental Protection Agency, Office of Emergency and Remedial Response, *Risk Assessment Guidance for Superfund. Volume 1: Human Health Evaluation Manual (Part A). Interim Final*, EPA/540/1-89/002, Washington, D.C., December 1989.

127. BAAQMD, *Bay Area Air Quality Management District CEQA Guidelines: Assessing the Air Quality Impacts of Projects and Plans*, April 1996.

128. ENVIRON International Corporation, *Technical Memorandum #1, Approach to a Plan for Risk Management, Mission Bay Project Area*, April 1998, Section 6.2.1.2.6.

129. ENVIRON International Corporation, *Technical Memorandum #1, Approach to a Plan for Risk Management, Mission Bay Project Area*, April 1998, Section 4.2.1 and Section 6.2.1.2.6.

130. The calculated value represents the 95% upper confidence limit (UCL) of the arithmetic mean. U.S. EPA recommends use of the 95% UCL of the arithmetic mean for quantifying reasonable maximum exposure.

131. ENVIRON used the following document in the preparation of the risk assessment presented in *Technical Memorandum #1, Approach to a Plan for Risk Management, Mission Bay Project Area*, April 1998, Section 6.0: Department of Toxic Substances Control, *Supplemental Guidance for Human Health Multimedia Risk Assessments for Hazardous Waste Sites and Permitted Facilities*: Chapter 7: Lead, Sacramento, California, July 1992.

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135. ENVIRON International Corporation, *Technical Memorandum #1, Approach to a Plan for Risk Management, Mission Bay Project Area*, April 1998, Section 6.2.1.3.1.

136. ENVIRON International Corporation, *Technical Memorandum #1, Approach to a Plan for Risk Management, Mission Bay Project Area*, April 1998, Section 6.2.1.3.2.

137. Barbara J. Cook, Chief, Northern California - Coastal Cleanup Operations Branch California Department of Toxic Substances Control, "Soil Reuse Within the Mission Bay Project," letter to Steve Morse, Chief, San Francisco Bay Regional Water Quality Control Board, December 10, 1997.

138. Steve Morse, Chief, Toxics Cleanup Division, California Regional Water Quality Control Board, San Francisco Region, "ENVIRON's Proposed Soil Reuse, Mission Bay Project Area, San Francisco, California," letter to Jim Adams, Catellus Development Corporation, February 26, 1998.

139. As discussed in Section 6.2.3 of *Technical Memorandum #1, Approach to a Plan for Risk Management, Mission Bay Project Area*, permeability ranges from 10^{-8} to 10^{-9} centimeters per second, which is considered extremely low.

140. San Francisco Public Works Code, Article 4.1, Section 123 (a), (b), (c) and (h), adopted March 17, 1997, and "Requirements for Batch Wastewater Discharges," May 23, 1997.

141. 1990 FEIR, Volume Two, pp. VI.N.33-VI.N.34.*

142. ENVIRON International Corporation, *Technical Memorandum #1, Approach to a Plan for Risk Management, Mission Bay Project Area*, April 1998, Appendix D.

143. Steve Seligman, Department of Industrial Relations, Cal-OSHA Consultation Service, personal communication to EIP Associates, January 13, 1997.

144. ENVIRON International Corporation, *Technical Memorandum #1, Approach to a Plan for Risk Management, Mission Bay Project Area*, Appendix C, April 1998, p. C-1.

145. ENVIRON International Corporation, *Site Investigation and Risk Evaluation Report, Mission Bay South of Channel, San Francisco, California*, February 4, 1998, p. 5-9. Barbara J. Cook, P.E., Chief, Northern California - Coastal Operations Branch, Department of Toxic Substances Control, California Environmental Protection Agency, letter of June 8, 1998, commenting on the Draft SEIR.

146. Loretta K. Barsamian, Executive Office and Stephen I. Morse, Chief, Toxic Cleanups Division, California Regional Water Quality Control Board, San Francisco Bay Region, "Risk Management Levels for the Mission Bay Project," letter to Philip L. Fitzwater, ENVIRON, January 16, 1998.

147. Proposition 65 requires public notification of the presence of hazardous chemicals and includes as one criterion a cancer risk of 1×10^{-5}. BAAQMD requires health risk assessments using a cancer risk level of 10×10^{-5} and a Hazard Index of 1.

148. ENVIRON International Corporation, *Site Investigation and Risk Evaluation Report, Mission Bay South of Channel, San Francisco, California*, February 1998, Chapter 5.

149. ENVIRON International Corporation, *Site Investigation and Risk Evaluation Report, Mission Bay South of Channel, San Francisco, California*, February 1998, p. 5-17 and Table 5-7.

150. ENVIRON International Corporation, *Site Investigation and Risk Evaluation Report, Mission Bay South of Channel, San Francisco, California*, February 1998, Section 5.1, particularly Section 5.1.7.2.2; and ENVIRON International Corporation, *Technical Memorandum #1, Approach to a Plan for Risk Management, Mission Bay Project Area*, April 1998, Appendix C.

151. ENVIRON International Corporation, *Site Investigation and Risk Evaluation Report, Mission Bay South of Channel, San Francisco, California*, February 1998, pp. 5-17 to 5-30.

152. BAAQMD, Risk Management Policy, May 9, 1991, p. 3.

153. 1990 FEIR, Volume Two, pp. VI.N.27-VI.N.38, with additional discussion provided in Volume Four, pp. XV.L.10-XV.L.13.*

154. ENVIRON International Corporation, *Technical Memorandum #1, Approach to a Plan for Risk Management, Mission Bay Project Area*, April 1998, Section 4.2.1.3.

* A copy of this report is on file for public review at the Office of Environmental Review, Planning Department, 1660 Mission Street, San Francisco.

K. HYDROLOGY AND WATER QUALITY

The Hydrology and Water Quality analysis for this SEIR updates the 1990 analysis based on changes to the proposed development and to water quality regulations that have occurred since certification of the 1990 FEIR. The three most important hydrology-related changes between the 1990 project and the project are that: 1) no wetlands are proposed to be constructed as part of this project; 2) a separated sanitary sewer and storm drain system, not a combined sewer system, is proposed for the central portion of Mission Bay and is analyzed in this SEIR; and 3) state and federal stormwater regulations, adopted after certification of the 1990 FEIR contain certain water quality requirements for stormwater discharges from municipalities, industrial businesses, and construction sites. This Hydrology and Water Quality section focuses the analysis on those changes and incorporates and summarizes the findings of the 1990 FEIR wherever applicable. Other aspects of this topic such as tidal flooding were covered completely in the 1990 FEIR and are focused out of this SEIR analysis (see "Water," in Appendix A, Initial Study). The endnotes for this section begin on p. V.K.64.

SETTING

SAN FRANCISCO'S COMBINED SEWER SYSTEM

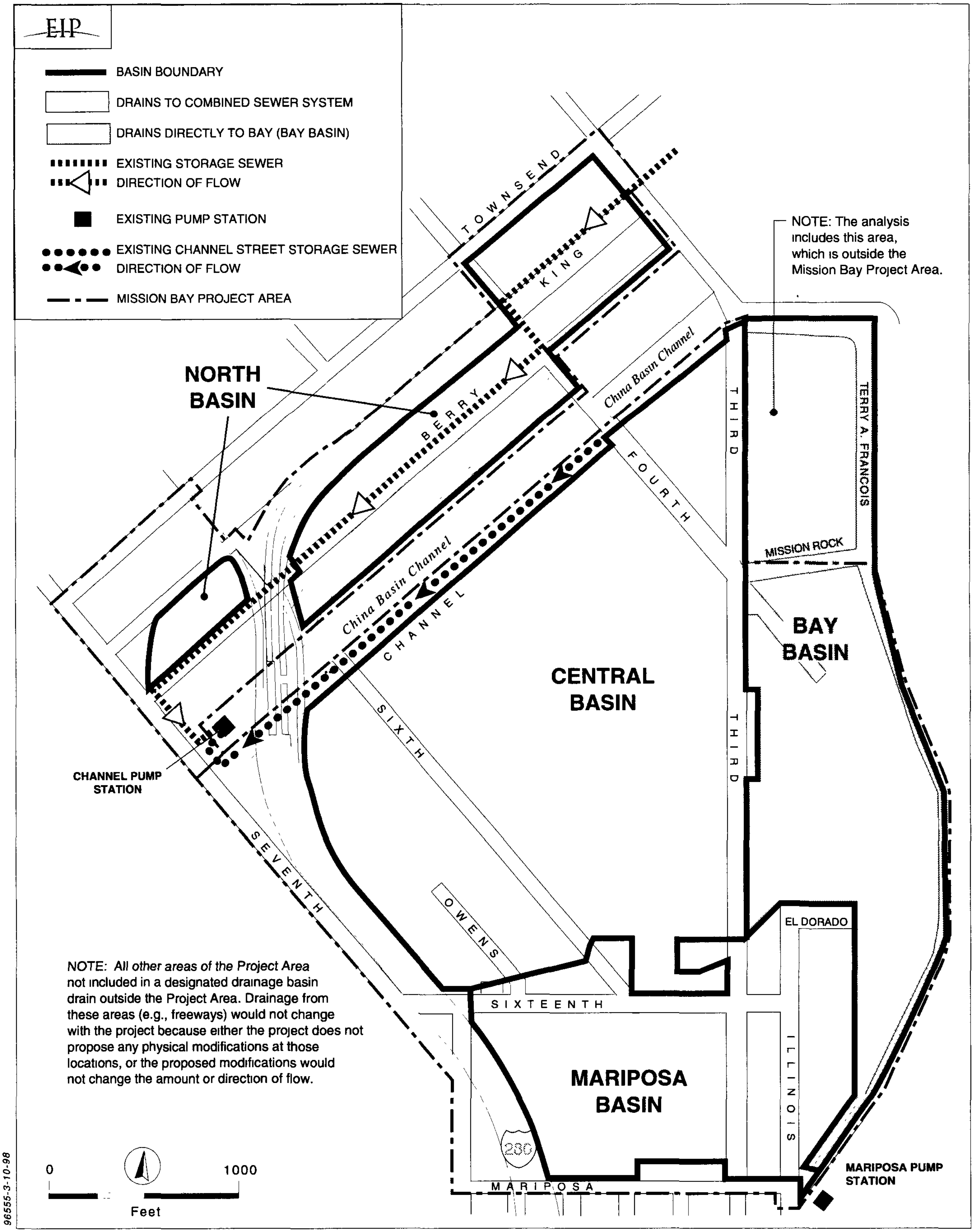
San Francisco operates a combined sewer system that collects sanitary sewage and stormwater (known as "combined sewage") in the same pipes. The topography of the City naturally divides the system into two watershed areas: the Oceanside and the Bayside. Combined sewage produced in the Oceanside watershed is collected and treated at the Oceanside Water Pollution Control Plant, located on the west side of the City near the San Francisco Zoo. Bayside combined sewage is collected and treated at the Southeast Water Pollution Control Plant in the southeast part of the City near Islais Creek, off Third Street at Jerrold Avenue and Phelps Street. Additional Bayside wet-weather facilities include the North Point Water Pollution Control Plant on Bay Street, which provides treatment for the northeast quadrant of the City and operates only during wet weather. The Project Area is in the Bayside drainage basin. Except for areas along the flatter waterfront of the City, including the Project Area, where combined sewage is pumped, the combined sewer system is largely operated by the force of gravity.

Of the approximate 84 million gallons per day (MG/day) of sanitary sewage produced in the City, about 67 MG/day are treated by the Southeast Water Pollution Control Plant and about 17 MG/day are treated by the Oceanside Water Pollution Control Plant. Under wet-weather conditions, the Southeast Plant can treat an additional 83 MG/day of combined sewage to a secondary-treatment level (a minimum of 85% removal of biochemical oxygen demand and total suspended solids) and an additional 100 MG/day at a primary-treatment level (30 to 40% removal of biochemical oxygen demand and total suspended solids), providing a combined 250 MG/day maximum wet-weather treatment capacity. (See Glossary for a definition of primary and secondary treatment, biochemical oxygen demand, and total suspended solids.) The North Point Water Pollution Control Plant is activated when it rains, providing 150 MG/day of primary treatment for the northern Bayside watershed and increasing total wet-weather treatment capacity for the Bayside to 400 MG/day. If treatment plant capacity is reached, excess combined flows are stored in storage/transport facilities for later treatment. The storage/transport facilities have a storage capacity of 125 million gallons. If the rainstorm is a large one, and the capacity of the storage/transport box sewers is exceeded, treated combined sewer overflows (CSOs) occur at outfalls along the City's shoreline. When combined sewage is temporarily stored in transport/storage structures, floating materials are removed from the water surface and some solids settle to the bottom of the structures. The accumulated solids are then flushed to the treatment plant after the storm has subsided. The treatment that occurs within the structures is approximately equivalent to primary treatment. See "Operation of Combined Sewer System," in Appendix J, Hydrology and Water Quality, for information on the operation of the City's combined sewer system.

EXISTING PROJECT AREA DRAINAGE PATTERNS

The drainage characteristics of the Mission Bay Project Area were described in the 1990 FEIR and are summarized as follows. Runoff in the Project Area is generated when rainfall runs off impermeable surfaces such as rooftops and paved areas. Compacted soil on land that has been used for parking, railroad, and industrial uses also is resistant to water penetration and may generate substantial runoff during heavy storms./1/ Because the Project Area is relatively flat, rainfall in very light storms may infiltrate permeable areas or evaporate before reaching the stormwater collection system. Due to the variation in soils found in the Project Area, the amount of infiltration reaching the groundwater table is variable. See "Subsurface Conditions" in Section V.H, Seismicity: Setting, for a description of the soil profile.

For the discussion purposes of this SEIR, the Project Area is divided into four watersheds that are shown in Figure V.K.1 as the North Basin, the Central Basin, the Bay Basin, and the Mariposa Basin. The Central Basin and the North Basin drain to the Channel Outfalls Consolidation Storage/Transports (shown in Figure V.K.1 as "Existing Channel Street Storage Sewer"), which flow to the Channel Pump Station. The Mariposa Basin drains to the Mariposa Transport, which flows to the Mariposa Pump Station. Both pump stations pump to the Southeast Water Pollution Control Plant. The approximate 65-acre Bay Basin currently drains directly to the Bay and not to the combined sewer system. The Bay Basin includes an approximately 20-acre, port-owned area bounded



SOURCE KCA Engineers, Inc

MISSION BAY SUBSEQUENT EIR

FIGURE V.K.1 EXISTING STORMWATER DRAINAGE BASINS IN THE PROJECT AREA

by Terry A. François Boulevard, Third Street, and Mission Rock Street, which is outside the Project Area (see Figure V.K.1). The portion of the Project Area that is south of the Channel does not receive wastewater or stormwater flow from basins outside the Project Area.

The drainage basin boundaries are not necessarily consistent with the Project Area boundaries. As shown on Figure V.K.1, not all of the Project Area lies within one of the designated drainage basins. Drainage from areas shown outside of a designated drainage basin (e.g., freeways, the thin strips of land along the Channel, and certain street intersections or small sections of parcels) would not change with the project because either the project does not propose any physical modifications at those locations, or the proposed modifications would not change the amount or direction of flow.

WATER POLLUTANTS

The Mission Bay Project Area currently produces three wastewater streams: municipal wastewater (and its effluent), treated CSOs, and urban stormwater runoff. Each wastewater stream contains similar constituents capable of affecting water quality and aquatic life in San Francisco Bay, but in different concentrations.

Municipal wastewater is a relatively strong waste stream containing high concentrations of organic matter that will decompose (measured as biochemical oxygen demand because the decomposition requires oxygen), inorganic particulates (measured as total suspended solids), nutrients (measured as total nitrogen and phosphorus), and pathogenic microorganisms. It also contains oil and grease and small quantities of toxic metals, pesticides, solvents, and plasticizers (additives in plastics that maintain softness and pliability). Conventional secondary treatment, as employed by San Francisco at its Southeast Water Pollution Control Plant, greatly reduces the concentrations of most substances in municipal wastewater. On the other hand, dissolved metals and organic substances that are resistant to breakdown by bacteria, may pass through the plant relatively unaltered. This waste stream, after treatment, is referred to as municipal wastewater effluent in this SEIR.

Urban stormwater is a large-volume wastewater stream. Pollutants contained in urban runoff include street litter, sediment (mostly inorganic particulates, measured as total suspended solids), oil and grease, oxygen-demanding substances, pathogenic microorganisms, toxic metals, and pesticides. The concentrations of oxygen-demanding substances, nutrients, and pathogenic microorganisms are much lower than in untreated municipal wastewater. CSOs exhibit a blend of the untreated characteristics of municipal wastewater and urban stormwater runoff.

Pollutants build up on impervious surfaces during dry periods when there is little or no rain to wash them away./2/ Sources of urban pollutants include vehicles, maintenance and landscaping practices, industrial activities, construction, non-stormwater connections to the drainage system (e.g., cross-connections from sanitary sewers and floor drains from businesses such as auto shops and restaurants), accidental spills, and illegal dumping. Sediment related to automobile use comes from pavement wear, atmospheric deposition, tire wear, and road maintenance. Atmospheric deposition contains sulfur, heavy metals, pesticides, organic compounds, fungi, pollen, and soil. Automobiles contribute other heavy metals such as chromium, copper, lead, zinc, iron, cadmium, nickel, and manganese, which are associated with tire wear, auto body rust, deterioration of chromium-plated surfaces, bearing and bushing wear, brake lining wear, diesel fuel and gasoline exhaust, motor oil, antifreeze, and other vehicle fluids./3/ The following paragraphs describe various water pollutants and their relevance for San Francisco Bay.

Total Suspended Solids

Suspended material is contained in both municipal wastewater effluent and urban stormwater runoff. Discharged suspended material can reduce water clarity in receiving waters. If the discharge occurs in quiescent waters, the material may settle to the bottom and could affect bottom-dwelling aquatic life. San Francisco Bay waters are well-mixed and naturally contain relatively high concentrations of suspended material. Discharges containing suspended material in concentrations typical for municipal, secondary-treated effluent and untreated urban runoff are unlikely to affect water clarity or settle to the bottom in substantial quantities. However, toxic metals, pesticides and other synthetic organic substances often adhere onto the surface of particulates and would enter the Bay waters in that manner. Thus, although suspended material itself is unlikely to be harmful to the aquatic environment, the substances associated with it are potentially harmful.

Oxygen-Demanding Substances

Oxygen-demanding substances include plant debris (leaves and lawn clippings), animal feces, street litter, and organic matter. Such substances depress the dissolved oxygen levels in streams, lakes, and estuaries. Lack of dissolved oxygen can asphyxiate aquatic organisms and shift the chemical reactions of certain compounds to more toxic forms. Hydrogen sulfide (H_2S), for example, forms primarily under anoxic (without oxygen) conditions. Dissolved oxygen levels in open waters of San Francisco Bay are usually close to saturation. Oxygen levels may be depressed in areas with limited water circulation such as the west end of China Basin Channel./4/

Nutrients

Plant nutrients, primarily nitrogen and phosphorus, are contained in both untreated and secondary-treated municipal wastewater and in urban stormwater. The concentration of nitrogen and phosphorus in secondary-treated municipal wastewater is typically many times greater than in stormwater because of the constituents in municipal wastewater and their breakdown products. Elevated nutrient levels in receiving waters can cause excessive growth of algae and other aquatic plants which can, in turn, lead to cycles of dissolved oxygen over-saturation and depletion. The problem is most apparent in poorly mixed or confined water bodies. Central San Francisco Bay does not experience elevated nutrient levels because of tidal-induced mixing and high volumes of tidal exchange.

Pathogenic Microorganisms

Pathogenic microorganisms are disease-causing parasites, bacteria, and viruses. They are usually present in stormwater but at much lower concentrations than in untreated municipal wastewater. The primary sources of pathogenic microorganisms in stormwater routed into a separate storm drainage system are typically the excrement from birds, domestic pets, and infiltration of sanitary sewage. Bacteria have the potential to contribute to exceedences of receiving water standards for contact recreation and shellfish harvesting.

Because there is no easy or inexpensive way to test water for the presence of these pathogenic organisms, a relatively easy test for a group of bacteria, called the total coliform test, is used instead. Coliforms are ubiquitous in soil and water. The test presumes that pathogenic organisms are present in general proportion to the concentration of total coliform organisms. During wet weather, most urban stormwater runoff contains high levels of coliform bacteria, often exceeding 10,000 Most Probable Number per 100 ml (MPN/100 ml) and may reach 1,000,000 MPN/100 ml./5/,/6/

Oil and Grease

"Oil and grease" is a measurement that includes a wide range of hydrocarbons, some of which may be toxic to aquatic organisms at low concentrations. Sources of oil and grease in municipal wastewater include food wastes, laundry waste, and illicit discharges of waste oil and solvents. Most of the oil and grease in municipal wastewater is removed by secondary treatment. Sources of oil and grease in urban stormwater include leakage of fuel and lubricants from vehicles, spillage at fueling stations, stormwater discharges from industrial and commercial activities, and illicit disposal of waste oils and solvents to the storm drain. Storm drain discharges containing oil may create an unsightly sheen on receiving waters, particularly in areas where circulation is limited.

Toxic Substances

Secondary-treated municipal wastewater and urban stormwater both may contain substances at low concentrations that are potentially toxic to aquatic life. They include ammonia, heavy metals, pesticides, and other synthetic organics. Ammonia is found in effluent from conventional secondary-treatment plants and, in its un-ionized form, can be toxic to aquatic life. Only traces of ammonia are typically found in stormwater runoff.

Heavy metals, particularly copper, zinc, and lead, are typically found in higher concentrations in urban stormwater runoff than in secondary-treated municipal wastewater. As discussed in "Impairment of Central San Francisco Bay," below, Central San Francisco Bay is regarded as impaired with respect to copper and mercury concentrations. It is also impaired with respect to diazinon, a pesticide found in low concentrations in urban runoff and treated municipal effluent and PCBs, or polychlorinated biphenyls, which are synthetic chemicals formerly used as coolants, insulating materials, and lubricants in electrical equipment.

Floatables

Floatables include litter, oils, or other large materials that float. They may contain significant amounts of heavy metals, pesticides, bacteria, or other pollutants. Floatables also create aesthetic problems and hazards to wildlife once they are discharged in waterways. Before the City installed baffling in its combined sewer system, floating solids and discoloration of the water surface were noticeable during CSOs and after the overflow events for approximately 12 to 25 hours (i.e., ½ to 1 tidal cycle). On the Bayside, the westerly winds tended to move the floatable material offshore into open waters, except at China Basin Channel, where houseboat dwellers have reported seeing overflow debris in the dock piling areas for a few days following CSOs./7/

POTENTIALLY AFFECTED RECEIVING WATERS

The Mission Bay project could affect water quality in San Francisco Bay, near-shore Bayfront waters, China Basin Channel, and Islais Creek. These receiving waters are discussed below.

San Francisco Bay

The San Francisco Bay is the largest estuary on the western coast of North America. It is used extensively for both recreational and commercial purposes and supports a strong ecological network of flora and fauna. Among the many beneficial uses of the Bay and the Bay-Delta Estuary are fishing and fisheries, non-contact and contact water recreation, transportation, cooling water supply, waste disposal, and aesthetics.

San Francisco Bay is very shallow; most of the Bay is less than 16 feet deep. The deepest parts are in the central Bay (approximately the area of the Bay bounded by the Golden Gate Bridge, a line extending east from Hunters Point to south Alameda, and the Richmond-San Rafael Bridge). The deepest point in the Bay, about 380 feet, occurs under the Golden Gate Bridge.

Water pollutants (measured in mass of pollutant per unit volume of water) enter San Francisco Bay from various sources, including municipal and industrial effluent, urban runoff, non-urban runoff, major tributaries (the Sacramento and San Joaquin rivers), dredging and disposal of dredged material, atmospheric deposition, spills, and marine vessel discharges. Some mixing of these inputs occurs through semi-diurnal (twice daily) tides. During each complete ebb-flood cycle in the Bay, 10 to 30% or more of Bay water is replaced by new ocean water. During dry weather each complete tidal cycle replaces about 24% of the volume of the Bay with new water. During wet weather, freshwater inflow from the Sacramento-San Joaquin Delta can increase the tidal exchange ratio to over 80%./8/ In the central part of the Bay near the Project Area, there is less flushing and mixing in the summer than in the winter.

Impairment of Central San Francisco Bay

The State Water Resources Control Board (SWRCB) has listed central San Francisco Bay as impaired on the basis of field surveys of the water column, sediments, sediment toxicity, bivalve bioaccumulation, and water toxicity./9/,/10/ The determination relates to mercury, copper, selenium, diazinon, and polychlorinated biphenyls (PCBs)./11/

- **Mercury**. The main source of mercury in the Bay is erosion and drainage from abandoned gold and mercury mines. Other sources include natural sources, atmospheric deposition, and various industrial and municipal sources.
- **Copper**. Copper enters the Bay through municipal sources, stormwater runoff (primarily through automobile brake pad dust), and other nonpoint sources (such as soils and abandoned mines). These are the three main sources, and they contribute roughly equivalent amounts.
- **Selenium**. Selenium enters the Bay through industrial point sources (e.g., oil refineries), agriculture, and natural sources. Control programs are in place to address selenium discharges from oil refineries.

- **Diazinon**. Diazinon is a pesticide that enters the Bay as runoff from agriculture and, to a lesser extent, residential land uses. Diazinon is a primary component of insecticides. Homeowner pesticide use peaks in late spring and early summer.
- **PCBs.** Although PCBs are no longer manufactured in the U.S., PCBs previously released to the environment enter the Bay through stormwater runoff and transport through the food chain. PCB levels in fish have resulted in health advisories for fish consumption.

Near-Shore Bayfront Waters

Water Quality and Aquatic Biota

Direct stormwater discharges enter the Bay in the near-shore tidal zone. Materials contained in stormwater discharges disperse throughout the Bay according to patterns of mixing and dispersion dictated by flow volumes, tidal currents, and vertical mixing./12/ Pollutants end up in different places in the Bay system (e.g., shallow water, deep water, sediments) depending upon their association with particulate matter, their solubility, and patterns of sediment resuspension, dispersion, and resettling.

Treated CSOs enter San Francisco Bay at shoreline locations, as well as in waterways and embayments with restricted water flow and mixing, such as China Basin Channel and Islais Creek. CSOs are subject to the same processes of dispersion, partitioning, and mixing as for discharges from stormwater outfalls (although CSOs are partially treated prior to discharge). Through these processes, pollutants from treated CSOs are integrated into the Bay system. The effects of existing stormwater discharges and CSOs are reflected, along with numerous other pollutant sources, in the existing water quality of the Bay.

Studies have evaluated the impacts of treated CSOs from the combined sewer system on aesthetics, water quality, shellfish contamination, fish populations, benthic populations, and the bioaccumulation of potentially toxic materials in San Francisco Bay biota. Studies of dispersion and mixing have shown that treated CSOs are diluted rather rapidly, and that dissolved oxygen concentrations are not affected greatly./13/ Neither the concentrations of pollutants, nor the duration of exposure to pollutants in treated CSOs appear to cause acute toxicity/14/ in the biota of the receiving water bodies./15/ Impacts due to treated CSOs were evaluated with regard to the long-term accumulation of pollutants in the tissues of fishes and invertebrates from the Bay. Where bioaccumulation of pollutants was noted,/16/ the dynamics of the biota considered, and the widespread transport of sediment-associated contaminants in San Francisco Bay, make it impossible to assign a specific source of the contaminants that caused the bioaccumulation.

Short-term effects of treated CSOs do not affect benthic and aquatic populations in the near-shore Bay to any great extent, primarily because the less-dense, freshwater CSOs remain on the surface of the near-shore water bodies, and do not penetrate to the bottom. Particulate material (settleable solids) from treated CSOs may settle to the bottom in areas where there is less water movement. The high organic content of the particulate material from treated CSOs generally leads to dense populations of pollutant-tolerant benthic organisms, relatively limited in species diversity. None of the studies that evaluated the effects of CSOs on benthic organisms found it possible to discriminate the direct effects of the CSOs from the overall, long-term impact of sediment deposition, resuspension, and re-deposition in the San Francisco Bay.

Water-Contact Recreation

Beneficial uses can sometimes be affected by near-shore discharges of treated CSOs./17/ Beneficial uses near the Project Area include navigation, non-contact water recreation, and fishing along the shoreline and in China Basin Channel. Beneficial uses along the San Francisco Bay shoreline, but not proximate to the Project Area, include navigation, non-contact water recreation, and fishing, and also water-contact recreation on the north shore near Crissy Field and Aquatic Park and on the southeast shore at Candlestick Point. While the Project Area shore and China Basin Channel are not necessarily attractive locations for water-contact recreation due to poor access and the generally industrial nature of the area, some water-contact recreation may occur there from time to time, particularly if houseboat residents swim in the Channel. Water-contact recreation is most likely to occur during dry weather; wet-weather conditions are normally less desirable for these activities.

As part of the City's permit requirements for its wet-weather facilities, the City conducts year-round monitoring, three times a week, including standard observations (including presence of foam, floating materials, odors or other evidence of pollutants) and tests for total coliform bacteria. The monitoring stations are located along the north shore near Crissy Field, St. Francis Yacht Club, and Aquatic Park, and along the southeast shore near the Candlestick Point State Recreation Area.

The coliform test data are used as an indicator of bacteriological water quality for public health protection at beaches with water-contact recreation. Upon commencement of a CSO event, the San Francisco Health Department requires that the City immediately post warning signs at the beaches. The signs are removed when the coliform concentrations are measured below the level of concern. The state-recommended water-contact recreation standard for total coliform is less than 1,000 MPN/100 ml./18/

China Basin Channel and Islais Creek

Hydrology

San Francisco Bay is east of the Project Area, and China Basin Channel separates Mission Bay North from Mission Bay South. As described in the 1990 FEIR, Mission Bay was an extensive shallow bay before it was gradually filled beginning in 1865. Fresh water drained into Mission Bay from springs on Rincon Hill and from what was then called Mission Creek./19/ China Basin Channel is the last remnant of Mission Creek and Mission Bay and is now a dead-end inlet of San Francisco Bay, used as a waterway for private and commercial boat traffic. The Channel is about 4,600 feet long and 150 feet wide through most of its length, and about 430 feet wide at its outlet to the San Francisco Bay at China Basin./20/ A marina community consisting of berths for about 20 houseboats and 35 pleasure craft occupies the south side of the Channel, approximately between Fifth Street and Sixth Street. The Channel receives treated CSOs from the City and County of San Francisco's combined sewer system (see "Project Area Wastewater System," under "Sewers and Wastewater Treatment" in Section V.M, Community Services and Utilities: Setting, for additional details on treated CSOs from the combined sewer system).

There is a moderate degree of undercutting and sloughing of the bank. More substantial erosion has occurred on the northern bank west of Fourth Street. Areas along the edges of China Basin Channel with riprap (see Glossary) or rubble are relatively protected from erosion, while other bare mud areas with little or no vegetation are more prone to erosion (see "Vegetation," in Section V.L, China Basin Channel Vegetation and Wildlife: Impacts, for additional detail on existing vegetation conditions along the Channel edges).

Tidal circulation in the Channel was discussed in the 1990 FEIR and is summarized here. The volume of water moving in and out during an average tidal cycle is large compared to the total volume of the Channel, which provides tidal circulation at the west end of the Channel, even though the Channel is more shallow at its inland terminus. As identified in the 1990 FEIR, another factor promoting water circulation in the Channel is that the Channel joins San Francisco Bay at a location where tidal currents are strong. Tidally-induced circulation is reduced during neap tides (tides of lowest range) when tidal flushing is weakest. Conversely, tidal flushing is most effective during the spring tide period (tides of highest range)./21/

Islais Creek is south of the Project Area between the Army Street Pier and Pier 90, on an east-west axis. The creek is about 5,000 feet long, and its width varies from 325 feet at the western end to about 650 feet at the mouth on the eastern end. Depth within the creek is about 25 feet from the head to the mouth. The total volume of Islais Creek at mean lower low water is about 55.5 million cubic feet. The sides of the creek are steep, and the upstream portion of the creek west of the bridge at Third Street is surrounded by heavy industry.

Islais Creek is a tidal inlet with a constriction at Third Street that confines circulation and makes the western end resemble a tidal lagoon. Circulation within the creek during dry weather occurs primarily through the action of tides and can also occur during high winds. The physical structure of the creek contributes to strong distinctions between saline and freshwater layers and weak mixing during periods of no freshwater input. Historically, Islais Creek was a seasonal stream. Today, the only substantial freshwater input to the creek is from treated CSOs, with minimal direct stormwater runoff into the creek during wet weather. When treated CSOs occur, there is minimal vertical mixing and dilution of the freshwater input with more saline Bay waters.

<u>Water Quality</u>

Water quality data from China Basin Channel and Islais Creek are limited. No significant new data have been collected since the 1990 FEIR. No comprehensive water quality data have been collected for China Basin Channel since the 1979 Bayside Overflow study, and the most recent data available for Islais Creek are from studies conducted by the City and County of San Francisco in 1985.

The *Bayside Overflow* study found low dissolved oxygen in China Basin Channel in the upper end of the Channel, with pH ranging from 7 to 8. Total coliform counts in China Basin Channel ranged from 200 to 500 MPN/100 ml. The *Bayside Overflow* study found that the depressed dissolved oxygen concentrations in China Basin Channel were unlikely to be directly attributable to the treated CSOs that occur there because dissolved oxygen concentrations in the CSO water have been measured at above background concentrations in the receiving water of the China Basin Channel. pH values between 7 and 8 are within the Basin Plan water quality objectives.

The Bay Benthic Report reported means and ranges of water quality characteristics for Islais Creek./22/ The lowest dissolved oxygen values measured in Islais Creek were during April, September, and November 1985, when minimum concentrations were measured at upstream stations below 5.0 μg/l. Mean dissolved oxygen during each sampling period followed expected patterns of temperature; concentrations were 5.8 μg/l in September, the warmest month, and greatest during January and February, the coolest months.

Measured pH in Islais Creek was lowest at upstream stations in March and April, reaching values of 6.4, slightly below Basin Plan water quality objectives. Mean pH values were between 7 and 8 in all sampling periods. Coliform concentrations varied both by sampling period and by station. In February, coliform values ranged from 40 to greater than 24,000 MPN/100 ml. Coliform counts were lowest in Islais Creek during the months with little or no rainfall (maximum values were less than 5,200 MPN/100 ml between May and October), whereas maximum values occurred in January-February, and again in December (maximum values of less than 24,000 MPN/100 ml).

When collection, storage, and treatment facilities reach capacity, treated CSOs occur approximately 10 times per year (long-term annual average) through six outfall structures along the north and south sides of China Basin Channel as well as from the outfall of the Division Street Sewer at the west end of the Channel. CSOs from these outfalls receive essentially the equivalent of primary treatment during wet weather.

When treated CSOs occur during wet weather, chemical concentrations in surface waters at the mouth of China Basin Channel reflect the chemical concentrations in the discharge water, as discussed in the 1990 FEIR./23/ The *Bayside Overflow* study found that concentrations of coliform bacteria and dissolved oxygen generally returned rapidly to background conditions after CSOs occurred.

Turning to Islais Creek, the main sources of freshwater flow to Islais Creek are three CSO structures that discharge into the head of the creek at Third Street, and the Quint Street Outfall, which discharges secondary-treated, wet-weather municipal wastewater effluent from the southern bank of the creek near the bridge at Third Street. CSOs to Islais Creek occur when the treatment, storage, and pumping capacity of the CSO system is exceeded by the combined sewage inflow. The Quint Street Outfall (secondary-treated) discharges only during wet weather when the capacity of the deep-water Pier 80 outfall from the Southeast Plant is exceeded.

The Bureau of Water Pollution Control of the City and County of San Francisco conducted a study in 1985 which included five sampling stations along the entire length of Islais Creek./24/ Dry-weather coliform concentrations in Islais Creek ranged from less than 20 to more than 5,400 MPN/100 ml. During wet weather, coliform concentrations ranged from 40 MPN/100 ml to greater than 24,000 MPN/100 ml. Distributions of coliform in the creek were similar in dry weather and wet weather—greater at upstream stations and less at stations closer to the Bay.

Sediment Quality

The sediment quality of China Basin Channel is degraded, which is likely primarily due to historic industrial discharges from nearby uses, and due to direct discharges of untreated sewage from the late 1800's to the mid-1900's into the western end of the Channel. For many years, there were no controls on the quality of discharges to surface water bodies like the Channel and the Bay. After the Southeast Plant was built in 1951, dry-weather flows from the Project Area received primary treatment and were discharged to the Bay near Pier 80. During wet weather, combined sewage continued to overflow to the Channel with no treatment, until completion of the Channel Outfalls Consolidation storage sewers in the late 1970's. Until the 1970's and early 1980's, completely untreated CSOs occurred at China Basin Channel and at other locations of the San Francisco Bay over 80 times per year./25/ While the San Francisco Clean Water Program has constructed major treatment and storage facilities that have reduced the number of CSOs to 10 or fewer per year, on average, and have improved the quality of those CSOs, the quality of sediment in the bottom of the Channel has been affected by the many earlier years of more numerous, previously untreated CSOs and other discharges.

Like China Basin Channel, the sediment quality of Islais Creek is degraded primarily due to historic discharges from industrial and urban activities, and the historic discharge of untreated sewage to the creek from the late 1800's to the mid-1900's. Present-day discharges contribute to the level of sediment in Islais Creek. Some studies have shown Islais Creek sediment to be highly toxic to aquatic organisms. Recent studies concluded that bioassay test organisms transplanted to Islais Creek were able to survive for as long as 10 days under extreme conditions./26/ The studies concluded that individual stations in the western end of the creek showed reduced survival of aquatic organisms but that there was no overall pattern of toxicity throughout the creek. Although degraded, both China Basin Channel and Islais Creek can support populations of living marine organisms (see "Wildlife," in Section V.L, China Basin Channel Vegetation and Wildlife: Setting)./27/,/28/

The RWQCB recently completed a Bay-wide survey of sediment chemistry and toxicity./29/ The survey included some limited sampling in China Basin Channel in which one sample each was collected at two locations in the Channel. The data suggest that sediment quality at upstream (western) locations may be more degraded than at the mouth of the Channel. This is consistent with information presented in the 1990 FEIR./30/ Because only a single sample was taken, and samples were collected under one condition, the sampling results are not conclusive. Nevertheless, the RWQCB has proposed the Channel for listing as a "candidate" toxic hot spot for clean-up. Islais Creek is also a candidate toxic hot spot./31/ The proposed listing is preliminary and is subject to revision as new information becomes available. "Candidate" toxic hot spots are not considered "known" toxic hot spots until hearings are held by both the RWQCB and the State Water Quality Control Board./31a/ China Basin Channel and Islais Creek would be considered "known" toxic hot spots if and when they are included in a Regional Toxic Hot Spot Cleanup Plan adopted by the RWQCB and approved by the State Water Quality Control Board. Both sites have been proposed for inclusion by the RWQCB./31b/

REGULATORY FRAMEWORK

In the Project Area, water resources policies are administered by several agencies, including the California Regional Water Quality Control Board, San Francisco Bay Region (RWQCB); the State Water Resources Control Board (SWRCB), and the U.S. Environmental Protection Agency (U.S. EPA). Development of Mission Bay is subject to the federal Clean Water Act, the California Porter-Cologne Water Quality Control Act (Porter-Cologne Act), applicable Water Code sections (plans and policies adopted by the SWRCB and RWQCB); and permitting and licensing requirements that occur during development review by the City and County of San Francisco.

San Francisco Bay Basin Water Quality Control Plan (Basin Plan)

The RWQCB regulates surface water and groundwater quality in San Francisco Bay through its *San Francisco Bay Basin Water Quality Control Plan* (Basin Plan)./32/ The Basin Plan is the master policy document describing the legal, technical, and programmatic bases of water quality regulation in the San Francisco Bay region. The Basin Plan fulfills the requirements of both the Porter-Cologne Act, which calls for water quality control plans in California, and the federal Clean Water Act. The plan identifies the beneficial water uses of surface waters (e.g., lakes, creeks, San Francisco Bay, etc.) and groundwater, the water quality objectives needed to protect those beneficial uses, and the strategies and schedules for achieving those objectives.

State policy for water quality control in California is directed toward achieving the highest water quality consistent with maximum benefit to the people of the state. Therefore, all water resources must be protected from pollution and nuisance that may occur as a result of waste discharges. Beneficial uses of surface waters, groundwaters, marshes, and mud flats serve as a basis for establishing water quality standards and discharge prohibitions to attain this goal. Beneficial uses that have been identified for San Francisco Bay include:

- Agricultural supply
- Areas of special biological significance
- Cold and warm freshwater habitat
- Ocean, commercial, and sport fishing
- Estuarine habitat
- Freshwater replenishment

- Groundwater recharge
- Industrial service supply
- Marine habitat
- Fish migration
- Municipal and domestic supply
- Navigation
- Industrial process supply
- Preservation of rare and endangered species
- Water-contact and non-water-contact recreation
- Shellfish harvesting
- Fish spawning
- Wildlife habitat

In accordance with the Clean Water Act, the U.S. EPA has promulgated the National Toxics Rule, which establishes water quality criteria for priority pollutants that could interfere with beneficial uses of U.S. waters. A similar rule is being developed specifically for California. Once these criteria are established, they will be incorporated in the Basin Plan.

Section 303(d) of the federal Clean Water Act requires states to list water bodies that are impaired despite existing technology-based controls implemented to achieve and maintain water quality standards. See "Impairment of Central San Francisco Bay," above. States are required to identify pollutants that cause exceedances of water quality standards, determine priorities among water bodies, and design, allocate, and implement water quality-based controls.

The State Water Resources Control Board has designated Central San Francisco Bay as impaired as a result of unacceptable levels of selenium, mercury, copper, diazinon, and PCBs. By specifically recognizing these pollutants, the RWQCB has indicated that a "total maximum daily load" process is technically feasible, and would likely result in different effluent limitations than are currently provided by the Basin Plan. "Total maximum daily load" calculations and regulatory processes are used to allocate among permitted dischargers the maximum load for a pollutant to be tolerated in the Bay. The RWQCB revises permits, as necessary, to ensure that established maximum pollutant loads are not exceeded. Implementing new load and waste load allocations (reflected in changes to permit conditions for San Francisco and other Bay Area dischargers that could be made by the RWQCB) would be expected to result in the attainment of water quality standards. The RWQCB intends to adopt schedules for completing "total maximum daily load" calculations and regulatory processes; however, the time frame for these processes will depend on the availability of funding, the availability of staff, watershed stakeholder group priorities, and further evaluation of the need for and feasibility of these efforts. If the RWQCB initiates a "total maximum daily load" regulatory process resulting in different effluent limitations than are currently provided by the Basin Plan. The City would have to comply with any changes to its permit that might result from RWQCB action.

National Pollutant Discharge Elimination System

The federal Clean Water Act prohibits the discharge of pollutants to navigable waters from a point source/33/ unless authorized by a National Pollutant Discharge Elimination System (NPDES) permit. As an implementation action to achieve water quality standards, NPDES requirements apply to discharges from wastewater treatment facilities and stormwater discharges. The U.S. EPA has delegated implementation of the NPDES to the SWRCB, which, in turn, has delegated implementation to the RWQCB. The RWQCB, therefore, issues and enforces NPDES permits for all dischargers in the San Francisco Bay Area, including the City and County of San Francisco.

Issued by the RWQCB in five-year terms, an NPDES permit contains discharge prohibitions, effluent limitations, and necessary specifications and provisions that ensure proper treatment, storage, and disposal of the waste. The permit often contains a monitoring program that establishes monitoring stations at effluent outfalls and receiving waters. NPDES permits are individually issued for point-source discharges, which usually refers to waste emanating from a single, identifiable location; a non-point source usually refers to waste emanating from diffuse locations. Stormwater is considered to be a non-point source if stormwater is discharged as overland flow, not from an identifiable location such as a pipe.

San Francisco NPDES Permits and Other Regulations

San Francisco discharges combined sewage from the Bay side of the City in accordance with the terms of two NPDES permits. The relatively minor discharges from separate storm drains that occur currently are not the subject of an NPDES permit. In the future, as the national stormwater permitting program expands, San Francisco expects to receive a separate NPDES stormwater discharge permit which would cover discharges from separate storm drains citywide, including any from Mission Bay.

To ensure that it is able to meet its permit conditions, San Francisco regulates the substances that may be discharged into the municipal combined sewer system. Under the terms of the City and County's Industrial Waste Ordinance, some industries and commercial operations must pretreat their waste before discharge to the sewer.

Combined Sewer System Permits

The water quality of the effluent discharged by the Southeast Plant and the North Point Plant on the Bay side of the City is regulated by two individual NPDES permits. Both NPDES permits set forth discharge prohibitions, effluent concentration limitations, receiving water limitations, and related operational requirements. Limitations are based on the operating conditions at the treatment plant; the plans, policies, and water quality objectives and criteria of the Basin Plan (see "San Francisco Bay Basin Water Quality Control Plan [Basin Plan]," under "Regulatory Framework" above; and federal water quality criteria, regulations, and rules, including those that specify how permit limitations are to be derived from the Basin Plan. The permits also specify the maximum flow to be processed at the treatment plant. One NPDES permit regulates all dry-weather and wet-weather discharges from the Southeast Plant, and the second regulates the quality of discharges from Bayside wet-weather facilities, including the North Point Plant./34/,/35/

The wet-weather requirements in the NPDES permit are based on water quality and technology goals, in accordance with the Federal Combined Sewer Overflow Control Policy. Water quality goals are defined in the Federal Clean Water Act, and technology goals are defined in the Nine Minimum Control technologies specified in the Federal Combined Sewer Overflow Control Policy.

Between 1970 and 1980, the City undertook a series of cost-benefit studies of CSO control measures. On the basis of these studies, the RWQCB found that adequate overall protection of beneficial uses, as identified in the Basin Plan, would be achieved if facilities were designed and constructed to meet a long-term average of four CSOs per year on the north shore, approximately from the Golden Gate Bridge to the Ferry Building; a long-term average of 10 CSOs per year on the southeast shore, approximately from the Ferry Building to Islais Creek; and an average of one CSO per year south of Islais Creek./36/

In accordance with these design criteria, the City designed and constructed substantial transport/storage boxes, treatment facilities, and pumping facilities. The transport/storage boxes temporarily store combined flows for gradual release to treatment plants as treatment capacity becomes available. The City has designed and constructed its combined sewer system so that during wet weather at least 85% of the combined flow is treated to the equivalent of primary treatment, which occurs in the box sewers, at the North Point Plant, and at the Southeast Plant. (See also "Operation of Combined Sewer System," in Appendix J, Hydrology and Water Quality.) Because this construction was completed as of March 4, 1997, the City is in compliance with this permit requirement.

The permit states, "these long-term design criteria will not be used to determine compliance or non-compliance with this prohibition."/37/ Instead, the permit provides that post-construction compliance is measured by adherence to operational criteria set forth in the permit. With regard to the long-term average criteria for treated CSOs, the permit provides that:

> The long-term average overflow frequency prescribed in this Order is based on information available at the time of adoption of this Order. If the Board finds that changes in the location, intensity or importance of affected beneficial uses or demonstrated unacceptable adverse impacts as a result of operation of the constructed facilities have occurred they may modify the long-term average overflow frequency. Such action could require the modification of constructed facilities, the modification of the operation of constructed facilities, or the construction of additional facilities./38/

In the event that beneficial uses in the discharge area were to change significantly or significant adverse impacts to Bay water quality were to occur, the RWQCB could choose to reassess these design criteria. The permits may also be modified when they are reviewed for renewal. The Southeast NPDES permit expires October 19, 1999, and the Bayside NPDES permit expires February 15, 2000.

<u>Phase I Stormwater Regulations</u>

With respect to pollutants in stormwater discharges, the Phase I stormwater regulations in the federal Clean Water Act require certain industrial activities, certain construction activities, and two sizes of municipalities—large (population of 250,000 or more) and medium (population 100,000 to 250,000)—to obtain NPDES permit coverage. The City and County of San Francisco does not currently operate under an NPDES Municipal Storm Water Permit because the majority of stormwater runoff in the City drains into the City's combined sewer system where it is treated and discharged in accordance with individual NPDES permits for each City sewage treatment plant (see "Operation of Combined Sewer System" in Appendix J, Hydrology and Water Quality, for additional detail about the sewer system). However, San Francisco's individual NPDES permits for its wastewater treatment plants specify similar requirements for stormwater quality as the municipal stormwater permits held by other stormwater dischargers in the Bay Area.

Most industrial and construction activities in the City are covered under the City's existing NPDES permits. The exceptions primarily include waterfront properties owned by the Port of San Francisco where runoff flows to a separate storm drain system. As appropriate, industrial businesses on these properties have filed Notices of Intent for coverage under the state's General Industrial Activities Storm Water Permit. Stormwater runoff draining directly to the Bay from construction sites of 5 acres or more must be covered under stormwater permits and must be managed by a Storm Water Pollution Prevention Plan (SWPPP). An SWPPP describes site controls for construction sites and industrial facilities that control or minimize pollutants from entering stormwater.

State guidelines for water quality control recommend the use of Best Management Practices to reduce pollutants in stormwater runoff./39/ A Best Management Practice (BMP) is defined as any program, technology, process, siting criteria, operating method, measure, or device that controls, prevents, removes, or reduces pollution. A source control BMP is an operational practice that prevents pollution at its source and typically does not require construction. A treatment control BMP is a method of treatment to remove pollutants from stormwater and typically requires construction and maintenance.

Phase II Stormwater Regulations

The U.S. EPA proposed Phase II stormwater regulations in January 1998 to regulate small municipal separate storm sewer systems/40/ not currently subject to the Phase I regulations, construction activities disturbing 1 to 5 acres of land, and other discharges designated by the local NPDES permitting authority, which, for San Francisco, is the RWQCB./41/ In effect, the proposed regulations would expand existing stormwater programs to these sources of stormwater discharge. The U.S. EPA anticipates these regulations to become final in March 1999. Areas of San Francisco not currently served by the City's combined sewer system, such as the Bay Basin described above, would be subject to these proposed regulations. The City and County of San Francisco is pursuing coverage under a general municipal NPDES permit under Phase I regulations and plans to be in compliance with Phase II regulations when those take effect./42/ The deadline proposed by the U.S. EPA for application under the general NPDES permit is May 2002.

The Phase II regulations would require San Francisco to develop and implement a stormwater management program that would include, at a minimum, control measures to address requirements concerning public education and outreach, public involvement, illicit discharge detection and elimination, construction site runoff control, post-construction stormwater management in new development and redevelopment, and pollution prevention and good housekeeping of municipal operations. The regulations would require that the program be designed to reduce the discharge of pollutants to the maximum extent practicable (MEP) and protect water quality. "MEP" is a technology-based control standard currently used in the existing municipal stormwater program against which permit writers and permittees assess whether or not an adequate level of control has been proposed in the stormwater management program. To meet the MEP requirement, the City's stormwater management program would need to include measurable goals besides these Best Management Practices. The proposed regulations state that implementation of BMPs consistent with the stormwater management program requirements and NPDES permit provisions would constitute compliance with the standard of reducing pollutants to the maximum extent practicable.

San Francisco Water Pollution Prevention Program

The City and County of San Francisco currently has a Water Pollution Prevention Program that encourages industries, commercial businesses, and residents to decrease the amount of pollutants in municipal wastewater and stormwater that enter the City's combined sewer system and are eventually discharged into either the San Francisco Bay or Pacific Ocean. Its activities include performing pollution prevention audits for industrial and commercial facilities and public education. The public education component consists of developing and distributing educational materials and conducting multicultural and multilingual outreach projects. In addition, the Water Pollution Prevention Program initiated a Storm Water Pollution Prevention Pilot Program in the Islais Creek drainage area to evaluate the implementation of storm water pollution prevention strategies. The program will be expanded City-wide on July 1, 1998.

Pretreatment Requirements and Industrial Waste Ordinance

Within the City and County of San Francisco's Industrial Waste Pretreatment Program, which regulates San Francisco industries and commercial businesses that discharge process wastewater into the City's combined sewer system, the City's Water Pollution Prevention Program identifies new and existing sources of toxic pollutants, guides the City's industries and commercial businesses through a mandated waste minimization approach, and implements a comprehensive public education campaign. Pollution prevention strategies focus on reducing the amount of pollutants discharged by industries, businesses, and residents, instead of treating the wastes at the discharge point. If necessary, the City may consider enforcement action for polluters./43/,/44/

Some discharges are allowed as overseen through industrial use discharge permits enforced by the Bureau of Environmental Regulation and Management of the San Francisco Public Utilities Commission. Under the authority of the San Francisco Industrial Waste Ordinance, the City may monitor and inspect industrial dischargers and may require sampling of process wastewater./45/ If necessary, the City may also mandate corrective actions in order to ensure that pollutants discharged into the City's combined sewer system do not exceed limits that might then cause the City to violate its NPDES permit for the Southeast Plant.

IMPACTS

Construction activities and operational activities of the project could potentially affect the quality of San Francisco Bay, including near-shore waters, because of changes in surface water runoff or effluent discharges. This analysis evaluates the potential for the project to substantially degrade water quality. Compliance with NPDES permits is assumed necessary to protect water quality. The analysis examines the project's potential effects as they relate to the three types of discharges: municipal wastewater effluent, treated CSOs, and stormwater. Pollutant loading of San Francisco Bay and near-shore waters are discussed. The potential discharge of construction-related pollutants to surface waters is also evaluated. Other hydrology and water quality issues, such as disposal of dewatered groundwater and tidal flooding, are discussed in "Water," in Appendix A, Initial Study. Groundwater contamination is discussed in Section V.J, Contaminated Soils and Groundwater.

STANDARDS OF SIGNIFICANCE

The proposed project would be considered to have a significant effect on hydrology or water quality if it would result in one or more of the following: substantially degrade water quality; contaminate a public water supply; or cause substantial flooding, erosion, or siltation. Criteria for evaluating surface and ground water quality in the San Francisco Bay area are based on beneficial uses and water quality objectives established by the RWQCB, as authorized under the Porter-Cologne Act.

QUALITY OF MUNICIPAL WASTEWATER FROM THE PROJECT

As proposed under the Redevelopment Plans for Mission Bay North and Mission Bay South, permitted uses in areas to be designated residential, retail, commercial industrial, and UCSF include businesses for dry-cleaning, car rental, restaurants, various neighborhood-serving business and professional services, light manufacturing, laboratories, research facilities, and printing shops (see "Proposed Land Uses," in Chapter III, Project Description, for additional discussion regarding proposed permitted uses). Among others, these commercial and industrial businesses have been identified by the Water Pollution Prevention Program as potential sources of problem pollutants, which include oil and grease, suspended solids, chemical oxygen demand (COD), asbestos, mercury, cadmium, chromium, copper, lead, nickel, silver, zinc, cyanide, and phenols. Thus, businesses that have been identified by the City to be associated with pollutants of concern potentially could locate almost anywhere in the Project Area.

In particular, the potential research and development activities associated with the Commercial Industrial and Commercial Industrial/Retail land use designations, and other research activities associated with UCSF land use designations could involve wet laboratories, which would likely use water in greater quantities than more typical office-based activities. On the other hand, laboratory facilities generally operate with a lower population density; therefore, traditional sewage would be discharged in relatively smaller quantities (or be more dilute).

The discharge of hazardous waste to the City's sewer system is regulated by City ordinance (see "Pretreatment Requirements and Industrial Waste Ordinance," in the Setting subsection). UCSF and Commercial Industrial operations may involve the discharge of some pollutants not typically associated with most other San Francisco discharges, which, if improperly handled, could discharge chemicals, radioactive materials, and biohazardous materials to the Southeast Plant (see Table H.1 in Appendix H, Health and Safety, which illustrates the range and nature of chemicals that could be used in the Project Area). Occasional violations are possible and could go undetected because of inconsequential effects on the operation of the Southeast Plant (in part due to the effect of dilution by the relatively large volume of City wastewater discharged to the plant, and in part due to the effectiveness of the treatment processes at the plant). If discharges are large enough to be detected (for example, if the inflow to the Southeast Plant experiences a sudden increase in concentration of a certain pollutant), the problem must be rapidly identified and isolated so that correction can be prescribed. If a problem occurs and this process is impeded, the NPDES permit for the City could be violated. At this time, no regulatory or legal authority requires that new facilities be equipped with sampling ports necessary for the collection of samples to determine specific sources of industrial and commercial pollutants. Mitigation Measure K.2 in Section VI.K, Mitigation Measures: Hydrology and Water Quality, addresses this impact.

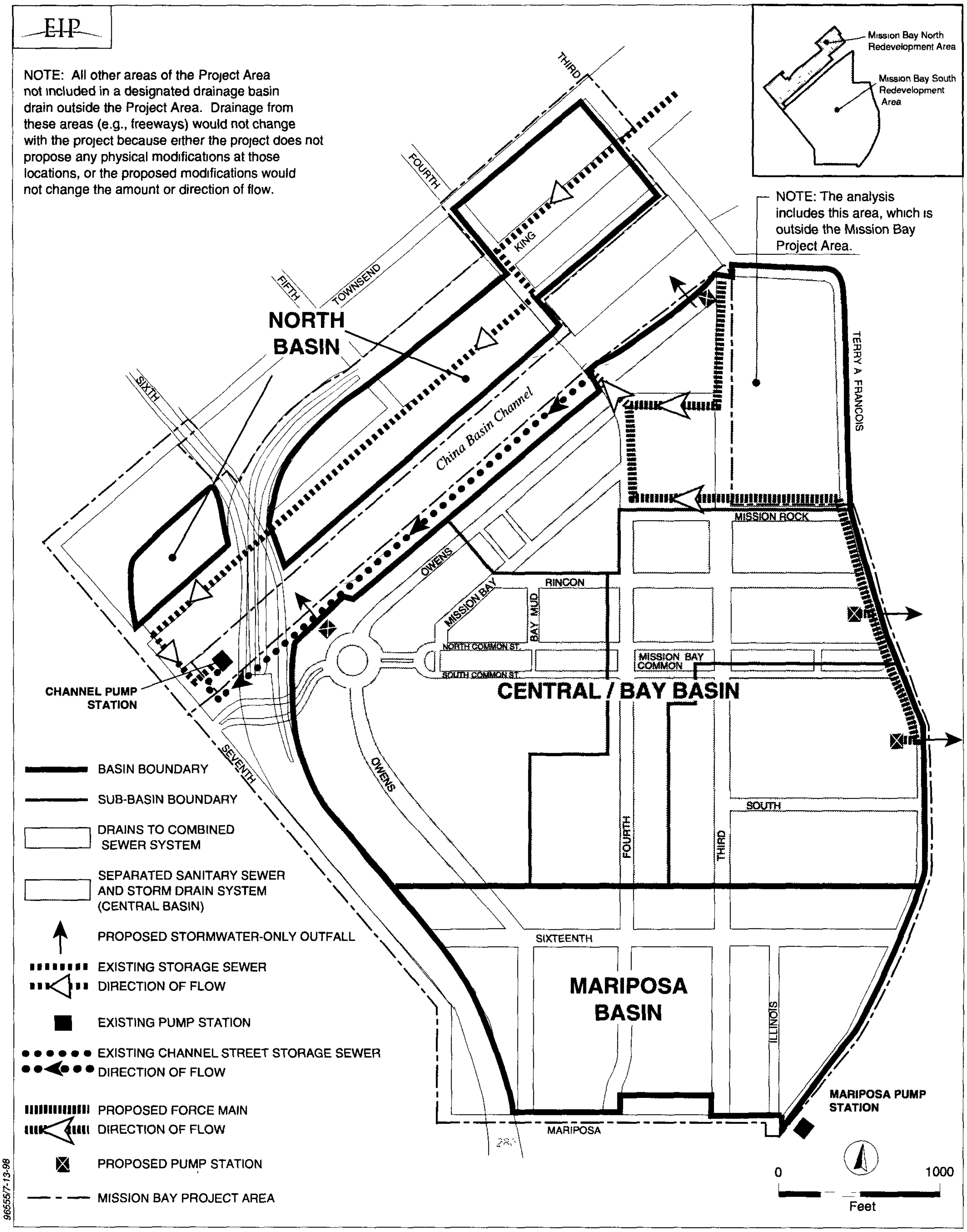
Because businesses in the Project Area would be similar to others existing in the City, and because the City conducts a wastewater pretreatment program to address problem pollutants, the concentrations of pollutants in wastewater from the Project Area are unlikely to differ substantially from other City wastewater. Therefore, the project is not expected to change the concentration of treated municipal wastewater effluent discharged from the Southeast Plant.

PROPOSED DRAINAGE PLAN

As described in detail in "Proposed Drainage Plan," in Section V.M, Community Services and Utilities: Impacts, the proposed development would need a new sewer system for a portion of the Project Area. The North Basin and the Mariposa Basin would be served by the City's existing combined sewer system (see Figure V.M.7 in Section V.M, Community Services and Utilities). For Mission Bay South, because stormwater on the existing Bay Basin would drain into new infrastructure and no longer directly into the Bay, the Central Basin would be enlarged with the addition of the Bay Basin, becoming the Central/Bay Basin. The reconfigured Central/Bay Basin as proposed by the project would be served by a separated sanitary sewer and storm drain system. All sanitary-only sewers in the Central/Bay Basin would connect to the existing combined sewer system for subsequent treatment at the Southeast Plant. All stormwater facilities would be sized to accommodate the City's standard 5-year design storm./46/

The separate storm drainage system in the Central/Bay Basin would include a special feature —diversion of the initial portion of the stormwater flow to the City's combined sewer system for treatment. Most urban areas in the United States built after the 1930's are equipped with separate sanitary and stormwater management systems. Conventional engineering practice is to separately collect sanitary sewage and convey it to a treatment plant. Separately collected stormwater can then be routed to the nearest convenient water body where it is discharged without treatment. These practices were developed to avoid the combined sewage overflow problems that plague older cities. At the time they were developed, urban stormwater runoff was considered an unpolluted waste stream. Now, urban stormwater is recognized as a large-volume, lightly contaminated waste stream requiring treatment before discharge to the environment, if that can be practically accomplished.

Initial flows from the Central/Bay Basin's storm-drain-only system would be conveyed to the City's combined sewer system for treatment and discharge, described below in "Diversion of Initial Flows to Combined Sewer System." Volumes greater than the initial flows up to a five-year storm in the Central/Bay Basin's storm-drain-only system would discharge stormwater directly to the Channel or Bay through four new stormwater outfalls—two outfalls to China Basin Channel and two to San Francisco Bay (see Figure V.M.7 in Section V.M, Community Services and Utilities, and Figure V.K.2 in this section). As is the existing City-wide practice, flows from storms greater than 5-year events would not be accommodated in the system and would pond or flow overland.) Stormwater from the Bay Basin is currently discharged through many drainage pipes located under the piers along the Bay shoreline adjacent to the Project Area.



SOURCE Hawk Engineers

MISSION BAY SUBSEQUENT EIR

FIGURE V.K.2 PROPOSED STORMWATER DRAINAGE BASINS IN THE PROJECT AREA

The drainage pattern in Mission Bay North would not change, as shown in Figure V.K.1 and Figure V.K.2, because no new major sewer infrastructure would be needed, the amount of impervious surfaces would not change substantially, and the freeway and commuter rail areas would not change with the project. The Mariposa Basin drainage area would increase slightly. Refer to "Sewers and Wastewater Treatment" in Section V.M, Community Services and Utilities, for a detailed description of proposed physical changes and additions to the system.

As shown in Figure V.K.2, the 173-acre Central/Bay Basin contains all of the Mission Bay South area east of I-280 and north of a line 300 feet north of 16th Street, plus an area bounded by Terry A. François Boulevard, Third Street, and Mission Rock Street that is outside the Mission Bay Project Area. This last area is the property of the Port of San Francisco and eventually would be developed in the future according to the Port of San Francisco *Waterfront Land Use Plan*. Interim land uses for the Project Area and for this port land are discussed in "Interim Uses," "Central Subarea," in Section V.B, Land Use, and "Existing and Planned Parks, Recreational Facilities, and Open Space," in Section V.M, Community Services and Utilities. An analysis of the proposed plans to accommodate drainage flows from interim uses is found below in "Proposed Drainage Plans for Interim Giants Ballpark and UCSF Parking."

Diversion of Initial Flows to Combined Sewer System

During rainfall events, rainwater may take several paths when it reaches the earth. As water fills surface depressions, it also seeps into the ground where the ground is permeable—a process known as infiltration. As the rate of rain falling on the ground exceeds the rate of water infiltration, a film of water builds up on the ground surface. Once this film is of sufficient depth, the water flows through topographically-defined flow corridors. This initial discharge of a storm is referred to as the "initial flow." Sometimes the initial flow of each storm contains the highest concentration of pollutants, but this is not always the case because the phenomenon is dependent on the duration of the preceding dry weather period, rainfall patterns, rainfall intensity (how hard and fast it falls), the chemistry of individual pollutants, and site-specific conditions.

The project proposes to divert a substantial amount of flow from each storm to the combined sewer system for treatment before discharge. Proposed pump stations would divert the initial-flow stormwater into the existing combined sewer system until treatment and storage capacity is reached. See "Infrastructure," in Section V.M, Community Services and Utilities: Impacts, for a detailed description of the proposed operation of the initial-flow diversion system.

Most other municipalities in the Bay Area operate separated sanitary sewer and storm drain systems./47/ Except for San Francisco, which captures and treats both sanitary sewage and stormwater, Bay Area wastewater treatment plants generally lack the hydraulic capacity to accept initial storm flows. The concept and the technology to capture and treat initial storm flows are not new, but its implementation at Mission Bay would be one of the first in the San Francisco Bay Area.

Volume Capture of Initial Flow

Treatment control BMPs are commonly designed to control small rainfall events, which generally are storms that occur more frequently than once per year on average, and to control the initial flows of larger rainfall events. Based on guidelines provided in the state's *Municipal Best Management Practice Handbook* and other sources, the initial-flow diversion system would be designed to capture 80% of the average annual runoff volume generated on the Project Area. The system would be designed and constructed to operate at a maximum pumping rate of 90 cubic feet per second, and the new system provided a storage capacity of 750,000 gallons./48/

Based on 70 years of rainfall records/49/, collecting about 1 inch of rainfall from each storm would capture about 80% of the City's average annual rainfall of 21 inches./50/ One inch of rainfall is equivalent to a 3-month storm return frequency for San Francisco./51/ This means that in general, for small storms, all of the resulting stormwater flows would be collected, stored, and pumped to the Channel box sewer for subsequent treatment. Only the early part of storm runoff from larger storms would be pumped to the Channel box sewer, either because the Channel box sewer storage capacity would be reached before the end of the storm or because the rainfall intensity would be such that resulting storm runoff rates would exceed the pumping rate to the Channel box. If the runoff rate in the Central/Bay Basin exceeded the pumping rate to the Channel box sewer before the Channel box was full, pumping and/or gravity flow to China Basin Channel and to the Bay would take place simultaneously. The system would be designed so that skimming and sediment removal would occur prior to discharge to the Channel or Bay. See "Sewers and Wastewater Treatment," in Section V.M, Community Services and Utilities, for a description of the system.

ALTERNATIVE WASTEWATER TREATMENT TECHNOLOGIES

The use of alternative wastewater treatment technologies for reducing wastewater pollutants is an area of interest in the City. Such technologies are alternative to the traditional technology of collection, treatment, and discharge to a water body. In late 1996, the Board of Supervisors adopted a resolution urging the San Francisco Public Utilities Commission (SFPUC) to conduct a feasibility study of "environmentally beneficial alternatives" for wastewater management on a citywide basis./52/ In early 1997, the SFPUC and a Technical Advisory Committee that reflected a wide range of interests prepared a draft report that identified the full range of alternative technologies available./53/ A brief summary of the draft report's findings is provided below. The San Francisco Public Utilities Commission has completed an independent assessment of these and other alternative technologies, and their applicability to Mission Bay. The report found that alternative stormwater treatment technologies potentially appropriate for Mission Bay include vortex gravity separators, sediment/oil trapping, and enhanced sedimentation, but does not make a specific recommendation for use of a specific technology. In addition, Catellus has prepared a feasibility assessment which is provided in "Catellus' Feasibility Assessment of Alternative Wastewater Treatment Technologies for the Mission Bay Project," in Appendix K, Hydrology and Water Quality. Also see Mitigation Measure K.4 in Section VI.K, Mitigation Measures: Hydrology and Water Quality.

Various alternative wastewater treatment technologies can be divided into "Source Control" (those that occur before runoff), "Treatment Optimization" (those that enhance existing treatment processes), and "Post-Secondary Treatment" (those that provide additional effluent treatment). Each is discussed below.

Source Control Technologies

Source control processes comprise methods such as: 1) downspout infiltration and graywater (see Glossary) reuse that segregate and re-use the better quality wastewater, and 2) non-structural BMPs, including public education and outreach, designed to educate the public about the importance of protecting stormwater, and regulating, at the City level, certain businesses likely to contribute pollutants to runoff. Non-structural BMPs are addressed in Mitigation Measure K.5 in Section VI.K, Mitigation Measures: Hydrology and Water Quality.

Other technologies in this group may not be feasible for the Mission Bay project. For example, downspout infiltration into the groundwater table would have limited utility because the existing groundwater table is relatively high (4 to 9 feet below the surface in many areas). However, downspout water could be diverted and stored for later irrigation use. If downspout infiltration was proposed, site-specific investigations would need to be conducted to determine feasibility.

Catellus has considered and rejected the use of graywater systems. Graywater may be reused in California for subsurface landscape irrigation of single-family dwellings./54/ A graywater reuse system must be located at the site on the building or structure that discharges the graywater and cannot be installed in geologically sensitive areas. Catellus has rejected this particular treatment technology because opportunities for onsite landscape irrigation are more feasible and appropriate in lower-density suburban areas, where individual homeowners can assume responsibility for operation and maintenance. Most residents (in condominiums, for example) who would occupy the Project Area would not generate sufficient demand for use of graywater. In addition, graywater systems would not be as effective during wet weather when irrigation demands would be lowest and the need to reduce flows to the combined and proposed separated systems would be highest.

Treatment Optimization Technologies

Secondary treatment modifications, such as adding ammonia removal and increased suspended solids removal, are actions that could be implemented at the Southeast Plant. Each of these treatment methods would have an effect on other parts of the plant and the plant site. The contribution of the project to the treatment plant volumes would be relatively small, and, therefore, the determination to implement one or more of these alternative treatments should be made in light of the other factors constraining treatment plant capacity and operations.

Other secondary treatment modifications, such as use of "living machine" algal ponds or floating aquatic plant ponds would require a relatively large area of land and routine maintenance. Catellus has considered the use of wetlands or ponds for the Central/Bay Basin and has rejected them for the Central/Bay Basin and the entire project due to space requirements. Catellus estimates that a pond treatment system would require surface area of up to 8 acres, including access and buffer zones. For wetlands, Catellus estimates that up to 50% more land surface would be required than for ponds, or about 12 acres. Another reason for Catellus' rejection of the use of wetlands is that wetland vegetation is dormant during the winter rainy months, reducing plant nutrient and metals-removal mechanisms when such mechanisms are needed the most. The 1990 FEIR evaluated a land use alternative that included three wetland areas, although they were not proposed or intended for the purpose of wastewater treatment./55/ No land is identified for wetland development under the current proposal.

Post-Secondary Treatment Technologies

Post-secondary treatment modifications, including additional flocculation and settling, constructed wetlands, advanced oxidation, activated carbon adsorption, membrane filtration, and selective ion exchange technologies (see Glossary), have the potential to improve effluent quality. These processes would most likely be implemented at the treatment plant location rather than at the project level, and are being considered by the SFPUC with regard to the overall needs and requirements of San Francisco's wastewater treatment, as part of the City's *Recycled Water Master Plan*.

Treatment of combined sewage produced at Mission Bay for re-use by Mission Bay as reclaimed water/56/ would require the project to include an on-site reclamation plant, which is not proposed. As discussed in "Reclaimed Water System," in Section V.M, Community Services and Utilities: Impacts, the City is planning a new non-potable water delivery system to which the Project Area could connect once the facilities are completed. The SFPUC is evaluating all options for providing reclaimed water for Mission Bay, including on-site reclamation "package plants" that would provide for on-site recycling ahead of the schedule for City-wide implementation of the recycled water system, as well as the amount of recycled water it could make available to the Project Area. Catellus believes that small-scale recycling facilities are not cost-effective. See "Use of Reclaimed Water," below, for a discussion of the water quality effects of reclaimed water use.

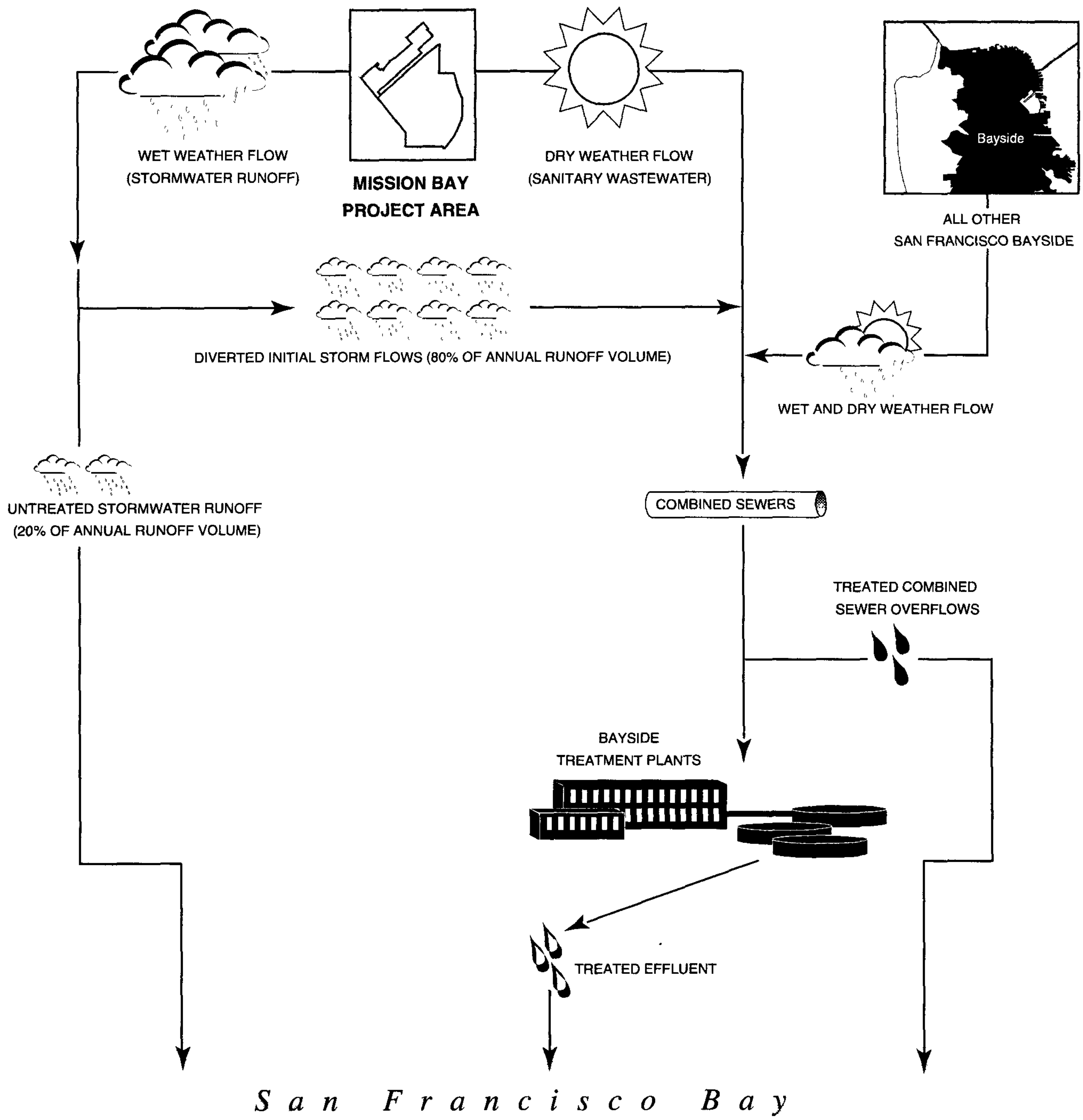
EVALUATION OF POTENTIAL WATER QUALITY IMPACTS

Changes in Discharges to Receiving Waters

The proposed project would contribute pollutant mass emissions to the Bay through the discharge of municipal wastewater effluent from the Southeast Water Pollution Control Plant, the discharge of treated CSOs, and the direct discharge of untreated stormwater to the Channel and Bay. Figures V.K.3 and V.K.4 show schematically the annual flows and selected pollutant loads attributable to the project under the Bayside Base Case plus Mission Bay Project condition and, for comparison, the Bayside Base Case plus Mission Bay 100% Combined Sewer System scenario; these scenarios are described below.

SFPUC staff used its Bayside Planning Model, a computer simulation program, to analyze the effects of Mission Bay and several reasonably foreseeable development projects on the City's Bayside wet-weather control facilities./57/ See "Bayside Planning Model," in Appendix J, for a description of the model. To assess the effects of the project and cumulative development on the City's treatment system, the following four scenarios were analyzed and the results presented and discussed in this SEIR:

- Bayside Base Case: Existing conditions with the inclusion of the new San Francisco Giants Ballpark and related parking, which is under construction, and the City's Sunnydale Flood Control Improvements project./58/
- Bayside Base Case plus Mission Bay Project: Separated sewer system for the Central/Bay Basin capturing 80% of average annual runoff volume by the initial-flow diversion system and discharging 20% to the Bay, combined sewers for the remainder of the Project Area; representing the project as currently proposed by Catellus.



POLLUTANT	BASE CASE	WITH PROJECT AS PROPOSED
Flow (MG/yr)	15.6	15.9
TSS (lb/yr)	8,300	6,600
Cu (lb/yr)	2.8	4.3
Ni (lb/yr)	3.1	4.8

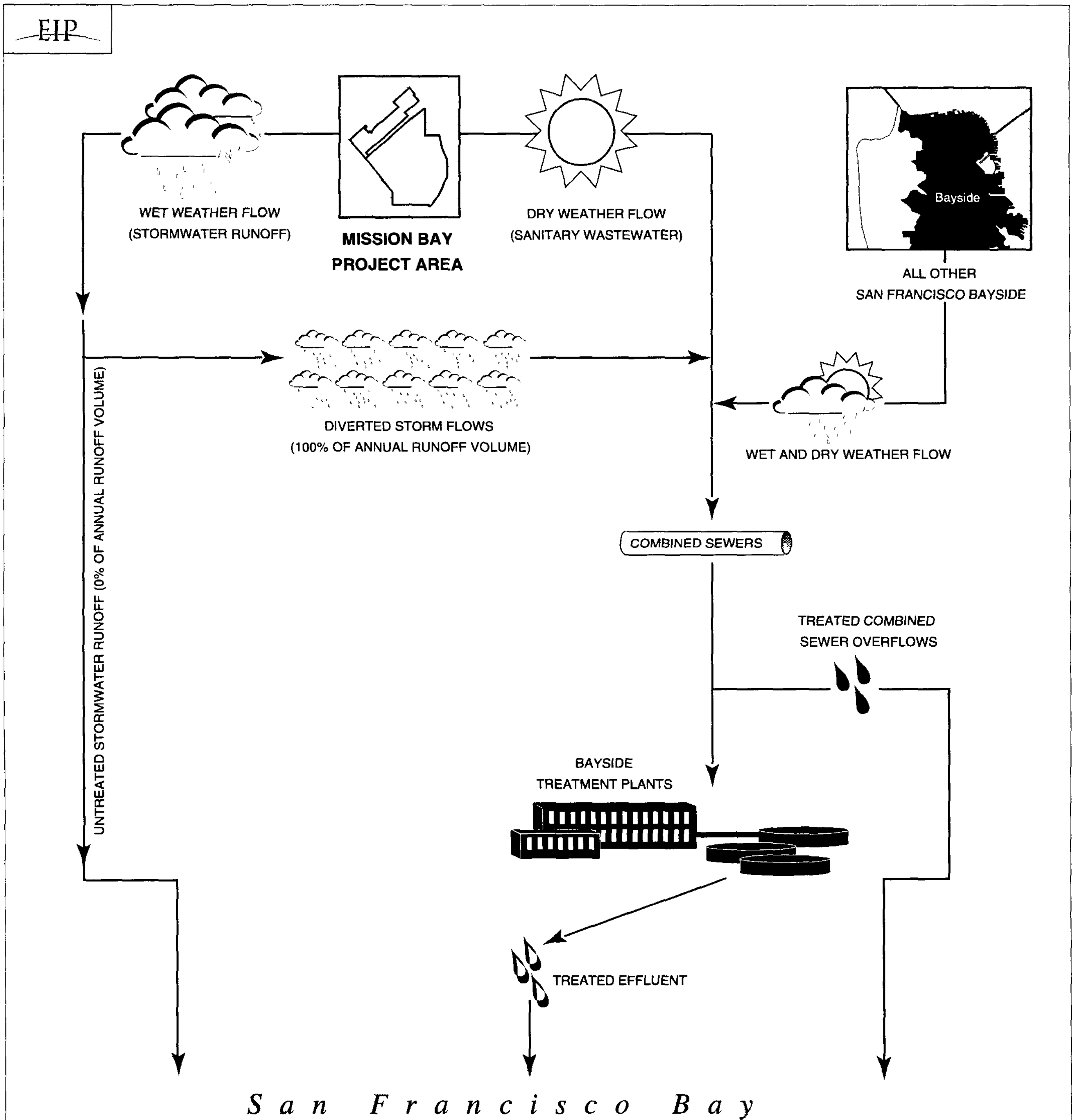
POLLUTANT	BASE CASE	WITH PROJECT AS PROPOSED
Flow (MG/yr)	30,203	31,045
TSS (lb/yr)	4,100,000	4,200,000
Cu (lb/yr)	2,100	2,200
Ni (lb/yr)	1,000	1,000

POLLUTANT	BASE CASE	WITH PROJECT AS PROPOSED
Flow (MG/yr)	910	912
TSS (lb/yr)	680,000	680,000
Cu (lb/yr)	300	300
Ni (lb/yr)	160	160

96555/8-20-98

SOURCE EIP Associates

FIGURE V.K.3 ANNUAL FLOWS AND SELECTED POLLUTANT LOADS ATTRIBUTABLE TO THE BAYSIDE BASE CASE PLUS PROPOSED SEWER SYSTEM FOR THE MISSION BAY PROJECT



POLLUTANT	BASE CASE	WITH 100% COMBINED SEWER SYSTEM
Flow (MG/yr)	15.6	0
TSS (lb/yr)	8,300	0
Cu (lb/yr)	2.8	0
Ni (lb/yr)	3.1	0

POLLUTANT	BASE CASE	WITH 100% COMBINED SEWER SYSTEM
Flow (MG/yr)	30,203	31,045
TSS (lb/yr)	4,100,000	4,200,000
Cu (lb/yr)	2,100	2,200
Ni (lb/yr)	1,000	1,000

POLLUTANT	BASE CASE	WITH 100% COMBINED SEWER SYSTEM
Flow (MG/yr)	910	928
TSS (lb/yr)	680,000	700,000
Cu (lb/yr)	300	300
Ni (lb/yr)	160	160

SOURCE. EIP Associates

FIGURE V.K.4 ANNUAL FLOWS AND SELECTED POLLUTANT LOADS ATTRIBUTABLE TO THE BAYSIDE BASE CASE PLUS 100% COMBINED SEWER SYSTEM SCENARIO FOR THE MISSION BAY PROJECT

- Bayside Base Case plus Mission Bay 100% Combined Sewer System: Combined sewer system for the Central/Bay Basin (100% discharge to the City's combined sewer system with no direct discharge to the Bay), representing a system similar to that previously proposed for the project analyzed in the 1990 FEIR, presented for comparison purposes.

- Cumulative Bayside: Mission Bay project (with separated sewer system) plus the proposed Candlestick Mills Stadium and Mall project, the Hunters Point Naval Shipyard Redevelopment Project, and proposed development of waterfront port properties (comprised primarily of piers). This list represents the major reasonably foreseeable projects in the City that could affect Bayside operations. To conservatively estimate effects on the City's combined sewer system the Bayside cumulative scenario assumes that these projects, except Mission Bay, will maximize flows to the City system.

The Bayside Planning Model includes the assumption that pumping rates at the various pump stations would be varied (within attainable limits) to distribute the inflow to as much of the Bayside system as possible, thus maximizing the use of every element in the system, before treated CSOs would be allowed to occur. Table V.K.1 shows estimated total combined sewage and CSO volumes for the Bayside facilities under the four scenarios. The cumulative impacts of the project, represented by the Cumulative Bayside scenario, are discussed later in this section in "Cumulative Issues."

Volume and Quality of Municipal Wastewater Effluent

Under the Bayside Base Case, about 30,000 MG/yr of municipal wastewater effluent is discharged from Bayside facilities to the Bay (see Table V.K.1). Under the proposed project (Bayside Base Case plus Mission Bay Project scenario), this volume would increase by about 3% to about 31,000 MG/yr largely due to the increase in dry-weather municipal wastewater. Under the Bayside Base Case plus Mission Bay 100% Combined Sewer System scenario, the volume of municipal wastewater effluent discharged to the Bay would also increase by about 3%, also largely due to the increase in dry-weather flow.

The City regularly monitors the quality of municipal wastewater effluent discharged to the Bay from the wastewater treatment plants and submits monthly monitoring reports to the RWQCB./59/ The City reports average monthly and average annual mass loads of various pollutants from its Southeast and North Point water pollution control plants. Southeast Plant data were used to estimate the total pollutant loads discharged in municipal wastewater effluent under various scenarios as shown in Table V.K.2. Municipal wastewater effluent flow volumes were obtained from the results of the Bayside Planning Model. Total pollutant loads were estimated by assuming that the quality of wastewater effluent would remain about the same under the proposed project as under the existing condition. This assumption is reasonable; however, actual pollutant loads could differ to the extent that the eventual mix of land uses in the project and other cumulative future projects differs from the existing San Francisco land use mix.

TABLE V.K.1
CHANGES IN EFFLUENT, OVERFLOW, AND STORMWATER VOLUMES

		Bayside Base Case + Proposed Sewer System for Mission Bay Project		Bayside Base Case + 100% Combined Sewer System for Mission Bay Project		Cumulative Bayside	
	Bayside Base Case	Flow Volume	Change from Existing (%)	Flow Volume	Change from Existing (%)	Flow Volume	Change from Existing (%)
Total Effluent (MG/yr)	30,203	31,045	2.8%	31,045	2.8%	31,496	4.3%
Total Overflows (MG/yr)	910	912	0.22%	928	2.0%	1,008	11%
Total Bayside Flow (MG/yr)/a/	31,113	31,957	2.7%	31,973	2.8%	32,504	4.5%
% of Flow Treated							
Secondary	87.3%	87.5%	—	87.4%	—	86.9%	—
Primary	9.7%	9.7%	—	9.6%	—	10.0%	—
Project Area Stormwater Flow (MG/yr)	15.6	15.9	2.3%	0	-100%	15.9	2.3%

Notes:

MG/yr = million gallons per year

a. Total Bayside Flow is the sum of Total Effluent and Total Overflows

Source: City and County of San Francisco, Public Utilities Commission, Clean Water Program, *Draft Bayside Cumulative Impact Analysis*, March 1998.
EIP Associates.

Each unit volume of discharge contains a certain concentration of pollutants, measured as mass per volume (e.g., milligrams per liter). Assuming the concentration stays the same, the pollutant mass, or load, is assumed to be roughly proportional to the volume of discharge in which it is contained. Therefore, if the volume of discharge changes, the pollutant mass load changes in proportion to the discharge volume. Thus, the pollutant load from effluent would increase by about 3% under the scenarios with a separated sewer system for part of Mission Bay and with a 100% combined system. The cumulative pollutant load from municipal wastewater effluent, due to all major reasonably foreseeable projects affecting Bayside operations, would increase by about 4%. The project and

TABLE V.K.2 ●
ESTIMATED ANNUAL MASS POLLUTANT LOADING TO BAY FROM BAYSIDE EFFLUENT DISCHARGES

	Bayside Base Case /a/	Bayside Base Case + Proposed Sewer System for Mission Bay Project	Bayside Base Case + 100% Combined Sewer System for Mission Bay Project	Cumulative Bayside
Effluent Volume (MG/yr) /b/	30,203	31,045	31,045	31,496
% Change in Volume from Base Case /c/	—	2.8%	2.8%	4.3%
Monitored Pollutant Load (lb/yr)				
Total Suspended Solids	4,100,000	4,200,000	4,200,000	4,300,000
Ammonia, Nitrogen	5,100,000	5,200,000	5,200,000	5,300,000
Oil and Grease	1,300,000	1,300,000	1,300,000	1,300,000
Polynuclear Aromatic Hydrocarbons	36	37	37	38
Arsenic	530	550	550	550
Cadmium	54	55	55	56
Chromium	250	260	260	260
Copper	2,100	2,200	2,200	2,200
Lead	880	910	910	920
Mercury	17	18	18	18
Nickel	1,000	1,000	1,000	1,100
Silver	530	550	550	550
Zinc	13,000	13,000	13,000	14,000
Selenium	180	190	190	190
Cyanide	2,500	2,600	2,600	2,600

Notes:

MG = million gallons
lb = pounds
yr = year

a. Derived from data in City and County of San Francisco, Public Utilities Commission, Bureau of Water Pollution Control - Southeast Plant, Southeast WPCP Monitoring Report December 1997, January 16, 1998. Polynuclear Aromatic Hydrocarbon data derived from City and County of San Francisco, Public Utilities Commission, Bureau of Water Pollution Control - Southeast Plant, Southeast WPCP Monitoring Report December 1996, January 17, 1997.
b. Derived from data in City and County of San Francisco, Public Utilities Commission, Clean Water Program, *Draft Bayside Cumulative Impact Analysis*, March 1998.
c. The percent change in volume is the same as for load. While the percent change reflects the incremental change that would occur in each analysis scenario, there is a level of imprecision associated with the load calculations. Therefore, all load values have been rounded to two significant figures to reflect the statistical uncertainty of the calculations. The significance of each change was evaluated by determining whether the change falls within the range of uncertainty.

Source: EIP Associates.

cumulative increase in treated effluent is expected and provided for, and would be well within the City's treatment plant capacity and NPDES permit limits. As discussed below under "Cumulative Issues," the estimated increase would be insignificant in the context of the entire Bay, would not affect beneficial uses, and is therefore not considered significant.

Volume and Quality of Treated Combined Sewer Overflows

Under the Bayside Base Case, approximately 910 MG/yr is discharged to near-shore waters of the Bay through overflow structures located along the Bay (see Table V.K.3). The City's Bayside Planning Model was used to estimate the increase in treated CSO volumes attributable to the proposed project as discussed above and the Mission Bay 100% Combined Sewer System scenario. Under the proposed project, treated CSO volumes would increase by about 0.2%, to about 912 MG/yr. Under the 100% combined sewer scenario, the overflow volume would increase by about 2% to about 928 MG/yr. In the cumulative scenario, the overflow volume would increase by about 11% to 1,008 MG/yr.

Based on existing treated CSO characteristics,/60/ annual pollutant loads were estimated for existing conditions, proposed project conditions, conditions with the 100% combined sewer scenario, and cumulative conditions as shown in Table V.K.3. The pollutants shown in Table V.K.3 are those the City's NPDES permit requires to be monitored. An average concentration was estimated for each pollutant based on the three most recent years of treated CSO monitoring data (October 1994 to June 1997). The calculations assumed that the quality of combined sewage (i.e., pollutant concentration) would remain the same under all conditions. Therefore, the annual pollutant loads under the proposed project, and the 100% Combined Sewer scenario, would increase in rough proportion to the estimated increases in CSO volumes. The calculated increase is about 0.2% for the proposed project and about 2% for the 100% Combined Sewer System scenario.

Increases in CSO volumes would not constitute a violation of the City's NPDES permit. The project-related increase in pollutant loading (0.2%) is not significant because it represents such a small portion of total Bayside discharges. An increase of 0.2% would not represent a permit violation, result in a violation of water quality objectives, substantially degrade water quality, or substantially affect aquatic organisms. Cumulatively, the load from overflows would increase by about 11%. This estimated cumulative increase is discussed further below in "Cumulative Issues."

TABLE V.K.3 ●
ESTIMATED ANNUAL MASS POLLUTANT LOADING TO BAY FROM BAYSIDE TREATED OVERFLOWS

	Base Case Bayside/a/	Bayside Base Case + Proposed Sewer System for Mission Bay Project	Bayside Base Case + 100% Combined Sewer System for Mission Bay Project	Cumulative Bayside
Overflow Volume (MG/yr) /b/	910	912	928	1,008
% Change in Volume from Base Case /c/	—	0.22%	2.0%	11%
Monitored Pollutant Load (lb/yr)				
Total Suspended Solids	680,000	680,000	700,000	750,000
Ammonia, Nitrogen	9,600	9,600	9,800	11,000
Oil and Grease	61,000	61,000	63,000	68,000
Polynuclear Aromatic Hydrocarbons	4.1	4.1	4.2	4.6
Arsenic	60	60	61	66
Cadmium	17	17	17	19
Total Chromium	91	92	93	100
Copper	300	300	300	330
Lead	470	470	480	520
Mercury	2.9	2.9	2.9	3.2
Nickel	160	160	160	180
Silver	37	37	38	41
Zinc	2,400	2,400	2,500	2,700
Selenium	6.5	6.5	6.6	7.2
Cyanide	38	38	39	42

Notes:

MG = million gallons   lb = pound   yr = year

a. Derived from the following data sources provided by Jim Salerno, Laboratory Supervisor, Southeast Water Pollution Control Plant, September 5, 1997:
   City and County of San Francisco, Department of Public Works, Bureau of Water Pollution Control, Bayside Wet Weather Overflow Monitoring Program Data Summary, October 1994 - June 1995.
   City and County of San Francisco, Department of Public Works, Bureau of Water Pollution Control, Bayside Wet Weather Overflow Monitoring Program Data Summary, October 1995 - June 1996.
   City and County of San Francisco, Department of Public Works, Bureau of Water Pollution Control, Bayside Wet Weather Overflow Monitoring Program Data Summary, October 1996 - June 1997.

b. City and County of San Francisco, Public Utilities Commission, Clean Water Program, *Draft Bayside Cumulative Impact Analysis*, March 1998.

c. The percent change in load is the same as the percent change in volume. While the percent change reflects the incremental change that would occur in each analysis scenario, there is a level of imprecision associated with the load calculations. Therefore, all load values have been rounded to two significant figures to reflect the statistical uncertainty of the calculations. The significance of each change was evaluated by determining whether the change falls within the range of uncertainty.

Source: EIP Associates.

Volume and Quality of Direct Stormwater Discharge to Bay

A few areas of San Francisco currently drain to separate storm sewers or directly to the Bay or Pacific Ocean. Most stormwater in the City is routed to the combined sewer system. As a consequence, the pollutant load discharged to surface waters via stormwater from San Francisco is small relative to the load contained in the City's other waste streams.

Under Bayside Base Case conditions at the Project Area, stormwater is discharged to the combined sewer with the exception of stormwater from the Bay Basin which drains directly to the Bay. The Bayside Base Case assumes development of the approved Giants parking lots in the Project Area, and assumes that drainage from the port-owned property outside the Project Area for up to a five-year storm would initially be routed to existing combined sewer lines along Third Street. Rainwater falling on this area either evaporates, percolates into the ground, or drains to the Bay. Based on an annual rainfall of 21 inches and a runoff coefficient of 0.62, the estimated total annual volume of stormwater runoff currently discharged to the Bay is about 15.6 MG/yr from the Bay Basin (see Table V.K.4)./61/

Under the proposed project, a larger area of the Central/Bay Basin would drain to near-shore waters, but only during large storms. The 173-acre Central/Bay Basin would drain to a separate storm drainage system discharging to the Bay during the latter portion of large storms. However, in smaller storms, runoff from the separate storm drainage system would be diverted to the combined sewer system. During larger storms, diversion of stormwater to the combined sewer system would stop after the Channel Street box sewer has reached its storage capacity, and all runoff would flow directly to the Bay through the four outfalls shown on Figure V.K.2. The diversion system would route about 80% of the total average annual runoff volume from the Project Area to the combined sewer system, with the remainder flowing to the Bay.

Under the project, the volume of stormwater discharged to near-shore waters of the Bay would increase slightly from 15.6 MG/yr to 15.9 MG/yr, an increase of about 2%. Under the Bayside Base Case plus Mission Bay 100% Combined Sewer System scenario, stormwater from the Project Area would be routed to the combined sewer system for treatment. No stormwater (and no stormwater pollutants) would be discharged directly to near-shore waters of the Bay, except overland flow which may occur in a greater than five-year storm.

No direct measurements of runoff quality from the Project Area or elsewhere in San Francisco are available. However, the concentrations of some pollutants in stormwater can be estimated using data from other Bay Area communities. Pollutant concentrations in urban runoff from different land use

TABLE V.K.4 ●
ESTIMATED ANNUAL POLLUTANT LOADING FROM DIRECT STORMWATER DISCHARGE TO THE BAY FROM PROJECT AREA

	Bayside Base Case /a/	Bayside Base Case + Proposed Sewer System for Mission Bay Project/b/
Stormwater Volume to Bay from Bay Basin of Mission Bay (MG/yr) /c/	15.6	15.9
Pollutant Load (lb/yr) /d/		
Total Suspended Solids	8,300	6,600
Cadmium	0.18	0.21
Total Chromium	1.5	2.2
Copper	2.8	4.3
Lead	6.6	10
Nickel	3.1	4.8
Zinc	24	27

Notes:

MG= million gallons   lb = pound   ac = acre
in = inch   yr = year

a. The percent change in load is the same as the percentage change in volume. While the percent change reflects the incremental change that would occur in each analysis scenario, there is a level of imprecision associated with the load calculations. Therefore, all load values have been rounded to two significant figures to reflect the statistical uncertainty of the calculations. The significance of each change was evaluated by determining whether the change falls within the range of uncertainty.
b. The Cumulative Bayside scenario did not model direct stormwater discharges other than from the Project Area. The Mission Bay project would be the same under cumulative conditions as proposed. Thus, pollutant loads under the Cumulative Bayside condition would be the same as under the proposed project condition.
c. Based on drainage basin area and runoff coefficient data provided by KCA Engineers, Inc. and Hawk Engineers.
d. Derived from unit load data found in Bay Area Stormwater Management Agencies Association, *San Francisco Bay Area Stormwater Runoff, Pollutant Monitoring Data Analysis, 1988 - 1995, Final Report*, prepared by Woodward-Clyde Consultants, October 15, 1996, Table 5-2.

Source: EIP Associates.

types have been measured in several Bay Area locations during the last five to seven years. These data have been compiled and analyzed by the Bay Area Stormwater Management Agencies Association (BASMAA), which has estimated typical pollutant loadings for different land uses. Stormwater quality is influenced by the type of land use. For example, metals levels in stormwater runoff from industrial land uses and highways may be higher compared to residential acres. Data reflect stormwater concentrations prior to any treatment. Actual pollutant concentrations in Mission Bay stormwater may vary somewhat, but these are the best available data and are considered reasonable.

The available BASMAA data allowed the analysis of seven pollutants—cadmium, chromium, copper, lead, nickel, zinc, and total suspended solids (TSS). Table V.K.4 shows the pollutant loads in stormwater discharged from the Project Area directly to the near-shore waters of the Bay. As shown, mass loading to the Bay from the Project Area would increase for six of the pollutants and decrease for total suspended solids. The amounts are very small relative to those from municipal wastewater effluent and treated CSOs.

The degree of pollutant build-up on urban surfaces before a storm influences the amount of pollutants that might be transported by stormwater. For example, if a series of storms occurs, stormwater runoff from the storms in the beginning of the series would be expected to contain higher pollutant loads than the runoff at the end of the series. For the purposes of this analysis, an even distribution of pollutant concentration is assumed throughout the duration of each storm. As discussed in "Diversion of Initial Flows to Combined Sewer System" above, the pollutant concentrations in runoff generated by the initial flows of a storm could be higher in some cases than in runoff generated later in the storm, when the ground surface could be cleaner. This analysis conservatively assumes that runoff quality would remain the same throughout a storm. To the extent that initial storm flows may contain higher concentrations of pollutants than later flows, more of those pollutants would be captured by the combined sewer system, and the pollutant loads in stormwater discharged directly to the Bay would be less than those shown in Table V.K.4.

Effects on Receiving Waters

Potentially-affected receiving waters include the deep waters of central San Francisco Bay in the vicinity of the outfall from the Southeast Water Pollution Control Plant and near-shore waters of the Bay along the Bayside shoreline. Deep waters of the Bay could be affected by the discharge of municipal wastewater effluent from Southeast Water Pollution Control Plant that is attributable to Mission Bay. Near-shore water quality could be affected by increased volume of treated CSOs and new separate stormwater discharges from Mission Bay. Near-shore waters also include China Basin Channel and Islais Creek. The impact analysis below discusses potential effects on deep Bay waters, followed by a discussion of effects on near-shore waters, including China Basin Channel and Islais Creek.

The critical consideration regarding biological impacts due to pollutant discharge to an aquatic system rests not in the mass load, but in the extent to which discharges to the system serve to increase contaminant concentrations. A toxicological effect is inferred if contaminant concentrations increase to the extent that the survival, growth, and/or reproduction of sensitive species in the habitat are threatened, or if contaminant concentrations increase to the point that the allowable margin of error for estimates of the effects of the contaminants is exceeded.

Deep Water Effects of Increased Treated Effluent

Monitoring reports demonstrate that San Francisco complies with the pollutant concentration limits in its NPDES permit and with permitted loads specified./62/ The City also operates its wastewater treatment facilities within their permitted capacities. The City's NPDES permit specifies a maximum, allowable, dry-weather flow through the Southeast Plant of 85.4 MG/day./63/ The project would cause a 3% increase in effluent flow (as would the 100% Combined Sewer scenario). This increase in volume, added to the current dry-weather flow of 74 MG/day, would result in a total dry-weather flow to the Southeast Plant of 76.2 MG/day, which would be well within the allowed flow of 85.4 MG/day. Thus, compliance with the existing permit would continue with the project.

As discussed above, the proposed project would cause a slight increase in the total municipal wastewater effluent discharged from the Southeast Plant. Because of the increased flow, the project would also cause a 2% to 3% increase in the pollutant loading to San Francisco Bay. The waste stream from the Project Area is not expected to differ in any substantial way from the current waste stream flowing to the Southeast Plant.

The estimated contaminant concentrations are compared to water quality screening values to determine whether the concentrations in the current waste stream have any toxicological effects on aquatic or benthic organisms, and thus to provide a framework for consideration of whether a 2% to 3% increase in the volume of this waste stream would have any such effects. The water quality screening values are either the Water Quality Objectives (WQOs) adopted by the RWQCB, or where WQOs from the RWQCB are unavailable, U.S. EPA National Ambient Water Quality Criteria for the protection of salt-water aquatic life are used. WQOs are the "target" Bay-wide, open-water concentrations that the RWQCB has determined are suitable for maintaining beneficial uses./64/ WQOs are not used as discharge criteria. Near-shore stormwater discharges relate to WQOs in the sense that existing ambient pollutant concentrations in open-Bay waters are the result of long-term integration by the Bay ecosystem of natural inputs, industrial, domestic and urban discharges, atmospheric deposition, stormwater discharges, and a variety of other inputs. Therefore, this direct comparison of municipal wastewater effluent to WQOs is extremely conservative.

Studies show that the actual dilution achieved by the outfall's diffuser unit ranges from factors of 19 to 34 during slack water./65/ Dilution under prevailing currents are several times greater than at slack tide conditions. For analysis purposes, a conservative dilution factor of 20 was used. Table V.K.5 shows the estimated contaminant concentrations in the Southeast Plant effluent after initial dilution (20:1) with ambient Bay water at the diffuser outfall in San Francisco Bay. The calculated dilution assumes that 19 units of ambient Bay water are mixed with one unit of municipal wastewater effluent from the diffuser. (Because ambient Bay water may contain measurable quantities of the pollutant in question, the calculated diluted concentration is not a simple division by 20.) Table V.K.5 also presents recent data on ambient concentrations of metals in Bay water from the ongoing Regional Monitoring Program, and metals concentrations for use in screening the quality of the diluted effluent water.

As shown in Table V.K.5, the estimated contaminant concentrations in the current waste stream are far less than the acute water quality screening values. The addition of increased pollutant loads under project conditions does not result in a substantial change in ambient metals concentrations in San Francisco Bay in the vicinity of the treated effluent discharge. Therefore, the addition of increased loads of metals to the Bay in the treated municipal wastewater effluent from the Southeast Plant would not cause a substantial degradation of Bay water quality from the toxicological perspective. It should be noted that water quality screening values derived from the Basin Plan for copper and selenium may change; RWQCB staff are in the process of re-evaluating these metals relative to publication of Basin Plan WQO concentrations. San Francisco Public Utilities Commission staff do not expect the proposed changes to the copper and selenium objectives to cause compliance problems for the City./66/

Near-Shore Effects

The potential impacts of shoreline discharges of stormwater and treated CSOs on water quality in San Francisco Bay are estimated by evaluating the potential impacts of near-shore discharges on the biota of the Bay in the immediate vicinity of the discharges. Near-shore discharges are not subject to the same diffusive mixing as the deepwater Southeast Plant outfall. Concentrations of toxic pollutants near and in the tidal zone of the Bay may be substantially higher than concentrations occurring in the open Bay, adjacent to the diffuser outfall, and therefore exposure of biota could be greater near-shore than in the open Bay. In order to conservatively evaluate such conditions, concentrations were estimated "at the end of the pipe," assuming no dilution. In order to evaluate the project's contribution to CSOs and stormwater discharge, this section discusses the existing effects of CSOs and stormwater discharges to near-shore waters. The increase to CSOs and stormwater discharges contributed by the project is then discussed in this context.

TABLE V.K.5 ●
COMPARISON OF POLLUTANT CONCENTRATIONS IN EFFLUENT WITH AMBIENT BAY WATER QUALITY

Pollutant	Effluent Concentration (μg/l)/a/	Diluted Effluent (μg/l)/b/	Ambient Bay Concentration (μg/l)/c/	Acute Water Quality Screening Values (μg/l)
Arsenic	2.1	2.33	2.34	69 /d/
Cadmium	0.21	0.105	0.10	43 /d/
Chromium	1.0	0.81	0.80	1,100 /d/
Copper	8.3	2.6	2.29	4.9 /d/
Lead	3.6	0.48	0.32	140 /d/
Mercury	0.07	0.008	0.005	2.1 /d/
Nickel	4.0	2.82	2.76	74 /e/
Silver	2.1	0.11	0.006	2.3 /d/
Zinc	53	4.4	1.98	90 /e/
Selenium	0.72	0.22	0.19	290 /e/

Notes:

a. City and County of San Francisco, Public Utilities Commission, Bureau of Water Pollution Control - Southeast Plant, Southeast WPCP Monitoring Report December 1997, January 16, 1998.
b. These values assume a 20:1 dilution, or 19 parts of ambient Bay water to 1 part of effluent.
c. San Francisco Estuary Institute, *1995 Annual Report: San Francisco Estuary Regional Monitoring Program for Trace Substances*, 1996.
d. California Regional Water Quality Control Board, San Francisco Bay Region. *Water Quality Control Plan* (Basin Plan), June 27, 1995, Water Quality Objectives for Toxic Pollutants, for surface waters with salinities greater than 5 parts per thousand p. 3-9, Table 3-3; 1-hour average concentrations.
e. Corresponds to the U.S. EPA Acute Ambient Water Quality Criteria for the protection of saltwater life (40 CFR, Section 131.36).

Source: Dr. Joseph M. O'Connor.

Effects of Treated Combined Sewer Overflows

Treated CSOs from Bayside facilities currently occur in the near-shore environment at 29 overflow locations, including 7 overflow outfalls in China Basin Channel and 4 in Islais Creek. The proposed project would increase the volume of treated CSOs. The project would also contribute to increased flow of secondary-treated wet-weather effluent from the Southeast Plant into Islais Creek during very large storms when the combined sewage inflow into the combined sewer system exceeds the 100 MG/day discharge capacity of the deepwater outfall. The quality of secondary-treated wet-weather effluent to Islais Creek is similar to the quality of secondary-treated dry-weather effluent that is discharged from the Pier 80 deepwater outfall (see Table V.K.5). Generally, pollutant concentrations in secondary-treated effluent are lower than in treated CSOs. For the purposes of analyzing the impacts of discharges to the near-shore environment, it is conservatively assumed that the secondary-treated, wet-weather effluent discharge to Islais Creek carries contaminants at the same concentrations as other treated CSOs.

The prediction of dilution factors for pollutants in stormwater runoff and CSOs to the Bay is difficult, at best. Dye studies have been carried out to determine the dilution of CSOs from numerous sites along the San Francisco shoreline./66a/ Dilution measured from dye studies ranged from 1:1 to more than 300:1, and were affected by the physical location of the overflow, duration of the overflow, volume of the overflow, stage of the tide, direction and velocity of tidal currents, wind speed and wind direction. This analysis conservatively assumed that CSOs and stormwater discharges were not diluted at all by the time the biota of the Bay were exposed to them. Under this scenario the biota of the nearshore environment would be exposed to pollutants at the concentrations calculated from load and volume estimates at the "end of the pipe." In fact, the biota would be exposed to much lower concentrations.

The effects in the near-shore are not evaluated against water quality objectives or other water quality screening criteria because CSO and stormwater discharges are short-term, seasonal, variable in duration and volume, and scattered at a number of locations along the shoreline, although the pollutant contribution from CSOs and stormwater discharges may remain concentrated in the near-shore environment rather than being integrated into the Bay ambient background concentrations. Therefore, near-shore impacts are evaluated by comparing pollutant concentrations in discharges to known concentrations of pollutants that have been shown to cause some effect on the biota. While the acute toxicity concentration ranges as presented in Table V.K.6 are neither criteria nor standards, and carry no regulatory weight or authority, they are used for comparison purposes in that they show the range of concentrations shown by toxicological research to have effects on some saltwater organisms. Among studies considered by the U.S. EPA, the "low acute" value, therefore, is the lowest concentration of a particular contaminant shown to have had some acute impact on some marine organism./67/ The "low acute" value is a yardstick or screening tool useful in estimating whether the concentration of contaminants in the CSO and stormwater discharges begin to approach concentrations of concern.

Other discharges that are continuous, such as treated municipal wastewater effluent (see "Deep Water Effects of Increased Treated Effluent") and groundwater (see "Contaminated Groundwater" in Section V.M, Contaminated Soils and Groundwater: Setting), are conservatively compared to WQOs, whereas intermittent discharges, such as treated CSOs and stormwater runoff discharges, are more appropriately, and conservatively, compared to acute toxicity concentration ranges as a guideline.

TABLE V.K.6 ●
COMPARISON OF POLLUTANT CONCENTRATIONS IN TREATED OVERFLOWS WITH CONCENTRATIONS SHOWN TO CAUSE ACUTE AND/OR CHRONIC TOXICITY IN BIOASSAYS WITH MARINE/ESTUARINE ORGANISMS

Metal	Mean Concentration (μg/l) /b/	Acute Toxicity Concentration Ranges (μg/l) /a/	
		High	Low
Arsenic	7.9	16,030	232
Cadmium	2.2	135,000	15.5
Chromium	12	105,000	2,000
Copper	39	600	5.8
Lead	61	27,000	315
Mercury	0.38	1,678	3.5
Nickel	21	350,000	151.7
Silver	4.9	2.3	--
Zinc	320	320,000	191.5
Selenium	0.85	760 /c/	--
Cyanide	5.0	10,000	4.9

Notes:
μg/l = micrograms per liter
-- = No Data

a. U.S. Environmental Protection Agency, Office of Water, Water Quality Criteria, 1986.
b. Mean concentration derived from data sources provided by Jim Salerno, Laboratory Supervisor, Southeast Water Pollution Control Plant, September 5, 1997:
   City and County of San Francisco, Department of Public Works, Bureau of Water Pollution Control, Bayside Wet Weather Overflow Monitoring Program Data Summary, October 1994 - June 1995.
   City and County of San Francisco, Department of Public Works, Bureau of Water Pollution Control, Bayside Wet Weather Overflow Monitoring Program Data Summary, October 1995 - June 1996.
   City and County of San Francisco, Department of Public Works, Bureau of Water Pollution Control, Bayside Wet Weather Overflow Monitoring Program Data Summary, October 1996 - June 1997.
c. Toxicity data for selenium provided for freshwater bioassays only.

Source: Dr. Joseph M. O'Connor.

- Table V.K.6 shows that, with the exception of copper, silver, cyanide, and zinc, the total concentrations of pollutants in treated CSOs are well below the lowest concentrations of pollutants causing acute toxicity in saltwater organisms.

Zinc concentrations in treated CSOs were estimated to exceed the lowest zinc concentration causing acute toxicity. However, acute toxicity in water from metals is due almost exclusively to metals in the dissolved form. Studies show that zinc in CSOs is present primarily in the particulate form, and that 41.5% of the total zinc in CSOs would be in the dissolved, bio-available form./68/ The zinc measured in treated CSOs represents not 320 μg/l, but a value less than half of that, approximately 132 μg/l. Thus, the actual concentration available to biota that are exposed to treated CSOs would be below the acute toxicity concentration range.

- The total silver concentration in treated CSOs appears to be within the acute toxicity concentration range. Because the reported silver concentration is based on data near or below the analytical detection limit for silver (half the detection limit was assumed when no silver was detected), the silver data reflect substantial uncertainty. Only the dissolved portion of the total concentration would be potentially available to biota, and studies of metals in stormwater runoff show that roughly 23% of the silver would be in the soluble, biologically available phase./68a/ Therefore, the actual concentration of silver in treated CSOs to which biota might be exposed would be about 1.1 μg/l in the dissolved phase, and the actual concentration available to biota that are exposed to treated CSOs would be below the acute toxicity concentration range.

The total copper concentration in treated CSOs is within the acute toxicity concentration range. However, only the dissolved portion of the total concentration would be potentially available to biota. Studies of metals in overflow waters show that about 26% of copper in the waste stream is in the soluble, bioavailable phase./69/ Thus, the actual concentration of copper in treated CSOs to which biota might be exposed, would be about 10 μg/l in the dissolved phase. Although this concentration exceeds the lowest acute toxicity value by a small amount, it is at the low end of the range. Furthermore, the CSOs are an existing condition; the project's effects would increase the duration of the overflow for a few minutes and increase the overflow volume by about 0.2%. The project is not expected to materially affect the concentration of copper (or any other pollutant) in treated CSOs. The project effect would not be a significant impact.

- The total cyanide concentration in treated CSOs is slightly within the acute toxicity concentration range. For analysis purposes, all the cyanide is assumed to be dissolved and potentially available to biota, although this is a conservative assumption. Although the cyanide concentration exceeds the lowest acute toxicity value by a small amount, it is at the low end of the range. The project would not be expected to materially affect the concentration of cyanide in treated CSOs.

- CSOs are an existing condition; the project's effects would increase the duration of the overflow for a few minutes and increase the overflow volume by about 0.2%. Treated CSOs would undergo unquantified mixing and dilution in the near-shore environment. Mobile salt-water species would quickly move away from fresh water CSOs. The data presented in Table V.K.6 suggest that organisms in the near-shore environment of San Francisco Bay could tolerate exposure to treated CSOs, and would not experience acute toxicity. The incremental change as a result of the project would be relatively small compared to existing conditions (a roughly 0.22% increase in load) and probably impossible to measure. For these reasons, there would be no significant impact of treated CSOs on the aquatic biota in the near-shore environment on the Bayside.

Effects of Stormwater Discharges

As previously discussed in "Volume and Quality of Direct Stormwater Discharge to Bay," the proposed project would result in a small increase in stormwater pollutant load to the near-shore environment of San Francisco Bay. The incremental increased load would be integrated into the Bay sediment and into Bay water concentrations. Effects on sediment quality are discussed below in "Effects of Mass Pollutant Emissions on Sediment Quality," below. Large increases in concentrations of pollutants in receiving waters may have the potential to harm the biota of the local near-shore environment.

Two of the four new planned stormwater outfalls are proposed to discharge into China Basin Channel, and the other two are proposed to discharge to San Francisco Bay along the eastern margin of the Project Area (see Figure V.K.2). Estimates of mixing and dispersion for the proposed stormwater discharges from the Mission Bay project are not available. Studies of mixing/70/ and dispersion models/71/ suggest that mixing in the near-shore environment is substantial but slow. The potential for near-shore impacts from stormwater discharges was evaluated by determining whether concentrations of toxic pollutants in undiluted stormwater from the Project Area would have the potential to cause toxic effects in populations of biota in the Bay.

Table V.K.7 presents estimated concentrations of six pollutants measured in stormwater (cadmium, chromium, copper, lead, nickel, and zinc) and a range of concentrations known to be acutely toxic to saltwater and estuarine organisms gleaned from the U.S. EPA development documents for Water Quality Criteria./72/,/73/ As presented in Table V.K.7, except for copper and zinc, the total copper concentrations of pollutants estimated for stormwater from the Project Area were well below the lowest concentrations of pollutants causing acute toxicity in saltwater organisms. Zinc concentrations in stormwater were well in excess of the lowest zinc concentration causing acute toxicity. However, as with treated CSOs, toxicity from metals in water is due to metals in the dissolved form. The estimated concentration of dissolved zinc in Mission Bay stormwater is approximately 87.2 μg/l. Thus, the estimated zinc concentration available to biota exposed to the stormwater discharge would be below the acute toxicity value.

As was the case with treated CSOs, copper concentrations in stormwater discharges are within the acute toxicity concentration range. However, only the dissolved portion of the total concentration would be potentially available to biota. Studies of metals in CSO waters show that about 26% of copper in the waste stream is in the soluble, bioavailable phase. Thus, the actual concentration of copper to which biota might be exposed from treated overflows would be about 8.7 μg/l in the dissolved phase. Although this concentration exceeds the lowest acute toxicity value by a small amount, it is at the low end of the range. Furthermore, copper is currently discharged into the near-shore waters from San Francisco's Bayside. The project's effect would be increasing the stormwater runoff volume by 0.3 MG/yr, and increasing the copper loading by 1.5 lbs/yr. Stormwater runoff from the project would occur only an average of approximately 10 times per year. For these reasons, the project's contribution to copper in near-shore waters would not be a significant effect.

TABLE V.K.7 ●
COMPARISON OF POLLUTANT CONCENTRATIONS IN STORMWATER WITH CONCENTRATIONS SHOWN TO CAUSE ACUTE TOXICITY IN BIOASSAYS WITH MARINE/ESTUARINE ORGANISMS

		Acute Toxicity Concentration Ranges (μg/l) /a/	
Metal	**Concentration (μg/l)/b/**	**High**	**Low**
Cadmium	1.7	135,000	15.5
Chromium	18	105,000	2,000
Copper	35	600	5.8
Lead	83	27,000	315
Nickel	38	350,000	151
Zinc	220	320,000	192

Notes:
a. U.S. Environmental Protection Agency, Office of Water, Water Quality Criteria, 1986.
b. Concentration estimates derived from Bay Area Stormwater Management Agencies Association, *San Francisco Bay Area Stormwater Runoff, Pollutant Monitoring Data Analysis, 1988-1995, Final Report*, prepared by Woodward-Clyde Consultants, October 15, 1996, Table 5-2.

Source: Dr. Joseph M. O'Connor.

Based on the data presented in Table V.K.7, organisms from the near-shore environment of San Francisco Bay could tolerate exposure to stormwater and would not experience acute toxicity. Given that stormwater would undergo some unknown amount of mixing and dilution in the near-shore environment, the impact of stormwater discharges on the aquatic biota in the near-shore environment of the Project Area would be less than significant.

Effects of Mass Pollutant Emissions on Sediment Quality

As discussed in "Sediment Quality," in Section V.K, Hydrology and Water Quality: Setting. China Basin Channel has been identified by the RWQCB as a candidate toxic hot spot for sediment quality. Islais Creek, which receives treated CSOs and secondary-treated wet-weather effluent from the Southeast Plant, has also been identified as a candidate toxic hot spot./74/

The results of the Bayside Planning Model indicate that future flows of treated CSOs under the project would decrease slightly to China Basin Channel, but the project would result in increased CSO volumes elsewhere, most notably to Islais Creek. Direct stormwater discharges would increase to

China Basin Channel due to the two stormwater outfalls. Increased volumes of CSOs to Islais Creek with the project and under cumulative conditions would cause a corresponding increase in pollutant load, including an increased load of settleable solids, to Islais Creek. A corresponding increase in pollutant load to China Basin Channel would occur with the proposed direct stormwater discharges. This would result in more sediment deposition on top of the bottom sediments, and an increased load of pollutants.

Pollutant concentrations associated with suspended particulates in overflows would be expected to remain the same. The chemistry of the surface layer of sediments is determined by the chemistry of the materials deposited to form the surface layer. Since the chemistry of the settleable solids that are discharged through overflows would not change, measurable changes to the surface-layer chemistry would not be expected. Pollutant concentrations associated with suspended particulate in stormwater discharges may change due to more development, but the load discharged to China Basin Channel would likely be substantially reduced by diversion of the more-polluted initial stormwater flows to the combined sewer system, and therefore, stormwater discharges to China Basin Channel are not expected to measurably change the sediment chemistry of China Basin Channel. The benthic fauna of the central portions of San Francisco Bay are essentially confined to the uppermost layer of the Bay sediment. As measurable changes in the physical or chemical composition of this layer are unlikely, measurable changes to the benthic fauna are also unlikely.

In addition, the relatively small increase in sediment volume caused by the project would not be expected to affect the RWQCB's determination to designate China Basin Channel or Islais Creek as a toxic hot spot, nor would it be expected to cause any changes to the possible remediation approach. Therefore, the project would have a less-than-significant impact on the sediment quality of both Islais Creek and China Basin Channel.

Effects on Water-Contact Recreation

- Although water-contact recreation occurs infrequently in the Project Area, water-contact recreation on the Bayside primarily takes the form of swimming and windsurfing on the north shore (off Crissy Field and in Aquatic Park) and windsurfing on the southeast shore near the Candlestick Point State Recreation Area. Overflow occurrences affecting beach closures are discussed here to assess the impacts of the project on the beneficial use of water-contact recreation.

The Bayside Planning Model estimated that the Bayside Base Case plus Mission Bay Project scenario and the Bayside Base Case plus 100% Combined Sewer scenario would increase the volume of treated CSOs along the Bayside with a concomitant increase in the duration of CSOs at the Channel, Mariposa, and Islais Creek CSO facilities, and that the effect would be the same under either scenario. The duration of CSOs at other Bayside facilities would not be affected. Due to the way the system is operated to maximize efficiency, the average duration of treated CSOs at the Channel CSO facilities would decrease by about 0.4 hour per year, or about 2.4 minutes per overflow (24 minutes divided by 10 overflows). Therefore, neither scenario would have an adverse effect on treated CSO duration to China Basin Channel.

The Bayside Planning Model projected average annual increases in treated CSO durations at the Mariposa and Islais Creek facilities of 1.5 and 1.8 hours, respectively, under both scenarios. These increases translate to about 9 minutes and 11 minutes per CSO event. Water-contact recreation occurs infrequently at these locations on the Bayside. Therefore, no impact from the increased duration of CSOs would occur due to CSOs from the Mariposa and Islais Creek facilities.

Conclusion

Based on the above analysis, no significant impacts on water quality, aquatic organisms, sediment quality in China Basin Channel and Islais Creek, or water-contact recreation, from either loads or concentrations of pollutants, would occur in the near-shore Bay due to the project. The potential significance of cumulative impacts is discussed below in "Cumulative Issues."

CUMULATIVE ISSUES

Water Quality

As indicated above, project-related pollutants discharged into San Francisco Bay would disperse and combine with pollutants from other reasonably foreseeable projects in San Francisco and cumulative development in areas surrounding the Bay. Other foreseeable projects in San Francisco large enough to potentially affect Bayside operations include the proposed Candlestick Mills Stadium and Mall project, the proposed Hunters Point Naval Shipyard Redevelopment project, and proposed development of waterfront port properties. For these projects, the Bayside Planning Model, discussed previously in "Changes in Discharges to Receiving Waters," in the Impacts subsection, was used to analyze a cumulative scenario in which it was assumed, as a worst-case in terms of impacts to the City's combined sewer system, that all other projects except for the Mission Bay project would maximize use of the combined sewer system.

Table V.K.8 provides the results of the Cumulative Bayside scenario and summarizes the cumulative effects of the cumulative projects on discharges and pollutant loads. As discussed earlier in "Evaluation of Potential Water Quality Impacts," increasing the volumes of municipal wastewater

TABLE V.K.8 ●
SUMMARY OF ANNUAL POLLUTANT LOADS TO BAY FROM BAYSIDE EFFLUENT AND OVERFLOWS

	Bayside Base Case	Bayside Base Case + Proposed Sewer System for Mission Bay Project	Change from Base Case	Bayside Base Case + 100% Combined Sewer System for the Mission Bay Project	Change from Base Case	Cumulative Bayside	Change from Base Case
Total Bayside Volume (MG/yr) /a/	31,113	31,957	844	31,973	860	32,504	1,391
Monitored Pollutant	**Load (lb/yr)**	**Load (lb/yr)**	**Change (%)/b/**	**Load (lb/yr)**	**Change (%)/b/**	**Load (lb/yr)**	**Change (%)/b/**
Total Suspended Solids	4,800,000	4,900,000	2.4%	4,900,000	2.7%	5,000,000	5.2%
Ammonia, as Nitrogen	5,100,000	5,300,000	2.8%	5,300,000	2.8%	5,300,000	4.3%
Oil and Grease	1,300,000	1,400,000	2.7%	1,400,000	2.8%	1,400,000	4.6%
Polynuclear Aromatic Hydrocarbons	40	41	2.5%	41	2.7%	42	4.9%
Arsenic	590	600	2.5%	610	2.7%	620	4.9%
Cadmium	71	72	2.2%	73	2.6%	75	5.8%
Total Chromium	340	350	2.1%	350	2.6%	370	6.0%
Copper	2,400	2,500	2.5%	2,500	2.7%	2,500	5.1%
Lead	1,300	1,400	1.9%	1,400	2.5%	1,400	6.5%
Mercury	20	20	2.4%	20	2.7%	21	5.2%
Nickel	1,200	1,200	2.4%	1,200	2.7%	1,200	5.2%
Silver	570	580	2.6%	590	2.7%	590	4.7%
Zinc	15,000	16,000	2.4%	16,000	2.7%	16,000	5.3%
Selenium	190	190	2.7%	190	2.8%	190	4.5%
Cyanide	2,500	2,600	2.8%	2,600	2.8%	2,700	4.4%

Notes:
See Table V.K.2 and Table V.K.3 for effluent and treated overflow loads, respectively.
MG = million gallons lb = pounds yr = year

a. City and County of San Francisco, Public Utilities Commission, Clean Water Program, *Draft Bayside Cumulative Impact Analysis*, March 1998.
b. The percentage change in load is assumed to be the same as the percentage change in volume. While the percentage change reflects the incremental change that would occur in each analysis scenario, there is a level of imprecision associated with the load calculations. Therefore, all load values have been rounded to two significant figures to reflect the statistical uncertainty of the calculations. The significance of each change was evaluated by determining whether the change falls within the range of uncertainty.

Source: EIP Associates.

effluent, treated CSOs, and direct stormwater discharges would increase the total mass pollutant load to receiving waters, but this would not cause significant water quality impacts with respect to toxicity on aquatic biota. The same conclusions for the proposed project apply to the cumulative effects of Bayside projects, in that the cumulative increase in pollutant mass load from these projects would have a less-than-significant effect on water quality.

As shown in Table V.K.8, the project would represent less than 3% of the increased total pollutant load from the Bayside./75/ The cumulative loads for pollutants would generally increase by 4-6%. Thus, the project would cause approximately half of this cumulative increase for the Bayside.

To put this in context, City discharges are a very small portion of the region-wide discharges to the Bay. Compared to municipal dischargers in the Bay Area, the load contribution of the Southeast Plant represents about 12% of all other municipal dischargers, and the Mission Bay project would represent less than 3% of that 12% (or 0.36% of all municipal wastewater discharged to the Bay)./76/,/77/

In addition, besides municipal wastewater, other sources of pollutant loading to San Francisco Bay include riverine inputs, nonurban runoff, urban runoff, point sources, dredging/sediment disposal, spills, and atmospheric deposition. Of these sources, point sources, including municipal dischargers and other permitted industrial dischargers, represent about 1-6% of the total load input to the Bay-Delta estuary./78/ Regarding stormwater discharges, San Francisco Bayside stormwater flows are about 1.8% of the total regional urban storm flow to the Bay./79/ Considering the contribution of the project and of the cumulative Bayside projects in the context of all the other pollutant inputs to the Bay, the cumulative pollutant loading from Bayside projects would be extremely small.

As previously discussed in "San Francisco Bay Basin Water Quality Control Plan (Basin Plan)," in the Setting subsection, the SWRCB has designated Central San Francisco Bay as impaired as a result of unacceptable levels of selenium, mercury, copper, diazinon, and PCBs. The RWQCB may initiate a "total maximum daily load" regulatory process which would likely result in different effluent limitations than are currently provided by the Basin Plan. The City would have to comply with any changes to its NPDES permits that might result from RWQCB action.

Aquatic Biota Effects

Bayside cumulative development would result in an increase in municipal wastewater effluent flows, treated CSOs, and stormwater discharges. Increased flows to San Francisco Bay necessarily mean that overall pollutant loads would increase; however, pollutant concentrations in treated effluent and treated CSOs would not change. As shown in Table V.K.5 through V.K.6, and explained above under the project analysis, the concentrations in existing treated effluent and treated CSOs would not cause a significant effect on aquatic biota. The lack of substantial effect is apparent even though the analysis and evaluation was performed using extremely conservative assumptions. Even though copper concentrations in stormwater discharges and CSO overflows might be just above the lowest copper concentration shown to cause acute toxic effects in saltwater biota, such an effect would be seasonal, intermittent, and short in duration. Therefore, none of the discharges from the Bayside Cumulative scenario would cause degradation in Bay water quality, an increase in toxicity, or degradation of sediment quality. Similarly, the cumulative development scenario would not cause a significant effect on aquatic biota.

As shown in Table V.K.7, and explained above under the project analysis, the project would change the concentrations of pollutants in stormwater discharges, but would not cause a significant impact on aquatic biota. Similarly, the cumulative development scenario would not cause a significant effect on aquatic biota.

Sediment Quality

As discussed in "Sediment Quality," in the Setting subsection. China Basin Channel has been identified by the RWQCB as a candidate toxic hot spot for sediment quality. Islais Creek, which receives treated CSOs and secondary-treated wet-weather effluent from the Southeast Plant, has also been identified as a candidate toxic hot spot./80/

As with the project, the results of the Bayside Planning Model indicate that future flows of treated overflow discharges under the Bayside Cumulative scenario would decrease slightly to China Basin Channel, but would result in increased flows of overflow discharges elsewhere, most notably to Islais Creek. Increased volumes of overflow discharges to Islais Creek with the project and under cumulative conditions would cause a corresponding increase in contaminant load, including an increased load of settleable solids. This would result in more sediment deposition on top of the bottom sediments, and an increased load of pollutants. As discussed with respect to the project, pollutant concentrations associated with suspended particulates in overflows would be expected to remain the same. As the chemistry of the settleable solids discharged to Islais Creek would not change, measurable changes to the surface-layer chemistry would not be expected. Effects on benthic organisms would not be significant.

The relatively small increase in sediment volume caused by the Bayside Cumulative scenario project would not be expected to affect the RWQCB's determination to designate Islais Creek as a toxic hot spot, nor would be expected to cause any changes to the possible remediation approach. (Treated combined sewer overflows, and therefore sediment deposition, in China Basin Channel would decrease due to the Bayside Cumulative scenario, and would similarly have no effect on the RWQCB's future actions.) Therefore, the Bayside Cumulative scenario would have a less-than-significant impact on the sediment quality of both Islais Creek and China Basin Channel.

Effects on Water-Contact Recreation

The Bayside Planning Model estimated that the Bayside Cumulative scenario would increase the average duration of treated CSOs from the North Shore overflow facilities by one-half hour during the year. Divided by an average of 4 CSOs per year, this translates to about 7 or 8 minutes per overflow. At the Yosemite overflow facilities, which discharge into Yosemite Slough, the long-term annual CSO duration was estimated to extend 0.9 hour per year, or 54 minutes per year for the single yearly (long-term average) overflow that occurs there. Because beaches are closed by daily increments, longer overflows at the north shore and at Yosemite would not have a measurable effect on beach closures under Bayside Cumulative scenario.

The long-term annual overflow duration at the Mariposa facilities was estimated to increase by 1.5 hours, translating to 9 minutes per overflow. At the Islais Creek facilities, the annual overflow duration was estimated to increase by 14.1 hours, or 1.4 hours per overflow. No water-contact recreation occurs in the waters near the facilities, and the increase in overflow duration would have no substantial impact in this area of the Bayside shoreline under the Bayside Cumulative scenario.

Conclusion

The above analysis finds that there are no significant cumulative impacts from the increased volume and pollutant load of treated municipal wastewater effluent, treated CSOs, and direct stormwater discharges, because there would be no substantial degradation in the water quality of the Bay or near-shore waters, there would be no toxic effect on aquatic biota, there would be no substantial change to sediment quality, and there would be no change to beneficial uses. CSOs generate a high degree of public concern, however, and conservative presumptions of significance are warranted when a setting may be degraded or impaired. For these reasons, and in an effort to provide for continued discussion regarding these concerns and to acknowledge the lack of conclusive evidence refuting a causal relationship between treated combined sewer overflows, stormwater discharges, and sediment quality, this report conservatively finds that the project would contribute to a potentially significant cumulative impact on near-shore waters of San Francisco Bay from treated CSOs, and direct stormwater discharges to China Basin Channel. The project contribution (0.2%) to the potential cumulative increase (11%) in Bayside CSO volumes, and the contribution of project-related stormwater discharges to possible cumulative impacts, would be reduced to a level of insignificance with the imposition of Mitigation Measures K.3 and K.4, described in Section VI.K, Mitigation Measures: Hydrology and Water Quality.

PHASED DEVELOPMENT AND INTERIM USES

Proposed Interim Drainage Plans for Phased Development

As discussed in "Review Process for Proposed Phases," in Chapter III, Project Description, and in "Phasing," in Section V.M, Community Services and Utilities: Impacts, development of a specific area or phase of Mission Bay would be accompanied by the development of adjoining infrastructure and improvements. The development of a drainage and sewer system, in particular, would occur simultaneously with roadway construction.

The Redevelopment Plans and related documents outline a review process whereby preliminary infrastructure plans, maps, and supporting documentation would be submitted to the Redevelopment Agency with each proposed phase of development (see "Review Process for Proposed Phases," in Chapter III, Project Description). The Redevelopment Agency would review the material for consistency with the Redevelopment Plans and related documents. The review process would continue with the Department of Public Works, which would conduct a review of the materials in conjunction with other responsible agencies, such as the San Francisco Public Utilities Commission Clean Water Program (Clean Water Program). For any proposed sewer or drainage plan, the Clean Water Program would analyze the proposed plans to determine whether the design plans are adequate and conform to the City's operational requirements.

As discussed in "Sewer Improvements: Central/Bay Basin," in Section V.M, Community Services and Utilities: Impacts, the drainage plan for each development phase would include directing stormwater flow from new buildings and permanently paved areas, including those in the existing Bay Basin that currently drains to the Bay, to the combined sewer system. A mitigation measure has been included in "Sewers and Wastewater Treatment," in Section VI.M, Mitigation Measures: Community Services and Utilities, calling for all new development in the Bay Basin to provide for stormwater drainage to the combined sewer system until the initial-flow diversion system is operational. As each phase of new development is proposed, the Clean Water Program staff would evaluate the volume of combined sewage expected to be discharged to the combined sewer system. The Clean Water Program staff would assess whether the combined sewer system has adequate capacity, such that operations, and compliance with the City's Bayside NPDES Permit would not be affected. A phase may include interim improvements, such as detention basins, to control drainage to the combined sewer system. The Clean Water Program staff would advise the Department of Public Works and the

Redevelopment Agency as to when the initial-flow stormwater diversion system would need to be fully functional for a defined area of the Mission Bay South Central/Bay Basin.

Proposed Drainage Plans for Interim Giants Ballpark and UCSF Parking

As described in detail in "Interim Uses," in Section V.M, Community Services and Utilities: Impacts, and shown on Figure III.B.4, one possible drainage scheme to accommodate interim Giants Ballpark and UCSF parking uses in the Project Area is proposed to include the use of a shallow surface detention basin. For purposes of analysis, one acre-foot of detention would be needed for every 10 acres of parking and would be located between the Giants and UCSF parking lots. The ultimate system, however, could vary and might include more than one basin. The detention basin would be graded to collect stormwater in the center of the basin, with a metered drain directing flows to the existing combined sewers in Third Street or Sixth Street. The metered drain would be designed with the capacity to handle stormwater flows up to the volume of a 3-month storm. Runoff generated from storms between a 3-month and a 5-year storm would be collected and stored in the basin, for gradual release to the City combined sewer system through the metered drain, with some pumping necessary to convey these low-flow volumes. The land would be graded such that flows beyond the 5-year storm would overflow the detention basin and flow north toward the Channel, across Channel Street and into the Channel until the metered drain to the sewer system lowered the water level in the detention basin below the elevation of Channel Street. As discussed above in "Proposed Interim Drainage Plans for Phased Development," the Clean Water Program staff would need to review and approve the plans once they are formally submitted.

Water Quality Effects of Phased Development and Interim Uses

The volume of stormwater discharge to the combined sewer system would increase with each phase of development, until it reaches the volumes discussed for the project at build-out, discussed above. Increased volumes of treated municipal wastewater effluent discharged to Islais Creek from the Southeast Plant and increased volumes of treated CSOs would result. Also, as discussed above, the increase in volume of effluent and CSOs would be accompanied by roughly proportional increases in pollutant load to the Bay.

The use of detention basins in the interim phase for Giants parking would tend to delay discharges of stormwater to the City's system, which would limit the possibility for increased CSOs as a result. However, if storm runoff volumes from interim parking lots for the Giants Ballpark and UCSF are great enough to occasionally (once every five years on average) flow overland into the Channel, oil and grease, metals and other pollutants from the parking lots would contribute to pollutant loads in the Channel on a short-term, temporary basis. Turbidity could increase from particulates on the parking lots.

As discussed in "Sewer Improvements: Central/Bay Basin," in Section V.M, Community Services and Utilities: Impacts, Sewers and Wastewater Treatment, infrastructure development of the proposed separated sewer system for the Central Basin and Bay Basin would occur with each phase, but would not necessarily be immediately operational. With each development phase, land use in the Bay Basin would become more intensified with additional buildings and higher automobile use. If the existing separated sewer system in the Bay Basin continued to be used to discharge stormwater runoff to the Bay, pollutant mass loading to the Bay could potentially increase from existing levels.

As discussed above in "Volume and Quality of Effects of Loading by Direct Stormwater Discharge to the Bay," it is expected that stormwater discharge from the Project Area eventually would be managed within a City-operated stormwater management program if the Phase II stormwater regulations become finalized. Although it is reasonable to assume that Mission Bay would eventually need to comply with stormwater regulations, the proposed regulations have not yet been finalized. Therefore, there is currently no regulatory requirement for a stormwater management program that addresses Mission Bay stormwater quality. Pollutant loading to the Bay could increase if stormwater continued discharging directly to the Bay. The main treatment control BMP proposed for the project is the initial-flow diversion system. Failing to implement other BMPs to minimize stormwater pollution could potentially conflict with the intent of proposed stormwater permit requirements and result in a significant impact.

Mitigation Measure M.5 in Section VI.M, Mitigation Measures: Community Services and Utilities. discusses conveying all stormwater runoff from newly developed areas in the Bay Basin to the combined sewer system prior to completion of the initial-flow diversion system. Mitigation Measure K.5 in Section VI.K, Mitigation Measures: Hydrology and Water Quality, discusses implementation of an individual stormwater management program that utilizes BMPs for Mission Bay until the Phase II regulations become final and Mission Bay is included in the City's stormwater management program. Mitigation Measure K.2, describes mandatory Mission Bay participation in the City's existing Water Pollution Prevention Program. Implementation of this mitigation measure would avoid a significant impact.

CONSTRUCTION ACTIVITY POLLUTANTS

As discussed in detail in "Proposed China Basin Channel Edge and Bridge Treatments," and shown on Figure V.L.2, in Section V.L, China Basin Channel Vegetation and Wildlife: Impacts, the project proposes to increase recreational opportunities along the edges of the Channel through improvements that include a pedestrian circulation system along the banks of the Channel on the north and south sides; promontory areas overlooking the Channel; a pedestrian bridge over the Channel linking Fifth Street to the future Owens Street, if permits can be obtained; stabilization of the banks of the Channel with riprap (see Glossary); and landscaping with salt-tolerant vegetation. The estimated quantities of riprap that would be placed along the north side of the Channel are 3,600 cubic yards from Fourth Street to Sixth Street, and about 400 yards from Fourth Street to Fifth Street. The area east of Third Street south of Mission Rock Street generally would be developed with residential and commercial industrial buildings. Open space would be developed along the west side of Terry A. François Boulevard. See Figure III.B.2 in Chapter III, Project Description. Because the edges of the Channel drain directly to the Channel, sediment and other construction-related pollutants associated with the proposed edge treatments, if not controlled, could be transported into the Channel water.

Erosion and Sediment

Unless mitigated, erosion in areas draining directly to surface waters could result in conflicts with Basin Plan WQOs for sediment, settleable and suspended material, and turbidity. Sediment is a pollutant in its own right, but is also a carrier for many other pollutants of concern, including oil and grease, heavy metals (such as copper, lead, nickel, and zinc), petroleum hydrocarbons, and pesticides. Such pollutants can be adsorbed onto the surface of individual soil particles.

Proposed riprap and landscaping of the Channel edges would potentially reduce existing erosion. During construction, soil surfaces along the Channel and in the area east of Third Street south of Mission Rock Street would be exposed to rainwater, and sediment could be discharged into the Channel and Bay. Along the Channel, loose soil could discharge into the water if there were no barriers. The slopes of the Channel would continue to be exposed to erosion until vegetation becomes established in areas where it is proposed. In the area east of Third Street, sediment-laden rainwater would enter the storm drains and be discharged to the Bay. Prevention of erosion and control of sediment would be addressed in the project's construction Storm Water Pollution Prevention Plan, discussed below.

Certain construction activities associated with installing and removing piles for the Channel-edge improvements could resuspend sediment. As shown on Figure V.L.2, three promontories on the north side of the Channel would extend over the Channel to provide overlooks. To provide reliable and safe support structures, construction crews may need to install new piles. Because they pose safety hazards, various piles and pilings primarily on the south side of the Channel would be removed or cut off at mud level (see "Proposed China Basin Channel Edge and Bridge Treatments" in Section

V.L, China Basin Channel Vegetation and Wildlife: Impacts, for a complete description of the proposed treatments). The project's Channel treatment proposal is subject to approval by the San Francisco Bay Conservation and Development Commission (BCDC) and authorization by the U.S. Army Corps of Engineers as described in "Loss of Salt Marsh Wetland Habitat," in Section V.L, China Basin Channel Vegetation and Wildlife: Impacts.

During pile-driving, sediment would be disturbed, producing a short-term increase in turbidity. In addition, contaminants that are adsorbed onto the surface of individual particles of sediment could re-dissolve in water. Bioaccumulation effects are discussed in "Resuspension of Contaminated Sediments," in Section V.L, China Basin Channel Vegetation and Wildlife: Impacts.

Other Construction-Related Pollutants

Other than sediment, pollutants associated with construction activities include nutrients, trace metals, other toxic chemicals, and miscellaneous wastes. Phosphorus, nitrogen, and potassium are the nutrients found in plant fertilizers, and if they were used heavily (e.g., to start plantings), they could result in discharge to waters where they may cause excessive growth of algae. Fertilizers would not be used for the salt-tolerant plants along the Channel, but could be used for landscaping of the proposed open space along Terry A. François Boulevard. Trace metals are associated with most construction activities and materials such as certain chemicals for cleaning, plumbing, painting activities, masonry and concrete, and floors and walls. Other toxic chemicals, including synthetic organic compounds (adhesives, cleaners, sealants, solvents, etc.), could cause adverse water quality effects if improperly stored and disposed. As discussed in "Water," in Appendix A, Initial Study, if hazardous materials are present in construction runoff that drains to the City's combined sewer system, the runoff would be subject to the pre-treatment regulations of the City's Industrial Waste Ordinance. Miscellaneous wastes from construction sites can include wash water from concrete mixers, paints and painting equipment cleaning activities, solid wastes, wood and paper packaging materials, and food containers. These pollutants would be addressed in the project's Construction Storm Water Pollution Prevention Plan, discussed below. Discharge of dewatered groundwater or any other batch discharge of wastewater into the City's combined sewer system would require a batch discharge permit from the City (see "Water" in Appendix A, Initial Study).

Storm Water Pollution Prevention Plan

Construction activities of at least 5 acres must obtain NPDES coverage under the state's General Construction Activity Storm Water Permit, administered by the RWQCB, and must prepare and implement a Storm Water Pollution Prevention Plan (SWPPP). The proposed Phase II stormwater regulations would extend existing stormwater requirements to construction activities disturbing more than 1 acre of land (see "Phase II Stormwater Permits" in the Setting subsection for a description of the proposed regulations). The new proposed regulations suggest that construction activities be addressed by each municipality's comprehensive stormwater management plan. Until the Phase II regulations are finalized, construction activities at Mission Bay would be subject to existing regulations.

In accordance with the requirements of the General Construction Activity Storm Water Permit, an SWPPP for construction must describe the site, erosion and sediment controls, means of waste disposal, implementation of approved local plans, post-construction control measures and maintenance responsibilities, and non-stormwater management controls. Management controls are BMPs and could include measures such as housekeeping practices (e.g., storing construction materials away from drainage courses, placing drip pans or absorbent materials under equipment when not in use); appropriate containment and disposal of waste; minimizing and stabilizing disturbed areas; and controlling the construction site perimeter and on-site erosion (e.g., surrounding the site with a silt fence or sandbag barrier). The project sponsor would also be responsible for having construction sites inspected by qualified individuals before and after storms to identify stormwater discharge from construction activity, and to identify and implement controls where necessary. The SWPPP would be prepared in accordance with guidelines contained in the general permit and in the *Construction Best Management Practices Handbook.*/81/ The SWPPP for the project would be prepared separately from this SEIR.

To ensure that appropriate BMPs are incorporated into the SWPPP, the SWPPP must contain, at a minimum, the BMPs listed in Mitigation Measure K.1 in Section VI.K, Mitigation Measures: Hydrology and Water Quality, or substantially equivalent measures, most of which would help protect the Channel from erosion and sediment during construction and installation. The monitoring and reporting requirements contained in the General Construction Activity Storm Water Permit allow changes and modifications to be made to the SWPPP, as necessary, based on experience during construction. The discharger must certify annually that its construction activity is in compliance with the requirements of the general permit and the SWPPP. Notification must be made to the RWQCB if certification cannot be made, or if there are other instances of noncompliance. SWPPPs are considered public reports under Section 308(b) of the Clean Water Act and must be made available to the RWQCB upon request.

USE OF RECLAIMED WATER

As discussed in "Reclaimed Water System," in Section V.M, Community Services and Utilities: Impacts, the project would provide a dual plumbing system for new commercial development greater than 40,0C ·quare feet in the Project Area that would supply potable and non-potable (reclaimed) water through two separate delivery systems or else would meet goals associated with the use of reclaimed water and comply with the City's Reclaimed Water Use Ordinance through other methods./82/ Reclaimed water, if provided for the Project Area, would be used mainly for non-contact uses such as flushing toilets, landscape irrigation, or cooling water. Potential adverse impacts from public exposure to reclaimed water were analyzed fully in the *Recycled Water Master Plan and Groundwater Master Plan Final Environmental Impact Report*./83/ That report explains that reclaimed water is treated by disinfection and filtration to produce a high-quality recycled product. Treatment criteria and management and application criteria for reclaimed water are specified in Title 22 of the California Code of Regulations. These criteria include specifications for treatment plant reliability, monitoring, and contingencies. Additional criteria in Title 17 of the California Code of Regulations specify requirements for preventing cross-contamination to the public water supply. The RWQCB also implements regulations for water reuse./84/

Compliance with the water use measures in Title 22 and Water Reuse Requirements would avoid any runoff that would contribute to local surface water quality degradation. Groundwater on the site is 4 to 9 feet below ground surface, and contiguous with water in the adjacent San Francisco Bay. Monitoring wells throughout the site west of Third Street indicate groundwater is brackish (salinity that is intermediate between freshwater and sea water)./85/ There are no current or proposed uses of groundwater at Mission Bay. Adherence to regulations and criteria provided in Title 22, Title 17, and the Water Reuse Requirements of the RWQCB, which would be implemented by the San Francisco Water Department of the SFPUC, would avoid any significant impacts to hydrology and water quality from use of reclaimed water.

GLOSSARY

Activated Carbon Adsorption: A treatment technology which can remove insoluble or hydrophobic organic compounds from wastewater. A common method of use is to pass wastewater over granular activated carbon in a filter column. The operation utilizes a liquid-solid partitioning mechanism.

Advanced Oxidation: A treatment method involving several related processes in which hydroxide-free radicals are generated to decompose organic chemical contaminants. The hydroxide-free radicals can be formed in several ways, the most common being a combination of UV light and ozone, or UV light and hydrogen peroxide.

Best Management Practices (BMPs): Any program, technology, process, siting criteria, operating method, measure, or device which controls, prevents, removes, or reduces pollution, including schedules of activities, prohibitions of practices, maintenance procedures, and other management practices to prevent or reduce the pollution of waters of the United States. BMPs also include treatment requirements, operating procedures, and practices to control plant site runoff, spillage or leaks, sludge or waste disposal, or drainage from raw material storage.

Biochemical Oxygen Demand (BOD): The decomposition of organic substances by aerobic microbes. BOD measures the amount of oxygen consumed.

C Factor: The amount of rainfall that ends up as runoff from a given area, expressed as a fraction. Also known as "runoff coefficient."

Constructed Treatment Wetlands: Engineered systems that optimize the water-cleansing ability of natural wetlands. A wetland's ability to assimilate pollutants depends on physical and chemical characteristics of the soil.

Downspout Infiltration: A wastewater reuse practice in which uncontaminated stormwater collected on rooftops is conveyed through downspouts to a percolation system and is used to recharge a groundwater aquifer.

Effluent Limits (numeric effluent limits): Limitations on amounts of pollutants that may be contained in effluents. Can be expressed in a number of ways including as a concentration, as a concentration over a time period (e.g., 30-day average must be less than 20 mg/l), or as a total mass per time unit.

Five-Year Storm: A storm of a size that occurs an average of once every five years, a relatively rare occurrence.

Five-Year Storm Standard: The five-year storm standard is an industry standard used to size underground combined stormwater sewer lines. The five-year standard has evolved from analyses of the cost to enlarge sewer lines versus the benefit from capturing stormwater flows from larger storms. Typically, flows exceeding the conveyance capacity of the underground stormwater lines are carried overland to a nearby catch basin or open body of water (bay, river, etc.). Sizing stormwater lines to the five-year storm standard requires analysis of many complicated factors such as: regional rainfall averages and historic intensity of local rainfall; the position of a site in its watershed (downstream areas in a watershed receive more runoff than upstream areas, where runoff originates); and the runoff coefficient of the watershed.

Flocculation: One step in the wastewater treatment process where mechanical or air agitation is used to form aggregates, or flocs, from the finely divided matter, through the addition of a chemical such as alum to create a loose precipitate, floc, which forms around particulate matter to create larger more settleable particles. Settling is the ensuing step in which floc particles are settled from the treatment vessel.

Graywater: Water that has been used in residences in wash basins or for laundry, baths, or showers.

Initial Flow: Either the early portion of stormwater runoff from storms, or a 3-month return frequency or higher, or all stormwater runoff from storms smaller than a 3-month storm. Typically in San Francisco, it is equal to 1 inch of rainfall.

Membrane Filtration: A broad category that covers the range of treatment technologies including micro-screening, micro-filtration, ultra-filtration, nano-filtration, and reverse osmosis. The common theme in each technology is that wastewater is filtered through a porous material or membrane, and a permeate and reject stream are produced.

Non-Storm Water Discharge: Any discharge to municipal separate storm sewer that is not composed entirely of storm water. Discharges containing process wastewater, non-contact cooling water, or sanitary wastewater are non-storm water discharges.

Nonpoint Source Pollution: Pollution that does not come from a point source. Nonpoint source pollution originates from aerial diffuse sources that are mostly related to land use.

NPDES Permit: The national program for administering and regulating discharges to waterways according to the federal Clean Water Act (CWA). In California, the State Water Resources Control Board (SWRCB) and the nine Regional Water Quality Control Boards (RWQCB) are responsible for administering the NPDES storm water program.

Outfall: The point where a storm drain or sewer discharges from a pipe, channel, ditch, or other conveyance to a waterway.

Point Source: Any discernible, confined, and discrete conveyance from which pollutants are or may be discharged. This term does not include return flows from irrigated agriculture or agricultural storm water runoff.

Pretreatment: Treatment of wastewater before it is discharged to a wastewater collection system.

Primary Treatment: Physical operations, such as screening and sedimentation, used to remove the floating and settleable solids found in wastewater.

Process Wastewater: Wastewater that has been used in one or more industrial processes.

Reclaim (water reclamation): Planned use of treated effluent that would otherwise be discharged without being put to direct use.

Reuse (water reuse): See "Reclaim," above.

Riprap: A layer of loose rock or aggregate placed over an erodible soil surface to protect soil from the erosive forces of water. It is typically used on storm drain outlets, channel banks and bottoms, roadside ditches, shorelines, and any other place where soil may erode.

Runoff: Water originating from rainfall and other sources (e.g., sprinkler irrigation) that is found in drainage facilities, rivers, streams, springs, seeps, ponds, lakes, wetlands, and shallow groundwater.

Secondary Treatment: Biological and/or chemical processes used to remove most of the organic matter found in municipal wastewater.

Selective Ion Exchange: The ion exchange process is carried out with small, synthetic, porous (plastic) resin beads that have been chemically modified to accept only positively or negatively charged ions.

Source Control BMPs: Operational practices that prevent pollution by reducing potential pollutants at the source. They typically do not require construction.

Tertiary (Advanced) Treatment: Combinations of unit operations and processes used to remove other constituents such as nitrogen and phosphorus that are not reduced significantly by secondary treatment.

Three-Month Storm: A storm that occurs an average of once every three months (four times a year).

Total Suspended Solids (TSS): The total particulate mass suspended in water.

Toxicity: Concentration of substance that would be lethal or would produce other responses detrimental to the health of organisms.

Trash Rack: A grated structure placed at the discharge point of an outfall that catches large-sized debris that may be in the stormwater and prevents the debris from being discharged into the receiving water.

Treatment Control BMPs: Methods of treatment to remove pollutants from storm water. Construction and maintenance are required for implementation.

Turbidity: Describes the ability of light to pass through water. The cloudy appearance of water caused by suspended and colloidal matter (particles).

NOTES: Hydrology and Water Quality

1. San Francisco Planning Department, *Mission Bay Final Environmental Impact Report*, Planning Department File No. 86.505E, State Clearinghouse No. 86070113, Certified August 23, 1990, Volume Two, p. VI.L.3.*

2. Bay Area Stormwater Management Agencies Association, *Start at the Source: Residential Site Planning & Design Guidance Manual for Stormwater Quality Protection*, prepared by Tom Richman & Associates, January 1997.

3. Storm Water Quality Task Force, *Municipal Best Management Practice Handbook*, prepared by Camp Dresser & McKee, Larry Walker Associates, Uribe and Associates, and Resources Planning Associates, March 1993.

4. City and County of San Francisco, *Bayside Overflows,* prepared by CH2M Hill, June 1979.

5. San Francisco Wastewater Program, *Bayside Wet-Weather Facilities - Revised Overflow Control Study*, May 1977.

6. "Most Probable Number" is a statistical measure and is not an exact count of the number of bacteria.

7. San Francisco Wastewater Program, *Bayside Wet Weather Facilities - Revised Overflow Control Study*, May 1979.

8. San Francisco Bay-Delta Aquatic Habitat Institute, *San Francisco Estuary Project, Status and Trends Report on Pollutants in the San Francisco Estuary*, March 21, 1991.

9. State Water Resources Control Board, *1996 California Water Quality Assessment Report*, January 1997, p. 2-1.

10. Thomas Mumley, Senior Water Resources Control Engineer, California Regional Water Quality Control Board -- San Francisco Bay Region, "Final Staff Report: Section 303(d) List of Impaired Water Bodies and Priorities for Development of Total Maximum Daily Loads for the San Francisco Bay Region," March 9, 1998.

11. Central San Francisco Bay is also impaired as a result of exotic species brought and released to the Bay in the ballast water of ships, but this issue does not relate to the Mission Bay project.

12. Water Engineering and Modeling, Numerical Modeling of San Francisco Effluent Disharges: Far Field Effects, 1993.

13. City and County of San Francisco, *Bayside Overflows,* prepared by CH2M Hill, June 1979.

14. Acute toxicity is measured as the concentration that caused mortality in 50% of test organisms over a fixed period of time (24-hr LC_{50}).

15. City and County of San Francisco, *Bayside Overflows,* prepared by CH2M Hill, June 1979.

16. City and County of San Francisco, *Bayside Overflows,* prepared by CH2M Hill, June 1979.

17. City and County of San Francisco, Planning Department, *Bayside Discharge Alternatives, Draft Environmental Impact Report*, Planning Department File No. 92.531E, State Clearinghouse No. 93023040, Certified May 20, 1994, Figure 14.*

18. California Code of Regulations, Title 17, Group 10, Article 4, Sections 7958-7959.

19. 1990 FEIR, Volume Two, p. VI.L.1.*

20. City and County of San Francisco, Planning Department, *Port of San Francisco Waterfront Land Use Plan, Final Environmental Impact Report*, Planning Department File No. 94.155E, State Clearinghouse No. 94123007, certified January 9, 1997, p. 272.*

21. 1990 FEIR, Volume Two, p. VI.L.6.*

22. City and County of San Francisco, Department of Public Works, Bureau of Water Pollution Control, *Bay Benthic Report*, November 1986.

23. 1990 FEIR, Volume Two, pp. VI.L.9-VI.L.10.*

24. City and County of San Francisco, Department of Public Works, Bureau of Water Pollution Control, *Bay Benthic Report, San Francisco Bay Outfall Monitoring, Southeast-Islais Creek*, November 1986.

25. City and County of San Francisco, Planning Department, *Bayside Discharge Alternatives, Draft Environmental Impact Report*, Planning Department File No. 92.531E, State Clearinghouse No. 93023040, May 20, 1994.*

26. MEC Analytical Systems, Inc., *Results of Laboratory and In Situ Bioassays Conducted at Islais Creek*, June 1997.

27. CH2M Hill, *Bayside Overflows*, prepared for the City and County of San Francisco, June 1979.

28. (a) MEC Analytical Systems, Inc., *Results of Laboratory and In Situ Bioassays Conducted at Islais Creek*, June 30, 1997.

(b) MEC Analytical Systems, Inc., *Sampling and Analysis of Sediment at Islais Creek, San Francisco, CA*, March 25, 1997.

29. Regional Water Quality Control Board (RWQCB), San Francisco Bay Region, *Proposed Regional Toxic Hot Spot Cleanup Plan*, December 1997.

30. 1990 FEIR, Volume Two, p. VI.L.10.*

31. RWQCB, San Francisco Bay Region, *Proposed Regional Toxic Hot Spot Cleanup Plan*, December 1997.

● 31a. Regional Water Quality Control Board, San Francisco Bay Region, *Proposed Regional Toxic Hot Spot Cleanup Plan*, December 1997, pp. 6-9.

● 31b. Regional Water Quality Control Board, San Francisco Bay Region, *Proposed Regional Toxic Hot Spot Cleanup Plan*, December 1997, p. 23.

32. RWQCB, San Francisco Bay Region, *San Francisco Bay Basin (Region 2), Water Quality Control Plan*, June 21, 1995.

33. A point source usually refers to waste emanating from a single, identifiable location, while a nonpoint source usually refers to waste emanating from diffuse locations. Stormwater is considered a nonpoint source, if stormwater is discharged as overland flow, not from an identifiable location such as a pipe.

34. RWQCB, San Francisco Bay Region, Order No. 94-149, NPDES Permit No. CA0037664, Reissuing Waste Discharge Requirements for City and County of San Francisco Southeast Water Pollution Control Plant, October 19, 1994.

35. RWQCB, San Francisco Bay Region, Order No. 95-039, NPDES Permit No. CA0038610, Reissuing Waste Discharge Requirements for City and County of San Francisco, Bayside Wet Weather Facilities Including the North Point Water Pollution Control Plant, San Francisco County, February 15, 1995.

36. RWQCB, San Francisco Bay Region, Order No. 95-039, NPDES Permit No. CA0038610, Reissuing Waste Discharge Requirements for City and County of San Francisco, Bayside Wet Weather Facilities Including the North Point Water Pollution Control Plant, San Francisco County, February 15, 1995, Section 10, p. 3; carried forward from NPDES Order No. 79-67.

37. RWQCB, San Francisco Bay Region, Order No. 95-039, NPDES Permit No. CA0038610, Reissuing Waste Discharge Requirements for City and County of San Francisco, Bayside Wet Weather Facilities Including the North Point Water Pollution Control Plant, San Francisco County, February 15, 1995, Section A.2, p. 7.

38. California Regional Water Quality Control Board, San Francisco Bay Region, Order No. 95-039, NPDES Permit No. CA0038610, Reissuing Waste Discharge Requirements for City and County of San Francisco, Bayside Wet Weather Facilities Including the North Point Water Pollution Control Plant, San Francisco County, February 15, 1995, Section E.5, p. 14.

39. Stormwater Quality Task Force, *Municipal Best Management Practice Handbook*, prepared by Camp Dresser & McKee, Larry Walker Associates, Uribe and Associates, and Resources Planning Associates, March 1993.

40. The existing regulations are written such that in effect, those areas of the City served by a separated sewer system are exempt from Phase I regulations because they have a population of less than 100,000.

41. Code of Federal Regulations, Title 40, Parts 122 and 123, National Pollutant Discharge Elimination System—Proposed Regulations for Revision of the Water Pollution Control Program Addressing Storm Water Discharges, January 9, 1998.

42. Geoff Brosseau, Executive Director, Bay Area Stormwater Management Agencies Association, memorandum to Daniel Rourke, SF PUC-BERM, March 2, 1998.

43. City and County of San Francisco, Department of Public Works, Office of the Director, Order No. 158170, December 18, 1991.

44. San Francisco Public Works Code, Article 4.1, Sections 118-138, adopted March 17, 1997.*

45. San Francisco Public Works Code, Article 4.1, Sections 118-138, adopted March 17, 1997.*

46. Sanitary-only sewers are sized based on land use wastewater generation rates.

47. The East Bay Municipal Utility District sewer and storm drain system is separated but often acts like a combined system.

48. To determine what proportion of annual average runoff could be accommodated in the combined sewer system from the initial-flow diversion system, the City performed a computer simulation of the proposed system given certain pumping rates and storage volumes, assuming that pumping to the Channel Street box sewer would stop when the sewer was full (see "Methodology for Selection of Initial Flow Design Volume," in Appendix J, Hydrology and Water Quality).

49. City and County of San Francisco, Clean Water Program, "Hydrometeorological Report for the City and County of San Francisco," prepared by Hydroconsult Engineers, Storm "Duration vs. Depth" Frequency Matrix, based on National Weather Service, Federal Office Building Hourly Rainfall for July 1907 - June 1978 (71 years) and the 6-Hour Between Storm Definition, Table 5-4, unpublished.

50. Beth Goldstein, Hydrologic Planning Group, Bureau of Engineering, Department of Public Works, City and County of San Francisco, memorandum to John Bouey, Branch Manager, Lee & Ro, November 10, 1997.

51. Roesner, L. A., E. H. Burgess, J. A. Aldrich, "The Hydrology of Urban Runoff Quality Management," presented at American Society of Civil Engineers (ASCE), Water Resources Planning and Management Conference, New Orleans, LA, May 20-22, 1991, 7 pp.

52. San Francisco Board of Supervisors, Resolution No. 876-96, File No. 53-96-1, adopted September 30, 1996.*

53. San Francisco Public Utilities Commission, *Draft Overview of Wastewater Management Alternatives for Reducing Pollutant Mass Discharge to the Bay*, prepared by CH2M Hill, April 1997.

54. San Francisco Public Utilities Commission, *Draft Overview of Wastewater Management Alternatives for Reducing Pollutant Mass Discharge to the Bay*, prepared by CH2M Hill, April 1997, p. 2-3.

55. 1990 FEIR, Volume Two, pp. VI.L.30 - VI.L.34.*

56. Reclaimed water is highly treated wastewater from the City's sewer system that has undergone an additional level of treatment so that it is acceptable for various non-potable uses. Non-potable water is water that is not safe for human consumption, and non-potable uses are those such as irrigation, toilet flushing, and industrial cooling with minimal human contact.

57. City and County of San Francisco, Public Utilities Commission, Clean Water Program, *Draft Bayside Cumulative Impact Analysis*, March 1998.

58. For the purposes of the Bayside Base Case scenario, the port-owned Ballpark parking area is included as part of the Central Basin because the area will drain to the existing combined sewer system. That area currently drains directly to the Bay, as part of the Bay Basin.

59. City and County of San Francisco, Public Utilities Commission, Bureau of Water Pollution Control - Southeast Plant, *Southeast Water Pollution Control Plant Monitoring Report December 1997*, January 16, 1998.

60. In addition to monitoring effluent quality, San Francisco monitors the quality of treated overflows discharged to near-shore waters of the Bay through overflow structures along the Bay.

61. For the purposes of the Bayside Base Case scenario, the port-owned Ballpark parking area is included as part of the Central Basin because the area will drain to the existing combined sewer system. That area currently drains directly to the Bay, as part of the Bay Basin.

62. City and County of San Francisco, Public Utilities Commission, Southeast WPCP Monitoring Report December 1996, prepared by Thomas J. Franza, Deputy Manager, submitted to Regional Water Quality Control Board, San Francisco Bay Region, January 17, 1997.

63. California Regional Water Quality Control Board, San Francisco Bay Region, Order No. 94-149, NPDES Permit No. CA0037664, Reissuing Waste Discharge Requirements for City and County of San Francisco Southeast Water Pollution Control Plant, October 19, 1994.

64. RWQCB, San Francisco Bay Region, *San Francisco Bay Basin (Region 2), Water Quality Control Plan*, June 21, 1995.

65. David A. Jones, Bureau of Engineering, Department of Public Works, memorandum to Files - Southeast WPCP NPDES Permit, August 9, 1994.

66. David Jones, Environmental Policy Analyst, Bureau of Systems Planning and Regulatory Compliance, San Francisco Public Utilities Commission, personal communication with EIP Associates, March 26, 1998.

66a. City and County of San Francisco, *Bayside Overflows*, prepared by CH2M Hill, June 1979.

67. U.S. Environmental Protection Agency, Office of Water, Water Quality Criteria, 1986.

68. Brown and Caldwell, Fresno Nationwide Urban Runnoff Program Project - Fresno Metropolitan Flood Control District - Final Report, May 1984, Table 4-9.

68a. Bay Area Storm Water Management Agencies Association, *San Francisco Bay Area Stormwater Runoff Monitoring Data Analysis, 1988-1995, Final Report*, prepared by Woodward-Clyde, October 15, 1996, Appendix E.

69. Brown and Caldwell, Fresno Nationwide Urban Runoff Program Project - Fresno Metropolitan Flood Control District - Final Report, May 1984, Table 4-9.

70. City and County of San Francisco, *Bayside Overflows*, prepared by CH2M Hill, June 1979.

71. Water Engineering and Modeling, Numerical Modeling of San Francisco Effluent Disharges: Far Field Effects, 1993.

72. United States Environmental Protection Agency, Office of Water Regulations and Standards, *Quality Criteria for Water, 1986*, EPA 440/5-86-001, May 1, 1986.

73. Chronic toxicity data comparisons would be applicable only if undiluted stormwater were to remain in the Bay for as long as 96 hours. In reality, occurrences of stormwater discharges are shorter in duration than chronic toxicity exposures of 96 hours.

74. RWQCB, San Francisco Bay Region, *Proposed Regional Toxic Hot Spot Cleanup Plan*, December 1997.

75. Regional municipal discharge flow data from RWQCB, San Francisco Bay Region, *Water Quality Control Plan*, June 21, 1995, Table 4-9.

76. Beth Goldstein, Bureau of Systems Planning and Regulatory Compliance, San Francisco Public Utilities Commission, memorandum to Hillary Gitelman and Kate Stacy, re: Dry and Wet Weather Flows to San Francisco Bay, March 13, 1998.

77. Regional municipal discharge flow data from RWQCB, San Francisco Bay Region, *Water Quality Control Plan*, June 21, 1995, Table 4-9.

78. San Francisco Estuary Project, *The Effects of Land Use Change and Intensification on the San Francisco Estuary*, August 1992, Figure 2.

79. Beth Goldstein, Bureau of Systems Planning and Regulatory Compliance, San Francisco Public Utilities Commission, memorandum to Hillary Gitelman and Kate Stacy, re: Dry and Wet Weather Flows to San Francisco Bay, March 13, 1998.

80. RWQCB, San Francisco Bay Region, *Proposed Regional Toxic Hot Spot Cleanup Plan*, December 1997.

81. Stormwater Quality Task Force, *Construction Activity Best Management Practice Handbook*, prepared by Camp Dresser & McKee, Larry Walker Associates, Uribe and Associates, and Resources Planning Associates, March 1993.

82. San Francisco Public Works Code, Article 22, Sections 1200-1210, adopted October 28, 1991.

83. City and County of San Francisco, Planning Department, *San Francisco Recycled Water Master Plan and Groundwater Master Plan Final Environmental Impact Report,* Planning Department File No. 92.371E, State Clearinghouse No. 94123049, certified August 7, 1997.*

84. City and County of San Francisco, Planning Department, *San Francisco Recycled Water Master Plan and Groundwater Master Plan Final Environmental Impact Report*, Planning Department File No. 92.371E, State Clearinghouse No. 94123049, certified August 7, 1997.*

85. 1990 FEIR, Volume Two, p. VI.L.5.*

* A copy of this report is on file for public review at the Office of Environmental Review, Planning Department, 1660 Mission Street, San Francisco.

L. CHINA BASIN CHANNEL VEGETATION AND WILDLIFE

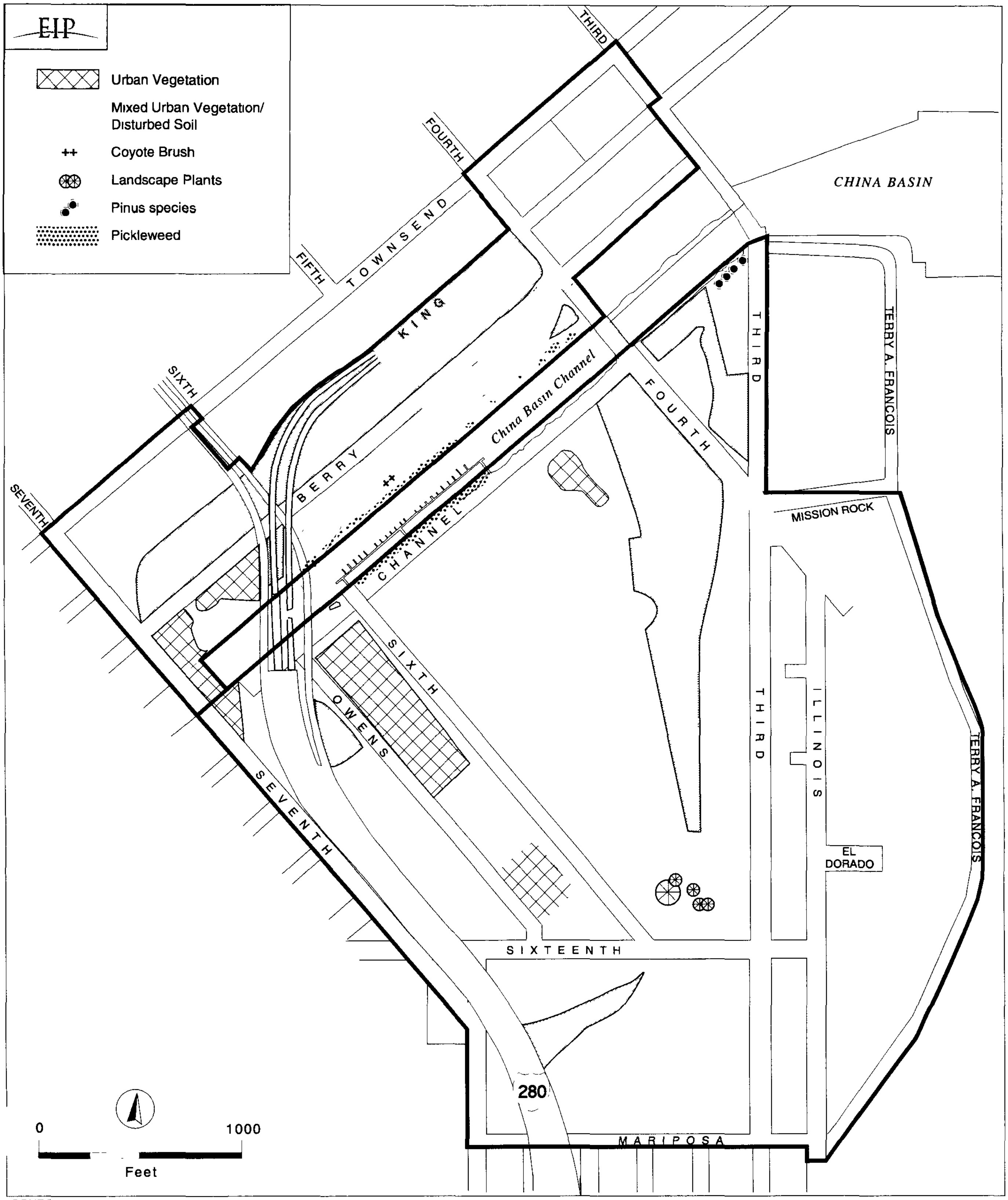
This analysis updates the 1990 FEIR analysis based on changes to the proposed development that have occurred since certification of the 1990 FEIR. The most important differences between the project alternatives analyzed in the 1990 FEIR and the project analyzed in this SEIR that are relevant to biological resources are: 1) the China Basin Channel edge treatments, and 2) a proposed pedestrian bridge at Fifth Street. The 1990 FEIR project proposed that most of the shoreline along the Channel be developed as rock and wire gabions, wooden decking, and concrete walls. The treatment now proposed for the project would be primarily a rock layer with plantings from the high tide line to the top of the bank, three promontories along the northern Channel edge, and primarily salt-tolerant plantings along the southern Channel edge. Storm drain outfalls along the Channel and Bay are now proposed (see "Sewer Infrastructure Improvements," under "Sewers and Wastewater Treatment: Impacts," in Section V.M, Community Services and Utilities, and Figure V.M.7). The 1990 FEIR did not evaluate any pedestrian bridges. The SEIR project proposes a pedestrian swing bridge crossing the Channel at Fifth Street. Finally, the 1990 FEIR discussed construction of substantial wetlands and dredging of the Channel, neither of which is now proposed.

The focus of this vegetation and wildlife analysis is on the effects of the proposed development on aquatic habitats in China Basin Channel and also considers development of two proposed storm drain outfalls on the Bay shoreline. Because the rest of the Project Area is highly urbanized and supports only urban landscaping or ruderal ("weedy") vegetation typical of disturbed areas (shown in Figure V.L.1), impacts of the project on terrestrial habitats of the Project Area were focused out in the Initial Study (see "Biology" in Appendix A, Initial Study). Urban landscaping and ruderal vegetation do not provide any significant habitat because they support only common and widespread plant and animal species adapted to urbanized environments./1/

The endnotes for this section begin on p. V.L.16.

SETTING

This section focuses on the aquatic and wetland habitats of China Basin Channel. China Basin Channel is not part of the Project Area, except for a small amount of water surface area. Treatment of the Channel edges is, however, proposed as part of the project. The Channel encompasses approximately 12 acres. It is an unlined waterway approximately 150 feet wide through most of its length, 430 feet wide at its outlet into San Francisco Bay, and 4,600 feet long, with earthen banks covered with concrete rubble or rip-rap in many areas. Although China Basin Channel itself is generally not part of the Mission Bay Project Area, the Project Area includes approximately 6,200



SOURCE EIP Associates

MISSION BAY SUBSEQUENT EIR

FIGURE V.L.1 EXISTING HABITAT TYPES IN THE MISSION BAY PROJECT AREA

linear feet of the Channel edges and a small amount of surface water area. Although periodically subject to occasional sewer overflows (usually during heavy storm events), the Channel supports a variety of aquatic plants, invertebrates, fish, and foraging water birds, as discussed below. (See "San Francisco's Combined Sewer System," and "Water Quality and Aquatic Biota," in Section V.K, Hydrology and Water Quality: Setting, for discussion of sewer overflows into the Channel.)

VEGETATION

At the Bay entrance to the Channel, immediately east of the Project Area, a marine plant community indicative of ambient Bay conditions occurs on the rocks and pilings. A green alga (*Enteromorpha* sp.)/2/ occurs seasonally in the outer and middle portions of the Channel and is visible at low tide. In June 1997, algae covered almost 100% of the mudflats exposed at low tide. The Channel sides support salt marsh vegetation, including a narrow fringe of native pickleweed (*Salicornia virginica*), approximately 2 to 5 feet wide, which has become established above the high tide line since the Channel was reconfigured by the Mission Bay landfill of the last century. Approximately 6,000 square feet (0.14 acre) of pickleweed occurs on the north bank of the Channel between 200 feet west of Sixth Street and the Peter Maloney (Fourth Street) Bridge, as shown in Figure V.L.1. Approximately 3,900 square feet (0.09 acre) of pickleweed occurs on the south bank of the Channel between 75 feet west of Sixth Street and the houseboat dock entrance near Fifth Street (see Figure V.L.1). Pickleweed is a dominant plant species of the northern coastal salt marsh community, a type of wetland that is considered sensitive because it has generally high wildlife values and has declined drastically in the region.

No pickleweed or other salt marsh wetland vegetation occurs along the Bay shoreline of the Project Area because of existing port development. The Bay shoreline consists of mudflats and open water.

The U.S. Army Corps of Engineers/3/ and the U.S. Environmental Protection Agency/4/ jointly define wetlands as: "Those areas that are inundated or saturated by surface or ground water at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions. Wetlands generally include swamps, marshes, bogs, and similar areas."

This definition has been interpreted by the Corps for purposes of wetland delineation/5/ to require three criteria to be designated a wetland: 1) inundation or saturation for at least a portion of the growing season, 2) prevalence of "hydrophytic" vegetation adapted to growing in saturated soils, and 3) the presence of "hydric" soils, meaning those soils that are saturated for long periods resulting in low levels of free oxygen and the presence of iron and other metals in a chemically reduced (unoxidized) state. The pickleweed area on the shoreline of the Channel meets the three criteria because: 1) the pickleweed area is inundated by high tides for varying lengths of time at least twice every 24 hours, 2) the area supports pickleweed which is adapted for life in saturated soil conditions and considered an obligate wetland species/6/, and 3) the Bay muds underlying the pickleweed meet the characteristics of hydric soils as described above and defined by the Corps' *Wetland Delineation Manual*.

All wetlands, regardless of size, origin (natural or artificial) or quality, are codified in the Clean Water Act regulations as one of several "special aquatic sites."/7/ This term is defined as "geographic areas, large or small, possessing special ecological characteristics of productivity, habitat, wildlife protection, or other important and easily disrupted values. These areas are generally recognized as significantly influencing or positively contributing to the general environmental health or vitality of the entire ecosystem or region." The pickleweed areas on the banks of China Basin Channel meet the definition of wetlands, are a special aquatic site, and are a viable (capable of living and reproducing) wetland habitat used by wildlife for foraging. Evidence of the viability of this habitat is provided by the fact that the wetland plants have remained alive and reproducing and wildlife use has continued since at least 1990, when the habitat was described in similar terms in the 1990 FEIR./8/

On the south shore, non-native iceplant (*Carpobrotus* sp.) is encroaching on the pickleweed near the middle reach of the Channel. The upper Channel banks are vegetated with ruderal (weedy) non-native annual grasses and forbs.

WILDLIFE

The invertebrate, fish, and water-dependent wildlife species present in the Project Area are common to the margins of San Francisco and San Pablo Bays. The estuarine habitat of the Channel is mostly degraded,/9/ and the shoreline habitat is limited in extent. Sampling of the benthic (bottom-dwelling) invertebrate community for this SEIR in July 1997 (Appendix Table K.1) revealed results similar to previous studies from 1979, as documented in the 1990 FEIR./10/ Both studies showed reduced numbers of species and individuals in the upper portion of China Basin Channel (upstream of the Peter Maloney Bridge) when compared to the area closer to the Bay. The predominance of pollution-tolerant mollusks (such as mussels) and burrowing marine worms indicates a degraded ecological condition. Samples taken from the northeastern portions of the Channel near its mouth showed a species composition and density of benthic invertebrates more typical of the San Francisco Bay, including filter-feeding organisms that have low tolerance to pollution. The degraded conditions of the Channel are likely to be primarily a result of historic land uses. Prior to the era of environmental regulations, industrial and sewage wastes were routinely discharged into the waters of most major ports (including China Basin Channel). The pollutants (especially heavy metals) from past activities have accumulated in the sediments where they remain to this day.

The high numbers of grebes, cormorants, herons, and certain species of diving ducks observed in the Channel during previous bird surveys by the Golden Gate Audubon Society and surveys conducted for this SEIR consistently indicate that the Channel may provide important fish habitat. Pacific herring spawn near the mouth of the Channel during the months of December through March. Currently, a local commercial Pacific herring fishery specializes in herring roe. In addition to their economic value, herring are an important species in the ecology of San Francisco Bay because herring, along with sardines and anchovies, are a primary food source for salmon and other sport fish./11/

Fish species observed in China Basin Channel during fish trawl sampling conducted in 1979 were Pacific herring, shiner surfperch, northern anchovy, and speckled sanddab. When a trawl survey was conducted during both low and high tide under the direction of EIP Associates on July 10, 1997, seven fish species were caught in the Channel: northern anchovy, Pacific herring, top smelt, shiner surfperch, jack smelt, Pacific sardine, and walleye surfperch. All of these species, with the exception of Pacific sardine, are common and widespread in the San Francisco Bay. Sardines are somewhat less common, but they are not a rare or protected species, and it is not unusual to find them in the San Francisco Bay./12/

The 1990 FEIR noted that some changes in aquatic ecology from earlier observations are likely over time because wildlife conditions may improve in the inner Channel as a result of the reduction in annual overflows of raw sewage./13/ Because animal populations can be cyclic, based on many environmental factors, and because no conclusions other than a characterization of species composition can be made from only two sets of sampling data (1979 and 1997), these observed increases in the number of fish species and increases in the numbers of individuals in the inner Channel may or may not be related to water quality conditions. No threatened or endangered fish species are known to inhabit the waters of China Basin Channel nor the San Francisco Bay Estuary in the vicinity of the Project Area.

Bird surveys conducted during 20 days in the winter of 1987/1988 by a member of the Golden Gate Audubon Society (for the Mission Creek Conservancy)/14/, along with subsequent surveys performed in the summer of 1997 by EIP Associates for this SEIR, documented the use of China Basin Channel by 61 bird species. Results are given in Appendix Table K.2. The results of both studies are generally consistent in that the bird census data of both studies indicate that a wide range of species is present, although the numbers of individuals of most species are low.

China Basin Channel provides primary habitat for more than two-thirds (68%) of the bird species observed in the Project Area. Relatively high counts of migratory waterfowl and shorebirds indicate the Channel provides resting and foraging habitat (but no breeding or nesting habitat except possibly for common gulls adapted to urban environments) during spring and fall migrations. Waterfowl and shorebirds require a series of stopover sites along their migration routes to rest and forage. Resting and foraging habitat is, however, more available and less critical to water birds than nesting or breeding habitat. The Channel provides a minimal area of resting and foraging habitat for resident and migratory waterfowl, shelter from storms, and limited winter foraging opportunities for fish-eating ducks. Wading birds, including herons and egrets, find limited year-round foraging habitat along the sparsely vegetated sides of the Channel. Caspian and Forster's terns dive for fish. Thus, the Channel meets at least some habitat needs (foraging and resting, but not breeding habitat) of the observed species for at least some period of time.

Most of the bird species observed in the Channel are present in the San Francisco Bay Area during fall and winter, and leave in early spring to breed elsewhere. One species that was sighted frequently, the brown pelican, is listed as endangered by both the state and federal governments. The peregrine falcon, sighted once foraging over the Channel, is listed as endangered by both state and federal agencies. None of these species (or any other birds) were observed to nest in the vicinity of the Channel. From a regional wildlife management perspective, the Channel provides minimal support for wildlife and is not capable of sustaining significant populations of the species observed because of the lack of suitable breeding habitat and contamination in the sediments from historic industrial and sewage discharges.

Small numbers of marine mammals, including the California sea lion (*Zalophus californianus*) and the harbor seal (*Phoca vitulina richardii*), have been observed upstream into the Channel in the vicinity of the houseboats. Neither species is listed under the California or Federal Endangered Species Acts, but both are protected by the Federal Marine Mammal Protection Act. Harbor seals are often found at the mouth of the Channel in larger numbers./15/ The Channel provides resting and limited foraging habitat for these animals, but is not capable of supporting large numbers. The Channel has minimal habitat value, primarily because of contamination from past sewage overflows. No other sensitive mammals are known to occur in the Project Area.

IMPACTS

STANDARDS OF SIGNIFICANCE

A project is considered to have a significant effect on the environment if it would substantially affect a designated rare or endangered species of animal or plant or the habitat of the species; substantially diminish habitat for rare or endangered fish, wildlife, or plants, or interfere substantially with the movement of any resident or migratory fish or wildlife species; result in a substantial loss or degradation of wetlands; or require removal of substantial numbers of mature, scenic trees.

PROPOSED CHINA BASIN CHANNEL EDGE AND BRIDGE TREATMENTS

To understand potential project impacts on vegetation and wildlife, it is necessary to discuss the treatment of the Channel edges and the proposed Fifth Street pedestrian bridge. Figure V.L.2 shows the proposed modifications to the Channel edges. Proposed treatments are conceptual at this time and are subject to refinement or modification through more detailed planning./16/

The northern edge of the Channel between Fourth and Sixth Streets is currently bare ground or mud with a narrow fringe of pickleweed, which provides limited wetland habitat value. This site would be graded slightly to a slope of 4:1 or flatter in certain small areas where scouring has left an escarpment. The project proposes a primarily hard, slope-stabilizing, textured rip-rap system extending upslope from the mean low water line to the mean high water line, with unspecified ornamental plantings above the mean high water line, as shown in Figure V.L.2./17/ (Rip-rap consists of a layer of stones placed irregularly to stabilize or strengthen an embankment.) The rip-rap proposed for the northern Channel edge is intended to stabilize slopes and protect them from erosion where they are currently steeper than 4:1 and scouring is visible./18/ At the top of bank, a paved pedestrian circulation system would parallel the Channel edge. At three locations, promontory areas on pilings would be developed over the Channel bank edge. Both the pedestrian circulation system and the promontory areas are proposed to afford opportunities for passive recreation such as strolling, sitting, socializing, and viewing.

The proposed treatment for both edges of the Channel from Sixth Street to the western end near the Channel Pump Station has not yet been determined. It is likely to take the form of rip-rap because existing Caltrans freeway footings and column supports preclude grading, and shading from the I-280 overpass would limit establishment of vegetation/19/. There is no pickleweed habitat along the southern edge of the Channel from 75 feet west of Sixth Street to the west end of the Channel. The strip of pickleweed habitat on the northern Channel edge ends approximately 200 feet west of Sixth Street and does not extend farther west because of shading and disturbance by freeway construction. The rip-rap treatment between the end of the Channel and Sixth Street would probably eliminate 75 feet of pickleweed habitat on the southern edge of the Channel and 200 feet of pickleweed habitat on the northern edge.

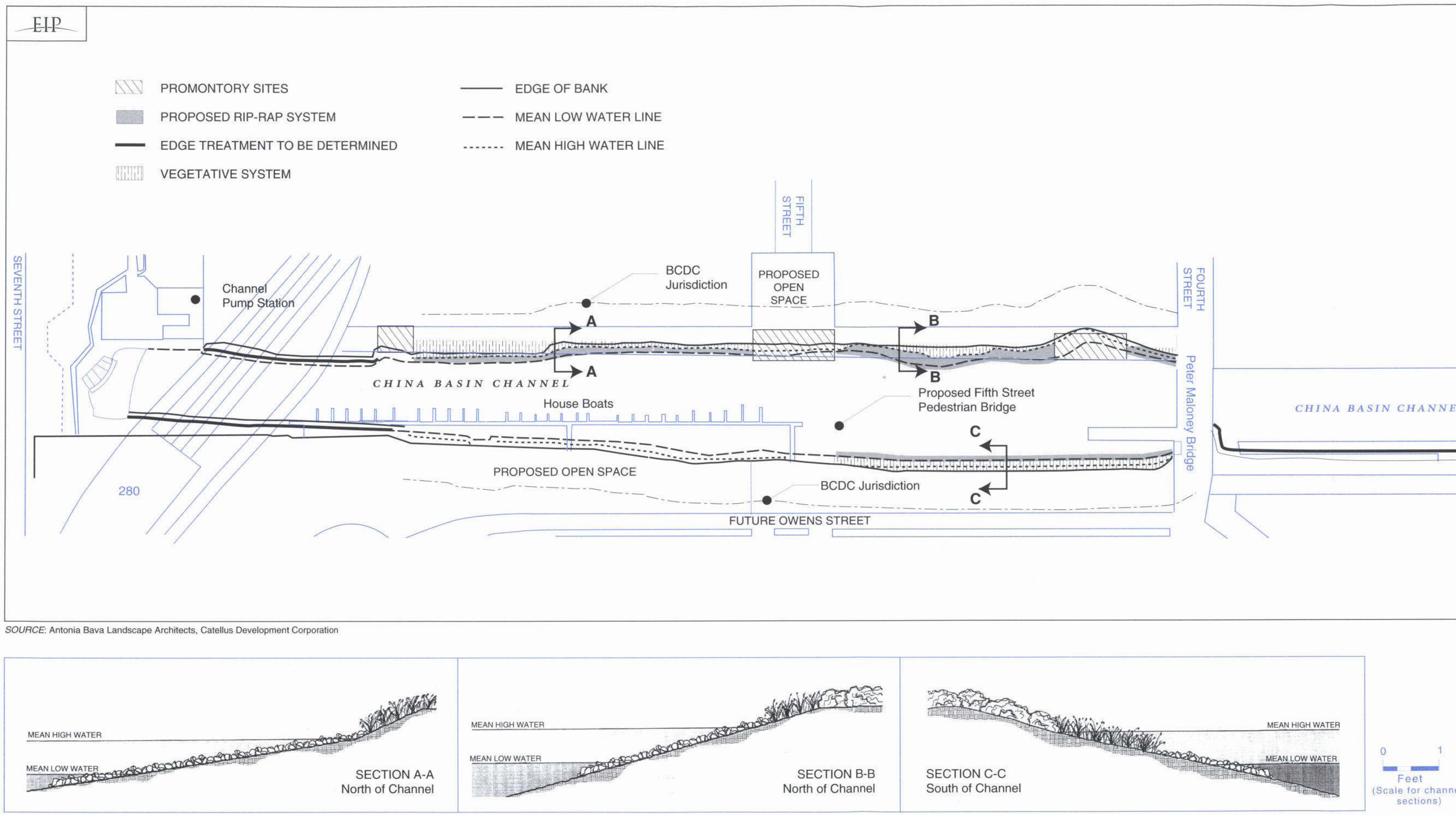
The southern Channel edge between Fourth and Fifth Streets, which is currently unvegetated and covered with loose rubble, would be treated with a vegetative system of salt-tolerant plantings (Figure V.L.2). To protect the toe of the slope from erosion and undercutting, rip-rap would be placed below the vegetative treatment from about 1 foot below the mean low water line to about 1 foot above the mean low water line./20/ Existing concrete rubble would have to be removed to plant this area successfully. Rip-rap is not planned over the entire southern edge slope, as is proposed for the north Channel shore, because the existing slopes are flatter and less scouring is visible.

The southern edge of the Channel between Third and Fourth Streets currently is covered with loose rip-rap and provides no habitat. The treatment for the southern Channel edge between Third Street and Fourth Street would likely be similar to that proposed for the southern edge between Fourth Street and Fifth Street (rip-rap near medium-low water, with salt-tolerant vegetation above the rip-rap).

No treatment is proposed for the southern Channel edge between Fifth Street and Sixth Street. This area, where the houseboats are docked, supports a thin strip of pickleweed (Figure V.L.1) with ornamental plantings on top of the bank. This wetland vegetation would remain unaffected by the project.

The proposed Fifth Street pedestrian bridge crossing over the Channel would be approximately 220 feet long with a 10-foot-wide pedestrian walking surface. The bridge would consist of a movable span of approximately 70 feet, with a northern approach span of 30 feet resting on a quay wall (a wall that separates the land from the water) at the edge of the Channel. The 30-foot south approach begins on a similar quay wall and extends by two spans of 50 feet and 70 feet, respectively, to the movable span. The spans would be supported in the water on pier structures embedded in firm strata below the bay mud at least 120 feet deep, or as determined by a detailed geotechnical soils investigation report. The northern approach span would be positioned at the east end of the proposed promontory site on the northern edge of the Channel between Fourth and Fifth Streets. This area is currently bare ground or mud with a narrow fringe of pickleweed. The southern approach span would be positioned on the southern edge of the Channel between Fourth and Fifth Streets. This area is currently unvegetated and covered with loose rubble.

Promontory structures would be built on the northern edge of the Channel at Sixth Street (approximately 60 feet by 100 feet), Fourth Street (approximately 60 feet by 190 feet), and Fifth Street (approximately 60 feet by 250 feet). It is anticipated that they would be built as either wooden or concrete decking or a combination. The Sixth Street promontory would be cantilevered over an existing outfall structure and would not require piles. The Fourth Street promontory would be



SOURCE: Antonia Bava Landscape Architects, Catellus Development Corporation

MISSION BAY SUBSEQUENT EIR

FIGURE V.L.2 PROPOSED MODIFICATIONS TO CHINA BASIN CHANNEL

constructed on one or two rows of piles, each row consisting of 13 to 14 piles. The Fifth Street promontory would use a combination of existing piles and an existing outfall structure for support. About 10 new piles would be required for the Fifth Street promontory.

Piles for the promontories are anticipated to be about 14 inches in diameter, constructed of prestressed, precast concrete. Piles would be driven in near the mean high tide line, in areas outside of the Channel right-of-way and on Catellus-owned property. In the case of the Fourth Street promontory, piles would likely be driven in the water. Approximately one-half of the piles are anticipated to be driven 125 to 130 feet deep to bedrock. This would provide an estimated 50-ton bearing capacity. Old piles that constitute hazards or obstructions would be removed. These have not been fully surveyed, but based on preliminary surveys, it is anticipated that all piles located in intertidal zones would be removed.

LOSS OF SALT MARSH WETLAND HABITAT

State/21/ and federal/22/ wetland policies call for "no net loss" of wetlands or wetland functions. The state policy goes beyond that by citing the intent of the State Legislature/23/ to increase wetland acreage by 50 % by the year 2000. These policies reflect the high values of wetland habitat, and the minimal remaining extent and quality of wetlands due to past losses. The project would replace a total of approximately 5,880 square feet (0.13 acre) of northern coastal salt marsh (pickleweed) wetland habitat on the north bank of the Channel, between 200 feet west of Sixth Street and the Peter Maloney (Fourth Street) Bridge and approximately 375 square feet (0.01 acre) of salt marsh on the south bank from Sixth Street to 75 feet west of Sixth Street, with a proposed rip-rap, hard-edge treatment. Installation of two proposed suction inlets for fire-fighting water supply on the north edge of the Channel near Fifth Street and Sixth Street would also have the potential for impacting salt marsh vegetation if they were not sited carefully. Construction of the proposed Fifth Street pedestrian bridge, the proposed fire-fighting suction inlets and two storm drain outfalls on the south edge of the Channel would not contribute an additional loss of northern coastal salt marsh wetland habitat in excess of what is being removed for the Channel edge treatments as discussed above. Construction of two proposed storm drain outfalls on the San Francisco Bay shoreline near Pier 52 and Pier 54 would also not impact salt marsh wetland habitat because none occurs there. The loss of even a small amount of northern coastal salt marsh wetlands or other special aquatic sites would cause a net loss of wetland area and functions, contrary to state and federal policies. Mitigation Measure L.1 in Section VI.L, Mitigation Measures: China Basin Channel Vegetation and Wildlife, addresses this impact.

If the outfalls proposed in the Bay and Channel were not designed properly, however, there would be a potential for losses of mudflat or bottom habitat for benthic organisms from scouring, as well as associated increases in turbidity.

Grading of the banks, placement of a rip-rap system for shore protection, and placement of pilings to support promontories, pivot piling to support a proposed swing pedestrian bridge at Fifth Street and the bridge itself, as proposed, and construction of suction inlets and stormdrain outfalls would require permits. As discussed in "Bay Conservation and Development Commission," in Section V.A, Plans, Policies, and Permits: Comparison with Existing Plans and Policies, the proposed Channel treatments and pedestrian bridge would require a BCDC permit because the placement of rock rip-rap, pilings, promontories, and bridge quay walls would constitute Bay fill. Placement of rip-rap, pilings, bridges, or other structural members in or over navigable waterways, such as the Channel, would require a permit under Section 10 of the Federal Rivers and Harbors Act. Grading, placement of rip-rap, or other discharges of fill materials below the high tide line would require a permit under Section 404 of the Federal Clean Water Act./24/ Section 404 of the Clean Water Act and implementing final rules/25/ require that a permit be obtained before placing fill in "waters of the United States," which include tidal waters below the high tide level and adjacent wetlands. Fill is defined as any material deposited which would change the bottom profile of the waterbody. Although a system of General Permits (Nationwide and Regional) exist to streamline permitting for specified activities believed to have minimal impacts, the proposed Channel edge rip-rap treatment does not meet the criteria for inclusion under any of these General Permits. Nationwide Permit 13 covers bank stabilization activities if the activity is less than 800 feet in length, but the proposed rip-rap system exceeds this by over 1,000 feet. Therefore, the proposed fill of areas below mean high water or adjacent wetlands with rip-rap would likely require an Individual Section 404 Permit.

Individual Section 404 Permits may be conditioned or denied based on substantive standards provided by the U.S. Environmental Protection Agency Clean Water Act Section 404(b)(1) guidelines and the U.S. Army Corps of Engineers' public interest review regulations. The 404(b)(1) guidelines require the evaluation of practicable upland alternatives to filling wetlands. The guidelines require that impacts of filling be fully analyzed and establish procedures that would apply to the proposed Channel edge treatments to minimize impacts through mitigation./26/ The Corps' public interest review regulations also require that impacts on fish and wildlife habitats (among other factors) be assessed and provide the District Engineers with authority to impose permit conditions to mitigate those impacts./27/ A condition of the 404 permit also requires water quality certification or a waiver from the San Francisco Bay Regional Water Quality Control Board (RWQCB) in accordance with Section 401 of the federal Clean Water Act. The RWQCB has recently been recommending replacement of wetland habitat at a ratio of 2 acres created to 1 acre lost in accordance with state wetland policy./28/

The loss of salt marsh wetland habitat would be a significant impact; Mitigation Measures L.1 and L.2 in Section VI.L, Mitigation Measures: China Basin Channel Vegetation and Wildlife, address this impact.

TURBIDITY AND RESUSPENSION OF CONTAMINATED SEDIMENTS

Suspension of sediments in the water column (turbidity) is a form of pollution even if the sediments are not otherwise contaminated. High amounts of turbidity can significantly degrade aquatic ecosystems. Turbidity can clog the gills of fish and other aquatic organisms, smother their spawning grounds and other bottom habitats, and kill vegetation by blocking sunlight. In addition, contaminants from historic industrial and sewage discharges concentrate over time in sediments by adsorbing onto the surfaces of individual particles as discussed in "Effects of Mass Pollutant Emissions on Sediment Quality," under "Construction Activity Pollutants" in Section V.K, Hydrology and Water Quality: Impacts.

Turbidity from Construction Activities

Any proposed grading, pile driving or removal, removal of rubble, construction of storm drain outfalls, suction inlets, use of large barges or tugboats to deliver equipment or materials, or other disturbance on the Channel edges or Bay outfall locations that extends below the water line or in the middle of the Channel would likely stir up bottom sediments and cause them to be resuspended in the water column. See "Effects of Mass Pollutant Emissions on Sediment Quality," in V.K, Hydrology and Water Quality: Impacts, for a discussion of changes in sediment quality due to water quality changes. Without mitigation, sediment resuspension in China Basin Channel or the Bay outfall locations could increase turbidity and concentrations of contaminants and potentially toxic substances in the water at the mouth of the Channel and, potentially, the open waters of San Francisco Bay, exacerbating an existing condition./29/ Contaminants from resuspended sediments could more readily enter the food chain through accumulation by benthic invertebrates and fish which are eaten by water birds and marine mammals./30/ Resuspension could increase contaminant levels to the point that they would be directly lethal to aquatic organisms, or contaminants could progressively bioaccumulate at non-lethal levels in lower organisms, such as benthic invertebrates and small fish, to reach concentrations that would eventually be lethal to organisms higher in the food chain, such as larger fish, water birds, and marine mammals. Without mitigation, this contamination could adversely affect certain beneficial uses of the Channel and Bay, including spawning of Pacific herring in the Bay and China Basin. Resuspension of contaminated sediments by this and other projects could cumulatively contribute to the death of animals such as brown pelicans, California sea lions, and harbor seals, protected under the Federal and State Endangered Species Act and the Marine Mammal Protection

Act. Turbidity and resuspension of contaminated sediments would be significant impacts; Mitigation Measures L.3 and L.4 in Section VI.L, Mitigation Measures: China Basin Channel Vegetation and Wildlife, and Mitigation Measure K.1 in Section VI.K, Mitigation Measures: Hydrology and Water Quality, address this impact.

Removal of old piles could occur typically by cutting them at the mudline (and leaving a stub under the mud) or by complete extraction. Complete extraction of the piles would cause temporary, but potentially substantial, turbidity in the water, and could disturb or destroy benthic organisms at each pile site. Cutting piles at the mudline would minimize disturbance of the bottom sediments. Both removal methods would permanently destroy sessile organisms that may be attached to the piles. When design plans for removal are finalized, they would be submitted to BCDC for approval before the piles are removed. Complete extraction of piles would be a significant impact (Mitigation Measures L.5 and L.6 in Section VI.L, Mitigation Measures: China Basin Channel Vegetation and Wildlife, address this impact). See "Loss of Salt Marsh Wetland Habitat," earlier in this section, for a discussion of the BCDC and Corps permits that would be required for the Channel-edge treatments.

The piles proposed for removal are likely preserved in creosote because creosote was used historically to prevent pileworms and other biotic growth from degrading wooden piles. Creosote is toxic to many kinds of aquatic biota. Removal of piles from the Channel could re-suspend small amounts of creosote in the aquatic environment with consequent adverse effects on beneficial uses. It is anticipated that all piles located in intertidal zones would require removal. On balance, removal of existing piles would pose a long-term benefit in that creosote-covered piles would be permanently replaced by inert, non-toxic precast concrete piles. The concrete piles would replace and add habitat for sessile marine organisms that attach themselves to structures and rocks.

Turbidity From Barge and Tugboat Activity

Barges moved by tugboats could be used to deliver equipment and building materials during building construction, construction of the proposed Fifth Street pedestrian bridge and other Channel edge improvements. Due to the shallow depth of China Basin Channel, the propellers of the tugboats would create currents (propwash) that could scour material from the bottom of the Channel and resuspend it, increasing turbidity. The implications for aquatic life would be the same as those previously described for turbidity caused by other construction activities in the Channel.

The amount of propwash that would induce resuspension of material depends on the speed of the propeller and its depth below the surface of the water. Most resuspended sediments would be carried away by currents and would re-deposit in areas of reduced current flow, either upstream of the construction site in the Channel or in nearby areas of San Francisco Bay. The turbidity and re-deposition of sediments from tugboat and barge activity would be considered a significant impact. Mitigation Measure L.4 in Section VI.L, Mitigation Measures: China Basin Channel Vegetation and Wildlife, addresses this impact.

DISRUPTION OF AQUATIC WILDLIFE (WATER-DEPENDENT BIRDS AND MAMMALS)

The value of the Channel habitat as a sheltered resting place for migratory water birds and marine mammals (seals and sea lions) could be adversely affected by construction and operation of the project. Construction-related noise such as noise from pile-driving could cause temporary abandonment of the Channel by resting or foraging waterbirds and mammals. During EIP surveys of the Channel for this SEIR, however, the occurrence and behavioral patterns of water birds and marine mammals did not appear to be substantially affected by seismic retrofit and construction of the I-280 freeway overpass at the west end of the Channel.

Human disturbance in the Channel area after build-out of the project could also result in displacement of water birds or mammals from China Basin Channel because of the addition of up to about 30,000 employees, about 11,000 residents, and other visitors in the Project Area, and resulting higher levels of human presence, litter, noise, pets, and potential harassment of wildlife. The proposed Fifth Street pedestrian bridge would enable an increased number of people to be closer to the Channel than is possible without the bridge. An increased number of people could result in increased opportunities and probability for wildlife harassment and additive wildlife displacement beyond what could occur without the bridge. Studies have been conducted that demonstrate that harassment of wintering water birds by people and their pets can result in losses of feeding opportunities, leading to reproductive failure during the next breeding season./31/

This potential impact must be analyzed in site-specific terms, by considering such factors as accessibility, habitat functions and extent, and the availability, location, and extent of similar habitat. For example, if habitat providing similar functions is available near the habitat affected, and is large enough to accommodate wildlife displaced from the impacted habitat, then impacts may not be significant./32/ China Basin Channel provides resting and feeding habitat for aquatic wildlife, but not nesting or breeding habitat. Feeding habitat for birds and marine mammals that eat fish, benthic invertebrates, and mollusks is prevalent in the San Francisco Bay in the immediate vicinity of the Channel. The open waters of the Bay provide ample opportunities for foraging on fish, and large expanses of mudflats on the nearby Bay shoreline provide benthic invertebrates for shorebirds. Because of their more exposed nature, these areas do not provide the same quality of resting habitat that is sheltered from unusually high tides, storms, and currents, as does China Basin Channel. The

Islais Creek Channel, on the other hand, provides similar, sheltered, resting habitat nearby (about 2 miles away) for mobile species such as birds and marine mammals. It also provides more habitat area than occurs in China Basin Channel. (Islais Creek Channel is from 325 to 650 feet wide and about 5,000 feet long.)

In summary, from a regional wildlife management perspective, the potential harassment and/or displacement of aquatic wildlife, primarily birds and marine mammals, does not constitute a significant effect. While some individuals could be displaced, including additive displacement as a result of the Fifth Street pedestrian bridge, it is not likely that displacement or harassment would result in mortality because suitable resting and foraging habitat is available nearby. This impact would not jeopardize the viability of populations of those species in the region.

It should be noted that harassment of endangered species or marine mammals is illegal and therefore mitigated by existing laws. Harassment of common wildlife species would not be likely to result in mortality or displacement because common animals are sensitive primarily during breeding activities, and there is no breeding habitat in the Channel. Therefore, impacts from increased human activity are considered less than significant.

As discussed in "Near-Shore Effects," in Section V.K, Hydrology and Water Quality, increases or changes in treated combined sewer overflows and stormwater discharges from the project or from cumulative development would not cause significant impacts on water quality or on benthic and aquatic biota in the Bay or in the near-shore waters, including China Basin Channel and Islais Creek.

Phasing of Development

Channel edge treatments, including viewing promontories, open space and park improvements would be developed in phases, as adjacent buildings were designed and constructed, as discussed in "Concept of 'Adjacency'" and "Open Space," under "Phasing of Construction of Infrastructure and Improvements in the Project Area," in Section III.B, Project Description. Impacts on wetlands or aquatic organisms from Channel edge treatments or other construction in the Channel would occur gradually during the development period, as described in the Impact subsection above.

Interim Uses

Channel edge treatments are not triggered by interim uses but instead will be constructed with adjacent, permanent development. Stormwater runoff from interim parking lots containing contaminants primarily from automobiles such as oil and grease, would flow into a detention basin for metered discharge into the City's sewage treatment system. See "Phased Development and Interim Uses," in Section V.K, Hydrology and Water Quality for a discussion of interim drainage plans and their effects on water quality.

NOTES: China Basin Channel Vegetation and Wildlife

1. See "Biology" in Appendix A, Initial Study.

2. Italicized names in parentheses are the scientific (Latin) names for flora and fauna. The abbreviation "sp." means one of various possible species of the genus named.

3. Code of Federal Regulations, Title 33, Section 3283(b), as of July 1, 1996.

4. Code of Federal Regulations, Title 40, Section 230.4(t), as of July 1, 1996.

5. U.S. Army Corps of Engineers, *Wetlands Delineation Manual*, Environmental Laboratory, 1987.

6. P.B. Reed, Jr., National List of Plant Species That Occur in Wetlands: California [Region 0], US Fish and Wildlife Service Biological Report 88, 1988.

7. Code of Federal Regulations, Title 40, Section 230.41, as of July 1, 1996.

8. San Francisco Planning Department, *Mission Bay Final Environmental Impact Report*, Planning Department File No.86.505E, State Clearinghouse No. 86070113, certified August 23, 1990, Volume Two, p. VI.M.1.*

9. 1990 FEIR, Volume Two, p. VI.M.1.*

10. 1990 FEIR, Volume Four, pp. VI.M.4-VI.M.5.*

11. *Estuary*, "Herring Pickles," Vol. 6, no. 3, June 1997.

12. C. Ryan, Fisheries Biologist, California Department of Fish and Game, telephone conversation with EIP Associates, August 18, 1997.

13. 1990 FEIR, Volume Four, pp. VI.M.4-VI.M.5.

14. Alan Hopkins, Mission Creek Channel Bird List, September 29, 1987 - February 26, 1988. Survey conducted for the Golden Gate Audubon Society. (Verified independently by EIP Associates wildlife biologists.)

15. 1990 FEIR, Volume Two, p. VI.M.3.*

16. Antonia Bava, Principal, Antonia Bava Landscape Architects, memorandum to EIP Associates, August 4, 1997.

17. Antonia Bava, Principal, Antonia Bava Landscape Architects, memorandum to EIP Associates, October 13, 1997.

18. Antonia Bava, Principal, Antonia Bava Landscape Architects, telephone conversation with EIP Associates, October 1, 1997.

19. Antonia Bava, Principal, Antonia Bava Landscape Architects, telephone conversation with EIP Associates, August 18, 1997.

20. Antonia Bava, Principal, Antonia Bava Landscape Architects, telephone conversation with EIP Associates, August 18, 1997.

21. Fish and Game Commission Wetlands Resources Policy, amended August 4, 1994.

22. J. Hendricks, Chief of South Coast Section, Regulatory Branch, U.S. Army Corps of Engineers, telephone conversation with EIP Associates, July 19, 1997.

23. California State Senate Concurrent Resolution 28, January 1, 1983.

24. J. Hendricks, Chief of South Coast Section, Regulatory Branch, U.S. Army Corps of Engineers, telephone conversation with EIP Associates, July 19, 1997.

25. Code of Federal Regulations, Title 33, Part 323, as of July 1, 1996.

26. Code of Federal Regulations, Title 40, Subpart H, Section 230.70, as of July 1, 1996.

27. Code of Federal Regulations, Title 33, Part 325, as of July 1, 1996.

28. C. Bean, Biologist, California Department of Fish and Game, telephone conversation with EIP Associates, July 19, 1997.

29. Aquatic Habitat Institute, Philip Williams & Associates, Ltd. "San Francisco Estuary Project, Status and Trends Report on Dredging and Waterway Modification in the San Francisco Estuary," March 29, 1990.

30. City and County of San Francisco, Planning Department, *San Francisco Giants Ballpark at China Basin Final Environmental Impact Report*, Planning Department File No. 96.176E, State Clearinghouse No. 96102056, certified June 26, 1997, Volume One, p. IV.313.*

31. C. Bean, Biologist, California Department of Fish and Game, telephone conversation with EIP Associates, July 19, 1997.

32. C. Bean, Biologist, California Department of Fish and Game, telephone conversation with EIP Associates, July 19, 1997.

* A copy of this report is on file for public review at the Office of Environmental Review, Planning Department, 1660 Mission Street, San Francisco.

M. COMMUNITY SERVICES AND UTILITIES

This section discusses Fire Protection, Police Protection, Public Health Services, Recreation and Parks, Schools, Solid Waste, Water Supply, Sewers and Wastewater Treatment, Energy Transmission Capacity and Infrastructure, and Telecommunications. Although the scope and characteristics of the proposed project differ from the alternatives analyzed in the 1990 FEIR, there are some similarities between Alternative A of the 1990 FEIR and the proposed project. For example, Alternative A from the 1990 FEIR included approximately 7,700 planned dwelling units and 25,000 projected employees/1/, compared to approximately 6,000 planned dwelling units and 30,000 projected employees for the proposed project analyzed in this SEIR./2/ Information from the 1990 FEIR has been incorporated by reference and is summarized when appropriate for each topic. In addition, relevant information for each topic has been updated and new information added when necessary to accurately describe the provision of services.

The organization of this section is different from the other Setting and Impact sections in this SEIR in that the Impact subsection follows the Setting subsection for each topic. The "Standards of Significance" discussion below applies to each of the topics. The endnotes for this section begin on p. V.M.56.

STANDARDS OF SIGNIFICANCE

The City has no formally adopted significance standards for potential impacts related to community services or public utilities. A project's demand for additional public services or utilities is not itself considered a significant environmental impact. However, to the extent that the demand may result in the expansion or construction of new utilities or community service facilities, the proposed project would be considered to have a significant effect on the environment if the new or expanded public facilities were in turn to result in a significant effect on the environment.

FIRE PROTECTION

SETTING

The 1990 FEIR described fire protection citywide and in the Mission Bay Project Area. Fire protection for the Project Area is provided by the San Francisco Fire Department (SFFD). Many aspects of the service provision for the proposed project are the same as they were for the 1990 FEIR./3/ The only important change is that the station at 416 Jesse Street has closed, and the units that were housed there have been moved to 676 Howard Street, which is now Station No. 1.

The SFFD consists of about 1,500 uniformed and 90 non-uniformed (civilian) personnel./4/ Fire department resources include engine companies, truck companies, rescue squads, fire boats, and other special purpose units./5/ These companies are organized into three divisions that are further divided into 10 battalions.

As shown in Figure V.M.1, the Project Area is located entirely within the Battalion 3 service area. This service area also includes the South of Market area and a small area north of Market Street between Union Square and Civic Center. The service area has an approximate western border of Seventh Street for Mission Bay North and Ninth and De Haro Streets for Mission Bay South, and has a southern border of 18th Street. The proposed project would overlap Division boundaries, with most of the proposed project in Division 1, and the southern part of the Mission Bay South Redevelopment Area (south of 16th Street) in Division 3.

Adjacent to the Project Area is China Basin Channel, Mission Creek Houseboat Marina, and various other maritime-related uses. The Port of San Francisco Fire Marshal conducts pier inspections and investigates fires, hazardous material incidents, and other emergencies occurring on port property./6/ The U.S. Coast Guard assists the SFFD along the waterfront and China Basin Channel when requested.

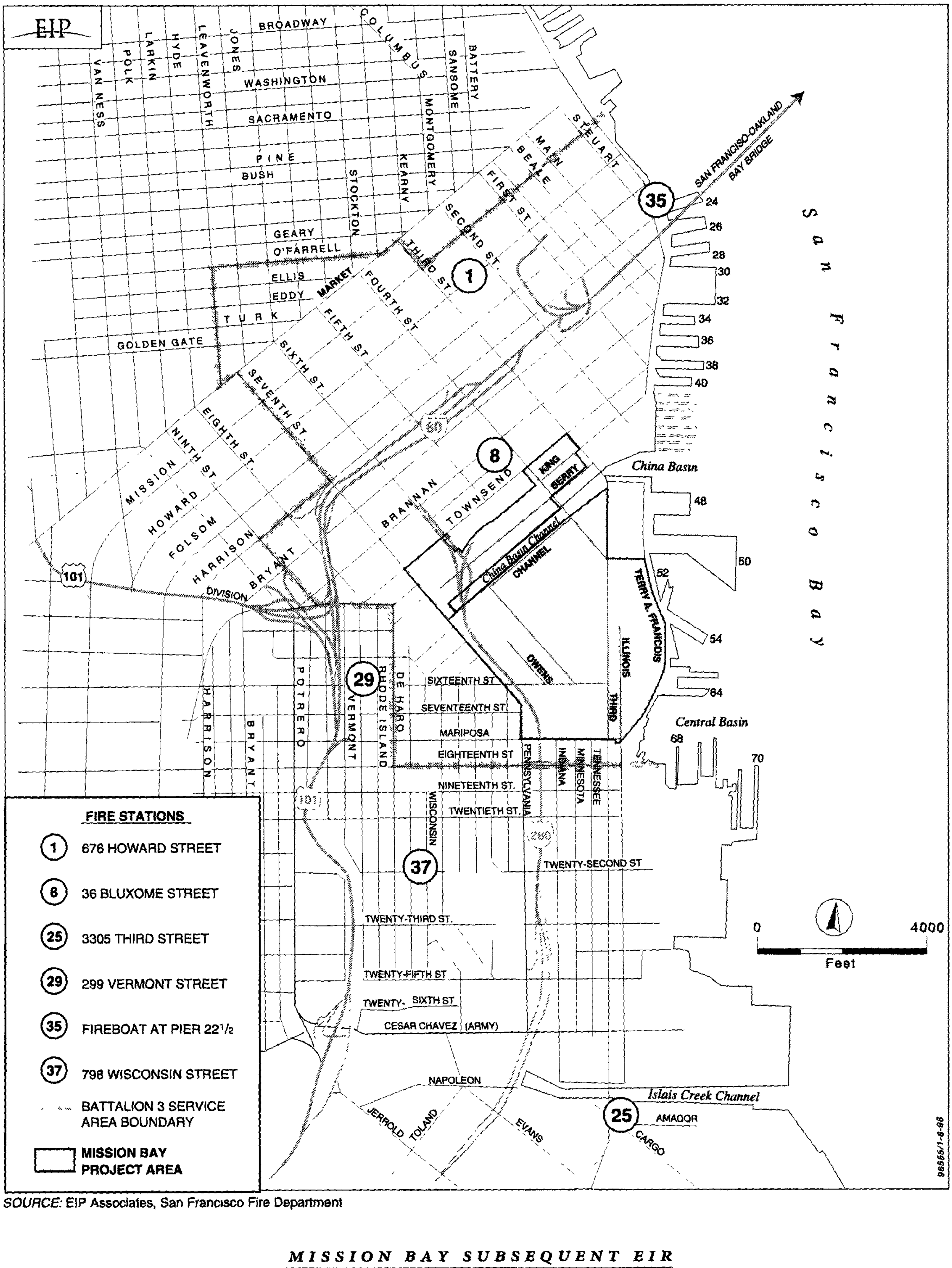
During fiscal year 1995-1996, the SFFD responded to a citywide total of 57,112 calls./7/ First response to a call from the Project Area comes from the closest station, which varies depending on the exact street location of the call. The closest station would likely be one of the following, as shown in Figure V.M.1:

- Station No. 1, 676 Howard Street
- Station No. 8, 36 Bluxome Street
- Station No. 25, 3305 Third Street
- Station No. 29, 299 Vermont Street
- Station No. 35, fireboat at Pier 22½
- Station No. 37, 798 Wisconsin Street

If the closest station is unable to respond, back-up comes from the next closest company./8/ The SFFD's targeted response time to fire and medical emergency calls is three minutes. The current average response time is slightly higher, but is considered acceptable./9/ The Fire Department is working to improve response times./10/

Hazardous Materials Response

The SFFD has a Hazardous Materials Response Unit that provides emergency response to incidents involving hazardous materials. The Hazardous Materials Response Unit (Haz Mat 1) is staffed by



SOURCE: EIP Associates, San Francisco Fire Department

MISSION BAY SUBSEQUENT EIR

FIGURE V.M.1 EXISTING FIRE STATIONS NEAR THE PROJECT AREA

members of Engine Company 36, and is housed at Station No. 36 on Oak Street, near the Civic Center. The Hazardous Materials Unit provides immediate response to chemical and biological spills at the request of a Fire Department Incident Commander or other city agency, and works in cooperation with the Department of Public Health. During fiscal year 1995-96, the SFFD responded to 179 hazardous materials calls. Of these calls, 15 (8.4%) were in the Battalion 3 area./11/

Fire-Fighting Water Supply

The fire-fighting water supply for the City and County of San Francisco includes both low-pressure and high-pressure water distribution systems. The low-pressure system serves the entire City and is the same as the drinking water supply distribution system. (See the discussion below under "Water Supply: Setting.") The high-pressure system, sometimes referred to as the Auxiliary Water Supply System (AWSS), is a specially dedicated system used only for fire-fighting. The high-pressure system can handle more volume, delivers water at a pressure of 10,000 gallons per minute (gpm), compared to 1,000 gpm that can be provided by the low-pressure system/12/, and can withstand seismic damage better than the low-pressure system./13/

In the Project Area, the high-pressure system is located under Third Street and around the perimeter of the Mission Bay Project Area./14/ Fire-fighters also have access to water from the Bay for fire-fighting purposes at specially installed suction connections. Water supply for the Project Area is discussed further under "Water Supply," below.

IMPACTS

The proposed project would increase demand on the San Francisco Fire Department. The number of incidents would be expected to increase as the number of dwelling units and office, research and development, commercial and retail uses in the area increase.

Fire Department personnel requirements would be expected to increase according to similar multipliers as described in the 1990 FEIR, despite the difference in the extent of development between the proposed project and the project alternatives analyzed in the 1990 FEIR./15/ The 1990 FEIR calculated staffing demands based on a five-step procedure. Briefly summarized, this procedure: 1) projected the number of incidents in the Project Area based on land use; 2) determined the average time to service a fire and non-fire incident for each land use category; 3) multiplied the projected number of incidents by the appropriate service time developing projections for fire service demands in terms of service time; 4) estimated the demand for additional fire service units based on average service time provided by engine and truck companies; and 5) estimated the number of personnel required to staff those units, conduct building inspections, and provide managerial and support services based on new commercial square footage./16/

The 1990 FEIR determined that in order to maintain the current level of fire protection in the Project Area, additional personnel, equipment, and a facility to house them would be needed. The amount of additional resources would vary depending on the alternative. For Alternative A, which consisted of a number of dwelling units (7,700) and projected employees (25,000) similar to the proposed project (6,090 and 30,000, respectively), the additional resources required would have included an engine company and the appropriate number of personnel to staff it, a truck company and appropriate personnel, and rehabilitation of closed Fire Station No. 30 or construction of a new station to house new personnel and equipment. Demand for these new resources was expected to occur over time as the project was built.

According to SFFD estimates and their review of the 1990 FEIR, the proposed project would generate similar personnel, equipment, and facility needs as for the alternatives analyzed in the 1990 FEIR. SFFD staff anticipate the need for a new engine company early on as development in the Project Area begins, and a new truck company later on. In addition, they foresee the possible need for a new rescue company to respond to hazardous materials incidents with the Hazardous Materials Unit. A new station would be required to house any new staff and equipment, including the Hazardous Materials Unit./17/

Development of a new fire station within the Project Area, south of China Basin Channel, would facilitate emergency access in the event of an earthquake. While emergency access from the west would be less likely to be a problem than assessed in the 1990 FEIR based on seismic upgrade of the elevated I-280 freeway structure, access from the north could be difficult without a station south of the Channel if one or both of the bridges that cross China Basin Channel were damaged or obstructed and access from the west could be difficult if any of the three underpasses under I-280 were obstructed. (See "Exposure of Concentrated Populations to Seismic Hazards" in Section V.H, Seismicity: Impacts, for further discussion.)

Another factor inhibiting emergency access to Mission Bay South from the north would be traffic associated with ballgames and special events at Pacific Bell Park. This new ballpark is under construction on King Street across Third Street, adjacent to the Project Area. Traffic before and after events is expected to cause jammed conditions on streets in Mission Bay near the ballpark site, making access for emergency vehicles more difficult for a few hours on large event and game days. For further discussion of traffic impacts, see "Impact of the New Giants Ballpark at China Basin" in Section V.E, Transportation: Impacts.

The proposed project includes 1.26 acres of land adjacent to the existing Fire Station No. 30 (which is no longer in service) to be given to the City for police and fire stations. Combined with the existing fire station, the total site would be approximately 1.5 acres. Potential impacts created by the construction and operation of a new fire station are included in the overall analysis of the proposed project contained in this SEIR. According to the San Francisco Fire Department, this would be a good location for a new station because it is located south of the Lefty O'Doul and Peter Maloney Bridges./18/ Funds would be contributed toward the construction of a fire station./19/ It is undetermined at this time whether there would be proceeds remaining to provide for additional Fire Department personnel and equipment to be housed in the proposed fire station. The addition of a large residential and commercial population south of the Channel without provision of Fire Department equipment located south of the Channel to serve this new community in the event of a major emergency would result in a potentially significant impact. Mitigation Measure M.6 in Section VI.M, Mitigation Measures: Community Services and Utilities, addresses this impact.

Hazardous Materials Response

Development of the UCSF biomedical instruction and research site and adjacent development of private research facilities, light industrial, and commercial uses would result in additional hazardous materials incidents and additional inspection requirements./20/ This would create additional workload for the SFFD Hazardous Materials Unit, which may require additional personnel and equipment. See "Emergency Response Capabilities" under "Other Issues" in Section V.I, Health and Safety: Impacts, for more information.

Fire-Fighting Water Supply

Proposed expansion of and improvements to the high-pressure (AWSS) water system are discussed below under "Water Supply: Impacts."

POLICE PROTECTION

SETTING

The 1990 FEIR discussed police protection provided by the San Francisco Police Department (SFPD), and analyzed staffing required to maintain the current citywide level of police protection in the Project Area. Since that analysis was done, the police district boundaries have changed. The Mission Bay North area is in the Southern District, which is served by the Southern Station. The Southern Station is located at 850 Bryant Street, which is approximately 1/4 mile from Mission Bay North at its closest point, and almost 1 mile away from the farthest point at the northeast corner. The Southern Station has 101 officers and is responsible for the South of Market neighborhood as well as Mission Bay North. All of Mission Bay South is now in the Bayview District, which is served by the Bayview Station. The Bayview Station is located at 201 Williams Street, which is just over 2½ miles from the southernmost tip of the Mission Bay South area, and almost 3½ miles from the northernmost point. The Bayview Station has 87 officers, and serves the area from China Basin Channel in the north to the city and county line in the south, including the Mission Bay South area, Potrero Hill, South Bayshore, Bayview/Hunters Point, and Candlestick Point.

Calls to the San Francisco Police Department are classified as either Priority A or Priority B. Priority A calls deal with life-threatening situations, severe assaults, and crimes in progress. Priority B calls concern urgent situations where the crime has already occurred. Total calls for service in 1996 and average response times for each district compared to citywide calls and response times are shown in Table V.M.1. As shown in the table, average response times for both the Southern and Bayview Districts were slightly shorter than average response times citywide in 1996.

The Project Area is currently an industrial area. The main issue noted by the Police Department is the homeless population located there./21/ As of the end of December 1997, citywide crime rates for 1997 were down 5.88% from last year. Crime rates are also down 8.89% from last year in the Bayview District. In the Southern District the year-to-date crime rate is up 1.75%./22/

It is more likely that the Project Area would remain accessible to police services in the event of an earthquake now than it was when analysis was done for the 1990 FEIR. The police station serving Mission Bay North is located north of the Channel, so obstruction or collapse of the Lefty O'Doul or Peter Maloney Bridges would not prohibit police access to proposed development north of the Channel. Similarly, Mission Bay South is now served by the Bayview Station, which is located such that police vehicles would not have to cross any bridges to gain access to proposed development south of the Channel. Routes west of Islais Creek that do not cross any bridges to reach Mission Bay South, would require vehicles to pass under I-280 on César Chavez Street, 25th, 20th, 18th, Mariposa, or 16th Streets. The typical route north to Mission Bay uses Third Street, crossing Islais Creek, and does not go under any freeway structures. For further discussion of the potential for disruption of emergency access to Mission Bay in the event of an earthquake, see "Exposure of Concentrated Populations to Seismic Hazards" in Section V.H, Seismicity: Impacts.

According to the *UCSF Long Range Development Plan Final Environmental Impact Report*, the UCSF Police Department (UCPD) has exclusive and primary responsibility for policing UCSF-controlled properties. The UCPD maintains a ratio of about 1.1 officers per 1,000 population (includes employees, students, vendors, and visitors)./23/

TABLE V.M.1
NUMBER OF CALLS TO THE SAN FRANCISCO POLICE DEPARTMENT IN 1996 AND AVERAGE RESPONSE TIMES

		Average Response Time	
	Number of Calls	A Priorities	B Priorities
Bayview Station	72,733	5:49 minutes	15:14 minutes
Southern Station	79,443	5:17 minutes	13:58 minutes
Citywide	776,678	5:50 minutes	15:26 minutes

Source: Captain Timothy Hettrich, Commanding Officer, Planning Division, San Francisco Police Department, letter to EIP Associates, July 31, 1997.

IMPACTS

To analyze the impacts of the project on police protection, the 1990 FEIR estimated the number of police incidents in the Project Area using police incident per land use ratios, and per capita police incident ratios in surrounding areas. Ratios of incidents per officer and support staff per officer were then used to estimate staff increases needed to maintain the current level of service./24/ For Alternative A, which is closest in projected employment and number of residents to the proposed project, it was estimated that 85 patrol, investigative, traffic and support personnel would be needed by full build-out./25/ Because the proposed project would consist of a similar number of employees and residents, it is reasonable to assume that demand for police services would be similar to that determined for Alternative A above. One difference in the proposed project from the project analyzed in the 1990 FEIR is the proposed UCSF site which would be located in Mission Bay South and would have its own police force.

Table V.M.2 provides an estimated number of police officers and support staff that would be needed due to the increased population in the Project Area from the proposed project in order to continue to provide the level of service that exists for the City as a whole. A level of service can be determined by comparing citywide police force staffing to total city population (residents plus workers). Using a police department staffing level obtained from the SFPD/26/, and Association of Bay Area Governments' (ABAG) population estimates for San Francisco /27/, a citywide ratio of 1 police officer for every 657 people was calculated. This ratio, when applied to the total projected resident and worker population of the Project Area at full build-out/28/, results in a need for 62 police personnel necessary to provide a comparable level of service. The size of the Police Department is

TABLE V.M.2
CITYWIDE NUMBER OF POLICE OFFICERS AND ESTIMATED PROJECT AREA DEMAND

	Population		Police Officers
Citywide	Residents	760,000	
	Workers	535,000	
	Total	1,295,000	1,971
Proposed project	Residents	10,900	
	Workers	30,000	
	Total	40,900	62

Sources: 1990 FEIR, ABAG *Projections '96*, San Francisco Police Department, EIP Associates.

governed by Charter, with a minimum number of officers set at 1,971./29/ The demand for additional police personnel would not be considered a physical environmental impact under the provisions of CEQA; however, the need for new facilities to serve additional personnel could create an environmental effect, and is discussed below.

Additional SFPD personnel needed to serve the project would need a station from which to operate. The exact amount of space that would be needed has not yet been determined. Using the estimate of 120 square feet per person from the 1990 FEIR/30/, the additional 62 police personnel would require 7,440 sq. ft. of interior building space. Additional space would be required for staff and visitor parking. According to the SFPD, there is no excess capacity at existing stations that would serve the Project Area./31/

The 1990 FEIR indicated that police access to the Project Area from existing and planned stations (the Southern Station and the planned Potrero District Station, now operating as the Bayview Station) would be a concern in the event of an earthquake./32/ This is no longer believed to be the case for the following reasons: 1) the SFPD has indicated that unlike a fire station, where equipment and personnel are located at the station most of the time except when called out for an incident, some number of police personnel would likely be out on patrol and already in or near the Project Area/33/; and 2) I-280 has been seismically retrofitted, and is less likely to collapse and block access to the Project Area from the west.

A new station within the Project Area would, however, provide the new resident and worker populations in the area access to a police station within the community which could help to involve the community in crime prevention. The 1990 FEIR discussed the accessibility of the police as influencing community involvement in crime prevention./34/ The station currently responsible for police protection to Mission Bay South is located almost 3 miles from the center of Mission Bay South. Therefore, development of a new station within the Project Area could increase community involvement and lower crime rates in the Project Area in the future compared to future conditions without a station.

The proposed project includes 1.26 acres of land adjacent to old Fire Station No. 30 (which is no longer in service) to be given to the City for police and fire stations. Combined with the existing fire station, the total site would be approximately 1.5 acres. This site may be considered among those potentially available for a relocated Southern Station. If the Southern Station were to be expanded and/or relocated, it could accommodate some of the additional demand for space to serve the Project Area. Catellus and the Redevelopment Agency would provide funding toward the construction of a police facility./35/ Potential impacts created by the construction and operation of a new police station are included in the overall analysis of the proposed project contained in this SEIR.

UCSF would have its own 24-hour police force (the UCPD), which would have primary responsibility for the UCSF site./36/ The UCPD would develop a plan for services and required resources at the time the new site is developed, and would enter into a memorandum of understanding with the SFPD, establishing jurisdictional boundaries and mutual aid responsibilities. With an estimated average daily population of 8,250 persons, the UCPD would need to increase their force by about 9 patrol officers and associated support staff and equipment to serve the UCSF site./37/ The UCSF site and its associated uses would not be expected to create substantial service demands on the SFPD./38/ UCSF employees and visitors could, however, generate crimes off-site, or generate demand through special circumstances such as protests, that would require some SFPD involvement and resources./39/ The ratio of existing SFPD officers to employed persons in the City as a whole includes UCSF employees at other UCSF sites such as Parnassus Heights, and UCSF employees in the Project Area were included in the calculation of the number of SFPD officers needed for the project, in order to account for these off-site crimes and special circumstances.

PUBLIC HEALTH SERVICES

SETTING

The San Francisco Department of Public Health (DPH) provides public health services to San Francisco residents. DPH's central office is located at 101 Grove Street, with satellite offices located throughout the City.

The Department of Public Health has undergone operational and structural changes since certification of the 1990 FEIR and is still undergoing changes. Most of the services analyzed in the 1990 FEIR are still provided, but in many cases the administrative organization of these services has changed. One service that is no longer provided directly by the Department of Public Health is ambulance service. As of July 1, 1997, the Paramedic Division of the Department of Public Health was transferred to the San Francisco Fire Department and will continue to provide ambulance services for the City. The Department of Public Health, through the Emergency Medical Services Agency, retains regulatory authority over the entire emergency medical system and management and control of the City's emergency medical services. Other emergency medical services provided by the Department of Public Health will continue, such as trauma and emergency medical services at San Francisco General Hospital and hazardous materials and toxics emergency management through the Bureau of Environmental Health Management. Ambulance service is discussed in "Utilities/Public Services" in the Initial Study, Appendix A.

The Department of Public Health is now organized into two main divisions: the Public Health Division and the Community Health Network. The Public Health Division focuses on strategies addressing the health needs of the population and community as a whole, and the Community Health Network provides personal health care services to San Franciscans. Services provided by these divisions include environmental health, personal health care (including primary care and hospital care), and mental health services, which are all discussed below./40/ There are many other services provided by the Department of Public Health, such as substance abuse treatment, which will not be discussed in detail as the demand for such services would not result in environmental impacts.

Environmental Health Services

The Bureau of Environmental Health Management provides services through five major program areas:

- The Consumer Protection Program (CPP) enforces state and local regulations and provides public education to protect food, water, residences, and recreational and institutional environments from contamination from biological, physical, and chemical agents. The CPP is responsible for inspection of food establishments, institutions, and detention facilities, homeless hotels and housing; enforcement of smoking ordinances in restaurants, workplaces and public areas; and enforcement of local ordinances controlling fixed-equipment noise in the community. CPP programs include the Food Program, Solid Waste Program, Complaint Program, and Water Quality Program.

- The Hazardous Materials Unified Program Agency registers and inspects businesses and institutions including UCSF that store hazardous materials either in above-ground containers or underground storage tanks, or that generate or treat hazardous wastes. It also regulates sites undergoing soil and groundwater remediation as a result of contamination from leaking underground storage tanks.

- The Hazardous Waste Program oversees the environmental (site) assessment and remediation of private sites, as required by local ordinance (Article 20 of the Public Works Code), inspects private businesses generating medical waste, responds to reports of illegally disposed hazardous waste, and provides technical assistance to the Safe Syringe Disposal Program and other hazardous waste prevention and management activities.

- The Childhood Lead Poisoning Prevention Program prevents and responds to childhood lead poisoning through health education and outreach, enforcement of state and local laws and regulations such as housing and building codes, screening, Case management and surveillance, and local and state advocacy.

- The Special Projects section handles a variety of issues. These include asbestos management; emergency response for hazardous materials incidents (in conjunction with the San Francisco Fire Department) and community follow-up to such incidents; and planning for handling oil spills and other disasters.

Personal Health Care Services

Primary care, including preventive and support services, is provided by the Department of Public Health at clinics located throughout the City. DPH's health center closest to the proposed Project Area is the Potrero Hill Health Center at 1050 Wisconsin Street. In addition, the South of Market Health Center at 551 Minna Street is a private, non-profit health center located close to the Project Area. There are also four DPH hospital-based health centers located at San Francisco General Hospital: Children's Health Center, Family Health Center, General Medicine Clinic, and Women's Health Center. All six health centers provide primary care services and referrals to specialty care services. They also provide preventive and support services such as health promotion and education, nutrition counseling, public health nursing, and dental care.

The hospital closest to the Project Area is San Francisco General Hospital (SFGH), which is also operated by the Department of Public Health. SFGH provides various levels of care including primary, urgent, and emergency services. SFGH is the City's only Level One Trauma Center and is the designated provider of trauma care to victims of violence, auto accidents, and other life-threatening incidents.

Mental Health Services

The Mental Health Division provides mental health services for eligible San Francisco residents. These services include prevention and early intervention, day treatment, outpatient treatment, case management, crisis intervention, inpatient treatment, residential treatment, and long-term care. The Mental Health Division also conducts public education and provides technical assistance and consultation. Mental health services are offered at clinics throughout the City. Some of these clinics are city-owned, and others are private facilities operating under city contracts. Also, some clinics have specific focuses, such as for ethnic and cultural groups. This means that persons needing mental health services may not use the facilities closest to them, but instead may choose to visit a clinic outside of their immediate area to address specific needs./41/

IMPACTS

The proposed project would be expected to increase demand on public health services in the areas of environmental health, personal health care services including preventive and support services, and mental health services.

Environmental Health

The proposed project has the potential to increase demand on Environmental Health Section programs by generating new establishments that would need to be inspected, and new dwelling units that would have an impact on the Consumer Protection Program (CPP). The number of full-time employees needed to provide adequate inspection and oversight service depends on the number and type of establishments that would operate in the proposed Project Area and the number of new residences. For example, it is estimated that approximately 300 food establishments, including retail, wholesale, and restaurants, could be inspected three to four times each year (excluding follow-up inspections) by one full-time employee; approximately 100 establishments that use or store hazardous materials, such as dry cleaners, or gas stations, could be inspected each year by one full-time employee; and approximately 1,000 complaints, such as private citizens complaining of abandoned cars or old tires in a yard area, could be handled each year by one full-time employee./42/ Therefore, additional full-time employees may be needed as a result of the proposed project, but the exact number cannot be determined at this time with existing project information because the project is defined at a planning level of detail and specific numbers of various types of retail establishments that may serve food and specific numbers of firms using hazardous materials are not known. This demand for health department staff would not, however, be considered a physical environmental impact under the provisions of CEQA, because it is unlikely that a new facility would need to be constructed to accommodate this potential increase in staff./43/

Personal Health Care Services

The proposed project would generate demand for personal health care services. The extent of this demand would depend on factors that cannot be determined accurately at this time. These factors include: 1) whether occupants and users of the Project Area would continue to use their current health care providers or would seek new ones closer to their new residence or place of work, which may depend partly on their health insurance or lack thereof, and 2) the health problems and health service needs of Project Area occupants and users. Consequently, the potential demand on clinics and programs operated by the Department of Public Health resulting from the increased resident and worker population of the proposed project cannot be reasonably estimated, as was stated in the 1990 FEIR./44/ An environmental impact would occur only if a new facility were required to accommodate project-related demand for public health services and construction or operation of that facility were to cause significant environmental impacts./45/

The Redevelopment Agency has included plans to relocate the South of Market Health Center in its revised South of Market Earthquake Recovery Redevelopment Plan./46/ If this health center were to expand its scope of service as part of the relocation, this could reasonably be expected to adequately provide for increase in demand resulting from the proposed project. In addition, although there are currently no plans for clinical care space at the new UCSF site, the *UCSF Long Range Development Plan* does state that "a small community clinic could be located at the new site depending upon the location selected."/47/ If there were additional demand for health center or clinical facilities, it would likely be met either in existing facilities or in one of these planned new facilities. Impacts of a small clinic were included in the overall analysis of the new UCSF site in the UCSF LRDP EIR; relevant impacts, such as transportation and air quality effects, are accounted for in this SEIR because the travel data from the LRDP EIR have been included in the transportation analysis for the Mission Bay Project Area. Therefore, effects that a medical clinic might have on traffic or related noise or air quality have been analyzed.

Mental Health Services

The proposed project would have an impact on demand for mental health treatment and crisis intervention, the extent of which would depend on many factors, including those listed under "Personal Health Care Services." Additional factors influencing demand for mental health services include age and socioeconomic status of the potential new population, and the proposed project's effect on the citywide employment rate.

An estimate of the number of potential clients can be made using the number of clients from the previous fiscal year per 100,000 population. In fiscal year 1996-97, there were about 2,450 clients per 100,000 residents./48/ This ratio, with a projected resident population of approximately 11,000 in the Project Area/49/, could result in about 270 clients seeking mental health services. This is considered a conservative estimate, with the actual number of potential clients expected to be lower. The projected 30,000 Project Area employees would also generate some need for additional crisis interventions, but there is no basis on which to estimate this number.

The estimated number of potential new users of mental health services and potential number of crisis incidents resulting from the proposed project might add to the demand on the Community Mental Health Services of the San Francisco Department of Public Health to the extent that a new facility would be needed to reasonably accommodate the demand./50/ It is not possible to make a definitive determination at this stage in the area planning process. If such a facility were needed and were provided, it would likely have impacts similar to those of small professional and community service facilities expected to be included in the neighborhood-serving retail areas; therefore, impacts of a small mental health facility have been accounted for in the overall analysis of the proposed redevelopment plans for the Project Area.

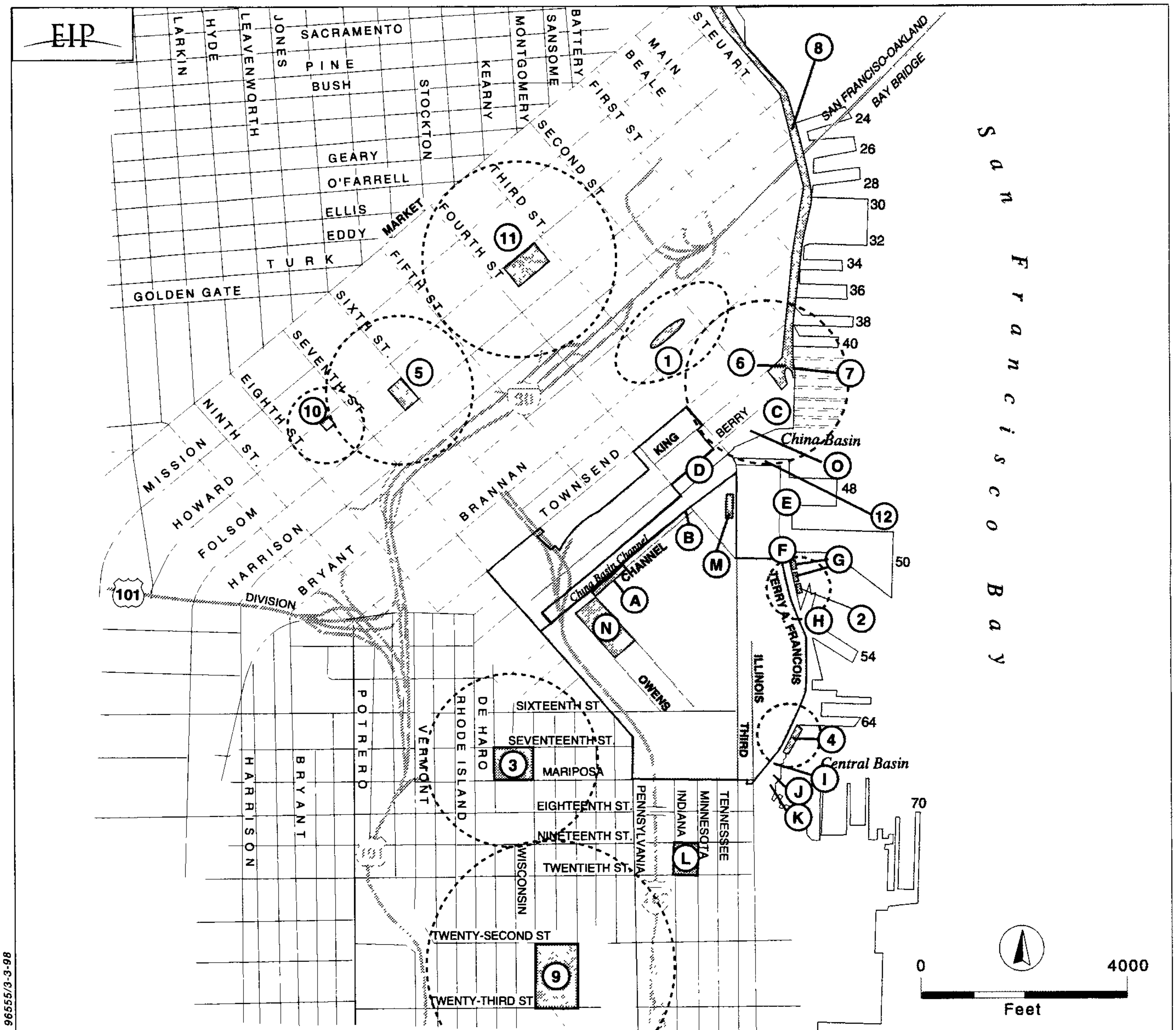
RECREATION AND PARKS

SETTING

The 1990 FEIR described existing open space, parks, and recreational facilities in and near the Project Area, and discussed relevant San Francisco plans and policies regarding open space. That information is updated for the SEIR, as necessary. For the following discussion of recreation and parks, the term "open space" is used to refer to publicly accessible parks, gardens, promenades, and piers. It is not meant to include public rights-of-way and streets.

Existing and Planned Parks, Recreational Facilities, and Open Space

At the time the analysis for the 1990 FEIR was done, Mission Bay and its surrounding areas were not well served by open space, parks, and recreational facilities./51/ However, there was, and continues to be, little demand for open space in the Project Area due to the fact that there are few residents and a minimal number of employees. The amount of open space in and around the Project Area has changed only slightly since that analysis was done. Existing parks, open spaces and recreational facilities, both public and private, are shown in Figure V.M.2. New parks and recreation areas in and near the Project Area include: Yerba Buena Gardens, South Beach Park, the South of Market



96555/3-3-98

SOURCE: 1990 FEIR; San Francisco Recreation and Park Department; Port of San Francisco, Open Space Inventory Table; Port of San Francisco Waterfront Land Use Plan, Republished April 1996.

PUBLICLY PROVIDED AND MAINTAINED

1. South Park (SFRPD)
2. Pier 52 Public Boat Launch Ramp (SFRPD)
3. Jackson Playground (SFRPD)
4. Agua Vista Park (Port)
5. South of Market Recreation Center (SFRPD)
6. South Beach Park (SFRA)
7. South Beach Harbor public access areas (SFRA)
8. Embarcadero Promenade (Port)
9. Potrero Hill Playground, Mini Park and Recreation Center (SFRPD)
10. Howard Langton Mini Park (SFRPD)
11. Yerba Buena Gardens (SFRA)
12. Approved China Basin Park (Port)

PRIVATELY PROVIDED AND MAINTAINED

A. Mission Creek Harbor public access improvements (Mission Creek Harbor Association)
B. Carmen's Restaurant deck
C. Dolph P. Rempp Sailing Ship Restaurant viewing deck
D. China Basin Building boardwalk
E. Jelly's Dance Cafe Restaurant deck and viewing area
F. Mariposa/Hunters Point Yacht Club
G. Continental Maritime sitting and viewing areas
H. Bay View Boat Club
I. Mission Rock Resort restaurant deck
J. San Francisco Boat Works private boat launch ramp
K. The Ramp restaurant deck and viewing area
L. Esprit Park
M. The Bladium
N. Mission Bay Golf Center
O. Giants Ballpark (under construction)

- - - - - Approximate Service Area of Public Open Space

Port = Port of San Francisco

SFRPD = San Francisco Recreation and Park Department

SFRA = San Francisco Redevelopment Agency

MISSION BAY SUBSEQUENT EIR

FIGURE V.M.2 EXISTING PUBLIC AND PRIVATE OPEN SPACE AND RECREATION FACILITIES IN THE VICINITY OF MISSION BAY

Recreation Center (which was under construction at the time of the 1990 FEIR analysis), the Mission Bay Golf Center, and the Bladium. The San Francisco Giants Ballpark is under construction at Third and King Streets. The size and location of these along with additional planned open space areas are discussed below.

Yerba Buena Gardens, approximately 8 acres in size, is located in the interior of the block bordered by Third, Fourth, Mission, and Howard Streets. It consists of an approximately 5.5-acre grassy esplanade, a 0.5-acre "east" garden, and a paved terrace area. It is provided and maintained by the Redevelopment Agency. The South of Market Recreation Center, located at Sixth and Folsom Streets, is an approximately 2-acre site with a gymnasium, community room, children's play area, and landscaped grass area. The Mission Bay Golf Center is a privately owned driving range, golf shop and restaurant. The Bladium is a privately owned, indoor roller-hockey arena. Both the Mission Bay Golf Center and the Bladium are within the Project Area.

South Beach Park, approximately 3 acres in size, is located north of the Project Area adjacent to South Beach Harbor. There are plans to expand the size of the park to a total of up to 5 acres./52/ Public access facilities and open space will be developed in connection with the BCDC permit for the San Francisco Giants Ballpark, including approximately 2 acres of public open space on port property along the southern shoreline of China Basin Channel, which is to be developed by the China Basin Ballpark Company; and a 25-foot-wide Port Walk along China Basin Channel with at least five viewing platforms and with public plazas at each end, which will be developed as part of the Giants Ballpark project./53/

The only existing improved open space within the Project Area is the Mission Creek Harbor public access improvements, a 1,400-foot strip (approximately 1 acre) of publicly accessible open space adjacent to the south edge of the Channel. This open space is accessible from Channel Street and has a community garden at Sixth and Channel Streets.

Parks and open spaces near the Project Area (including those mentioned above that are new since the 1990 FEIR) and their approximate sizes /54/ are listed below:

- South Park (0.9 acre)
- Jackson Playground (4.4 acres)
- Esprit Park (2 acres)
- Agua Vista Park (0.5 acre)

- The South of Market Recreation Center (2 acres)
- South Beach Park (3 acres)
- The Potrero Hill Playground, Recreation Center, and Mini Park (10.2 acres)
- Yerba Buena Gardens (8 acres)
- Howard Langton Mini Park (0.2 acre)
- The public boat launch ramp at Pier 52
- Other open spaces include: private open spaces associated with marinas located along the east side of Terry A. François Boulevard, restaurant viewing decks, and other small fishing and viewing areas along the Bay.

There are no recreational centers that include a full-court gym within 1,500 feet of the Project Area. The closest recreational centers are: the Potrero Hill Playground and Recreation Center, which is about 2,500 feet southwest of the Project Area; and the South of Market Recreation Center, which is approximately 2,500 feet northwest of the Project Area. There are no senior programs at any of the parks mentioned above. The Potrero Hill Neighborhood House at De Haro and Southern Heights Street, about 0.5 mile from the Project Area, is a private, non-profit senior center which offers recreation, health screening, and nutrition programs to seniors. It serves senior citizens in the Potrero Hill, Lower Potrero Hill and Inner Mission areas.

Citywide Open Space

Total public open space in San Francisco is approximately 6,000 acres. This consists of:

- 3,500 acres owned and managed by the San Francisco Recreation and Park Department, consisting of parks of various sizes throughout the City;
- 170 acres owned by the State of California at Candlestick Point State Recreation Area;
- 620 acres owned by the federal government and managed by the National Park Service as part of the Golden Gate National Recreation Area;
- 1,500 acres that were formerly a U.S. Army base at the Presidio, which are now open to the public and managed jointly by the Presidio Trust and National Park Service/55/;
- About 150 acres provided by the San Francisco Redevelopment Agency/56/; and
- About 47 acres on Port of San Francisco property, consisting mainly of waterside promenades, public access space on piers and wharf structures, and various parks that range in size from less than 1 acre to approximately 3 acres. China Basin Park, an approximately

2-acre Giants Ballpark park, will be constructed and maintained on port property, along the southern edge of the China Basin Channel and is included in the 47-acre total./57/ An additional 24 acres of public open space are planned for port property, but not yet funded or developed/58/.

Plans and Policies

Various documents set forth plans, policies and goals for the City regarding provision of adequate open space. These include the Recreation and Open Space Element, *Mission Bay Plan*, and *Central Waterfront Plan* of the *San Francisco General Plan*, and the Bay Conservation and Development Commission's (BCDC) *San Francisco Bay Plan* and *San Francisco Waterfront Special Area Plan*. See "Recreation and Parks" in Appendix L for a brief summary of relevant plans and policies from the *San Francisco General Plan* and BCDC plans.

The City's basis for analyzing the distribution of public open space is the "neighborhood service area" concept, which is found in the Recreation and Open Space Element under Citywide Objectives and Policies. This concept takes into account the distance prospective users are willing to walk to an open space, and then categorizes open spaces according their service area, size, facilities offered, and targeted users. The four categories of open space are city-serving, district-serving, neighborhood-serving, and subneighborhood-serving. These are shown and described further in Table V.M.3, in the Impacts subsection.

Open spaces and their service areas are shown on Map 2, p. I.3.11, of the Recreation and Open Space Element. Neighborhoods that fall outside these service area boundaries are described as "not adequately served by public open space."/59/

IMPACTS

Methodology

The impact of the proposed project on open space is estimated based on guidelines and policies set forth in the *San Francisco General Plan* Recreation and Open Space Element, and the supply of existing and proposed open space available. The national standard used for open space analysis in the 1990 FEIR is not used in this analysis because the National Recreation and Park Association has developed a new approach since the 1990 FEIR was completed that is appropriate for citywide, long-term planning purposes rather than an area-by-area assessment.

TABLE V.M.3
OPEN SPACE CATEGORIES

Category	Size	Facilities Offered	Target Users	Service Area
City-serving open space	1 to 1,000 acres	Unique features such as forested areas, fields, vista points; facilities for specialized active recreation requiring large areas; may also contain recreation centers, playgrounds or totlots. Hilltop and shoreline open spaces can be categorized as city-serving because of their unique locations, but would be assigned a smaller service area.	City residents as well as people from outside the city; heavy use by neighborhood residents	One-half mile, or a 10-minute walk
District-serving open space	>10 acres	Usually contain playfields, and recreational facilities for active use, able to accommodate students and adults; facilities for organized team sports; may also include indoor recreation facilities.	Usually serve more than a single neighborhood or community	3/8ths of a mile, or a seven and a half-minute walk
Neighborhood-serving open space	1 to 10 acres, with a preferred minimum size of 4 to 5 acres	Usually landscaped, contain areas of scenic interest that are natural or man-made, provide for active and/or passive recreation, not requiring organized programs; able to accommodate all user groups from pre-school to seniors; have playground areas; may also contain playfields and/or athletic facilities. Some squares, hilltops, plazas and shoreline open spaces can be considered neighborhood-serving.	Primarily serve a single neighborhood or community	One quarter of a mile, or a five-minute walk
Subneighborhood-serving open space	<1 acre	Small spaces, often called mini-parks, frequently include a totlot or playground; primarily designed for children of elementary school age, and can include active sports, games, and landscaped parklike areas; sitting areas for all users.	Used primarily by people from immediately adjacent area	One-eighth of a mile

Source: *San Francisco General Plan*, Recreation and Open Space Element, pp. I.3.9 - I.3.10.

Open Space Demand

Demand for open space would result from the proposed project's resident and worker populations.

Resident Demand

Mission Bay is not within the service area of any existing open space under the jurisdiction of the Recreation and Park Department, according to Map 2, page I.3.11 of the Recreation and Open Space Element of the *San Francisco General Plan*. As shown in Figure V.M.2, the areas served by various privately owned, publicly accessible waterfront parks and facilities such as the Continental Maritime sitting and viewing areas and the China Basin Building boardwalk would include parts of the eastern edge of the Project Area. If South Beach Park were to be considered a neighborhood-serving open space according to the Recreation and Open Space Element categories as described in Table V.M.3, its service area would be about 1/4 mile, and would reach the northeasternmost portion of the Project Area. To adequately serve residents of the proposed project, an adequate number of additional parks would need to be developed, each of an appropriate size, within distances specified in the Recreation and Open Space Element of the *San Francisco General Plan*. A park system that would achieve this, and "cover" the residential development of the Project Area, could consist of different combinations of types and numbers of parks. The exact size and number of parks would, in part, depend on their location relative to residential units. The Recreation and Open Space Element, while discussing quantity of open space per capita generally, does not establish a policy on the quantity of open space desirable in any new residential development in the City. Therefore, a quantitative analysis cannot be used to directly assess whether a particular parcel of open space would be adequate to serve a proposed residential development. Categories of parks, typical facilities, size, and approximate service areas are shown in Table V.M.3.

New residential development is proposed for the North and Central Subareas of the Project Area. The closest existing district park, the Potrero Hill Playground, Mini Park and Recreation Center, is approximately 3/4 mile south of the southernmost tip of the Project Area, and over 1 mile away from much of Mission Bay South and all of Mission Bay North. According to the Open Space Element, either a new district park of 10 acres (located within 3/8 mile of residential units), or a combination of one or more new neighborhood parks (with a preferred size of 4 to 5 acres each/60/) located within 1/4 mile of residential units, along with one or more sub-neighborhood parks (typically less than 1 acre in size/61/) within 1/8 mile would adequately cover the service area of proposed new residential development. Facilities that would be typical of neighborhood and sub-neighborhood parks are described in Table V.M.3.

Along with the demand for parks occasioned by the residential development proposed in the North and Central Subareas, there would be some commercial development, which would generate employee demand for parks. Employees in this area would be expected to use the same parks as residents. Therefore, parks would need to be developed at a size and scope adequate to provide for employees in the North and Central Subareas as well as residents. Employee demand is discussed further below.

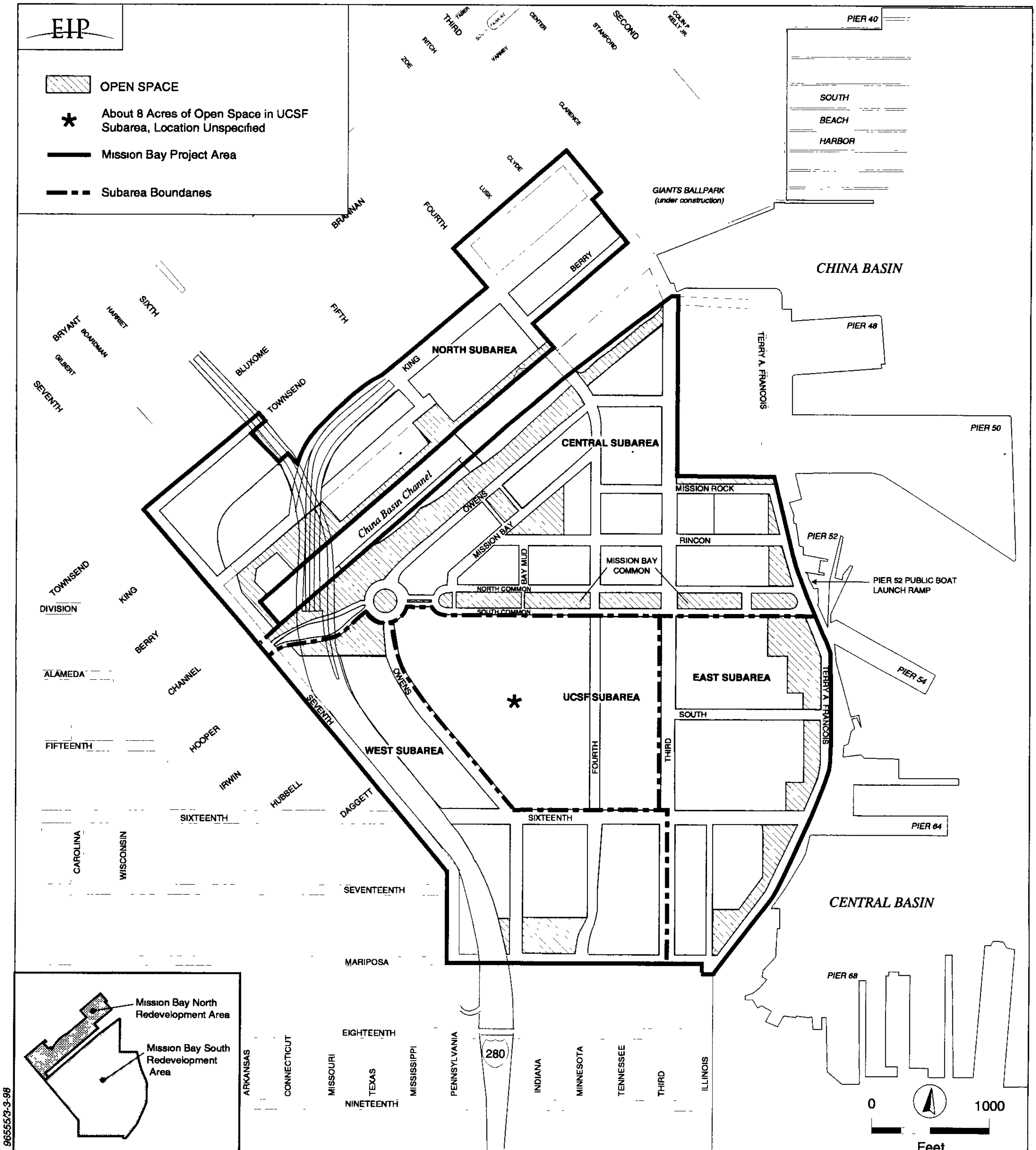
Employee Demand

In the 1990 FEIR, employee demand for open space was estimated based on the Downtown Plan's requirement that commercial developments provide 1 square foot of open space for every 50 gross square feet of building space./62/ An employee density factor of 1 employee per 290 gross square feet was used, to convert this to a standard of 0.14 acre of open space per 1,000 employees./63/ The requirements of the Downtown Plan would not apply to Mission Bay. It is useful, however, to provide the Downtown Plan's estimates of employee needs for open space to confirm that planned neighborhood parks would provide at least the minimum amount of open space recommended by the Downtown Plan. If this standard were applied to the proposed project, employee demand for open space would be approximately 4 acres. The San Francisco Planning Code, Section 138(c) requires that open space related to a downtown building must be within 900 feet of the building, and must be within the same use district as the building./64/ Therefore, to provide adequate open space for employees of the proposed project, a minimum of 4 acres of open space would need to be provided; it would best serve employees if it were located according to the guidelines set out in the San Francisco Planning Code, so that employees could walk to open space during their lunch hour.

Proposed Project Open Space

Privately owned recreation facilities within the Project Area that would be eliminated over time as a result of the proposed project include the Mission Bay Golf Center and the Bladium (as discussed in "Buildings to Be Demolished," in Section V.B, Land Use: Impacts).

Total public open space, including 8 acres within the UCSF site, would be approximately 47 acres. The total open space in the 1990 *Mission Bay Plan* was about 63 acres that included the open water of the China Basin Channel (12.5 acres) and about 11 acres of open space on Port-owned property north of Mission Rock Street./65/ Because the open water of the Channel and the Port property are not in the current Project Area, the 1990 *Mission Bay Plan* included about 39.5 acres of open space in the Project Area. Therefore, the proposed project (with 47 acres of open space) would have about 7.5 more acres of open space than the approved *Mission Bay Plan*. The open space system for the proposed project is being designed to create a linked system of public parks, plazas, and play areas



SOURCE: Catellus Development Corporation

MISSION BAY SEIR INITIAL STUDY

FIGURE V.M.3 PROPOSED PROJECT PUBLIC OPEN SPACE

that could accommodate active as well as passive recreational use./66/ Active uses could include athletic playing fields, court games, children's play areas, informal lawn recreation, and paths for skating, jogging, walking, and bicycling. Passive recreation could include paths for strolling, and places for sitting, viewing, and socializing. The open space system proposed would highlight distinctive features of the Project Area including China Basin Channel and the Bay. Bicycle and pedestrian paths would connect the planned open space areas as well as connect the Project Area with Nearby Areas. Proposed bicycle and pedestrian paths would extend the citywide network of bicycle and pedestrian routes. Open spaces would be designed to take into account features that would address public safety issues and to reinforce unique Project Area views. The main features of the open space system are described below and shown in Figure V.M.3.

The following description of proposed parks reflects information contained in the SFRA's *Design Standards and Guidelines, Mission Bay* (Draft C)./67/ The acreages of proposed parks are approximate./68/ The northern edge of the Channel would be developed as a landscaped area oriented to the water with paved walkways and viewing platforms along the Channel edge. It would provide areas for passive recreation including strolling, sitting, and viewing the Channel. Extending north from this park would be a neighborhood square of almost 1 acre in size (about the same size as South Park) that would allow for passive recreation and could contain a fountain, pavilion, artwork, or similar feature.

At the western end of the Channel on the north side would be an approximately 3-acre park, adjacent to and surrounding the existing pump station. A portion of this park would be under the freeway, and therefore would not be useful for certain types of passive recreation, such as quiet conversations, sunbathing, and viewing. This space would accommodate certain types of active recreation, depending on the height of the freeway, such as skateboarding, rollerblading, or basketball. The rest of this park is planned as a grassy, landscaped area around the existing pump station.

A pedestrian bridge over the Channel at Fifth Street may be included in the project. If it is, it would connect the open space areas north and south of the Channel. On the south side of the Channel, an approximately 8.5-acre linear park would consist primarily of grassy areas, pedestrian pathways, and viewing and seating areas. This park could also accommodate a children's play area. The existing Mission Creek Harbor public access improvements already located within this area would remain. This park would connect at its western end with an approximately 3-acre neighborhood park that could accommodate different types of active recreation. Areas under the freeway could accommodate compatible recreation such as skateboarding, rollerblading, or basketball. The portion of this park not under the freeway could accommodate a softball field.

The linear park south of the Channel would also connect with an approximately 1-acre park located approximately across the Channel from Fifth Street, that would be developed as a "symbolic center for the [residential] community."/69/ There would be a central green space which would allow for flexibility in use. Residential development could be oriented facing the park, which would increase public safety.

The Common would be developed as a linear park running east/west between residential development to the north and the UCSF site to the south. It would be approximately 130 feet wide (just under half the width of the panhandle of Golden Gate Park) and would have a total area of approximately 6 acres. The Common would accommodate a pedestrian path and a variety of features that could include: open green areas, a cafe, pavilions and/or bandstands, and fountains. This park would provide views to Twin Peaks to the west and the Bay to the east, and would connect with a park near the Bay at its eastern end. The intended function of The Common would be as "a focal point of activity and interest and as a meeting ground between UCSF and Mission Bay neighborhoods."/70/

There are 8 acres of open space planned within the UCSF Subarea, in addition to approximately 1.5 acres of the 2.2-acre school site set aside for a public school yard. The layout and location of this open space is yet to be determined.

An approximately 6-acre park would be developed as a bayfront linear park along the west side of Terry A. François Boulevard from Mission Rock Street in the north to 16th Street in the south. It would be predominantly a flexible-use lawn area, which could accommodate passive as well as active uses. These uses would include pedestrian and bicycle pathways, informal field-related sports, informal performance areas, and enough space to develop tennis courts. The project sponsors would work with the Port, which owns the property east of this proposed park, to maintain access to Port uses. This includes setting aside up to 1 acre of land for access to and parking for the Pier 52 Public Boat Launch Ramp Project./71/ To satisfy the requirements of a California Department of Boating and Waterways grant, the Port would need to reserve space for the Pier 52 parking lot for a minimum of 20 years within 600 feet from the top of the boat ramp. One option that has been proposed is to locate the parking lot within the bayfront linear park at the north end, reducing the useable area of the park to about 5 acres.

There would be two neighborhood parks located south of 16th Street. One park, approximately 2 acres in size, would be located just west of Terry A. François Boulevard, and would allow for waterfront viewing, community activities, and informal play areas. An approximately 2,000-square-foot, 13-foot-tall MUNI electrical substation would be placed on the southern portion of this open space at the intersection of Terry A. François Boulevard and Mariposa Street. The MUNI substation would be placed near other structures in the open space (e.g., bathrooms) to help conceal its appearance, if such structures were located in this area of the open space. The other park, approximately 2.5 acres in size, would be located just north of Mariposa Street and west of the proposed Fourth Street extension; it would be a green, flexible-use, community park large enough to accommodate a soccer field. This location would be relatively noisy from traffic on nearby streets (see "Cumulative (Year 2015) Traffic Noise," in Section V.G, Noise and Vibration: Impacts, above); therefore, more active noisy uses, such as a soccer field, could be appropriately placed nearer the streets, with quieter recreational uses, such as picnic areas, placed further from the streets.

Some Project Area parks and other public open spaces would be connected by bicycle and pedestrian paths. These would consist of setbacks that would be designated along certain streets in addition to specified sidewalk widths. These setbacks would include: a 20-foot setback to accommodate a pedestrian path along 16th Street from Terry A. François Boulevard to Owens Street; a 20-foot setback for a pedestrian path on the east side of Owens Street from 16th Street to the traffic circle; and a 20-foot setback on the north side of Mariposa Street from Terry A. François Boulevard to Owens Street./72/

Open spaces would be designed to include development of pedestrian pathways, seating areas, appropriate landscaping, restrooms at some locations, and "essential accessory facilities such as equipment storage facilities, concession stands, or gazebos."/73/ The Infrastructure Plans, which are currently being developed, will describe the extent of development and maintenance of formal recreation facilities, such as softball and soccer fields, basketball and tennis courts, or skateboarding and rollerblading parks; various parks could accommodate these uses as described above.

In addition to public open space, private open space would be developed along with residential development. The amount of private open space called for in the *Design Standards and Guidelines* would be 70 square feet for each dwelling unit, except for units located on the two blocks that are bordered by Third and Fourth Streets and Townsend and Berry Streets designated as Mission Bay North Retail, where 35 square feet per unit is called for./74/ Private open space could be designed for individual units or as common open space to be shared by all residents of a building. Individual open spaces could include patios, terraces, or balconies; common open space could include mid-block lanes, gardens, building courtyards, and rooftop open spaces.

How Proposed Open Space Addresses Demand

To meet objectives and policies of the Recreation and Open Space Element, Project Area open space would need to be of an adequate size to accommodate a variety of uses for both residents and employees, and be located within reasonable walking distances from residential and commercial development. The proposed parks described above and shown in Figure V.M.3 include a variety of neighborhood-serving and subneighborhood-serving parks.

Passive recreation would be possible throughout the Project Area, and would satisfy employee and resident demand for public open space. All areas of commercial development would be located within the recommended 900 feet of open space, if UCSF places part of its planned 8 acres of open space within about 900 feet of 16th Street to serve buildings in the southern portion of the UCSF site. All residential development in the Project Area would be located within the recommended 1/4 mile distance from a neighborhood-serving park, which would offer passive recreation; several blocks of residential development (e.g., residential units in the western portion of Mission Bay South) would be located within the service range of more than one public open space area. The proposed pedestrian bridge at Fifth Street would increase accessibility of public open space to residents, effectively increasing the serviceable range of some open space.

Resident demand for active open space would be *generally* accounted for by the parks discussed below, although some parks would be located further away than recommended in the Recreation and Open Space Element (1/4 mile), and may not contain the facilities for active recreation that would need to be developed to completely satisfy resident demand. Formal active recreation would be possible near residential development, though not within the recommended 1/4 mile of residential development in the eastern portion of the Project Area. Open space areas that could be available for formal active recreation include: the western end of the linear park south of the Channel, east of the I-280 freeway structure, if a softball or soccer field were developed; and several acres near and under the freeway at the western end of the Channel in Mission Bay North and Mission Bay South if facilities such as basketball courts and skateboarding/rollerblading facilities were constructed.

Informal active recreation would be easily accessible to all residents in a variety of locations: the linear park south of the Channel; the 1-acre park south of the Channel approximately opposite the end of Fifth Street; The Common; and the northern part of the bayfront linear park. Additional parks that could provide for active recreation would be located more than the recommended 1/4 mile from residential development, and would include: a park north of Mariposa Street and west of the proposed Fourth Street extension that could accommodate a soccer or softball field; the central and southern portions of the bayfront linear park; and the park located south of the bayfront park at the intersection of Terry A. François Boulevard and Mariposa Street.

Project Area public open space could potentially respond to regional objectives in the Recreation and Open Space Element by supplementing the types of recreation available within the City, if a soccer field were developed in the park on Mariposa Street, for example. Also, some Project Area public open space would be expected to draw visitors from throughout the City because of distinct views and features, which include proximity to the Channel and the Bay and adjacent maritime uses.

Section IV of the Conceptual Framework for a Proposal for the Catellus Development Portion of the South of Channel Redevelopment Plan Area states that Catellus would be responsible for constructing all of the improvements for public open space and meeting obligations regarding hazardous waste investigation and remediation./75/ Open space parcels would be owned and managed by the San Francisco Redevelopment Agency. UCSF would be responsible for maintaining the 8 acres of open space on its site. The timeframe for development of open space would be phased, so that when a parcel is developed, open space areas adjacent to it or nearby would be developed at the same time. The approach to investigation and management of any contaminated soil for open space parcels to be accepted by the Redevelopment Agency under consideration is the use of a Risk Management Plan to establish acceptable levels of risk for various sites in the Project Area depending on proposed land use. This approach is described in "Risk Management Plan for Post-Development Conditions," under "Approach to Analysis of Potential Effects After Build-Out (Post-Development)" in Section V.J, Contaminated Soils and Groundwater: Impacts.

Phasing of Open Space Development

The preliminary infrastructure plans propose that open space be constructed with each phase of development. Prior to implementation, the preliminary infrastructure plans would be subjected to the review and approval process described in "Review Process for Proposed Phases," under "Phasing of Construction of Infrastructure and Improvements in the Project Area" in Section III.B, Project Description. Public open space shown in the Mission Bay North land use plan would be constructed when the adjacent parcel is developed. Mission Bay South would be divided into two "zones" to determine the appropriate amount of open space to be constructed by each development phase. Rather than requiring construction of open space immediately adjacent to building parcels, the phasing plan calls for apportioning creation of open space in each of the zones. One zone would begin north of The Common and would extend to the northern boundary of Mission Bay South. The second zone would begin south of The Common and would extend to the southern boundary of Mission Bay South. When development is proposed within one of the zones, open space would be required in the amount of at least 0.46 acre of open space for each 1.0 acre of developable area until all open space is developed in that zone. The open space provided would be within the same zone as the proposed development. The Common may be counted as public open space in either of the zones, but not both.

In addition to the zone system for establishing development of public open space in Mission Bay South, issuance of the first building permit in Mission Bay South for Catellus-owned property would trigger a requirement to develop the portion of South Channel Park between Third and Fourth Streets.

Much of the open space could be constructed in larger increments than required by the minimum ratio and would, where feasible, generally be constructed in proximity to the proposed development. Additional open space may be developed in conjunction with each phase, and any amount exceeding the above ratio would be credited toward future development within the zone./76/ Provided the open space is near the development in each phase, provision of open space over the course of Project Area build-out would be adequate.

SCHOOLS

SETTING

The San Francisco Unified School District (SFUSD) provides public primary and secondary education in the City and County of San Francisco. The District currently operates 18 high schools, 17 middle schools, and 77 elementary schools./77/

Students at all grade levels often attend schools outside of their neighborhoods. Parents can choose which schools their children attend, depending on availability of space. Many parents prefer to send their elementary-school-age children to schools in their own neighborhood./78/

There are no public schools in the Mission Bay Project Area. At the time of the analysis for the 1990 FEIR, there were two school-age children within the area included in that project. They were residents of the houseboat community, and they both attended private schools./79/ No residential development has occurred in the Project Area since then, and the houseboat community is not part of the currently proposed project.

Public schools that would serve the Project Area and their 1996-1997 enrollments and approximate capacities are shown in Table V.M.4. Capacities are approximate because a change in the use of a classroom would affect the number of students in a class. For example, a special education class has 6 students, a typical elementary class up to and including third grade has 20 students, and fourth and fifth grade classrooms have more than 20 students. The capacity of schools in San Francisco is an issue due to a new state law limiting class size to 20 students for kindergarten through third grade. This law is expected to be changed to include fourth grade, placing further demand on availability of classrooms. Other issues influencing demand include enrollment trends, which are related to a number of factors, including citywide population growth and migration of students from private to public schools due to class size reduction.

The SFUSD has had to use much of its formerly excess capacity to accommodate the increase in demand for classrooms resulting from class size reduction. According to current estimates, about 88% of available capacity is being used at the high school level, about 95% of available capacity is being used at the middle school level, and roughly all available capacity is being used at the elementary school level./80/

TABLE V.M.4
ENROLLMENT AND CAPACITY OF SCHOOLS NEAR THE PROJECT AREA, 1996-1997 ENROLLMENT

	No. of Students	Approximate Capacity
Elementary Schools		
Daniel Webster	424	438
Bessie Carmichael	380	432
Middle School		
Potrero Hill	453	650
High School		
Mission	1,113	1,610

Sources: District and School Profiles, 1996-1997, Planning Research and Information Systems, SFUSD, March 1997; and Timothy Tronson, Director of Facilities Planning, San Francisco Unified School District, e-mail to EIP Associates, November 7, 1997.

IMPACTS

The 1990 FEIR analyzed the impact of project alternatives on schools in terms of the number of students generated by the proposed project compared to the District's capacity. The 1990 FEIR analysis determined that a new school in the Project Area, as well as development of capacity outside of the Project Area, would be needed to accommodate new students. The proposed project would have fewer residential units (22% fewer) than Alternative A which was analyzed in the 1990 FEIR. However, factors influencing demand are different now, as discussed in the Setting subsection.

In order to analyze project demand on schools, estimates of the number of students generated by the proposed project were made using population forecasts done by the Association of Bay Area Governments./81/ This analysis, shown in Appendix L, resulted in an estimate of 1,615 school-age children expected to reside in the Project Area by full build-out in 2015. Of these 1,615, approximately 730 would be of elementary school age, 395 would be of middle school age, and 490 of high school age. The actual number of school-age children who would need to be accommodated by the SFUSD would be lower than the total number of projected school-age children, as about 25% would attend private schools, resulting in about 555 attending public elementary school, about 300 attending public middle school, and about 375 attending public high school from the Project Area.

Growth in numbers of school-age children would occur in other areas of the City as well as in the Project Area, according to ABAG and SFUSD projections. The project would contribute to cumulative demand for school facilities. The District currently plans to expand capacity by opening four new schools within the next three to four years. Argonne Elementary School is currently being constructed; a new Bessie Carmichael Elementary School will be constructed (but will be a replacement facility, with the existing school to be demolished); the Tenderloin Elementary School, located on Van Ness Avenue at Turk Street, is under construction and has a projected capacity of 540 students and 72 day-care children/82/; and the School of the Arts High School is being planned and its funding is partially secured./83/ Although these new schools would provide a net increase of approximately 1,100 seats at the elementary school level, the District's ability to accommodate existing students has been reduced in order to achieve required class size reductions. In addition, current District enrollment projections did not take into account completion of the proposed project or the impact of class size reduction. Therefore, it cannot be assumed that the District's current plans to expand capacity would be sufficient to accommodate all Project Area students at build-out.

The proposed project includes a 2.2-acre site for a new school. Measure M.1 in Section VI.M, Mitigation Measures: Community Services and Utilities, discusses transfer of school site to the San Francisco Unified School District. This amount of space would be adequate for an elementary school./84/ An average elementary school in San Francisco has approximately 386 students./85/ In order to use the proposed 2.2-acre site most efficiently, the District would employ an architect to design the new school. It is estimated that an approximately 30,000- to 40,000-sq.-ft. school could be constructed, which would incorporate 25 to 28 classrooms, offices, a library, a multipurpose room, and conference rooms./86/ In a conservative estimate, a 25-classroom school, with 20 students in each class, would accommodate about 500 students./87/ If an elementary school of this size were built in the Project Area, it would not be able to accommodate the number of elementary-school-age children expected to live in the Project Area at full build-out. If 500 of the approximately 555 new public school students were accommodated at a new elementary school within the Project Area, approximately 55 elementary school students would need to attend other schools throughout the District. These 55 students would fill about 5% of the 1,100 planned new elementary school seats if they could be available to Mission Bay children, or about 15% of an average size elementary school in San Francisco./88/ It is reasonable to assume that the additional 55 elementary school students could be accommodated either in a new school in the Project Area or in other School District facilities. Middle and high school students would probably not be easily accommodated at nearby schools or elsewhere in the District. The 300 public middle school students would fill about 40% of an average size middle school, and the 375 public high school students would use about 35% of an average size high school.

The City and County of San Francisco would need to develop additional classroom space to accommodate students generated by the proposed project. The proposed project (except for the UCSF site) would contribute to this through payment of a one-time development impact fee, which is a fee charged to developers based on the floor area of new residential and commercial development. This fee is collected for the School District at the time building permits are issued; it is $1.72/square foot (sq. ft.) for residential development and varies from $0.08/sq. ft. to $0.24/sq. ft. for different types of commercial development./89/ The development impact fees were set by the state legislature and are reviewed every two years by the State Allocation Board. The San Francisco Board of Education then must set the fees within the state constraints. The fees do not necessarily increase annually./90/ The project would generate approximately $11.2 million in development impact fees for schools./91/ Construction of a 500-student elementary school would cost about $12.6 to $17.6 million in 1998 dollars./92/ Therefore, development impact fees would be insufficient to cover the cost of a new elementary school and would not provide funds for middle and high school facilities.

Potential impacts of a new 500-student elementary school on site are included in the overall analysis of the proposed project contained in this SEIR. Approximately 730 additional public school students (55 elementary, 300 middle, and 375 high school students) would need to be accommodated in the public school system. It is assumed that all SFUSD capacity would be full due to recent legislation to reduce class sizes (discussed above) and other growth in the City. Therefore, SFUSD would need to increase its capacity in order to accommodate all students from the Project Area. Options that could be considered by the SFUSD to increase the capacity of the school district include implementing year-round schools, using portable classrooms, or building new permanent classrooms at an existing or new school site. While constructing new schools might cause significant impacts at those locations, it is too speculative to identify impacts at this time from construction of additional school facilities without knowing what action or actions the SFUSD would take to accommodate the additional students, whether SFUSD would choose to accommodate the additional students in a manner that would result in physical changes to the environment, or exactly where those actions would occur. Any new facilities proposed by SFUSD would undergo appropriate environmental review for site-specific physical environmental impacts.

SOLID WASTE

SETTING

Citywide System

The 1990 FEIR discussed solid waste production and disposal but did not account for substantial amounts of recycling and other solid waste diversion, as the City had not established any diversion standards or approaches. In 1993, the City and County of San Francisco Board of Supervisors approved a Source Reduction and Recycling Element (SRRE)/93/ (Resolution Number 245-93) to implement California Assembly Bill 939, the California Integrated Waste Management Act of 1989 (Public Resources Code 40000 *et seq.*). AB 939 requires cities to divert 25% of their solid waste from landfills by January 1, 1995, and 50% by January 1, 2000. These goals are to be achieved through implementation of source reduction, recycling and composting activities./94/ In 1996, San Francisco recycled 35% of the 1,115,700 tons of solid waste generated./95/ UCSF is required to divert 50% of its solid waste by the year 2000 because it is a state agency and, therefore, subject to compliance with AB 939./96/

Two companies are authorized by the City to collect waste within San Francisco: Golden Gate Disposal and Sunset Scavenger Company. They haul the waste to the Sanitary Fill Company's transfer and recycling station in southeastern San Francisco. Waste not diverted by recycling and sorting is hauled to the Altamont Landfill in Alameda County for disposal.

The City and County of San Francisco entered into agreements with the Sanitary Fill Company, Alameda County Waste Management Authority, and Oakland Scavenger Company (now Waste Management of Alameda County, or WMAC) in 1988. The agreements allow for disposal of up to 15 million tons of waste at the WMAC's Altamont Landfill. In 1996, approximately 745,000 tons of city municipal solid waste was deposited in the Altamont Landfill./97/ At the beginning of 1996, approximately 10.6 million tons of landfill capacity remained under the existing contract. The Altamont Landfill Capacity Projections, released July 18, 1996, estimate the current 15-million-ton limit to be reached between 2012 and 2016./98/ The dates of closure vary depending on estimated job and sales growth rates and estimated rates of solid waste diversion. The Altamont Landfill has a total planned capacity of approximately 67 million tons, of which 35.7 million tons is currently permitted. WMAC is planning for the expansion of the landfill to its planned capacity./99/

Mission Bay Project Area

Both of the City's private collection companies serve the Project Area; China Basin Channel is the dividing line between the two service areas. Sunset Scavenger Company serves the area south of the Channel, and Golden Gate Disposal Company serves the area to the north.

Approximately 2,700 tons of waste are generated in the Project Area annually./100/ Applying the citywide diversion rate of 35% (most diversion occurs through recycling) to the Project Area, an estimated 1,750 tons of waste from the Project Area was deposited in the Altamont Landfill in 1996. Issues regarding current hazardous waste generation are discussed in "Existing Hazardous Materials and Waste" in Section V.I, Health and Safety: Setting.

IMPACTS

Solid Waste Generation

At build-out, the project is estimated to generate about 19,000 tons of solid waste per year (see Appendix Table L.2)./101/ This total represents 1.7% of the City's 1996 waste generation total of about 1,115,700 tons./102/ At the 1996 diversion rate (35%) the project would contribute about 12,000 tons of waste to the landfill, while about 7,000 tons would be recycled. The proposed project would generate about 16,300 tons per year more than the estimated 2,700 tons per year existing annual solid waste generation for the Project Area.

To provide a cumulative analysis, Mission Bay's projected solid waste generation was compared with the Altamont Landfill Capacity Projections, because the Altamont Landfill is San Francisco's primary solid waste disposal site, accepting most of the solid waste from the City that is not recycled. The Altamont Landfill Capacity Projections report prepared in 1996 examines the effects of San Francisco volumes of solid waste on the Altamont Landfill./103/ Estimates used in the Altamont Landfill Capacity Projections provide nine scenarios for generation and diversion of San Francisco's solid waste. Waste generation estimates are based on various growth projections of the City's population and economy, all of which assume some growth in Mission Bay. Under scenario 1A in the report, the lowest waste generation rate (0.78% annual growth in waste volume from 1996 to 2015) and the highest diversion rate (50% by 2000) for the City/104/, the project would contribute 1.7% (about 9,700 tons) of the City's estimated 548,500 tons of waste to the landfill for the year 2015. Scenario 3C projects the highest waste generation rate (2.10% annual growth in waste volume from 1996 to 2015) and the lowest diversion rate (40% by 2000) for the City./105/ The project would contribute 1.3% (about 12,000 tons) of the City's projected total annual volume of 863,000 tons to the landfill in 2015 under scenario 3C. The project's contribution to the citywide solid waste volume under scenarios 1A and 3C is shown in Table V.M.5. (The project would contribute a greater percentage to the citywide total in scenario 1A compared to scenario 3C, because scenario 3C projects a much larger citywide waste generation than scenario 1A.)

The solid waste generation estimates for the Mission Bay project are assumed to be included in the growth projections for the Altamont Landfill and would not affect projected dates of closure./106/ As discussed in the setting, San Francisco is projected to reach the limit of its 1988 contract for solid waste disposal at the Altamont Landfill between 2012 and 2016. Fulfillment of the contract limitations would require the City to consider new landfill options. These options include contracting with Altamont Landfill under their proposed landfill expansion, or contracting with other landfills. Disposal companies could potentially require additional staff and collection equipment to serve the

TABLE V.M.5
SOLID WASTE GENERATION AND DIVERSION AT BUILD-OUT OF THE MISSION BAY PROJECT (2015) /a/

	Diversion Rate /b/ (tons per year)					
	Scenario 1A (50% Diversion)			Scenario 3C (40% Diversion) /c/		
	Amount Diverted	**Amount Disposed**	**Total Waste Generated**	**Amount Diverted**	**Amount Disposed**	**Total Waste Generated**
Mission Bay Subarea						
North	2,400	2,400	4,800	1,900	2,900	4,800
Central	1,700	1,700	3,400	1,400	2,000	3,400
East	2,600	2,600	5,200	2,100	3,100	5,200
West	2,300	2,300	4,600	1,800	2,800	4,600
UCSF	690	690	1,380	552	828	1,380
Mission Bay Total/d/	9,700	9,700	19,000	7,800	12,000	19,000
Citywide in 2015	548,510	548,510	1,097,020	575,330	862,994	1,438,324
% of City in 2015	-	-	1.7%	-	-	1.3%

Notes:
a. Based on data from Table J.2 in Appendix J.
b. Diversion rate refers to the amount of waste that would be recycled or composted, thus preventing it from being dumped in a landfill.
c. Amount diverted refers to the percentage of waste that would be recycled or composted. Amount disposed refers to the amount that would be deposited in a landfill.
d. Numbers may not add exactly due to rounding.

Source: City and County of San Francisco, *Altamont Landfill Capacity Projections,* prepared by Hilton Farnkopf & Hobson, July 18, 1996.

Project Area. The disposal of hazardous waste generated by UCSF and other research facilities is discussed in "Potential Environmental Impacts of Hazardous Waste Generation and Disposal," in Section V.I, Health and Safety: Impacts.

Construction/Demolition Debris

Various construction phases (demolition, excavation, and construction) of the project would generate solid waste in the form of demolition debris, excavated spoils, and construction waste (debris/waste). This type of debris/waste is not defined as refuse and would not be collected by the hauler that normally serves the Project Area./107/ Normally, a construction company would have several subcontractors, including demolition and excavation subcontractors. They would dispose of the debris/waste by contracting with other licensed haulers. The construction contractor and subcontractors would determine the cost-effectiveness of recycling the debris/waste, or having the materials hauled away to one of many of landfills around the Bay Area where a disposal fee would be charged. Private recycling facilities and processors accept some construction and demolition debris (i.e., concrete, asphalt, clean wood, and clean dirt) for little or no fee, which would divert these materials from landfill space./108/ In theory, the non-recyclable debris/waste could be disposed at the Altamont Landfill, but that is not likely due to the cost of hauling and the disposal fees compared to other landfill options that are less expensive./109/ All construction and demolition debris from San Francisco, disposed of in any landfill, is included in the City's total waste generation volume subject to compliance with AB 939.

While not a significant impact, recycling these materials can be ensured if there is a construction contract provision that stipulates a recycling requirement similar to the provision in the UCSF LRDP Mitigation Monitoring Program that requires contractors to include recycle amounts in bids and requires documentation to show that the recycling commitment was met./110/ Management of excavated soils containing chemicals is discussed in "General Soil Movement and Transport During Construction" under "Impacts During Project Development," in Section V.J, Contaminated Soils and Groundwater.

WATER SUPPLY

SETTING

Citywide System

The San Francisco Water Department (SFWD) supplies water to the City and County of San Francisco, including the Project Area. The SFWD serves a total population of about 2.3 million people, providing water to residential, commercial, and industrial customers in the San Francisco Bay region and some Central Valley users through direct deliveries to City customers and wholesale deliveries to 30 water agencies in the area. The SFWD's water supply originates from a variety of sources, including the Hetch Hetchy Reservoir in Yosemite National Park, the Alameda Creek watershed in the East Bay, and the Peninsula Watershed on the San Francisco Peninsula. Water is transported to the San Francisco Bay Area through an extensive system of connecting reservoirs, pipelines, and tunnels. Consumption within the City and County of San Francisco is currently about 90 million gallons per day (mgd)./111/ Total system-wide consumption is about 250 mgd.

Mission Bay Project Area

The Mission Bay Project Area is entirely within the University Mound Reservoir pressure zone./112/ Portions of three University Mound service districts serve Mission Bay. The estimated water consumption for 1996 in Mission Bay was approximately 97,000 gallons per day (gpd), or about 0.1% of citywide consumption (see "Water Supply" in Appendix L).

Low-Pressure Water System

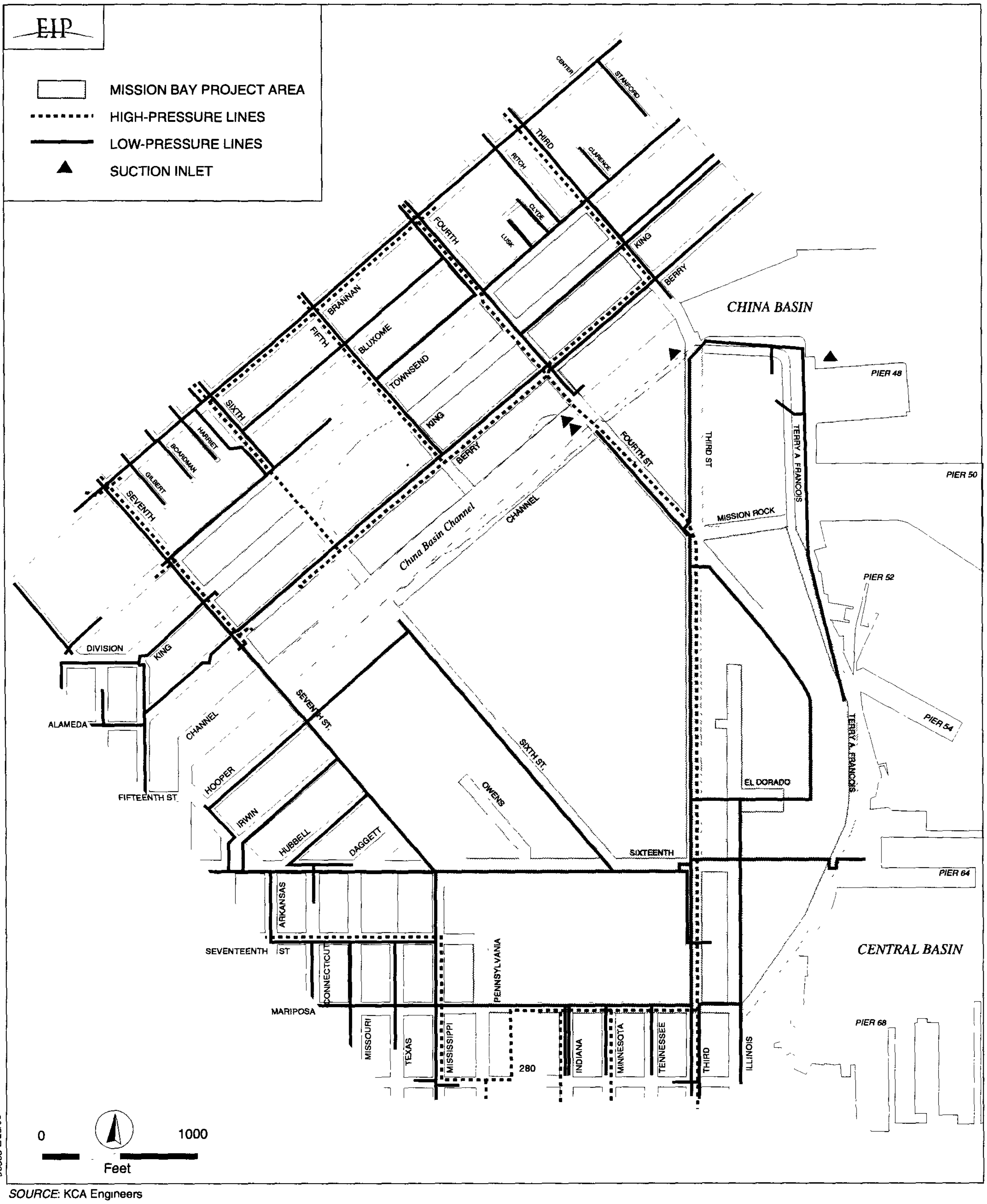
The low-pressure water main system provides water for domestic and commercial uses. In the Mission Bay Project Area, low-pressure lines are generally located within the rights-of-way of streets throughout the area, as shown in Figure V.M.4. They consist of cast and ductile iron pipes that vary from 8 inches to 16 inches in diameter. This system was determined to be adequate by the 1990 FEIR./113/ Because land uses have remained relatively unchanged since the 1990 FEIR analysis, and no changes have occurred to the existing low-pressure water system, the system is assumed to continue to be adequate for existing Mission Bay land uses in 1997.

Fire-Fighting Water Supply

There are three water supply systems for fighting fires. The primary water supply for fire-fighting in the Project Area is low-pressure domestic water from the City's water mains. The Auxiliary Water Supply System (AWSS) provides water exclusively for fire-fighting, and is used if the primary system does not provide adequate water supply or is out of service. A third system of cisterns and suction inlets is used if the previous two systems fail.

The AWSS is completely independent of the domestic water distribution system and is under the sole jurisdiction of the Fire Department. This system is commonly referred to as the "high-pressure system" because it provides 10,000 gallons per minute (gpm). (The domestic system provides 1,000 gpm.) Pipes for this system are located under Third Street and around much of the perimeter of the Project Area, as shown in Figure V.M.4. The existing high-pressure water system in Mission Bay is adequate to serve existing land uses./114/

San Francisco has constructed cisterns, which are large underground water tanks, to supplement water supply for fire-fighting in emergencies when the regular systems fail. No cisterns are located in the Project Area, because the China Basin Channel and the San Francisco Bay act as a back-up supply of water for fire-fighting. Pump trucks draw water in through four suction inlets near the Project Area



SOURCE: KCA Engineers

MISSION BAY SUBSEQUENT EIR

FIGURE V.M.4 EXISTING HIGH-PRESSURE AND LOW-PRESSURE WATER LINES IN MISSION BAY

(shown in Figure V.M.4), three in the Channel and one in the Bay near Pier 48, for fire-fighting. Additionally, the Channel and the Bay provide fire-boat access to buildings near the shore.

IMPACTS

Water Demand

The proposed project would require approximately 2.9 million gallons per day (mgd)/115/ at build-out (see Appendix Table L.3), which is an increase of about 2.78 mgd over the existing daily water demand for the Project Area. The project's estimated water demand represents 3.2% of the City's current daily water demand of 90 mgd, and 1.2% of the system-wide usage of 250 mgd. The project water demand at build-out represents 3.1% of the City's projected 92.5 mgd in 2010, and 1.0% of the projected San Francisco Water Department (SFWD) demand of 279 mgd for that same year./116/ The SFWD determined that they would have adequate resources to supply the project, provided Mission Bay water users utilize reasonable water-conserving measures. Measure M.2 in Section VI.M, Mitigation Measures: Community Services and Utilities, identifies these methods of water conservation.

Low-Pressure Water System

The existing low-pressure water system is not adequate to serve the proposed project. The distribution system south of the Channel does not supply all areas of proposed development, and in some areas pipe sizing would be inadequate. Figure V.M.5 shows proposed low- pressure water lines and their connections to the existing low-pressure lines. This system would be composed of low-ductile iron pipe/117/ mains, low-pressure fire hydrants, valves and fittings, and appurtenant improvements. The average diameter of the water lines would be 12 inches. Some existing water lines would need to be relocated to conform with proposed street rights-of-way. The Project Area lies at the low end of the City's low-pressure water supply system, which adds reliability to the system during periods of high demand./118/ San Francisco requires low-flow shower heads (2.5 gal/min.), aerated faucets, and low-flush toilets (1.6 gal/flush) for all new construction./119/

Fire-Fighting Water Supply

The existing Auxiliary Water Supply System (AWSS) is not developed in the center of the Project Area (see Figure V.M.4), and is inadequate to serve the needs of the proposed project. This could be a significant impact; Measure M.3 in Section VI.M, Mitigation Measures: Community Services and Utilities, addresses extension of the AWSS. Figure V.M.5 shows the expanded AWSS, or high-pressure water supply system, for the project. This system would link up to the City's AWSS through existing lines in Third Street and Mariposa Street. The Mission Bay North System would be connected with the proposed Mission Bay South System by a new line near Seventh Street and Berry Street, and a relocated line connecting the Fourth Street line with the Third Street line./120/

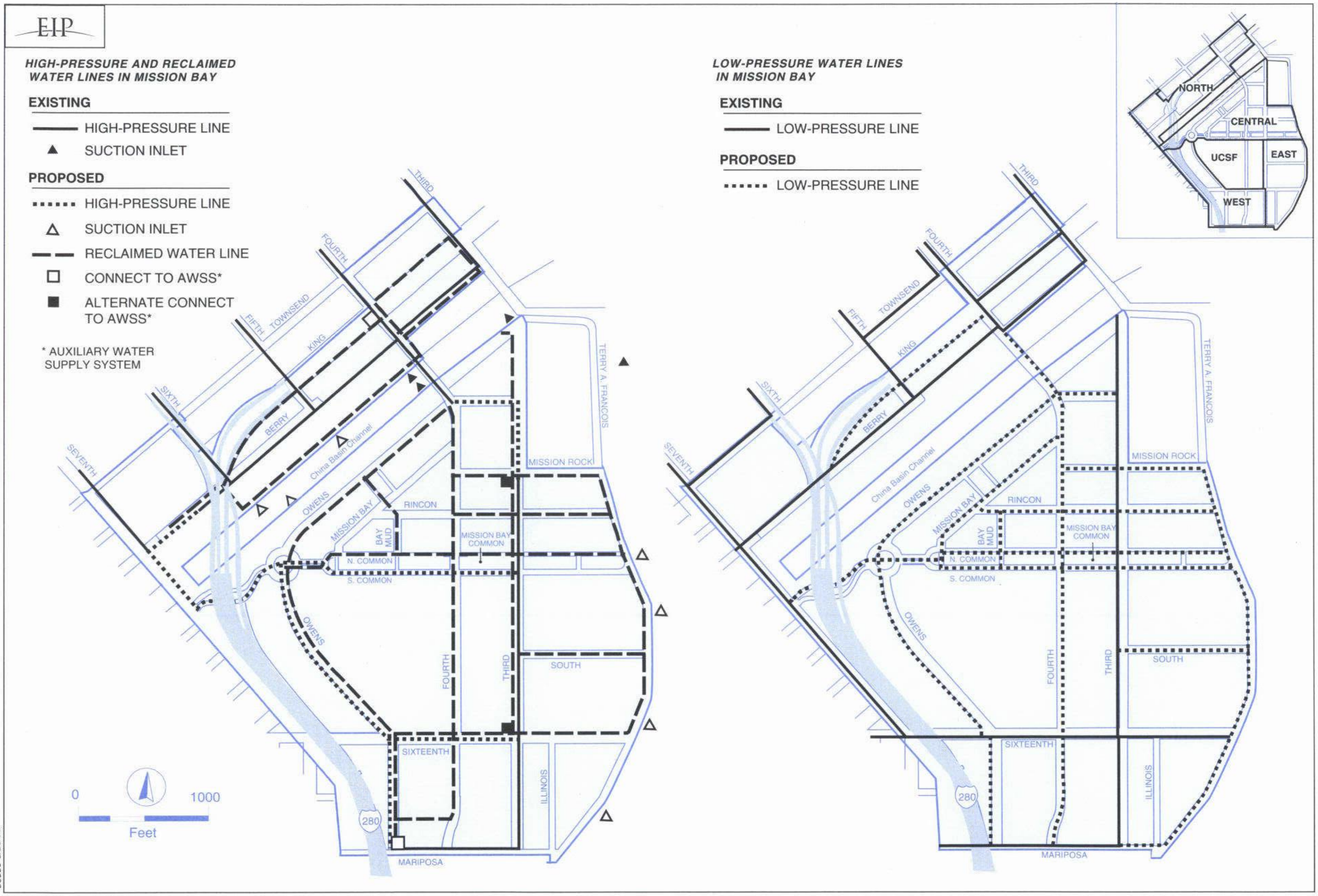
Three new suction inlets would be located in the Channel and four in the Bay, which would provide Mission Bay with a total of 11 suction inlets (6 in the Channel and 5 in the Bay). Issues related to the construction and maintenance of suction inlets are discussed in "Loss of Salt Marsh Wetland Habitat," in Section V.L, China Basin Channel Vegetation and Wildlife: Impacts. No cisterns would be required due to the proximity of the Bay and Channel.

Reclaimed Water System

San Francisco Ordinances 390-91 and 391-91, adopted in 1991, require the use of reclaimed water and groundwater "wherever it is reasonable to do so," and ordered the San Francisco Water Department and Department of Public Works to prepare a Recycled Water Master Plan and a Groundwater Master Plan. The City's Draft Recycled Water Master Plan (RWMP), revised July 1996, proposes that treated water from the Oceanside Water Pollution Control Plant be conveyed to a new recycled water treatment facility. This water would be supplemented with groundwater from proposed wells on the west side of the City./121/ This non-potable source of water would be used primarily for landscape irrigation (72%), toilet flushing and office cooling systems (20%), and for industrial uses (8%)./122/ San Francisco Ordinances 390-91 and 391-91 also require dual piping in new commercial buildings over 40,000 square feet./123/ Dual piping is designed to bring both potable and non-potable water to commercial units. Non-potable water would be used for toilet flushing, landscaping, and cooling systems, while potable water would be reserved for all other uses.

The proposed reclaimed water system for the Project Area is shown in Figure V.M.5. The project's system would be linked to the City's reclaimed water system either via a connection point with the high-pressure water line (AWSS), or using an alternate supply service line at a valve vault which meets the Fire Department design standards at Mariposa Street and Owens Street. The project would be allowed a single vault connect to enable the Fire Department to easily isolate reclaimed water users and direct all water to a fire./124/ According to the City's Draft Recycled Water Master Plan, service to the Project Area is planned to be completed in the third phase of construction (around 2011)./125/ If a new source were located, some reclaimed water service could be provided earlier than the availability of recycled water from the Oceanside Water Pollution Control Plant and the westside wells. Installation of dual piping in Project Area buildings would be in compliance with City Ordinances 390-91 and 391-91.

UCSF indicates that it is not required to comply with City Ordinances 390-91 and 391-91, and does not plan to install dual piping in the initial phase of building. UCSF may use reclaimed water for the



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SOURCE: KCA Engineers

MISSION BAY SUBSEQUENT EIR

FIGURE V.M.5 EXISTING AND PROPOSED HIGH-PRESSURE AND LOW-PRESSURE AND RECLAIMED WATER LINES IN MISSION BAY

cooling system in its centralized utility facility./126/ Development in the Project Area would have a total average annual demand of about 0.98 mgd of reclaimed water at build-out in 2015 (see Appendix Table L.4), subsequent to the proposed completion of service to the Project Area under the City's Reclaimed Water Plan./127/ The total average annual demand of 0.98 mgd would not be distributed evenly throughout the year, but would be higher in the summer months and lower in the winter months. Assuming full implementation of the non-potable water uses, the potable water demand would be reduced to about 1.9 mgd from 2.9 mgd. The Recycled Water Master Plan and the Groundwater Master Plan would supply a combined 12.1 mgd/128/ of non-potable water to portions of San Francisco when completed in 2011, which would reduce the City's overall potable water demand to 80.4 mgd. Full implementation of the reclaimed water system would reduce the Mission Bay potable water demand to 2.4% of the City's projected total daily potable water demand, from 3.6% of the City's 80.4 mgd daily potable water demand if Mission Bay were to use no reclaimed water.

The San Francisco Public Utilities Commission is reexamining its ability to supply all of the possible reclaimed water users identified in the Recycled Water Master Plan. If Mission Bay were to receive no reclaimed water, water users in the Project Area would continue to be required to exercise all available methods of water conservation,/129/ as stipulated in Measure M.2 in Section VI.M, Mitigation Measures: Community Services and Utilities. For a discussion of an on-site reclamation plant see "Alternative Wastewater Treatment Technologies," in Section V.K, Hydrology and Water Quality: Impacts. Without reclaimed water, Mission Bay water users would use only potable water. As a result, Mission Bay water demand would be about 2.9 mgd of potable water, less any savings in water use through water conservation.

Construction and Phasing of Infrastructure

Trenching and removal of soils for the installation of water lines could unearth contaminated soils. This issue is discussed in "Exposure From Construction Activities" under "Impacts During Project Development" in Section V.J, Contaminated Soils and Groundwater: Impacts. Low-pressure and reclaimed water lines to serve each building would be installed according to the preliminary infrastructure plans for each specific development phase in accordance with the concept of "adjacency," following review by various City agencies in the process described in "Review Process for Proposed Phases" under "Phasing of Construction of Infrastructure and Improvements in the Project Area," in Section III.B, Project Description.

Phasing of Fire-Fighting Water Supply

Preliminary infrastructure plans would be prepared for each development phase, to be reviewed and approved by the Redevelopment Agency and appropriate City departments, coordinated by the Department of Public Works, as described in the "Review Process for Proposed Phases," under "Phasing of Construction of Infrastructure and Improvements in the Project Area," in Section III.B, Project Description. The preliminary infrastructure plans for development of some specific phases would include plans for extension of the Auxiliary Water Supply System (AWSS). It may be necessary to make improvements not immediately adjacent to the development parcels in order to make the system functional. For example, extension of the AWSS pipeline from the development parcel to connect to the City's AWSS may require construction of several blocks of pipeline, rather than only the pipeline in the adjacent street. Some existing AWSS source lines may need to be replaced with larger lines or new lines installed to increase flow capacity to a development parcel. As with other infrastructure improvements, new AWSS pipelines would be sized to accommodate all expected future service to be provided by the new line at build-out.

Plans for improvements to the AWSS included in the preliminary infrastructure plans would be approved by the San Francisco Fire Department's Bureau of Engineering and Water Supply and the Department of Public Works before issuance of a building permit. Failure to install an approved AWSS pipeline to phases of development not now served by the existing system would create a significant impact in that inadequate firefighting water supply could result in hazardous conditions for temporary periods in parts of the Project Area. Measure M.3 in Section VI.M, Mitigation Measures: Community Services and Utilities, addresses this impact.

SEWERS AND WASTEWATER TREATMENT

SETTING

San Francisco Wastewater System

San Francisco has a combined wastewater system that collects both stormwater runoff and residential and commercial sewage in the same sewer lines. Under dry-weather conditions about 84 million gallons per day (mgd) of sewage (average dry-weather flow) are currently produced in the City each day./130/ During wet-weather periods additional stormwater entering the combined system produces large volumes of combined stormwater runoff and sewage (combined sewage) that can occasionally exceed storage and treatment capacities, resulting in wastewater discharges into the ocean or San Francisco Bay. These discharges receive flow-through treatment, as floating materials and settleable solids are removed, but no disinfection is provided. For a complete discussion of San Francisco's combined sewer system and wet weather capacity issues, see "San Francisco's Combined Sewer System" in Section V.K, Hydrology and Water Quality: Setting.

Sewage from the Bayside drainage basin, which includes the Project Area, is transported to the Southeast Water Pollution Control Plant at Jerrold Avenue and Phelps Street. The Southeast Plant treats about 67 mgd dry-weather flow on average. During wet weather, the Southeast Plant can increase its capacity to accommodate the increased volume of flow. Under heavy rainfall conditions, the North Point Plant is activated to provide treatment to all combined sewage from the northern portion of the Bayside drainage, effectively decreasing the combined sewage flow to the Southeast Plant.

Project Area Wastewater System

The 1990 FEIR estimated the current sewage generation for the Project Area to be approximately 72,000 gpd./131/ The existing sewer system in the Project Area is shown in Figure V.M.6. Sewage and rainwater runoff from Mission Bay North and an area east of Seventh Street drains to an 18- by 18-foot reinforced-concrete, pile-supported box sewer (storage sewer), which runs along The Embarcadero, King Street and Berry Street to Division Street near the Channel Pump Station at the west end of the Channel. An 11- by 11-foot storage sewer along the south edge of the Channel connects with the north of Channel storage sewers through a 5-foot-diameter pipe; together these storage sewers make up the Channel Outfalls Consolidation. Combined sewage from the Project Area south of the Channel, east of Owens Street and north of 16th Street, drains north to the Channel Street storage sewer and then flows to the north of Channel storage sewers. Sewage produced from areas along Seventh Street and west of Seventh Street flows to the Division Street sewer (a four-compartment sewer) then drains into the north of Channel storage sewers. The Channel Outfalls Consolidation drains to the Channel Pump Station which pumps sewage south to the Southeast Plant through a 66-inch-diameter force main./132/

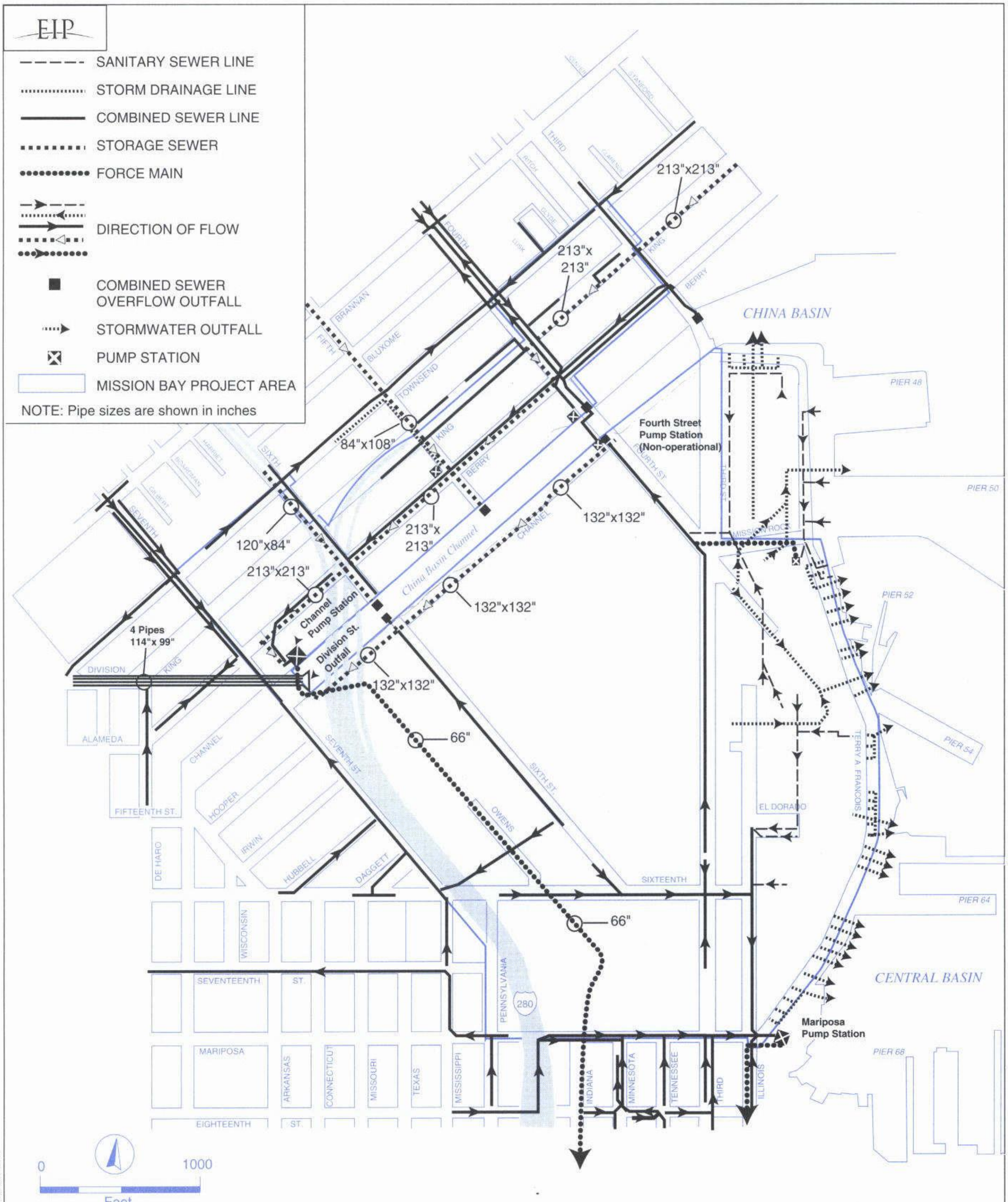
Sewage from an area 300 feet north of 16th Street and east of Pennsylvania Street flows into a recently built storage/transport sewer under Mariposa Street. This storage sewer runs under Mariposa Street from Third Street east to the Mariposa Pump Station. The Mariposa Wet-Weather Pump Station transports combined storm runoff and sewage south to gravity sewers at 21st Street and Illinois Street via a 20-inch force main under Third Street. The existing Third Street sewer located south of the Project Area is inadequate to handle wet-weather flows. A separate dry-weather pump station pumps dry weather flow south through a 10-inch force main./133/ A 60-inch gravity sewer will be constructed by the City under Illinois Street, between 24th Street and the Islais Creek

Transport Storage Structure located at the intersection of Third Street and Caesar Chavez Street. This Illinois Street Auxiliary Sewer will transport combined wet-weather flow from the Mariposa Pump Station to the Southeast Plant. Construction of the Illinois Street Auxiliary Sewer is expected to begin in 1998 with construction to take approximately eight months./134/

The east portion of the Project Area, east of Third Street from Mission Rock Street south to near El Dorado Street and a strip along Terry A. François Boulevard from near Pier 64 south to Mariposa Street, is served by a separate stormwater drainage system. Figure V.K.1 shows the area currently served by a separated stormwater drainage system. Stormwater from this area drains directly into the Bay, without treatment, through 22 drainage outlets shown in Figure V.M.6. An area outside of the Project Area (east of Third Street and north of Mission Rock Street) is also served by a separate stormwater drainage system, which drains directly into the mouth of the Channel through two drainage outlets on the south side of the Channel. Buildings in these areas with separate stormwater drainage lines are served by sanitary sewer-only lines which flow into the City's combined sewer system.

Most of the sewer and stormwater mains in the Mission Bay area are about 70 to 80 years old. The smaller mains are constructed of concrete or clay; larger mains are brick or reinforced concrete on piles. These older mains must be upgraded to handle projected five-year storms./135/,/136/ Sewer lines generally start at 8 to 12 inches in diameter and increase to a maximum size of 36 inches by 54 inches (in the case of an existing rectangular sewer) before flowing into a storage sewer or pump station.

During wet-weather conditions, pumping by the Channel Pump Station is increased in order to bring the Southeast Plant to capacity. Excess combined sewage flow is held in the north of Channel and Channel Street storage sewers for later release to the Southeast Plant for treatment. When large storms occur and the capacity of these storage sewers is exceeded, the flow-through treated combined sewage discharges into China Basin Channel at seven points shown in Figure V.M.6. In addition, the Division Street sewer has a separate outfall which drains directly into China Basin Channel during large storms when the capacity of the system is exceeded./137/ When the capacity in the Mariposa Street storage sewer flowing to the Mariposa Pump Station is exceeded, the flow-through treated combined sewage discharges directly into the Bay. For a complete discussion of combined sewage discharges and NPDES permitting, see "Combined Sewer System Permits," under "San Francisco NPDES Permits and Other Regulations," and "San Francisco's Combined Sewer System" in Section V.K, Hydrology and Water Quality: Setting.



SOURCE: KCA Engineers

MISSION BAY SUBSEQUENT EIR

FIGURE V.M.6 EXISTING SEWER LINES IN MISSION BAY

IMPACTS

Wastewater Generation

Total wastewater generation for the proposed Mission Bay project at build-out would be about 2.5 mgd/138/ (average dry-weather flow) (see Appendix Table L.3). This total would represent about 3.0% of the current citywide wastewater volume of about 84 mgd. The 2.5 mgd generated by the project would represent 3.7% of the 67 mgd currently treated by the Southeast Plant. The projected 2.5 mgd represents an increase of about 2.4 mgd over the current Project Area generation of about 72,000 gallons per day (0.072 mgd).

Sewer Infrastructure Improvements

Major upgrades are proposed to the existing sewer infrastructure to accommodate the project.

North Basin

Mission Bay North Subarea (North Basin) project plans include the addition of combined sewer lines along the north shore of the Channel to drain into the existing Fourth, Fifth, and Sixth Street sewer lines. The proposed sewer alignment is shown in Figure V.M.7.

Mariposa Basin

The existing combined sewer system for the southern portion of the project, from an area beginning 300 feet north of 16th Street, extending south to Mariposa, and east to Terry A. François Boulevard. (Mariposa Basin), would continue to flow to the Mariposa Pump Station. Project upgrades in the Mariposa Basin would include new combined sewer lines in Owens Street, Fourth Street, Third Street, and Terry A. François Boulevard. A new line in the eastern portion of 16th Street would take combined sewage west to the Illinois Street line and from there south to the Mariposa Pump Station. A new auxiliary sewer would be needed along Illinois or Third Street from 16th Street to Mariposa Street to provide additional storage capacity. These lines would flow into the existing sewer lines in 16th, Mariposa, and Illinois Streets shown in Figure V.M.7.

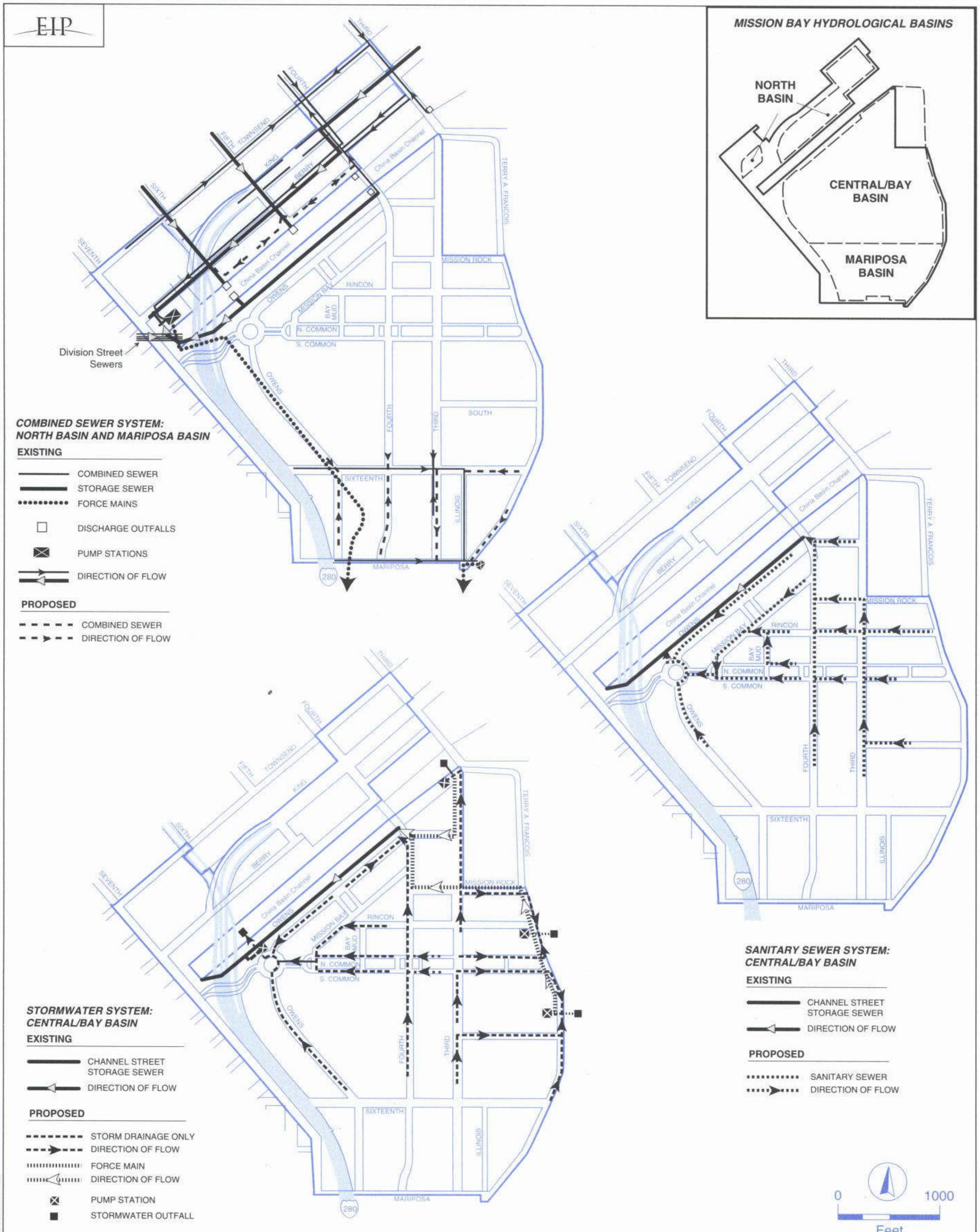
Central/Bay Basin

Proposed improvements to the Central/Bay Basin of the Project Area, from 300 feet north of 16th Street north to the Channel, include a system with separate sanitary-sewer-only and storm-drainage-only lines (see Figure V.M.7). This system would be designed to accommodate stormwater runoff up to a five-year storm event, the same as other areas of the City./139/ Runoff from storm events greater than five-year storms would be carried overland to the Bay or Channel similar to other waterfront areas of the City. Permitting and water quality issues for discharge of stormwater are discussed in "San Francisco NPDES Permits and Other Regulations" in Section V.K, Hydrology and Water Quality; Setting, and in "Effects of Stormwater Discharges" under "Effects on Receiving Waters" in Section V.K, Hydrology and Water Quality: Impacts.

The sanitary sewer system would transport sewage only, no stormwater. This system would be comprised of two main drainage areas; each area would flow to the Channel Street storage sewer by gravity./140/ During wet weather and high storage sewer levels, the sanitary sewage would be lifted to drain into the top of the storage sewer to prevent potential flow problems. Sewage west of Fourth Street would flow to the Channel Street storage sewer near the existing Sixth Street overflow/outfall, and sewage east of Fourth Street would be conveyed to the east end of the Channel Street storage sewer near the Peter Maloney Bridge, as shown in Figure V.M.7. Some existing sewer lines would need to be relocated to conform with proposed street rights-of-way.

The stormwater-only component would take all stormwater runoff from streets and rooftops to the proposed pump stations by gravity. The pump stations would then force the "initial flows"/141/ of each storm into the Channel Street storage sewer for storage and subsequent treatment at the Southeast Plant. The remainder of the stormwater (approximately 20% of the annual stormwater runoff) would be discharged directly into the Bay or Channel through four stormwater outfalls. Two stormwater outfalls would discharge into the Bay and two would discharge into the Channel. See Figure V.M.7 for the preliminary locations of the stormwater outfalls. Issues related to construction and operation of stormwater outfalls are discussed in "Loss of Salt Marsh Wetland Habitat" in Section V.L, China Basin Channel Vegetation and Wildlife: Impacts. Volume of "initial flow" diversion and corresponding rainfall volumes are discussed in "Volume Capture of Initial Flow," under "Proposed Drainage Plan," in Section V.K, Hydrology and Water Quality: Impacts.

At each new pump station stormwater would flow into the first chamber of a two-chambered collection box divided by a baffle and weir system./142/ Water from the first chamber would be pumped to the Channel Street storage sewer and sent to the Southeast Plant for treatment. When the available storage capacity of the Channel Street storage sewer was reached, the pump in the first chamber would shut off, stopping the diversion of stormwater into the Channel Street storage sewer. When the diversion was stopped and the inflow of stormwater exceeded the capacity of the first chamber, stormwater would flow under the baffle and over the weir into the second chamber./143/ This would activate a pump in the second chamber which would pump the stormwater to the Bay or



SOURCE: Hawk Engineers, Inc.; KCA Engineers

FIGURE V.M.7 PROPOSED CHANGES TO THE SEWER SYSTEM IN MISSION BAY

Channel. Trash racks in the system would prevent debris from being discharged to the Bay or Channel./144/ Pumps and a force main system (discussed below) would be required to maintain the flow in this system. To efficiently regulate operations, the pump stations would be connected to a computer system that controls the City's sewer system.

The diverted "initial flow" stormwater runoff would be transported to the Channel Street storage sewer through force mains (see Figure V.M.7). Diverted stormwater runoff from the east side of the Central/Bay Basin would be transported by force main to the east end of the Channel Street storage sewer at the Fourth Street Bridge. Diverted stormwater from the west side of the Central/Bay Basin would drain into the Channel Street storage sewer near its west end. Four pump stations would be needed to pump the storm water through the force mains, two on the Bay side of the project and two along the Channel. From the Channel Street storage sewer this stormwater runoff combined with sanitary sewage would be pumped to the Southeast Plant for treatment.

Project Area Storage Sewers

According to the 1990 FEIR, the 1990 project would not have increased the number of overflow events due to large storms; however, those events that occurred would be of longer duration and increased volume./145/ The Channel Outfalls Consolidation, which includes the Channel Street storage sewer, was built in the late 1970's. The design generally took into account possible development of the area, then zoned for heavy industry (M-2), although not necessarily at the intensity and density now proposed./146/ The sewer system proposed as part of the project includes a storm-drain-only component for the Central/Bay Basin that would reduce the volume of stormwater flowing to the Channel Street storage sewer in large storms, thus helping to reduce the demand on sewer storage/transport capacity. No alteration to the Channel Street storage sewer would need to occur./147/ The Mariposa Street storage sewer was built in the early 1990's to reduce the number of combined sewer overflows from the Mariposa Street drainage basin./148/ For a complete discussion of storage sewer capacity during wet weather, see "Volume Capture of Initial Flow," under "Proposed Drainage Plan," in Section V.K, Hydrology and Water Quality: Impacts.

Construction and Phasing of Infrastructure

At the time a specific development phase is proposed, the project proponent would submit preliminary infrastructure plans for review. The specific approval procedure is described in "Phasing of Construction of Infrastructure and Improvements in Project Area" in Section III.B, Project Description. The preliminary infrastructure plans for a phase would contain proposed improvements to the sewer system when the specific development phase triggered the need for increased sewer capacity, upgraded sewer lines, or expanded sewer service. These proposed sewer improvements would require the approval of the San Francisco Clean Water Program staff.

The preliminary infrastructure plans would propose sewer system improvements to be installed in conjunction with roadway construction and generally based on the "adjacency" concept. The nature of sewer systems dictates that improvements be made adjacent to and downstream of the specific development area. These improvements would provide adequate conveyance and storage capacity for the phase under development, and for expected future development to be served by the improved sewer facilities. Individual phases may trigger the need for large-scale sewer improvements due to the cumulative effects of previous phases. Demand for these large-scale improvements would be reviewed by Clean Water Program staff for consistency with the infrastructure plan, and could include improvements such as installation of sewer lines or a pump station. Trenching and removal of soils for the installation of sewer lines could potentially unearth contaminated soils. This issue is discussed in "Exposure From Construction Activities" under "Impacts During Project Development," in Section V.J, Contaminated Soils and Groundwater: Impacts.

<u>Sewer Improvements: Mission Bay North and Mariposa Basin</u>

Connections to the combined sewer system in Mission Bay North and the Mariposa Basin in Mission Bay South would generally follow the adjacency concept as these areas become developed. Improvements would include expansion of sewer lines to previously unserved areas. There are no plans to enlarge the combined storage and conveyance facilities in Mission Bay North.

<u>Sewer Improvements: Central/Bay Basin</u>

At build-out, the Central/Bay Basin in Mission Bay South would be served by a separated stormwater and sanitary sewer system; however, the entire separated sewer system would not be installed in the early phases of development. Initially, sanitary-only lines from new buildings and separated stormwater-only lines installed from new buildings and permanently covered surfaces in the Central Basin and Bay Basin, would drain into the City's combined sewer system. Improvements would be made to the combined system in order to meet demand created by construction within specific phases. To prevent the need for paving and later replacing infrastructure improvements in the same roadways, new connections to the combined system would incorporate the ultimate improvements needed for the separated sanitary sewer system at build-out. Additionally, while combined sewer upgrades would be made under roads, lines would also be laid for the separated stormwater-only system, although this entire system would not be functional in the early phases of development. No stormwater runoff from up to a five-year storm from new buildings or paved areas would be permitted to drain directly to the Bay or Channel. The runoff would be directed to the City's combined sewer system, or accommodated in a temporary detention basin until capacity is available for conveyance into the City's combined sewer system. This issue is addressed by Measure M.5 in Section VI.M, Mitigation Measures: Community Services and Infrastructure.

During development of the Project Area, some stormwater runoff in the Central Basin and Bay Basin would be held in surface detention basins to conserve storage capacity in the Channel Street storage sewer. Stormwater runoff would drain into these detention basins from undeveloped areas and interim parking lots. These detention basins would be designed to drain slowly to the City's combined sewer system to prevent stormwater runoff from overloading the system.

Improvements and upgrades to the existing combined sewer system would continue until Clean Water Program staff determine that additional development in the Central Basin and Bay Basin would create stormwater runoffs that exceed the design capacity of the Channel Street storage sewer. If the Clean Water Program finds that development in the Central Basin or Bay Basin would exceed the capacity of the Channel Street storage sewer as part of the review of the preliminary infrastructure plans, Catellus would be required by the City to install the separated sewer system with an operational "initial flow" diversion system described above before approval of the next building phase.

Interim and Temporary Uses

Interim Uses

Before build-out of the Mission Bay South Redevelopment Area, undeveloped land may be occupied by interim uses. For example, areas in the northern portion of Mission Bay South would be used as parking for the San Francisco Giants Ballpark, while some areas to the south would be used for UCSF parking. See Figure III.B.4 for the conceptual locations of currently proposed interim parking. These surface parking lots would be constructed of impervious materials, which would prevent ponding and seepage of rainwater that now occurs in the area. If allowed to drain into the existing sewer system, these temporary parking areas would increase the volume of stormwater runoff, which may exceed existing sewer system capacity.

To prevent interim parking areas from overloading the sewer system, it is contemplated that these areas would be graded and berms constructed to allow for temporary surface storage of rainwater from large storms up to a five-year storm event. The area generally bounded by Third Street, 16th Street, Sixth Street, and Channel Street would contain one large parking lot for the Giants Ballpark, and several smaller parking lots for UCSF. These parking lots would drain to one or more surface detention basins south of the ballpark lot and north of UCSF (see Figure III.B.4).

The detention basin or basins would be constructed with berms along the sides to contain the stormwater. The lots would be graded to direct and detain stormwater flows. The large basin(s) would have an underground storm drainage system that would drain stormwater to the existing sewer system for treatment at the Southeast Treatment Plant. The drainage system would be designed to limit the drainage volumes to prevent exceedance of the sewer system capacity from stormwater flows. According to one conceptual design, between a three-month and a five-year storm, stormwater flows would be greater than the capacity of the drainage system. The excess runoff would be held in the detention basin(s) and drain to the sewer system slowly, as capacity becomes available. Stormwater flows in excess of five-year storms would flow northward, creating overland flow across Channel Street into the Channel.

The detention basin(s) could still be in operation after development of the school or Mission Bay South residences. In the wet season, detention basin(s) could be full of water and could attract local children, which would be a significant hazard. Measure M.4 in Section VI.M, Mitigation Measures: Community Services and Utilities, addresses this impact.

Two small parking lots serving the Giants Ballpark in Mission Bay South between Third Street and Fourth Street would be designed with surface detention basins to contain large volumes of stormwater on site while slowly pumping runoff to the City's combined system. Additional detention basins throughout the Central Basin may be used to temporarily accommodate stormwater runoff adjacent to newly developed areas.

Other interim uses could include truck parking and storage, open recreation, and temporary structures built for construction staging and equipment, as sales and rental offices, and for environmental clean-up activities. These structures would not create substantial additional flows to the sewer system in dry or wet weather.

Temporary Uses

Temporary uses, such as festivals, Christmas tree lots, truck parking and automobile parking, would not exceed 90 days and would not require land to be paved; therefore, stormwater could continue to pond and seep into the soil similar to existing conditions. Temporary uses would not substantially increase stormwater runoff, and would not exceed existing sewer capacity.

ENERGY TRANSMISSION CAPACITY AND INFRASTRUCTURE

SETTING

The Pacific Gas and Electric Company (PG&E) provides the Project Area with electricity and natural gas. PG&E's main distribution lines that serve downtown San Francisco extend underground through Mission Bay along Third, Mariposa, and Seventh Streets. These main lines are adequate for current demand in Mission Bay. Peak demand, rather than average consumption, determines transmission capacity and infrastructure requirements. (Energy consumption is discussed in "Energy/Natural Resources" in the Initial Study [Appendix A]).

Electricity

Electrical demand is the amount of electricity being consumed at any one time, with peak demand being the maximum demand occurring over a specified period. Peak electrical demand is estimated using projected annual consumption and typical load factors for each land use. Peak electrical demand in the Project Area is approximately 10.3 megawatts (MW), and occurs in summer at about 12:00 noon./149/ The Potrero and Embarcadero Substations serve the Project Area. Electricity is distributed through underground power lines.

Natural Gas

Natural gas is distributed to consumers in San Francisco by PG&E as well as private gas marketers. Transmission to the Project Area is through a distribution system owned, operated, and maintained by PG&E. Natural gas transmission infrastructure is considered adequate for current demand in the Project Area./150/

IMPACTS

Electricity

As discussed in the Setting subsection, peak electrical demand determines the adequacy of the transmission capacity and infrastructure required. Peak electrical demand for the proposed project is estimated to be approximately 51.25 MVA./151/ PG&E does not anticipate any capacity or infrastructure constraints in serving the Project Area./152/

Natural Gas

PG&E does not anticipate any constraints in the availability or capacity to serve the Project Area with natural gas. Existing infrastructure would be adequate for projected Project Area demand, with the potential need for minor upgrades only./153/

Construction

The proposed project would include work to provide a joint trench for utilities including electricity and natural gas. The utility owner (PG&E) would conduct any necessary upgrades to its transmission lines as needed for each phase of construction./154/ Trenching and removal of soils for the installation and/or upgrading of electricity and natural gas lines could potentially unearth contaminated soils. This issue is generally discussed in "Exposure From Construction Activities" under "Impacts During Project Development," in Section V.J, Contaminated Soils and Groundwater: Impacts.

TELECOMMUNICATIONS

SETTING

Telecommunications service is provided to residents and businesses in San Francisco by Pacific Bell. Pacific Bell passes costs of service provision to its customers and adds capacity as needed and as dictated by market demand.

Recent deregulation of the telecommunications industry has resulted in an increased number of telecommunications providers entering the market. Generally, Pacific Bell provides the Project Area with local transmission and distribution facilities, and other providers pay access charges to Pacific Bell for use of this infrastructure.

IMPACTS

New development in the Project Area would result in increased demand for telecommunications services for residences and commercial uses. The proposed project would include provision of trenches and installation of underground conduit ducts for utilities including telephone, cable, and possibly fiber optic lines. The telecommunications infrastructure would be installed and upgraded as needed for each phase of construction. Trenching and removal of soils for the installation of underground telecommunications lines could potentially unearth contaminated soils. This issue is generally discussed in "Exposure From Construction Activities" under "Impacts During Project Development," in Section V.J, Contaminated Soils and Groundwater: Impacts.

Based on preliminary information, Pacific Bell would serve the proposed project via fiber optic cable and remote terminal sites./155/ The size and location of remote terminal sites has not yet been determined. The size of easements for remote sites could range from space within the main terminal rooms of buildings to separate sites within the Project Area ranging from a 12-foot by 15-foot terminal box to a 50-foot by 50-foot easement. A 50-foot by 50-foot site would include a building of approximately 16 feet by 20 feet, and a parking lot with space to pull up in front of the building./156/ Employees would visit the site(s) periodically, but would not work full-time at these locations.

Therefore, the demand for telecommunications services generated by the proposed project would result in environmental impacts associated with the construction of such a facility. Impacts of constructing a remote telephone terminal facility in the Project Area would be the same as those from constructing other nonresidential buildings and are described generally in air quality, transportation, and contaminated soils sections of the SEIR as well as in Section III.A of the Initial Study (Appendix A).

Once the necessary infrastructure was in place, it would be expected that day-to-day service could be provided to the Project Area in the same way that it is currently provided throughout the City, possibly involving minor construction impacts typical of individual telephone installation.

NOTES: Community Services and Utilities

1. San Francisco Planning Department, *Mission Bay Final Environmental Impact Report*, Planning Department File No. 86.505E, State Clearinghouse No. 86070113, certified August 23, 1990, pp. II.7, II.18.*

2. Hausrath Economics Group, Employment and Population Estimates for the Proposed Project and the Alternatives and Cumulative Growth Scenario for San Francisco and the Rest of the Region, 1995 - 2015, Memorandum to EIP Associates, August 7, 1997.

3. Harold E. Gamble, Deputy Chief of Administration, San Francisco Fire Department (SFFD), letter to EIP Associates, August 25, 1997.

4. Harold E. Gamble, Deputy Chief of Administration, SFFD, letter to EIP Associates, August 25, 1997.

5. An engine company consists of 4 officers and 11 firefighters; a truck company consists of 3 officers and 17 fire fighters. These are the number of personnel required to cover all shifts, based on information from the San Francisco Fire Department used in the 1990 FEIR, p. VI.D.35.

6. 1990 FEIR, Volume Two, p. VI.D.1.

7. Harold E. Gamble, Deputy Chief of Administration, SFFD, letter to EIP Associates, August 25, 1997.

8. Harold E. Gamble, Deputy Chief of Administration, SFFD, letter to EIP Associates, August 25, 1997, and telephone conversation with EIP Associates, August 29, 1997.

9. Harold E. Gamble, Deputy Chief of Administration, SFFD, letter to EIP Associates, August 25, 1997.

10. Harold E. Gamble, Deputy Chief of Administration, SFFD, letter to EIP Associates, August 25, 1997.

11. Harold E. Gamble, Deputy Chief of Administration, SFFD, letter to EIP Associates, August 25, 1997.

12. 1990 FEIR, Volume Two, p. VI.D.4.

13. City and County of San Francisco, Planning Department, *San Francisco Kaiser Medical Center Geary Campus Development Project Final Environmental Impact Report*, Planning Department File No. 95.102E, certified April 10, 1997, Volume 1, p. 213.*

14. 1990 FEIR, Volume Two, VI.D.4.

15. Harold E. Gamble, Deputy Chief of Administration, SFFD, letter to EIP Associates, August 25, 1997.

16. 1990 FEIR, Volume Three, p. XIV.D.4.

17. Harold E. Gamble, Deputy Chief of Administration, SFFD, letter to EIP Associates, August 25, 1997.

18. Harold E. Gamble, Deputy Chief of Administration, SFFD, letter to EIP Associates, August 25, 1997.

19. The Honorable Willie Lewis Brown, Jr., Office of the Mayor, *Mission Bay Conceptual Framework for a Proposal for the Catellus Development Portion of the South of Channel Redevelopment Plan Area*, July 7, 1997, p. 25.*

20. Harold E. Gamble, Deputy Chief of Administration, SFFD, letter to EIP Associates, August 25, 1997.

21. Captain Timothy Hettrich, Commanding Officer, Planning Division, San Francisco Police Department (SFPD), letter to EIP Associates, July 31, 1997.

22. San Francisco Police Department Crime Statistics, preliminary report based on all SFPD originated and mail-in reports received as of 1/11/98, http://www.ci.sf.ca.us/police/9706.htm, 1/29/98.

23. University of California San Francisco, *UCSF Long Range Development Plan Final Environmental Impact Report*, State Clearinghouse No. 95123032, certified January 1997, Volume II, p. 453.

24. 1990 FEIR, pp. VI.D.41-VI.D.44 and p. XIV.D.15.

25. 1990 FEIR, p. VI.D.44.

26. Captain Timothy Hettrich, Commanding Officer, Planning Division, SFPD, telephone conversation with EIP Associates, August 18, 1997.

27. Association of Bay Area Governments, *Projections '96*, December 1995.

28. Hausrath Economics Group, Employment and Population Estimates for the Proposed Project and the Alternatives and Cumulative Growth Scenario for San Francisco and the Rest of the Region, 1995 - 2015, memorandum to EIP Associates, August 7, 1997.

29. City and County of San Francisco Charter, with amendments enacted through the Election of November 7, 1995, Section 3.530-3, p. CH-30.1.

30. 1990 FEIR, p. VI.D.131.

31. Captain Timothy Hettrich, Commanding Officer, Planning Division, SFPD, telephone conversation with EIP Associates, October 7, 1997.

32. 1990 FEIR, p. VI.D.9.

33. Captain Timothy Hettrich, Commanding Officer, Planning Division, SFPD, telephone conversation with EIP Associates, October 7, 1997.

34. 1990 FEIR, P. V1.D.43.

35. The Honorable Willie Lewis Brown, Jr., Office of the Mayor, *Mission Bay Conceptual Framework for a Proposal for the Catellus Development Portion of the South of Channel Redevelopment Plan Area*, July 2, 1997, p. 25.*

36. University of California San Francisco, *1996 Long Range Development Plan*, adopted January 1997, p. 213.

37. University of California San Francisco, *UCSF Long Range Development Plan Final Environmental Impact Report*, State Clearinghouse No. 95123032, certified January 1997, Volume II, p. 453.

38. University of California San Francisco, *UCSF Long Range Development Plan Final Environmental Impact Report*, State Clearinghouse No. 95123032, certified January 1997, Volume II, p. 453.

39. Deputy Chief Bill Welsh, Commander, Administration Bureau, SFPD, telephone conversation, September 5, 1997.

40. Information about the Department of Public Health was obtained through telephone calls and memoranda from Joanne Kimata, Senior Health Planner, San Francisco Department of Public Health, Office of Policy and Planning, and from various department managers. Names of department managers contacted, dates, and methods of communication are noted where appropriate for specific items of information discussed in the SEIR.

41. Bill McConnell, Associate Director for Quality Management, Mental Health Division, Department of Public Health, telephone conversation with EIP Associates, August 6, 1997.

42. Ben Gale, Director, Bureau of Environmental Health Management, Department of Public Health, telephone conversation with EIP Associates, July 31, 1997.

43. Goleta Union School District v. The Regents of the University of California, 36 Cal. App. 4th 1121 (1995).

44. 1990 FEIR, Volume Two, p. VI.D.21.

45. Goleta Union School District v. The Regents of the University of California, 36 Cal. App. 4th 1121 (1995).

46. Charles Range, Executive Director, South of Market Health Center, telephone conversation with EIP Associates, August 12, 1997.

47. University of California San Francisco, *1996 Long Range Development Plan*, adopted January 1997, p. 169.

48. Bill McConnell, Associate Director for Quality Management, Mental Health Division, Department of Public Health, telephone conversation with EIP Associates, August 5, 1997.

49. Hausrath Economics Group, Employment and Population Estimates for the Proposed Project and the Alternatives and Cumulative Growth Scenario for San Francisco and the Rest of the Region, 1995 - 2015, memorandum to EIP Associates, August 7, 1997.

50. Bill McConnell, Associate Director for Quality Management, Mental Health Division, Department of Public Health, telephone conversation with EIP Associates, August 7, 1997.

51. 1990 FEIR, Volume Two, p. VI.D.11.

52. Port of San Francisco, Open Space Inventory table, December 17, 1997.

53. Kari Kilstrom, Planner, Planning and Development Division, Port of San Francisco, letter of transmittal, copy of Port Commission memo dated October 9, 1997, and attachments, to EIP Associates, October 20, 1997; and Will Travis, Executive Director, San Francisco Bay Conservation and Development Commission, letter to China Basin Ballpark Company, October 23, 1997.

54. Acreages have been rounded to the nearest tenth of an acre.

55. City and County of San Francisco, *San Francisco General Plan*, Recreation and Open Space Element, p. I.3.7; and staff at Presidio Visitors Center, telephone conversation with EIP Associates, August 27, 1997.*

56. Barbara Amato, Development Specialist, San Francisco Redevelopment Agency, telephone conversation with EIP Associates, November 4, 1997.

● 57. Douglas F. Wong, Executive Director, Port of San Francisco, memorandum accompanying *San Francisco Port Commission, Resolution No. 97-92 (July 22, 1997),* October 9, 1997, p. 2.

58. Port of San Francisco, Open Space Inventory table, December 17, 1997.

59. City and County of San Francisco, *San Francisco General Plan*, Recreation and Open Space Element, p. I.3.10.*

60. City and County of San Francisco, *San Francisco General Plan*, Recreation and Open Space Element, pp. I.3.9 - I.3.10.*

61. City and County of San Francisco, *San Francisco General Plan*, Recreation and Open Space Element, p. I.3.10.*

62. 1990 FEIR, p. VI.D.71, and *San Francisco General Plan, Downtown Plan*, p. II.1.15.*

63. 1990 FEIR, p. VI.D.71.

64. San Francisco Planning Code, Volume 1, Section 138(c), January 1996.

65. City and County of San Francisco, Planning Department, *Mission Bay Plan*, as amended September 1990, p. 3-38.*

66. San Francisco Redevelopment Agency, *Design Standards and Guidelines, Mission Bay,* Draft C, prepared by Catellus Development Corporation; as adopted by the Mission Bay Citizen Advisory Committee on December 11, 1997, revised March 30, 1998, p. 75.

67. San Francisco Redevelopment Agency, *Design Standards and Guidelines, Mission Bay,* Draft C, prepared by Catellus Development Corporation; as adopted by the Mission Bay Citizen Advisory Committee on December 11, 1997, revised March 30, 1998, pp. 75-78.

68. Eric Harrison, Project Manager, Catellus Development Corporation, letter to EIP Associates, December 17, 1997, and attachment: "AREA CALCS in Acres - Mission Bay, JFP Block Numbering Scheme, 10/18/97 Plan w/KCA Engrs Adjustments with SFRA Survey Area Boundaries."

69. San Francisco Redevelopment Agency, *Design Standards and Guidelines, Mission Bay,* Draft C, prepared by Catellus Development Corporation; as adopted by the Mission Bay Citizen Advisory Committee on December 11, 1997, revised March 30, 1998, p. 76.

70. San Francisco Redevelopment Agency, *Design Standards and Guidelines, Mission Bay,* Draft C, prepared by Catellus Development Corporation; as adopted by the Mission Bay Citizen Advisory Committee on December 11, 1997, revised March 30, 1998, p. 77.

71. Fred DeJarlais, Vice President, KCA Engineers, Inc., facsimile to EIP Associates, January 8, 1998.

72. San Francisco Redevelopment Agency, *Design Standards and Guidelines, Mission Bay,* Draft C, prepared by Catellus Development Corporation; as adopted by the Mission Bay Citizen Advisory Committee on December 11, 1997, revised March 30, 1998, p. 30.

73. San Francisco Redevelopment Agency, *Design Standards and Guidelines, Mission Bay*, Draft C, prepared by Catellus Development Corporation; as adopted by the Mission Bay Citizen Advisory Committee on December 11, 1997, revised March 30, 1998, pp. 75-78.

74. San Francisco Redevelopment Agency, *Design Standards and Guidelines, Mission Bay,* Draft C, prepared by Catellus Development Corporation; as adopted by the Mission Bay Citizen Advisory Committee on December 11, 1997, revised March 30, 1998, p. 36.

75. The Honorable Mayor Willie Lewis Brown, Jr., Office of the Mayor, *Mission Bay: Conceptual Framework for a Proposal for the Catellus Development Portion of the South of Channel Redevelopment Plan Area,* letter to Commissioner Dar Singh, July 7, 1997, Exhibit C, pp. 24-25.

76. Eric Harrison, Catellus Development Corporation, *Summary of Infrastructure Review Process for Mission Bay*, letter to EIP Associates, February 3, 1998.

77. San Francisco Unified School District, District and School Profiles, 1996-1997, Planning, Research and Information Systems, March 1997.

78. Jim Green, Evaluator, Technical Planning and Decision Support, San Francisco Unified School District, telephone conversation with EIP Associates, September 5, 1997.

79. 1990 FEIR, Volume Two, p. VI.D.51.*

80. Timothy Tronson, Director of Facilities Planning, San Francisco Unified School District, e-mail to EIP Associates, November 7, 1997.

81. Association of Bay Area Governments, *Projections '96*, December 1995.

82. San Francisco Unified School District, Negative Declaration, Tenderloin Elementary School, October 25, 1995, p. 1.

83. Timothy Tronson, Director of Facilities Planning, San Francisco Unified School District, e-mail to EIP Associates, November 7, 1997.

84. Timothy Tronson, Director of Facilities Planning, San Francisco Unified School District, telephone conversation with EIP Associates, July 14, 1997.

85. This average was arrived at from data in the San Francisco Unified School District, *District and School Profiles, 1996-1997*, Planning, Research and Information Systems, March 1997. The total enrollment at the 77 elementary schools is 29,703, which results in an average of 386 students in each school.

86. Timothy Tronson, Director of Facilities Planning, San Francisco Unified School District, e-mail to EIP Associates, November 7, 1997.

87. A conservative estimate for purposes of this analysis would reflect the minimum number of students that would likely be accommodated on site and, therefore, the maximum potential demand on the District in accommodating remaining students.

88. Based on numbers in the San Francisco Unified School District's 1996-1997 *District and School Profiles*, March 1997, average school sizes in San Francisco are as follows:

Elementary school:	390 students
Middle school:	725 students
High school:	1,065 students

89. San Francisco Unified School District, Property Management Division, "School Facility Impact Fee Changes," August 30, 1994.

Residential Development	$1.72 per square foot
Nonresidential Development	
Office	$0.24 per square foot
Retail/Service	$0.13 per square foot
Light Industrial	$0.22 per square foot
Warehouse	$0.09 per square foot
Lodging	$0.08 per square foot

Education Code Section 17620, Government Code Section 65995.

90. Artie Kelley, Manager, San Francisco Unified School District, Property Management Department, telephone conversation with EIP Associates, March 13, 1998.

91. Assumes residential units are 840 sq. ft., and parking structures are not required to pay development impact fees.

92. Lucian R. Blazej, Executive Director, Facilities Development and Management, San Francisco Unified School District, telephone conversation with EIP Associates, August 12, 1998. Construction of an elementary school would cost about $315 per sq. ft., not including the cost of land or furniture and

equipment, resulting in a cost of about $12.6 million for a 40,000-sq.-ft. facility, and a cost of about $17.6 million for a 56,000-sq.-ft. facility.

93. City and County of San Francisco, *Source Reduction and Recycling Element, Final Draft,* prepared by Brown, Vence & Associates, October 1992. This document is an element of the City's Integrated Waste Management Plan, and was adopted by the Board of Supervisors in 1993.

94. City and County of San Francisco, *Source Reduction and Recycling Element, Final Draft*, prepared by Brown, Vence & Associates, October 1992.

95. Cybele Chang, Associate, San Francisco Solid Waste Management Program, telephone conversation with EIP Associates, August 14, 1997.

96. Michelle Schaefer, Environmental Coordinator, University of California San Francisco, telephone conversation with EIP Associates, September 8, 1997.

97. Cybele Chang, Associate, San Francisco Solid Waste Management Program, telephone conversation with EIP Associates, August 14, 1997.

98. City and County of San Francisco, *Altamont Landfill Capacity Projections*, prepared by Hilton Farnkopf & Hobson, LLC, July 18, 1996.

99. City and County of San Francisco, *Altamont Landfill Capacity Projections*, prepared by Hilton Farnkopf & Hobson, LLC, July 18, 1996.

100. Based on 1,600 employees generating 1.68 tons/employee/year. Waste generation factor from Cybele Chang, Associate, San Francisco Solid Waste Management Program, letter to EIP Associates, August 15, 1997.

101. The 1990 FEIR estimated a waste generation rate of 62,000 tons per year for Alternative A. This value is about 45,000 tons more than the proposed project's estimated 17,500 tons of waste per year. This difference can be attributed to the use of more recent waste generation data (see "Solid Waste" in Appendix L).

102. Cybele Chang, Assistant, San Francisco Solid Waste Management Program, telephone conversation with EIP Associates, August 14, 1997.

103. City and County of San Francisco, *Altamont Landfill Capacity Projections*, prepared by Hilton Farnkopf & Hobson, LLC, July 18, 1996.

104. City and County of San Francisco, *Altamont Landfill Capacity Projections*, prepared by Hilton Farnkopf & Hobson, LLC, July 18, 1996, Table 1A. Lowest waste generation and highest diversion rate (50% by 2000).

105. City and County of San Francisco, *Altamont Landfill Capacity Projections*, prepared by Hilton Farnkopf & Hobson, LLC, July 18, 1996, Table 3C. Highest waste generation and lowest diversion rate (40% by 2000).

106. The growth projections used in estimating future waste generation range from low (0.78% annual solid waste growth rate) to high (2.10% annual waste growth rate). The low-end estimates use ABAG projections for citywide employment and population growth, which includes considerable growth in the Mission Bay area. The high-end estimates use State Department of Finance projections, which is

considerably greater than the ABAG projections and would include a larger amount of growth in Mission Bay. Because waste generation estimates for the Mission Bay Project Area prepared for this SEIR are based on the full build-out of the development program by 2015 and remain less than 2% of the total citywide amounts, it is reasonable to assume that the additional solid waste from the Project Area has been taken into account in the Altamont Landfill Capacity Projections.

107. City and County of San Francisco, Planning Department, *San Francisco Kaiser Medical Center Geary Campus Development Project Final Environmental Impact Report,* Planning Department File No. 95.102E, certified April 10, 1997, Volume I, p. 428.*

108. San Francisco Recycling Program, *San Francisco Directory of Recycling Services; for companies that recycle construction and demolition waste,* August 6,1997.

109. Cybele Chang, Assistant, San Francisco Solid Waste Management Program, telephone conversation with EIP Associates, September 9, 1997.

110. University of California San Francisco, UCSF Long Range Development Plan Mitigation Monitoring Program, January 17, 1997, p. 14.

111. City and County of San Francisco, Planning Department, *San Francisco Kaiser Medical Center Geary Campus Development Project Final Environmental Impact Report,* Planning Department File No. 95.102E, certified April 10, 1997, Volume I, p. 215.*

112. Pressure zones are created by pumping water to reservoirs located above serviceable communities. Water flowing downhill from these reservoirs allows for more reliable service and creates increased pressure to provide water to tall buildings.

113. 1990 FEIR, Volume Two, p. VI.D.22-23.*

114. Steve Van Dyke, Superintendent, Bureau of Engineering and Water Supply, San Francisco Fire Department, telephone conversation with EIP Associates, September 5, 1997.

115. The water demand for the project is approximately 0.981 mgd greater than the water demand for the previous Mission Bay project (1.895 mgd). The difference in water demand estimates between the previous Mission Bay project and this project is a result of more conservative estimates in commercial industrial water use, an increase in retail square footage, and a higher water demand estimate for the irrigated open space (see "Water Supply" in Appendix L for a more detailed discussion of the water demand estimate differences).

116. City and County of San Francisco, Planning Department, *San Francisco Recycled Water Master Plan and Groundwater Master Plan Final Environmental Impact Report,* Planning Department File No. 92.371E, November 1, 1996, p. 448.*

117. Low ductile iron pipes are rigid, non-flexible pipes.

118. The Honorable Mayor Willie Lewis Brown, Jr., Office of the Mayor, *Mission Bay: Conceptual Framework for a Proposal for the Catellus Development Portion of the South of Channel Redevelopment Plan Area,* letter to Commissioner Dar Singh, July 7, 1997, Exhibit C, p. 6.

119. San Francisco Ordinance No.: 346-91 for Single Family Dwellings, 185-91 for Multi-Family Dwellings, 359-91 for Commercial Buildings, California State Building Code Section 402.0 (c).

120. The Honorable Mayor Willie Lewis Brown, Jr., Office of the Mayor, *Mission Bay: Conceptual Framework for a Proposal for the Catellus Development Portion of the South of Channel Redevelopment Plan Area,* letter to Commissioner Dar Singh, July 7, 1997, Exhibit C, p. 6.

121. City and County of San Francisco, Planning Department, *San Francisco Recycled Water Master Plan and Groundwater Master Plan Final Environmental Impact Report,* Planning Department File No. 92.371E November 1, 1996, pp. 97-100.*

122. City and County of San Francisco, Planning Department, *San Francisco Recycled Water Master Plan and Groundwater Master Plan Final Environmental Impact Report,* Planning Department File No. 92.371E, November 1, 1996, pp. S1-S11.*

123. Exemptions can be granted by the General Manager of the Water Department, in accordance with section 1204 (d)(2), on a temporary basis until reclaimed water service is available, through issuance of an alternative water supply certificate, or permanently if the requesting body proves that reclaimed water use is not appropriate for the intended purposes.

124. Karen Kubick, City Distribution Division Project Manager, San Francisco Public Utilities Commission, telephone conversation with EIP Associates, October 29, 1997.

125. City and County of San Francisco, Department of Public Works, *Recycled Water Master Plan*, Revised Draft, July 1996.

126. Michelle Schaefer, Environmental Coordinator, University of California San Francisco, telephone conversation with EIP Associates, September 8, 1997.

127. The estimated daily reclaimed water value may be conservatively large because it assumes all buildings would have dual plumbing and uses relatively high water demand factors. A reclaimed water demand number smaller than the estimated 0.98 mgd would mean a correspondingly larger potable demand, closer to the total 2.9 mgd discussed above in "Water Demand," under "Water Supply: Setting."

128. City and County of San Francisco, Planning Department, *San Francisco Recycled Water Master Plan and Groundwater Master Plan Final Environmental Impact Report,* Planning Department File No. 92.371E, November 1, 1996, p. 455.*

129. Michael P. Carlin, Water Resources and Planning Manager, San Francisco Public Utilities Commission, letter to Paul Deutsch, San Francisco Planning Department, March 17, 1998.

130. Nathan Brennan, Superintendent Bayside Operations, Water Pollution Control, telephone conversation with EIP Associates, August 14, 1997.

131. Sewage generation is assumed to be about the same in 1997. The only major change is the addition of the Mission Bay Golf Center (driving range). While this driving range uses considerable amounts of water, it is assumed that this water seeps into the ground and does not contribute to sewage generation in the Project Area.

132. Flows must be "forced" through a force main by pumping. Sewage flows downhill under the influence of gravity in ordinary sewers. Force mains are usually smaller in cross section than ordinary sewers.

133. Beth Goldstein, Hydrologic Planning Group, SPARC, San Francisco Public Utilities Commission, telephone conversation with EIP Associates, October 22, 1997.

134. Barry Pearl, City Planner, San Francisco Public Utilities Commission, telephone conversation with EIP Associates, November 12, 1997.

135. Henry Anderson, Senior Civil Engineer, San Francisco Public Utilities Commission, Sewer Operations, telephone conversation with EIP Associates, September 5, 1997.

136. A five-year storm has such a large magnitude that its occurrence is relatively rare. A five-year storm occurs an average of once every five years.

137. 1990 FEIR, Volume Two, p. VI.D.25-26.*

138. The 1990 FEIR estimated wastewater production at build-out under Alternative A to be 1.71 mgd, which is 0.78 mgd less than estimated for the current project. This is a result of the difference in water demand calculations discussed in "Water Demand" under "Water Supply: Impacts," in Section V.M, Community Services and Utilities.

139. For a discussion of the five-year storm standard see "Glossary" in Section V.K, Hydrology and Water Quality: Impacts.

140. To maintain the gravity-fed nature of sewer lines in a flat area like Mission Bay, the lines would be engineered with a system of varying slopes and pipe shapes.

141. "Initial flows" would constitute approximately 80% of the annual stormwater runoff volume.

142. The baffle and weir design in the collection box would be similar to that in the City's storage sewers. The baffle and weir combine to remove floatables and allow some settlement of suspended particles before an overflow discharge if the sewer is large enough to retain flows for some period of time, as are the City's combined storage/transport structures. A weir is a partition that prevents water from spilling out of the storage sewer. A baffle is a partition that extends from the top of the storage sewer to below the top of the weir. When the storage sewer fills with combined sewage the weir contains the flow. As the sewers continue to fill, the water level rises above the bottom of the baffle. Water must flow under the baffle and over the weir in order to overflow. Floating materials cannot flow under the baffle and are prevented from being discharged. In storage sewers, temporary storage would allow heavier suspended particles to settle. The separated storm sewers are not expected to be sized as storage facilities and so would not provide for substantial amounts of settling.

143. The diversion of initial storm flows to the storage sewer would usually stop before the direct discharge of stormwater to the Bay begins. Under some circumstances, stormwater could be discharged directly to the Bay while still being diverted to the Channel Street storage sewer. This could occur during unusual rainfall conditions when the inflow from intense, short storms or localized rain showers enters the diversion system faster than it can be pumped, or diverted, into the Channel Street storage sewer. If the storage sewer is not full, it would continue to fill while stormwater simultaneously discharges to the Bay.

144. Donald Miller, P.E., Principal of Hawk Engineers, Inc., letter to David Knadle, Construction Director, Catellus Development Corporation, August 5, 1997.

145. 1990 FEIR, Volume Two, p. VI.D.105.*

146. Henry Anderson, Senior Civil Engineer, San Francisco Public Utilities Commission, Sewer Operations, telephone conversation with EIP Associates, August 15, 1997.

147. Henry Anderson, Senior Civil Engineer, San Francisco Public Utilities Commission, Sewer Operations, telephone conversation with EIP Associates, August 15, 1997.

148. Beth Goldstein, Hydrologic Planning Group, SPARC, San Francisco Public Utilities Commission, telephone conversation with EIP Associates, October 22, 1997.

149. 1990 FEIR, p. VI.H.3. Peak demand in the Project Area is assumed to be approximately the same now as it was when the analysis was done for the 1990 FEIR. The Mission Bay Golf Center was constructed in December 1992. No other change in land use has occurred that would cause a substantial change in electricity demand.

150. Mark Feiling, Industrial Power Engineer, Pacific Gas & Electric (PG&E), telephone conversation with EIP Associates, October 8, 1997.

151. Mark Feiling, Industrial Power Engineer, PG&E, memorandum to EIP Associates, September 12, 1997, with corrections per telephone conversation, September 17, 1997.

152. Mark Feiling, Industrial Power Engineer, PG&E, telephone conversation with EIP Associates, September 15, 1997.

153. Mark Feiling, Industrial Power Engineer, PG&E, telephone conversation with EIP Associates, October 8, 1997.

154. Mark Feiling, Industrial Power Engineer, PG&E, telephone conversation with EIP Associates, September 17, 1997.

155. David G. Kearnan, Loop Planning Engineer, Pacific Bell, letter to EIP Associates, September 2, 1997.

156. David G. Kearnan, Loop Planning Engineer, Pacific Bell, letter to EIP Associates, September 2, 1997, and telephone conversation with EIP Associates, September 5, 1997.

* A copy of this report is on file for public review at the Office of Environmental Review, Planning Department, 1660 Mission Street, San Francisco.

N. GROWTH INDUCEMENT

This section describes the direct and indirect implications of development in the Project Area for growth in San Francisco and the Bay Area. The related cumulative growth scenario is presented in "Project Area and Cumulative Citywide Growth" in Section V.C, Business Activity, Employment, Housing, and Population: Impacts. The endnotes for this section begin on p. V.N.11.

Analysis of the growth-inducing impacts of large-scale development such as that proposed for the Project Area considers four main topics:

- "Net addition": the extent to which Project Area development would result in growth of business activity and employment or housing and population that otherwise would not occur in the City or the region;
- The growth-inducing relationship between increases in employment and associated increases in population;
- The "multiplier" effect: representing the inter-relationships between various sectors of economic activity — a means of describing the indirect and induced business activity and population growth associated with the addition of jobs and residents in the Project Area; and
- The "spillover" effect: the extent to which Project Area development would result in growth and change not otherwise expected in areas near the Project Area.

This growth inducement section covers the same topics and follows the same methodologies used in the 1990 FEIR.

"NET ADDITION": PROJECT AREA CONTRIBUTIONS TO SAN FRANCISCO EMPLOYMENT GROWTH

There would be more total employment and job opportunities in San Francisco with the proposed project than without it, but not all of the 28,300 additional jobs would represent net additional employment in the City, i.e., employment growth that would only occur in San Francisco assuming development of the proposed project.

UCSF and Spin-off Economic Activity

For the most part, development of the UCSF site with instruction, research, and support activities, associated research and development activities, and other supporting businesses would represent a direct contribution to overall economic activity and employment growth in San Francisco—net additional economic activity and employment attributable to the project. Without the project as proposed, San Francisco would not be able to accommodate most of UCSF expansion plans within the City.

The UCSF Long Range Development Plan (LRDP) includes expansion at some existing sites in San Francisco with most growth planned at a major new site—Mission Bay, in San Francisco./1/ If The Regents had chosen a location entirely outside of San Francisco, the employment effects associated with the new site would have been lost to San Francisco. UCSF and associated spin-off and support business activity and jobs would represent the bulk of the proposed project's contribution to net additional economic growth and increased job opportunities in San Francisco. The UCSF site in Mission Bay is expected to employ 9,100 people; all but 1,000 of those jobs (8,100 jobs) are assumed to represent expansion of UCSF operations and, thus, jobs that would not occur in San Francisco if another site outside the City had been selected for the new site./2/ (If the Brisbane Baylands/Executive Park option had been chosen, there would be some net additional growth for San Francisco, but substantially less than would be the case under the proposed project.) Moreover, the UCSF site at Mission Bay is expected to attract research and development (such as private biotechnical companies) and other related business activities, including retail service and business service offices, providing a substantial amount of the demand for the new Commercial Industrial development proposed for Mission Bay South (estimated to accommodate a total of about 15,300 jobs).

Faster Pace of Development and Employment Growth

Without the proposed project, ABAG *Projections '96* expects there would be incremental growth in Project Area economic activity and jobs (in office, retail/entertainment, and hotel sectors). The 1990 *Mission Bay Plan* provided for lower-rise commercial/industrial/office development in a business park environment similar to that currently proposed for the West and East Subareas. The 1990 Plan also allowed for substantial retail development and a hotel.

The two proposed Redevelopment Plans for Mission Bay North and Mission Bay South would accelerate the pace of development, resulting in more business activity and job growth in those sectors than otherwise expected by the year 2015. Therefore, in addition to the employment growth associated with UCSF and spin-off economic activity, some of the greater amount of business activity and employment accommodated in the Project Area by 2015 would represent net additional growth in San Francisco in that time period. Some of the business activity and employment would represent shifts of growth otherwise expected elsewhere in San Francisco, as explained immediately below.

Shifts from Other City Locations Not a Net Addition

Some of the economic activity expected in the Project Area under the proposed project would have location options elsewhere in the City and would be expected to increase in San Francisco whether or not the proposed project were developed. In these cases, growth in the Project Area would represent a shift of business activity and jobs expected elsewhere in San Francisco, not a net addition to San Francisco economic activity by 2015. Such shifts would have an impact on development patterns and on the amount of growth expected elsewhere in San Francisco; demand for space in some locations would be less than otherwise expected by 2015 because activities would choose instead to locate in the Project Area (see "Implications for Nearby Areas," following).

Some of the demand for Commercial Industrial space in the Project Area would come from businesses that have other location options in San Francisco. Office businesses that might otherwise choose space in mid-rise new or renovated existing space in the Transbay, Civic Center, or eastern South of Market areas would be potential tenants for the new office space in the Mission Bay South subareas. Multimedia enterprises that typically choose renovated existing space in South of Market, Potrero Hill, and Inner Mission locations might be attracted to new development in the Project Area, depending on the cost, physical configuration, and amenity package.

Project Area retail, entertainment-oriented commercial, and hotel uses are described as oriented to citywide and visitor demand and establishments in that development also would have location options elsewhere in the City. Waterfront sites both north and south of the Project Area, and sites in the South of Market, Potrero Hill, Inner Mission, and South Bayshore areas are potential alternative locations for city-serving retail development and entertainment-oriented commercial development of the types proposed for Mission Bay. Seawall lots along the Northeast waterfront and the South Beach waterfront north of the Project Area, and sites in the Transbay area could accommodate hotel development. Development of the proposed project would result in less of those types of activities than otherwise expected in those other parts of San Francisco.

"NET ADDITION": PROJECT AREA CONTRIBUTIONS TO SAN FRANCISCO HOUSEHOLD AND POPULATION GROWTH

There are no housing units in the Project Area now, so this geographic area does not contribute to the current housing inventory in San Francisco. Development of the Project Area as proposed under the Mission Bay North and South Redevelopment Plans would result in approximately 6,090 additional units in San Francisco.

The Mission Bay Project Area is one of the few remaining locations in the City that has the potential to accommodate large amounts of new housing development and, therefore, substantial population growth in San Francisco. Since the 1991 re-zoning, the Project Area has had the potential to add over 8,000 units to San Francisco's housing inventory. In *Projections '96*, ABAG shows incremental development of about 2,800 units by 2015, housing 5,500 people. (See "No Project/Expected Growth Alternative" in Chapter VIII, Alternatives to the Proposed Project.) Assuming the incentives and assistance provided by the proposed Redevelopment Plans, the pace of housing development would be likely to increase under the proposed project, resulting in more dwelling units, households, and population in San Francisco than otherwise expected by 2015.

RELATIONSHIP BETWEEN EMPLOYMENT GROWTH AND POPULATION

Employment growth can induce population growth (i.e., new workers to fill new jobs), thereby stimulating housing demand and demand for community facilities and infrastructure. Those additional workers come from several sources: new residents in the area, people joining the labor force (e.g., having finished school, deciding to return to work, or taking a job for the first time), and unemployed people finding jobs. It is the new residents in the area that represent the population growth "induced" by employment growth.

From the regional perspective, Project Area development and associated employment growth would not induce more population growth than otherwise expected in the Bay Area. While the UCSF expansion and associated employment growth represent mostly net additions to San Francisco growth and economic activity, they do not represent net additions to regional employment growth and economic activity. Alternative locations considered for the UCSF expansion included a site in Alameda County and a combined San Mateo County/San Francisco site (Brisbane Baylands/Executive Park). If the Mission Bay site had not been selected as the preferred location, one of those other locations in the region would have been, thereby ensuring that the direct, indirect, and induced economic activity associated with UCSF would remain within the Bay Area. Under either option (the San Francisco location or another location in the region), the employment growth represented by UCSF and associated economic activity would be expected to induce about the same amount of population growth (to fill labor needs) throughout the region. Because this SEIR includes full build-out of the proposed project and other components of the San Francisco cumulative growth scenario, this SEIR accounts for the induced growth that the project would generate regionally.

As indicated by the preceding discussion, there would be differences in the locations within the region that would see the effects of induced population growth. The proposed project, accommodating the new UCSF site in San Francisco, would result in more business activity and employment growth concentrated in San Francisco than would be the case if the new UCSF site were located elsewhere. Along with more job opportunities in the City than would otherwise be the case, there would be more induced population growth and associated housing and other service demands in San Francisco, as well as demand for housing in other locations throughout the region. Again, this growth scenario is part of the Project Area and cumulative analyses in this SEIR.

MULTIPLIER EFFECTS

Multiplier effects describe those economic inter-relationships through which businesses or institutions support other businesses by purchasing goods and services; business activity supports household spending by providing jobs and wage and salary income; and household spending generates sales and revenue for consumer-oriented businesses.

Some of the multiplier effects of economic activity in the Project Area would be represented by businesses and households that would also be located in the Project Area. For example, UCSF purchases of supplies, equipment, and services would support some of the research and development, office, and other tenants of Commercial Industrial development in Mission Bay South. Some households in the Project Area would move there because of job opportunities in the Project Area. Project Area household and worker retail spending would support most of the convenience retail stores, shops, and eating and drinking places, and some part of the city-serving retail outlets.

Other components of the multiplier effects of Project Area economic activity would be represented by business activity and population growth elsewhere in San Francisco and in other parts of the region. Conversely, some economic activity in the Project Area would represent the multiplier effect of businesses located outside the Project Area. For example, downtown offices or hotels could be customers of businesses likely to locate in the Project Area, purchasing the goods and services they offered.

The cumulative scenario of growth in San Francisco and the rest of the region incorporates all of these multiplier effects, to the extent they are captured in the Bay Area region. Therefore, the cumulative analyses in this SEIR incorporate the impacts of any additional growth outside the Project Area that could be considered to be generated by Project Area activity.

"SPILLOVER EFFECTS": IMPLICATIONS FOR NEARBY AREAS

This section presents a description of how the proposed project would affect the type and pace of growth and change in nearby commercial, industrial, residential, and mixed-use areas. Over time, Project Area development would affect the land use and residential character, as well as economic activity, in areas beyond Project Area boundaries. Those Nearby Areas (South of Market, Showplace Square, North Potrero, Potrero Hill, Lower Potrero, Central Bayfront, Inner Mission, and South Bayshore) are expected to change over time in any case. Development in the Project Area would affect the pace of that change and, potentially, the character of the change otherwise expected.

Most of the effects would be in those areas that would be competitive locations for either business activity or residential development. In addition to effects on the location of development (whereby development conditions in the Project Area result in shifts of demand from business activity and households that might otherwise locate in other nearby San Francisco districts), implications for development patterns also include "spillover" effects on Nearby Areas. Changes in the level of economic activity and in housing market and other real estate market conditions in Nearby Areas, in response to changed land use and development conditions in the Project Area, are spillover effects.

The analysis that follows is an extension of the discussion of implications for citywide growth. Effects on development patterns in Nearby Areas—on demand for space and demand for housing—are determined by comparison to what would otherwise be expected in the future in those areas as well as by comparison to existing conditions.

The discussion is organized according to the major types of development (or land use categories) that would be accommodated in the Project Area. The locations that might be affected (i.e., the locations that would compete with the Project Area and those nearby locations that would experience spillover effects of Project Area growth and development) are identified as relevant for each development type.

Commercial Industrial Development and UCSF

Office development under the proposed project would not have much effect on the Class A downtown San Francisco office market. There would be some effects in the area near the Transbay Transit Terminal, because the new lower-rise office space in the Project Area would compete with the lower-cost office space that could be incorporated in new mixed-use buildings in that district. Substantial office absorption in the Project Area by 2015 would reduce some of the demand for new office space in the Transbay area.

The flexible development in the Project Area, designed to accommodate a mix of office, research and development, multimedia, service, and light industrial activities, would also affect the demand for existing space in renovated warehouse and industrial buildings in the South of Market and Inner Mission, and in older industrial districts at the foot of Potrero Hill. To the extent development in the

Project Area would provide an affordable alternative to existing space for small offices, multimedia businesses, and other businesses seeking to expand, there would be less demand for existing space elsewhere than would be otherwise expected. The result would be lower rents for existing space and more space options throughout those fringe areas of the downtown for lower-rent paying tenants.

The ability of the Project Area to accommodate within its own borders large amounts of office, research and development, and other commercial and industrial space would moderate the potential for spillover effects in Nearby Areas from the substantial influx of economic activity represented by the new UCSF site. Without the proposed development program for the East and West Subareas, there would be more demand in the South of Market, North Potrero, Lower Potrero, Central Bayfront, and Inner Mission Nearby Areas for start-up and expansion space for spin-off enterprises and supporting commercial activities associated with the new UCSF site. It would be difficult to accommodate large amounts of spin-off economic activity in those nearby commercial and industrial districts, however. As a consequence, San Francisco might not capture this economic benefit of the proposed project. The substantial component of Commercial Industrial development proposed for the Project Area would offer assurance that those as-yet unknown space needs could be met and also would offer another measure of relief to the needs of those lower-rent-paying businesses that would be likely to continue to be attracted to the older industrial and warehouse districts in this part of the City.

Retail, Entertainment-oriented Commercial, and Hotel Development

The entertainment-oriented commercial development proposed for the North Subarea would absorb a large amount of the expected demand generated by development of the adjacent San Francisco Giants Ballpark (outside the Project Area), as well as some demand from other city residents and visitors for shopping, eating and drinking, and entertainment. As a consequence, there would be less pressure to add visitor-oriented restaurants, bars, and specialty retail shops on the ground floors of existing buildings in the South Beach area, leaving more of that space available for neighborhood-serving uses. The Project Area would also compete with other locations along the waterfront further north that could also accommodate substantial visitor-oriented retail and entertainment activity. The proposed project could reduce the likelihood of development of substantial retail and entertainment oriented commercial uses in the Waterfront Mixed Use Opportunity Areas designated for the piers and associated seawall lots south of the Ferry Building during this time period./3/

The Project Area would compete with other suitable locations in the City for city-serving retail development. Among the potential locations for this type of retail development are sites in the western South of Market and in the Inner Mission (locations that have captured most of this type of development in San Francisco in the last decade), waterfront sites in the Central Bayfront, as well as waterfront locations north of the Ferry Building. There are also locations in South Bayshore that could accommodate city-serving retail development. Of note, the proposed Candlestick Mills retail mall would depend to some extent on some of the same growth in retail and entertainment spending required to support city-serving retail development proposed for the Project Area.

It is unlikely that re-capture of existing retail spending that leaks from San Francisco, combined with expected growth through 2015 in City residents' and businesses' retail spending, would support development of all of the potential city-serving retail locations identified in current project and area planning efforts./4/ Successful development of a home improvement outlet store in the Project Area, for example, would most likely preclude this type of development in the Central Bayfront or South Bayshore areas. Similarly, opening a major retail computer and office supply outlet store in the Project Area could reduce continued growth of that type of economic activity in Inner Mission, North Potrero, or South of Market locations.

The story is the same for the hotel development proposed for the Project Area. There are a number of potential hotel sites that could be developed in San Francisco by 2015. In addition to the Project Area site in the Central Subarea, there are two sites in the Yerba Buena Center Redevelopment Area (one is now under construction), a site in the Transbay area, and waterfront locations landside of The Embarcadero, including seawall lots along the Northeast waterfront and the South Beach/China Basin waterfront./5/ The markets for each of those sites would overlap; the Project Area hotel would compete with other waterfront hotels and potentially with the Yerba Buena and Transbay hotels for the business travel market. If there were not enough growth in demand by 2015 to support all of this potential hotel development, development of the Project Area hotel site would most likely affect waterfront hotel development during that same period. As in the case of visitor and entertainment-oriented stores, restaurants, and bars, successful hotel development in the Project Area would reduce the likelihood of such development on other properties, at least through the 2015 time horizon.

Finally, the proposed project includes substantial neighborhood-serving retail that would be supported by the spending of Project Area households, businesses, and workers on convenience goods and services. Because that retail demand would be satisfied by development within the Project Area, spillover effects in Nearby Areas (retail demand supporting expansion of convenience retail areas nearby) would be minimized. Furthermore, the large amount and likely variety of such retail development in the Project Area would offer expanded convenience shopping opportunities that would attract to the Project Area some retail spending from households and businesses in Nearby Areas. That spending would otherwise support convenience retail expansion outside the Project Area. It is unlikely that the Project Area share would be large enough to erode the existing base of retail development in those neighborhoods, however.

Residential Development

Adjacent Port Property

Development of the proposed project would substantially change the Project Area, and would create a new neighborhood adjacent to the China Basin Channel houseboat community. Public and private investment in infrastructure, community facilities, access improvements, open space, and improvement of the Channel edge, as well as development of convenient shopping opportunities, would enhance the residential environment. Over time, upgrading of houseboat units would be likely, with turnover of houseboat residents.

Given the expectation for the future type and level of maritime activity on other port property adjacent to the Project Area, there would not be substantial negative spillover effects of the conversion of the Project Area from an industrial district to a mixed-use neighborhood. The *Waterfront Land Use Plan* designates the piers east of the Project Area and some of the adjacent port property to the west across Terry A. François Boulevard to remain in maritime use. Other port properties east of the Project Area were included in the 1990 *Mission Bay Plan* and were designated for open space uses. Due to the new Mission Bay project, the Port is re-evaluating long-term land uses for these sites. A major open space will be considered along with other possible uses. The Port will amend the *Waterfront Land Use Plan* if required to reflect its long-term plans as more information becomes available./6/

Currently, the piers and adjacent land area are underutilized because the cargo operations and ship repair that used to occur there have continued to decline in San Francisco and have consolidated to other locations along the waterfront. The level of this type of maritime activity is not expected to increase. There is likely to be some intensification of activity in the pier area because the Port has relocated its Maintenance Facility from Pier 46B to Pier 50. Tug-and-tow and other maritime support operations may also increase over time.

The residential development proposed for the Central Subarea and the Commercial Industrial development, including office and research and development uses, proposed for the East Subarea could co-exist for some time with adjacent maritime activity of those types at the relatively modest levels that have existed for the last 10 years. Over the longer term, as the open space uses, residential and new commercial districts become established, increased traffic and other effects of increasing the density of population and employment in the vicinity could make the piers adjacent to the Project Area less attractive for industrial maritime activities. In addition, once the Project Area developed into a mixed-use community, piers east of the Project Area would be more valuable for commercial and recreational development. Although this would be a long time in the future given the ample supply of other waterfront locations for such development, the longer-term result could be contribution to pressure for development of the piers for non-maritime uses.

South of Market/East of Third Street

New residential and retail development in this area since the mid-1980's has done more to change the historic character of the east South of Market district than would proposed development in the Project Area. Project Area residential and retail development proposed for Mission Bay North would be expected to capitalize on the earlier success of the South Beach development and extends that already well-established land use transition.

The large amount of housing and associated residential amenities proposed for the Project Area would represent an upgrading of the residential character of neighborhoods in the vicinity. Demand-induced increases in prices and rents for newer units would be likely offset by the dampening effect of the Project Area's new inventory added to the local housing supply.

South of Market/West of Third Street, Potrero Hill, Lower Potrero, and Inner Mission

New construction resulting from the proposed project would enhance and broaden the appeal of residential areas in the eastern part of the City near the downtown. As in the eastern South of Market, however, supply-side counter effects would moderate any demand-induced increases on prices and rents. With development of the proposed project, older residential enclaves in the South of Market west of Third Street and in the Lower Potrero and Inner Mission Nearby Areas would more likely remain relatively lower-cost residential areas than would be the case without Project Area residential development. If there were no substantial increases to the housing inventory in San Francisco such as that proposed for the Project Area, there would be more demand on the existing housing stock in these areas near the downtown as trends established over the last two decades continued. The supply-side boost of Project Area residential development also would absorb some of the demand that would otherwise support continued expansion of live/work infill development in those districts.

More Distant Residential Areas

The South Bayshore and more distant residential areas of the Inner Mission would not experience effects of Project Area development to the same degree as closer-in areas surrounding Mission Bay. There would likely be changes in the character of the Inner Mission and South Bayshore neighborhoods over time, but those changes would reflect planned transportation improvements and other projects and development programs in the neighborhoods themselves (Third Street Light Rail, Bayview-Hunters Point Redevelopment Plan, 49ers Stadium and Candlestick Mills project, Hunters Point Shipyard re-use, Northeast Mission neighborhood planning), as well as overall economic vitality and demographic trends in the City.

NOTES: Growth Inducement

1. University of California San Francisco, *UCSF Long Range Development Plan Final Environmental Impact Report*, State Clearinghouse No. 95123032, certified January 1997, Volume II, pp. 27-31.

2. University of California San Francisco, *UCSF Long Range Development Plan Final Environmental Impact Report*, State Clearinghouse No. 95123032, certified January 1997, Volume II, p. 516.

3. Port of San Francisco, *Waterfront Land Use Plan*, 1996, Map C, p. 55A.*

4. This conclusion is echoed in the *Cumulative Growth Scenario*. See Keyser Marston Associates, Inc., *San Francisco Cumulative Growth Scenario, Final Technical Memorandum*, prepared for the San Francisco Redevelopment Agency, March 30, 1998, p. 41.*

5. Port of San Francisco, *Waterfront Land Use Plan*, 1996, Map C, p. 55A.*

6. Port of San Francisco, *Waterfront Land Use Plan*, 1996, pp. 40–51, including Map A and Map B, and pp. 126A and 127A. Also, Alec Bash, AICP, Planning & Development Division, Port of San Francisco, Fax memorandum to Paul Deutsch, Mission Bay EIR Coordinator, Office of Environmental Review, City and County of San Francisco, November 21, 1997.*

* A copy of this report is on file for public review at the Office of Environmental Review, Planning Department, 1660 Mission Street, San Francisco.

VI. MITIGATION MEASURES

USER'S GUIDE TO THE MITIGATION MEASURES

This chapter presents the mitigation measures that address significant environmental impacts of the proposed project, as discussed in Chapter V, Environmental Setting and Impacts. The mitigation measures either reduce or avoid significant impacts. Sections VI.A through VI.N follow the order of the environmental topics in Chapter V. At the end of this chapter are two tables: Table VI.7 summarizes mitigation measures from the 1990 FEIR that are discussed in this SEIR, and Table VI.8 summarizes mitigation measures that are not discussed in this SEIR.

MITIGATION MEASURES DISCUSSED IN THIS SEIR

Measures discussed in this SEIR are divided into three categories: 1) project features that would avoid significant impacts, 2) mitigation measures identified in this SEIR, and 3) mitigation measures from the Initial Study. The "project features" category contains aspects of the project designed by the project sponsors to address potential impacts. The SEIR analysis was performed assuming that these measures would be part of the project. If these measures were not implemented, significant impacts could arise that have not been evaluated in this SEIR. The second category, "mitigation measures identified in this SEIR," contains mitigation measures that would mitigate significant impacts identified in the environmental analysis in this SEIR.

In the Initial Study published September 19, 1997, included as Appendix A in this SEIR, certain potential impacts were determined to be either adequately covered in the 1990 FEIR, mitigated by project features, or less than significant. These impacts did not require further environmental analysis, and the appropriate mitigation measures are carried forward into this chapter. In some cases, such measures have been modified or were found not to be necessary, as a result of the SEIR analysis.

Mitigation measures identified in this SEIR and from the Initial Study may be required by decision-makers as conditions of project approval, if the project were to be approved. Implementation of some mitigation measures may be the responsibility of other public agencies, outside the jurisdiction of the City and County of San Francisco.

Mitigation Measures from the 1990 Mission Bay FEIR

This chapter also indicates the disposition of mitigation measures proposed in the 1990 FEIR, which were designed to address significant environmental impacts of the alternative development scenarios considered in the late 1980's. Mitigation measures from the 1990 FEIR that remain applicable to the proposed project have been incorporated in the SEIR, as discussed below.

The mitigation measures from the 1990 FEIR are relevant to this document because, pursuant to California law,/1/ this document is a Subsequent EIR. It is a Subsequent EIR because the changes proposed for development of the Mission Bay area are substantial and could involve new or more severe significant environmental effects than those analyzed in the 1990 FEIR. Nevertheless, much of the baseline information developed for the 1990 FEIR is still relevant, as are some of the mitigation measures. Information in the 1990 FEIR that is still accurate and relevant is incorporated by reference and summarized in this SEIR, as described in Chapter I, Preface.

In addition, this SEIR is intended to provide a clear understanding of possible mitigation measures, without the need for frequent reference to the original 1990 FEIR. Therefore, summaries of all of the mitigation measures proposed in the 1990 FEIR are presented in Tables VI.7 and VI.8. See Section VI.O, Summary Tables of 1990 FEIR Mitigation Measures, for a discussion of the structure and organization of these two tables.

A. PLANS, POLICIES, AND PERMITS

Mitigation measures have not been identified because no significant impacts have been found.

B. LAND USE

Mitigation measures have not been identified because no significant impacts have been found.

C. BUSINESS ACTIVITY, EMPLOYMENT, HOUSING, AND POPULATION

Mitigation measures have not been identified because no significant impacts have been found.

D. VISUAL QUALITY AND URBAN DESIGN

MITIGATION MEASURES IDENTIFIED IN THIS SEIR

Lighting and Glare

D.1 Design parking structure lighting to minimize off-site glare. The design could include 45-degree cutoff angles on light fixtures to focus light within the site, and specifications that spill lighting from parking areas would be 0.25 foot-candle or less at 5 feet from the property line of the parking areas. Applies to individual sites within the Project Area. Applies to Mission Bay North and Mission Bay South.

Architectural Resources

D.2a Retain an architectural historian to prepare an evaluation of the architectural integrity and historical importance of Fire Station No. 30 prior to development on this site. If the building is determined to be eligible for the National Register, preserve, rehabilitate, and reuse the building in a manner that is consistent with the Secretary of the Interior's guidelines for historic preservation. Applies to Mission Bay South.

D.2b If Fire Station No. 30 is found to be eligible for the National Register, require the following mitigation measures to reduce (though not eliminate) the significant impact prior to demolition of the structure. Prepare a "Historical American Building Survey," including the precise recording of the structure through measurements, drawings, and photographs. Provide sufficient detail in the survey documentation so that after demolition, the historical structure could be reconstructed from the survey data. File copies of the records and documents with the appropriate federal, state, and city agencies. Include salvage and selective re-use of building materials in the mitigation program once the survey has been completed. Upon completion, provide a copy of the report to the San Francisco Planning Department, the President of the San Francisco Landmarks Preservation Advisory Board, and the Redevelopment Agency. Applies to Mission Bay South.

MITIGATION MEASURES FROM THE INITIAL STUDY

Archaeological Resources

D.3 Retain the services of an archaeologist, because of the strong possibility of encountering the remains of cultural or historic artifacts or features in the six historic resources areas. The Environmental Review Officer (ERO) in consultation with the President of the Landmarks Preservation Advisory Board (LPAB) and the archaeologist would determine: 1) whether the archaeologist should instruct all excavation and foundation crews on the project site of the potential for discovery of historic archaeological deposits and artifacts, and the procedures to be followed if such materials are uncovered; and 2) prior to the commencement of foundation excavation, a program of archaeological testing.

Retain a qualified historic archaeologist to supervise a pre-foundation excavation testing program for each phase of Project Area development or each construction site, as appropriate, using a series of mechanical, exploratory borings or other testing methods determined by the archaeologist to be appropriate. A qualified historical archaeologist would supervise the testing in the six historic resource areas to determine the probability of finding cultural and historical remains. At the completion of the archaeological testing program, the archaeologist would submit a written report first and directly to the ERO and the President of the LPAB, with a copy to the project sponsor, which describes the findings, assesses their significance and proposes appropriate recommendations for any additional procedures necessary for the mitigation of adverse impacts to cultural resources determined to be significant.

Retain a certified archaeologist to supervise a program of on-site monitoring during site excavation in the six historic resource areas, following site clearance and pre-excavation testing. The certified archaeologist would record observations in a permanent log. Should cultural or historic artifacts be found following commencement of excavation activities, the archaeologist would assess the significance of the find, and immediately report to the ERO and the President of LPAB. Upon receiving the advice of the consultant and the LPAB, the ERO would recommend specific mitigation measures, if necessary. The monitoring program, whether or not there are finds of significance, would result in a written report to be submitted first and directly to the ERO and the President of the LPAB, with a copy to the project sponsor.

Suspend excavation or construction activities which might damage discovered cultural resources for a total maximum of four weeks over the course of construction at each site to permit inspection, recommendation and retrieval, if appropriate.

Implement an appropriate security program to prevent looting or destruction, if cultural resources of potential significance are discovered. Any discovered cultural artifact assessed as significant by the archaeologist upon concurrence by the ERO and the President of the LPAB would be placed in a repository designated for such materials or possibly exhibited in a public display. Following approval of the archaeological testing and monitoring program reports by the ERO and the President of LPAB, a final report would be sent to the California Archaeological Site Survey Office at Sonoma State University, the Foundation for San Francisco's Architectural Heritage and the State Office of Historic Preservation. The Office of Environmental Review would receive three final copies of the final archaeological findings report. Archaeological testing could be coordinated with other site investigations for geotechnical and toxic waste purposes.

Measure is identified as J.1 in Appendix A, Initial Study. Applies to Mission Bay North and Mission Bay South.

D.4 Develop archaeological exploration programs, consistent with Measure D.3, above, for pre-identified sensitive historic archaeologic areas that should include the following:

D.4a Define specific research parameters and prepare a written study plan in consultation with the ERO and LPAB prior to subsurface exploration, with emphasis on National Register determination of historical significance and the maximum retrieval of archaeological data;

D.4b Examine large-scale exposure of soil profiles;

D.4c Complete detailed field records, including photographs and drawings, to document subsurface soil profiles, archaeological deposits and integrity of such deposits; and

D.4d Complete a detailed report of findings to describe research and exploration methodologies, testing results, all archaeological findings and recommendations for resource management.

Measure is identified as J.2 in Appendix A, Initial Study. Applies to Mission Bay North and Mission Bay South.

D.5 Archival review suggests that depositional integrity of the late 19th-century city dump has been lost because of scavenging while the dump was in operation; however, important historical artifacts may still be present. Pre-construction archaeologic testing is therefore not recommended. Archaeological monitoring during construction would be the appropriate mitigation measure for that area. Therefore, retain the services of a qualified archaeologist. The ERO in consultation with the President of the LPAB and the archaeologist would determine whether the archaeologist should instruct all excavation and foundation crews in the area of the 19th-century city dump of the potential for discovery of cultural and historic artifacts or features. If such artifacts or features were uncovered, follow procedures described in Measure D.3 for suspension of construction activities, notification of the ERO and President of the LPAB, and development recovery measures, as appropriate.

Measure is identified as J.3 in Appendix A, Initial Study. Applies to Mission Bay North and Mission Bay South.

D.6 The entire Mission Bay Project Area has at least some sensitivity for the presence of unknown archaeological remains. Prehistoric cultural deposits could be encountered in three identified areas and unknown historical features, artifact caches and debris areas could be located anywhere in the Project Area. Follow procedures for instructing excavation crews, notifying the ERO and President of the LPAB, and developing recovery measures, as described in Measure D.3, above. In addition, in the event that prehistoric archaeological deposits are discovered, consult local Native American organizations. Dialogue with the ERO, LPAB and the archaeological consultant would take place in developing acceptable archaeological testing and excavation procedures, particularly in regard to the disposition of cultural materials and Native American burials.

Measure is identified as J.7 in Appendix A, Initial Study. Applies to Mission Bay North and Mission Bay South.

Pedestrian-Level Winds

● D.7 Require a qualified wind consultant to review specific designs for buildings 100 feet or more in height for potential wind effects. The Redevelopment Agency would conduct wind review of high-rise structures above 100 ft. Wind tunnel testing would also be required unless, upon review by a qualified wind consultant, and with concurrence by the Agency, it is determined that the exposure, massing, and orientation of buildings are such that impacts, based on a 26-mile-per-hour hazard for a single hour of the year criterion, will not occur. The purpose of the wind tunnel studies is to determine design-specific impacts based on the above hazard criterion and to provide a basis for design modifications to mitigate these impacts. Projects within Mission Bay, including UCSF, would be required to meet this standard or to mitigate exceedances through building design.

Measure is identified as I.10 in Appendix A, Initial Study. Applies to Mission Bay North and Mission Bay South.

Shadows

D.8 The Redevelopment Plan documents would require analysis of potential shadows on existing and proposed open spaces during the building design and review process.

Measure is identified as a feature of the project on p. 13 in Appendix A, Initial Study. Applies to Mission Bay North and Mission Bay South.

E. TRANSPORTATION

This section presents the transportation project features and mitigation measures that were developed to avoid or mitigate the potentially significant impacts of the project as identified and described in Section V.E, Transportation: Impacts. Many of the project features and mitigation measures would involve capital costs of construction and/or ongoing costs of operation and maintenance. Some of these costs would be incurred by the public or private entities that have committed to implementing the measure; for other measures, the responsibility for implementation has not been determined. While some of the measures are included as part of the project or are already programmed by a public agency, many of the measures are not currently programmed in the formal capital and operating plans for San Francisco Municipal Railway (MUNI), the San Francisco Department of Parking and Traffic, the Department of Public Works, or any other involved public agencies. The source of the funding for each measure is not necessarily known at this time. Funding sources will be identified by decision makers in connection with their review and action on aspects of the project within their jurisdiction.

The transportation mitigation measures that involve physical modifications to intersections and streets in and near the Project Area would not all be needed at the outset of development and occupancy. For example, most intersections in the Project Area would continue to operate at acceptable levels of service in early stages of development, but would deteriorate over time as more sites were occupied and more travel to and from the Project Area occurs.

Transportation features that are part of the project (Measures E.1 through E.28, below) would be constructed during project development either based on an "adjacency" principle, or based on thresholds establishing need for the feature. Thus, if development was proposed adjacent to a roadway or intersection where transportation improvements have been identified as project features, these would be constructed as part of the infrastructure development for that site, along with other improvements like water lines, sidewalks, and bicycle lanes that are proposed as part of the project. If the development site was at an intersection, the adjacency concept would call for that project to construct transportation improvement features for all approaches to the intersection for which improvements have been identified, and not just those immediately adjacent to the site being developed.

Some key intersections may begin to reach congested conditions due to traffic from other parts of the Project Area before development has occurred on sites adjacent to the intersections. Therefore, thresholds have been established for each of the project features, based on the number of p.m. peak hour vehicle trips that is likely to cause one or more intersections in and near the Project Area to deteriorate to unacceptable levels of service. As part of the review process for each development phase (see "Review Process for Proposed Phases," under "Phasing of Construction of Infrastructure and Improvements in the Project Area," in Chapter III, Project Description, for more information about the review process), the number of p.m. peak hour vehicle trips generated by the new phase would be estimated using the trip rates shown in Table VI.1, and added to the project's total calculated number of p.m. peak hour vehicle trips already generated by the developed portions of the Project Area, using the same trip rates.

This number will determine which new project features and mitigation measures would need to be implemented in that phase, other than those already required by the adjacency principle.

TABLE VI.1 ●
MISSION BAY P.M. PEAK HOUR VEHICLE TRIP GENERATION RATES

Project Area	Land Use Type	P.M. Peak Hour Vehicle Trip Rate
Mission Bay North	Retail	1.36 per ksq. ft.
	Restaurant	6.02 per ksq. ft.
	Residential	0.75 per d.u.
	Movie Theater	0.06 per seat
Mission Bay South	Retail	2.00 per ksq. ft.
	Hotel	0.27 per room
	Residential	0.81 per d.u.
	Office	0.95 per ksq. ft.
	Research and Development	0.59 per ksq. ft.
	Large Retail	4.50 per ksq. ft.
UCSF Subarea	UCSF	0.61 per ksq. ft.
	School	0.05 per student

Notes:
ksq. ft. = 1,000 square feet
d.u. = dwelling unit
UCSF Subarea is part of Mission Bay South

Sources:
Wilbur Smith Associates, based on:
- City and County of San Francisco, Planning Department, Guidelines for Environmental Review: Transportation Impacts, Appendix 1, July 1991.
- Movie Theater: AMC Kabuki Theaters attendance data, January 1994.
- City and County of San Francisco, Planning Department, Guidelines for Environmental Review: Transportation Impacts, July 1991.
- City and County of San Francisco, Planning Department, Citywide Travel Behavior Survey, Visitor Travel Behavior, August 1993.
- University of California San Francisco, *UCSF Long Range Development Plan Final Environmental Impact Report*, State Clearinghouse No. 95123032, certified January 1997.
- 1990 U.S. Census - Journey-to-Work Trip Characteristics

PROJECT FEATURES THAT AVOID SIGNIFICANT IMPACTS

The following traffic and transit project features are included in the project to improve traffic circulation and transit operations. These improvements have been included in the transportation analyses conducted for the project, and are reflected in the transportation impacts described in Section V.E, Transportation: Impacts.

Traffic

The following traffic measures would directly improve the circulation of automobile traffic in Mission Bay and, because many of the transit operations in Mission Bay share the right of way with private automobiles, would improve transit operations in Mission Bay.

Intersections

Table VI.2, which follows intersection measure E.20, lists the intersection improvements assumed in the impact analysis; each intersection shows the approximate amount of cumulative development that would produce a number of p.m. peak hour project vehicle trips that establish the need for improvement. The project's contribution to p.m. peak hour traffic was assumed to grow for each consecutive development phase, while the cumulative background traffic contribution was assumed to be that estimated for year 2015, and was held constant for each phase. This provides a conservative analysis which avoids underestimation of impacts that otherwise might result if cumulative background traffic from development outside the Project Area were to grow at a nonlinear pace. Development of a site or block adjacent to a listed intersection would require that improvements be constructed in advance of reaching the vehicle trip threshold level shown in Table VI.2.

The number of p.m. peak hour vehicle trips that would require improvements to the following intersections could result from a variety of project development schemes and land use combinations. The p.m. peak hour vehicle trip generation rates for each type of land use planned for Mission Bay are listed in Table VI.1. These rates can be used to establish a variety of mixes of land use development that would require improvement of the intersections noted in Table VI.2. For example, the project contribution of 10,400 p.m. peak hour vehicle trips may correspond to the development of 3,000 residential units, the movie theater, 420,000 square feet of retail, and 100,000 square feet of restaurant space in Mission Bay North, plus 1,400 residential units, 3,300,000 square feet of office and research and development space, and 250,000 square feet of large retail space, a 500-room hotel, 160,000 square feet of neighborhood- and city-serving retail, and 2,200,000 square feet on the UCSF site in Mission Bay South. Another mix of land use development that would yield the same number of vehicle trips would have 1,010,000 fewer square feet of office and research and development space and 1,000 more dwelling units, and would also indicate the need to carry out the project transportation measures listed below at intersections shown for improvement at 10,400 vehicle trips.

E.1 Third Street/King Street. Applies to Mission Bay North and Mission Bay South.

- E.1a Widen the northbound approach to provide an additional through lane on the west side of Third Street.
- E.1b Reconfigure the existing traffic signal.
- E.1c Install "Don't Block the Box" signs.

E.2 Third Street/Berry Street. Applies to Mission Bay North and Mission Bay South.

- E.2a Restripe the northbound approach to provide an additional through lane.
- E.2b Reconfigure the existing traffic signal.
- E.2c Install "Don't Block the Box" signs.

E.3 Thi… Street/Owens Street. Applies to Mission Bay South.

Install a new traffic signal.

E.4 Third Street/The Common. Applies to Mission Bay South.

Install new traffic signals.

E.5 Third Street/South Street. Applies to Mission Bay South.

Install a new traffic signal.

E.6 Third Street/16th Street. Applies to Mission Bay South.

- E.6a Widen the northbound approach to provide two exclusive left-turn lanes.
- E.6b Reconfigure the existing traffic signal.

E.7 Third Street/Mariposa Street. Applies to Mission Bay South.

- E.7a Widen the eastbound approach to provide an additional through lane.
- E.7b Widen and restripe the westbound approach to provide an exclusive left-turn lane and an additional through lane.
- E.7c Reconfigure the existing traffic signal.

E.8 Fourth Street/King Street. Applies to Mission Bay North.

- E.8a Widen the eastbound approach to provide an exclusive right-turn lane.
- E.8b Reconfigure the existing traffic signal.
- E.8c Install "Don't Block the Box" signs.

E.9 Fourth Street/Berry Street. Applies to Mission Bay North.

- E.9a Restripe the westbound approach to provide an additional lane.
- E.9b Restripe the northbound approach to provide an additional lane.
- E.9c Reconfigure the existing traffic signal.
- E.9d Install "Don't Block the Box" signs.

E.10 Fourth Street/Owens Street. Applies to Mission Bay South.

Install a new traffic signal.

E.11 Fourth Street/UCSF private street forming the western extension of South Street. Applies to Mission Bay South.

Install a new traffic signal.

E.12 Fourth Street/16th Street. Applies to Mission Bay South.

Install a new traffic signal.

E.13 Fourth Street/Mariposa Street. Applies to Mission Bay South.

E.13a Widen the eastbound and westbound approaches to provide exclusive left-turn lanes.
E.13b Install a new traffic signal.

E.14 Seventh Street/16th Street. Applies to Mission Bay South.

E.14a Remove on-street parking on all approaches.
E.14b Restripe the northbound and eastbound approaches to provide an additional through lane.
E.14c Restripe the southbound approach to provide an additional through lane and an exclusive left-turn lane.
E.14d Restripe the westbound approach to provide an additional through lane and a right-turn pocket.
E.14e Install a new traffic signal.
E.14f Provide the appropriate traffic warning devices for the Caltrain track crossing.

E.15 Owens Street/16th Street. Applies to Mission Bay South.

Install a new traffic signal.

E.16 Owens Street/Mariposa Street/I-280 Off-ramp. Applies to Mission Bay South.

E.16a Widen the eastbound approach to provide an exclusive left-turn lane.
E.16b Reconfigure the existing traffic signal.

E.17 I-280 On-ramp/Mariposa Street. Applies to Mission Bay South.

E.17a Widen the westbound approach to provide an exclusive left-turn lane.
E.17b Install a new traffic signal.

E.18 Seventh Street/The Common. Applies to Mission Bay South.

E.18a Install a new traffic signal.
E.18b Provide the appropriate traffic warning devices for the Caltrain railroad track at-grade crossing.

E.19 Fifth Street/King Street. Applies to Mission Bay North.

- E.19a Narrow approximately 250 feet of the median on the westbound approach to provide an exclusive left-turn lane.
- E.19b Restripe the I-280 off-ramp touchdown and narrow the median on the south side of King Street for a distance of about 300 feet beginning at the intersection with Fifth Street, to increase the number of eastbound lanes from the existing two to three.
- E.19c Reconfigure the existing traffic signal.

E.20 Seventh Street/Berry Street. Applies to Mission Bay North.

- E.20a Install a new traffic signal.
- E.20b Provide the appropriate traffic warning devices for the Caltrain tracks crossing.
- E.20c Open Berry Street "at-grade" rail crossing.

The proposed intersection lane configurations listed above are shown in Figure V.E.8 in Section V.E, Transportation: Impacts, and described in detail with the corresponding signalization changes in Appendix D under "Proposed Streets in Project Area" in "Roadway System." Installing "Don't Block the Box" signs is a measure called for at intersections where gridlock could occur, which can cause problems at nearby intersections when traffic backs up for more than a block during the p.m. peak period as a result of the gridlocked intersection. As indicated in the transportation impacts analysis in "Year 2015 Cumulative Conditions," under "Traffic Impacts" in Section V.E, Transportation: Impacts, a few intersections near the Project Area at freeway on and off ramps would deteriorate below acceptable levels of service (to LOS E or F) even with these project features in place.

<u>Street Segments</u>

Table VI.3, which follows street segment Measure E.26, shows the threshold number of p.m. peak hour project vehicle trips that would "trigger" each street segment improvement listed. The number of p.m. peak hour vehicle trips noted in Table VI.3 could be created by a variety of possible land use combinations, as explained for intersection improvements. Table IV.1 provides the p.m. peak hour vehicle trip generation rates that can be used to determine the number of vehicle trips that would be created by various mixes of land uses. In creating the thresholds for street segment improvements, the project's contribution to p.m. peak hour traffic was assumed to increase for each consecutive development phase, while the cumulative background traffic contribution from outside the Project Area was assumed to be that estimated for year 2015, as described above for intersections. The trigger for constructing the connector between Common Streets and Seventh Street would be about 8,200 p.m. peak hour vehicle trips from development in the Project Area as a whole, or 2,300 p.m. peak hour vehicle trips from Mission Bay South, whichever occurs first.

TABLE VI.2
MISSION BAY NORTH AND SOUTH PROJECT FEATURES: INTERSECTION IMPROVEMENT THRESHOLDS BASED ON CUMULATIVE PROJECT P.M. PEAK HOUR VEHICLE TRIPS /a/

Intersection	Measure	Mission Bay North and South Project P.M. Peak Hour Vehicle Trips
Third/King	Reconfigure signal & widen street.	5,500
Third/The Common /b/	New signal.	10,400
Third/South /b/	New signal.	8,200
Third/Owens /b/	New signal.	8,200
Third/Berry	New signal & restripe street.	5,500
Third/16th	Reconfigure signal & widen street.	8,200
Third/Mariposa /c/	Reconfigure signal & widen street.	14,200
Fourth/King /b/	Reconfigure signal & widen street.	5,500
Fourth/Berry /b/	Reconfigure signal.	14,200
Fourth/Owens /b/	New signal.	8,200
Fourth/"South" /d/	New signal.	8,200
Fourth/16th	New signal.	8,200
Fourth/Mariposa	New signal.	8,200
Seventh/16th	New signal; restripe street.	5,500
Owens/16th	New signal.	10,400
Owens/Mariposa/I-280 Off-ramp	Reconfigure signal.	5,500
I-280 On-ramp/Mariposa	New signal.	10,400
Seventh/The Common/e/	New signal and railroad crossing.	8,200
Fifth/King	Narrow median; reconfigure signal.	8,200
Seventh/Berry	New signal and railroad crossing.	8,200

Notes:

a. When Project Area development reaches a level that produces the number of p.m. peak hour project vehicle trips shown, the intersection would need to include the measures shown in order to maintain an acceptable level of service.
b. Improvements may be needed before the vehicle trip threshold indicated to accommodate MUNI Third Street Light Rail project construction.
c. Remove on-street parking and restripe within the existing right of way to provide two lanes for the westbound approach and adjust signal timing by the end of a project development scheme that produces 5,500 p.m. peak hour vehicle trips.
d. "South" Street at Fourth Street may have a different name; it is the extension of South Street between Third and Fourth Streets in the UCSF site.
e. This improvement would be triggered earlier if 2,300 p.m. peak hour vehicle trips were generated by Catellus and UCSF development in Mission Bay South before a total of 8,200 p.m. peak hour vehicle trips were generated by development in the Project Area as a whole.

Source: Wilbur Smith Associates.

The measures listed in the table and described below are included in the project and were accounted for in the traffic impact analysis. If listed street segments were constructed after the project vehicle trip thresholds indicated in the table were reached, potentially significant local traffic congestion would occur beyond that discussed in "Traffic Impacts," under Section V.E, Transportation: Impacts. If development was proposed adjacent to a street segment included in the list of features below, the improvement would be constructed as part of the infrastructure development for that site regardless of whether the project vehicle trip threshold had been reached.

E.21 Third Street. Applies to Mission Bay North and Mission Bay South.

- E.21a Widen Third Street on the west side between Berry Street and King Street to accommodate the additional lanes described in Measure E.1.
- E.21b Widen Third Street for approximately one-third the distance between Mariposa Street and 16th Street to accommodate the lane configuration described in Measure E.6.
- E.21c In cooperation with MUNI and the Department of Public Works, reconfigure Third Street in the project area to accommodate the Third Street light rail transit median while maintaining two travel lanes in each direction and exclusive left-turn lanes at specific locations, as listed in Measure E.6 and E.7.

E.22 Mariposa Street. Applies to Mission Bay South.

Widen Mariposa Street between Terry A. François Boulevard and Pennsylvania Street, including the bridge over the Caltrain tracks.

E.23 Fourth Street. Applies to Mission Bay North and Mission Bay South.

- E.23a Widen Fourth Street between China Basin Channel and King Street to accommodate the Third Street light rail tracks and a MUNI station platform between Berry and King Streets.
- E.23b Extend Fourth Street southward, parallel to Third Street, to intersect with Mariposa Street at the existing intersection with Minnesota Street.

E.24 King Street. Applies to Mission Bay North.

- E.24a Widen eastbound King Street between Fifth and Fourth Streets to accommodate the lane configurations for the Fourth Street/King Street intersection in Measure E.8.
- E.24b Construct westbound King Street frontage road between Fifth Street and Berry Street.

E.25 Owens Street. Applies to Mission Bay South.

- E.25a Construct Owens Street between Third and Fourth Streets, providing a median approximately 24 feet wide to accommodate the MUNI Third Street light rail line, with no on-street parking.
- E.25b Construct Owens Street between Fourth Street and The Common, providing on-street parking on the north side of the street only.

E.25c Extend Owens Street northward from 16th Street to The Common, providing no on-street parking.

E.25d Construct Owens Street between 16th Street and Mariposa Street, providing no on-street parking.

E.26 North Common and South Common Streets connection to Seventh Street. Applies to Mission Bay South.

E.26a Construct an "at-grade" connection to Seventh Street across Caltrain tracks, in conjunction with Measure E.18 for the new intersection.

E.26b Prohibit parking at trolleybus stops for the 22-Fillmore line east of Third Street where bus line is extended.

Transit

The following two transit features were assumed to be part of the project and were incorporated into the transit impact analysis conducted for the project.

E.27 MUNI Line 22-Fillmore. Applies to Mission Bay South.

Reroute the MUNI 22-Fillmore trolleybus line to travel on 16th Street to Third Street, and then north on Third Street to The Common. If not already accomplished, install trolleybus wire support poles and/or eyebolts on buildings along the new route, and complete North Common Street and South Common Street east of Third Street. Prohibit parking on North Common and South Common Streets at trolleybus stops.

An extended route for the 30-Stockton or the 45-Union/Stockton line would replace the service lost by the rerouting of the 22-Fillmore trolleybus line in Measure E.27 above. It is assumed that both transit features would occur simultaneously in order to serve both the Project Area and parts of the Lower Potrero area.

E.28 MUNI Line 30-Stockton or 30/45-Union/Stockton. Applies to Mission Bay South.

Extend about half of the 30-Stockton or the 30/45-Union/Stockton trolley buses south and east of the current terminus at the Caltrain terminal to the current terminus of the 22-Fillmore line, at the same time that the 22-Fillmore is rerouted as called for in Measure E.27. Route trolley buses to Connecticut Street via Townsend or Mission Bay Street, and then east to a new terminus near Third and 20th Streets. The coordination of Measure E.27 with E.28, to provide extended MUNI trolleybus service to Mission Bay by rerouting the 22-Fillmore and 30 Stockton or 30/45 Union/Stockton lines, shall be accomplished in phases, if necessary, to provide service as early in project development as MUNI service may be needed. The phases may include:

TABLE VI.3
MISSION BAY NORTH AND SOUTH PROJECT FEATURES: STREET SEGMENT IMPROVEMENT THRESHOLDS BASED ON CUMULATIVE PROJECT P.M. PEAK HOUR VEHICLE TRIPS /a/

Street Segment	Mission Bay North and South Project P.M. Peak Hour Vehicle Trips
Fourth Street between 16th and Mariposa Streets	8,200
Fourth Street between 16th and "South" Streets /b/	8,200
Fourth Street between "South" Street and Peter Maloney Bridge /b/	10,400
Owens Street between Third and Fourth Streets /c/	10,400
Owens Street between Fourth Street and The Common	14,200
Owens Street between The Common and 16th Street	10,400
Owens Street between 16th and Mariposa Streets	12,200
Connection of Common Streets to Seventh Street	8,200/d/
King Street (eastbound) between Fourth and Fifth Streets	5,500
King Street (westbound) between Fifth and Berry Street	5,500
Third Street between Berry and King Streets	5,500
Third Street, south of 16th Street, approximately one-third the distance between 16th and Mariposa Streets	8,200
Mariposa Street Caltrain bridge widening	10,400
Mariposa Street between Pennsylvania Street and Fourth Street	12,200
Mariposa Street between Fourth and Third Streets	14,200
Mariposa Street between Third Street and Terry A. François Boulevard	14,200

Notes:

a. When Project Area development reaches a level that produces the number of p.m. peak hour project vehicle trips shown, the intersection would need to include the measures shown in order to maintain an acceptable level of service.
b. "South" Street at Fourth Street may have a different name; it is the extension of South Street between Third and Fourth Streets in the UCSF site.
c. This feature may be needed earlier to accommodate MUNI's Third Street Light Rail project.
d. This improvement would be triggered earlier if 2,300 p.m. peak hour vehicle trips were generated by Catellus and UCSF development in Mission Bay South before a total of 8,200 p.m. peak hour vehicle trips were generated by development in the Project Area as a whole.

Source: Wilbur Smith Associates.

E.28a Construct Mission Bay Street, the Seventh Street Connector to North and South Common Streets and the Caltrain at-grade rail crossing, and the portion of North and South Common Streets east of Third Street, early enough in project development to accommodate MUNI trolleybus travel, including poles and eyebolts supporting trolley wires, and provide poles and/or eyebolts supporting trolley wires along 16th Street and a portion of Common Streets in the Project Area, as described in Measure E.27 and above in this measure; or

E.28b If item E.28a is not feasible sufficiently early in project development, for an interim period until the necessary streets and trolley wires have been constructed as part of adjacent development, construct the portion of North and South Common Streets east of Third Street and install poles and/or eyebolts supporting trolley wires along the new route for the 22-Fillmore, and extend some but not all of the trolleybuses, so that both Mission Bay and Lower Potrero areas continue to be served. This measure involves only limited service to Mission Bay; or

E.28c If item E.28a is not feasible sufficiently early in project development, for an interim period until the necessary streets and trolley wires have been constructed as part of adjacent development, provide service to Mission Bay temporarily using diesel buses on 16th Street, or construct the portion of North and South Common Streets east of Third Street and install poles and/or eyebolts supporting trolley wires along the new route for the 22-Fillmore line and reroute all of the 22-Fillmore trolley buses, and provide service to Lower Potrero temporarily using diesel buses on Townsend and Seventh Streets to the route ultimately proposed for the 30 or 30/45 line (see Figure V.E.10) to shuttle between the Caltrain terminal at the end of the 30-Stockton and 30/45-Union/Stockton lines and the Lower Potrero area formerly served by the 22-Fillmore, until Mission Bay Street and the Seventh Street Connector to North and South Common Streets is completed and poles and/or eyebolts to support trolleybus wires are installed; or

E.28d Use a combination of items E.28b and E.28c to provide MUNI trolleybus service to both the Mission Bay and Lower Potrero areas until necessary streets and trolley wires have been constructed as part of adjacent development in the Project Area.

These two route changes would be similar to those included in the proposed project analyzed in the 1990 FEIR. They would improve the project's transit accessibility by providing BART riders access to the 16th Street station directly from Mission Bay South on the 22-Fillmore line. This bus line also travels north-south from Church and 16th Streets, serving areas north of Market Street and ending at Fillmore Street and Marina Boulevard. A rerouted 30-Stockton or 30/45-Union/Stockton bus would provide additional access to downtown and to locations in the northeast quadrant of the City for MUNI passengers in Mission Bay South.

While these two route modifications have been assumed for the transit analysis of this project, and MUNI has committed to implement the changes when the transit demand in Mission Bay has grown sufficiently, funding has not yet been obtained. MUNI has indicated that the reroutings would occur simultaneously when there is sufficient demand. Implementation of these transit features will require that the roadway infrastructure plus the necessary trolleybus wire support poles and/or eyebolts be in place prior to the beginning of trolleybus service along 16th Street (between Seventh and Third Streets), Third Street (between 16th and The Common), The Common (between Third Street and the end of the 22-Fillmore line east of Third Street), Fourth Street (between King and Mission Bay Streets), Mission Bay Street (between Fourth Street and The Common), and The Common and the Seventh Street connector (between Mission Bay Street and Seventh Street, including the opening of the proposed at-grade railroad crossing of the Caltrain tracks). Some of these streets might not have been constructed or improved, with related trolleybus features, based on either the adjacency requirement or the p.m. peak hour vehicle trip thresholds, by the time transit service demand calls for the MUNI line reroutings. For example, based on vehicle trips alone, the extension of Fourth Street between the Peter Maloney Bridge and South Street, including the segment leading from the bridge to Mission Bay Street, would not be constructed early in project buildout, because the p.m. peak hour vehicle trip threshold for this street segment is shown in Table VI.3 as 10,400 vehicle trips, and adjacent development may not occur before MUNI service extensions are needed. Therefore, the street construction and improvements necessary for MUNI service have been included in the MUNI service measures above.

- MUNI describes these two transit features in its current Capital Improvement Plan and in the Short Range Transit Plan, although they are not currently programmed or funded through 2005. The Capital Improvement Plan estimates the total cost of these trolley bus route modifications to be approximately $30 million. Applications are being made to MTC by the San Francisco Transportation Authority to fund replacement trolley bus fleet, in part to meet the Mission Bay transit demand. MUNI staff has indicated that it could be possible to extend the 22-Fillmore line in approximately year 2003 to coincide with the start of service on the Third Street light rail extension. It is less likely that the 30-Stockton or 30/45-Stockton/Union line would be extended at the same time, based on current plans./2/

MITIGATION MEASURES IDENTIFIED IN THIS REPORT

Traffic

The transportation analysis determined that the following measures would mitigate the significant traffic impacts identified in Section V.E, Transportation: Impacts.

Intersections

Table VI.4, which follows Mitigation Measure E.38, lists the traffic intersection mitigation measures and notes the p.m. peak hour vehicle trip threshold for each intersection to be mitigated. The number of p.m. peak hour vehicle trips noted in Table VI.4 could be created by a variety of possible land use combinations, as explained for intersection improvements. Table VI.1 provides the p.m. peak hour vehicle trip generation rates that can be used to determine the number of vehicle trips that would be created by various mixes of land uses. In creating the thresholds for intersection mitigation measures, the project's contribution to p.m. peak hour traffic was assumed to grow for each consecutive development phase, while the cumulative background traffic contribution from outside the Project Area was assumed to be that estimated for year 2015. If these intersection mitigation measures were adopted as part of project approval, development proposed adjacent to the intersection would require that the mitigation measures be implemented regardless of whether the project p.m. peak hour vehicle trip threshold had been reached.

E.29 Seventh Street/Brannan Street. Applies to Mission Bay South.

Restripe the northbound approach to provide three lanes.

E.30 Seventh Street/Townsend Street. Applies to Mission Bay North.

E.30a Restripe the southbound, eastbound, and westbound approaches to provide a left-turn lane, a through lane, and a right-turn lane.
E.30b Restripe the northbound approach to provide a left turn lane, a through lane, and a shared right-through lane.

E.31 Seventh Street/Berry Street. Applies to Mission Bay North.

E.31a Restripe the eastbound approach to provide two lanes.
E.31b Restripe the northbound and southbound approaches to provide a left-turn lane, a through lane, and a shared right-through lane.

E.32 Seventh Street/North and South Common Streets. Applies to Mission Bay South.

E.32a Restripe the northbound approach to provide two through lanes, and a right- turn lane.
E.32b Restripe the southbound approach to provide two through lanes, and a left-turn lane.

E.33 16th Street/Potrero Street. Applies to Mission Bay South.

Restripe the eastbound and westbound approaches to provide a left-turn lane, a through lane, and a shared right-through lane.

E.34 16th Street/Vermont Street. Applies to Mission Bay South.

Install a new traffic signal.

E.35 Eighth Street/Townsend Street. Applies to Mission Bay North.

E.35a Eliminate traffic circle and reconfigure intersection./3/
E.35b Install a new traffic signal.

E.36 Third Street/Townsend Street. Applies to Mission Bay North.

E.36a Remove the on-street parking on the westbound approach during the p.m. peak commute period.
E.36b Provide an additional westbound through lane during the p.m. peak commute period.

E.37 Third Street/King Street. Applies to Mission Bay North.

E.37a Widen the northbound approach on the east side to provide an additional through lane.
E.37b Widen the eastbound approach to provide an additional through lane.

E.38 Fourth Street/King Street. Applies to Mission Bay North.

Widen the southbound approach to provide an additional lane.

Street Segments

The following street segment measures would be needed as part of implementing intersection Measures E.29-E.32 and Measures E.36-E.38. Thresholds for these measures would be the same as for the corresponding intersection, shown in Table VI.4.

E.39 King Street. Applies to Mission Bay North.

Widen the south side of King Street between Fourth Street and Third Street to provide the additional eastbound through lane noted in Mitigation Measure E.37, including providing additional right-of-way.

E.40 Third Street. Applies to Mission Bay North.

Widen the east side of Third Street between Berry Street and King Street to provide the additional northbound through lane noted in Mitigation Measure E.37, including providing additional right-of-way.

E.41 Fourth Street. Applies to Mission Bay North.

Widen the west side of Fourth Street for approximately half the distance between Townsend Street and King Streets to provide the additional southbound lane noted in Mitigation Measure E.38, including providing additional right-of-way.

E.42 Seventh Street. Applies to Mission Bay North and Mission Bay South.

Eliminate on-street parking on both sides of Seventh Street between Townsend and 16th Streets during the morning and afternoon peak commute periods to accommodate the lane configuration changes described in Mitigation Measures E.29, E.30, E.31, and E.32.

TABLE VI.4
MISSION BAY NORTH AND SOUTH MITIGATION MEASURES: INTERSECTION MITIGATION THRESHOLDS BASED ON CUMULATIVE PROJECT P.M. PEAK HOUR VEHICLE TRIPS

Intersection	Measure	Mission Bay North and South Project P.M. Peak Hour Vehicle Trips
16th/Vermont	New signal	2,600
Seventh/Townsend	Restripe street	8,200
Eighth/Townsend	Intersection reconstruction	8,200
16th/Potrero	Restripe street	8,200
Third/King	Widen street	10,400
Third/Townsend	Restripe street	10,400
Fourth/King	Widen street	12,200
Seventh/Berry	Restripe street	14,200
Seventh/Brannan	Restripe street	15,400
Seventh/North and South Common	Restripe street	15,400

Notes:

When Project Area development reaches a level that produces the number of p.m. peak hour project vehicle trips shown, the level shown on a particular line, the intersection would need to include the measures shown in order to maintain an acceptable level of service.

Source: Wilbur Smith Associates.

The improvements to the street network listed above were developed to relieve traffic congestion at intersections that the transportation analysis predicts would deteriorate to an unacceptable level (LOS E or F) as a result of the project, thereby causing significant impacts. The measures would improve the operation of these intersections to LOS D or better. Table VI.5 summarizes the intersection and street segment mitigation measures for intersections that would fail to operate at an acceptable level of service with project traffic, and describes the relative improvement in level of service that each measure would provide under both the existing-with-project and cumulative conditions. The mitigated levels of service for existing-with-project and cumulative conditions are also shown in Figures VI.1 and VI.2, respectively. These figures indicate that the recommended mitigation measures could improve the operation of most of the study intersections from LOS E or F to LOS D or better.

TABLE VI.5
SUMMARY OF INTERSECTION MITIGATION MEASURES
(Levels of Service for Weekday PM Peak Hour)

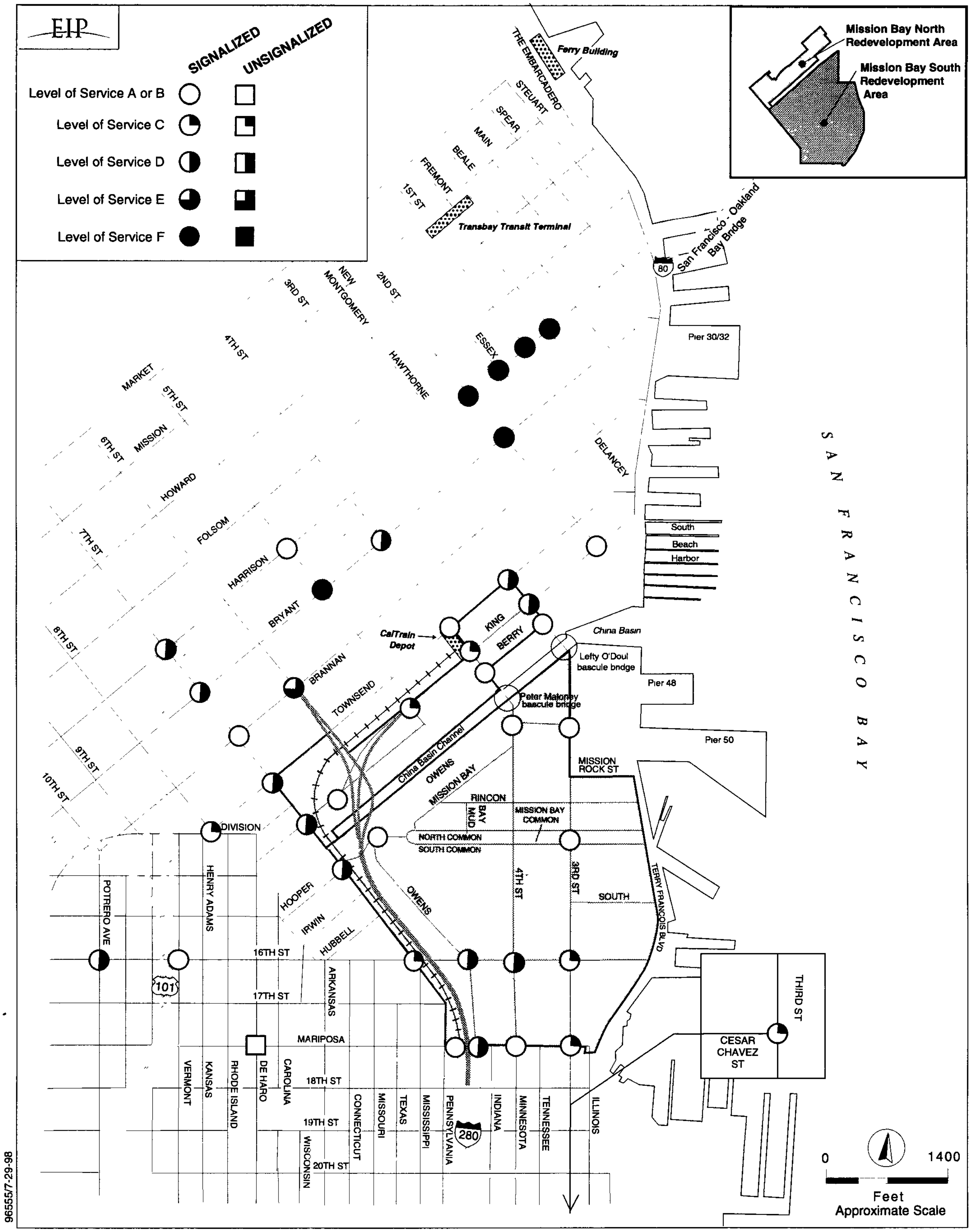
Study Intersection	Mitigation Measure	Impact	Comment
Berry St./Seventh St.	Re-stripe eastbound approach to provide 2 lanes. Re-stripe both the northbound and southbound approaches to provide a left-turn lane, a through lane, and a shared right-through lane.	Cumulative + Project: F to C	Requires elimination of on-street parking on Seventh Street during the morning and afternoon peak commute periods.
Brannan St./Seventh St.	Re-stripe the northbound approach to provide 3 lanes.	Existing + Project: E to B Cumulative + Project: F to B	Requires elimination of on-street parking on Seventh Street during the morning and afternoon peak commute periods.
King St./Third St.	Either (1) widen the northbound approach to provide an additional through lane; or (2) widen the eastbound approach to provide an additional through lane.	Cumulative + Project: would remain E with either measure alone.	Must implement BOTH mitigation measures in order to improve to LOS D.
King St./Fourth St.	Widen the southbound approach to provide an additional through lane so there is a total of 2 through lanes, a right-turn lane, and a left-turn lane.	Cumulative + Project: E to D	
Townsend St./Third St.	Prohibit on-street parking in the westbound direction during PM peak period commute to provide a right-turn lane.	Cumulative + Project: F to D	
Townsend St./ Seventh St.	Re-stripe the westbound and southbound approaches to provide a left-turn lane, one though lane, and one right-turn lane. Restripe the northbound approach to provide an exclusive left-turn lane, a through lane and a shared right-through lane.	Existing + Project: F to D Cumulative + Project: F to D	Requires elimination of on-street parking on Seventh Street during the morning and afternoon peak commute periods.
Townsend St./Eighth St.	Reconfigure to remove traffic circle; signalize this intersection.	Existing + Project: E to C Cumulative + Project: F to C	Traffic volumes meet Caltrans' peak hour volume Traffic Signal Warrant.
Sixteenth St./Potrero St.	Restripe westbound approach to provide 1 left-turn lane, 1 through lane, and 1 shared right-through lane; restripe eastbound approach to provide 1 left-turn lane and 1 shared right-through lane.	Cumulative + Project: F to C	

(Continued)

TABLE VI.5 (Continued)

Study Intersection	Mitigation Measure	Impact	Comment
Sixteenth St./ Vermont St.	Signalize intersection.	Existing + Project: F to A Cumulative + Project: F to A	Traffic volumes under Existing + Project conditions meet Caltrans' peak hour volume Traffic Signal Warrant.
The Common/ Seventh St.	Re-stripe the northbound approach to provide two through lanes and a right-turn lane; restripe the southbound approach to provide two through lanes and a left-turn lane.	Cumulative + Project: E to D	Requires elimination of on-street parking on Seventh Street during the morning and afternoon peak commute periods.
Brannan St./Sixth St.	No measures recommended.	Unavoidable Significant Impact.	
Bryant St./Second St.	No measures recommended. Conditions vary according to traffic conditions on the Bay Bridge.	Unavoidable Significant Impact.	
Bryant St./Fifth St.	No measures recommended. Conditions vary according to traffic conditions on the Bay Bridge.	Unavoidable Significant Impact.	
Harrison St./First St.	No measures recommended. Conditions vary according to traffic conditions on the Bay Bridge.	Unavoidable Significant Impact.	
Harrison St./Second St.	No measures recommended. Conditions vary according to traffic conditions on the Bay Bridge.	Unavoidable Significant Impact.	
Harrison St./Fremont St./I-80 Off-Ramp	No measures recommended. Conditions vary according to traffic conditions on the Bay Bridge.	Unavoidable Significant Impact.	
Harrison St./Essex St.	No measures recommended. Conditions vary according to traffic conditions on the Bay Bridge.	Unavoidable Significant Impact.	

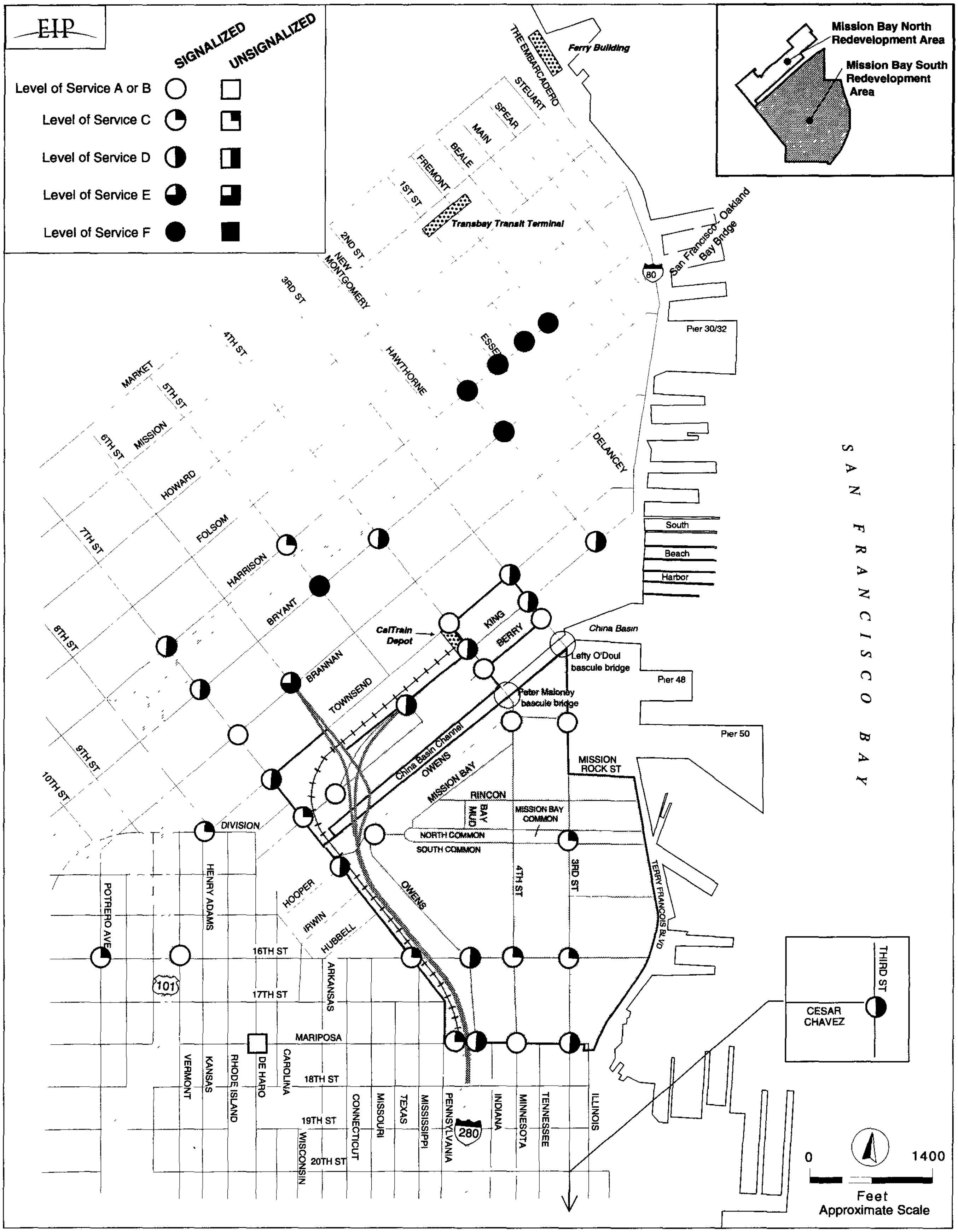
Source: Wilbur Smith Associates



SOURCE: Wilbur Smith Associates

MISSION BAY SUBSEQUENT EIR

FIGURE VI.1 WEEKDAY P.M. PEAK HOUR LEVELS OF SERVICE: EXISTING WITH PROJECT, MITIGATED



SOURCE: Wilbur Smith Associates

MISSION BAY SUBSEQUENT EIR

FIGURE VI.2 WEEKDAY P.M. PEAK HOUR LEVELS OF SERVICE: YEAR 2015 CUMULATIVE, MITIGATED

No mitigation measures are recommended for the study intersections located near the I-80 on-ramps (e.g., the intersections on Harrison Street), because the conditions at these ramp intersections depend very much on the traffic conditions on the freeway. It is not anticipated that freeway traffic would lessen in the forseeable future. Therefore, these intersections, which currently operate at LOS F during the afternoon peak hour, could not be mitigated and would continue to operate at LOS F during the p.m. peak hour.

Freeway and Ramp Measures

The City and County of San Francisco has a general policy not to increase the capacities of freeway on- and off-ramps (see *San Francisco General Plan,* Transportation Element, Policies 3.1 and 18.3). However, for a project the magnitude of Mission Bay, it is important to determine if any feasible improvements would be available to address the impacts of project traffic on freeways and freeway ramps. The project includes improvements to intersections of Mariposa Street with the I-280 southbound on-ramp and northbound off-ramp. A new signal would be provided at the on-ramp, and the signal at the off-ramp would be reconfigured.

The other major freeway ramp connection that directly serves the Project Area is the new I-280 on- and off-ramps at King Street, which is not expected to exceed acceptable levels of service or need mitigation in the near future. As Bay Area population and employment characteristics change, the traffic volumes carried by these new ramps will eventually increase to reach an equilibrium with the volumes carried by the nearby ramps.

Increases in the capacity of the on- and off-ramps to U.S. 101/I-80 between Third Street and the Bay Bridge would not likely result in any substantial reductions in delay and congestion, as the capacity of the Bay Bridge and U.S. 101 largely determines the ability of these ramps to move traffic on and off the freeway. In addition, the capacity of many of these ramps is controlled by the capacity of the nearest surface street intersections. Additional capacity at some ramps, such as the northbound U.S. 101 off-ramp to Vermont Street, would not be desirable as it would tend to encourage more traffic through the Potrero Hill area. As there are no regional plans to increase the capacity of the Bay Bridge, the Golden Gate Bridge, and U.S. 101/I-280, efforts to increase ramp capacities would not yield major benefits in terms of improving traffic conditions.

The 1990 FEIR included several freeway and bridge mitigation measures that would increase the capacity of regional freeway facilities. These measures are not within the jurisdiction or authority of the Mission Bay property owners, the San Francisco Redevelopment Agency, or the City and County of San Francisco. One of these measures is incorporated for reference and summarized here. The others would have substantial environmental impacts that would outweigh potential benefits, including the potential to contribute to regional air pollution levels by encouraging additional single-occupant vehicle travel; therefore they have not been included for reconsideration. These rejected 1990 FEIR measures are summarized in Table VI.8.

E.43 Increase Bay Bridge tolls for single-occupant vehicle (SOV) trips during commute hours to discourage non-carpool traffic. Applies to Mission Bay North and Mission Bay South.

The Metropolitan Transportation Commission has conducted studies indicating that such congestion-pricing measures would be effective in reducing SOV trips during the commute periods. On January 1, 1998, the State Legislature implemented a temporary toll raise for all vehicles at all times, with the intent of using the increased revenue for seismic upgrade of the bridge. This could possibly encourage more drivers to carpool in order to "share" the additional incurred cost.

Transit

As discussed in Section V.E, Transportation: Impacts, the project's contribution to cumulative demand for AC Transit service is the only significant effect on regional transit facilities. The AC Transit District is a separate entity and is not within the jurisdiction of the City and County of San Francisco or its various agencies and departments. Therefore, mitigation of this impact could not be carried out by the City or the Redevelopment Agency, nor could the City require Catellus or other property owners within the Project Area to directly carry out any increases to AC Transit service. The following measure, however, could aid in addressing the impact by expanding bus service to the East Bay.

E.44 Encourage the Alameda - Contra Costa Transit District to expand transbay bus service to accommodate cumulative demand; encourage the Metropolitan Transportation Commission to provide funding for AC Transit District service expansion, and support AC Transit District in its requests for funding from other sources. Applies to Mission Bay North and Mission Bay South.

Although MUNI is planning to expand service in the future, as described in Section V.E, Transportation, under "Light Rail Extensions," cumulative transit trips from employment and population growth in the rest of San Francisco, including Mission Bay, would exceed MUNI's capacity as currently planned for 2015. The following measure has been identified to address both the existing-with-project and cumulative impacts on MUNI. In addition, it could help to reduce local traffic impacts.

E.45 Extend and operate the route of the N-Judah MUNI Metro line from the Embarcadero station to Mariposa Street, using the MMX and Third Street light rail tracks. Applies to Mission Bay North and Mission Bay South.

As shown in Table V.E.16, the anticipated MUNI capacity in year 2015 would not be able to accommodate the expected northbound project ridership on the MMX and Third Street light rail in the vicinity of the project. Therefore, additional MUNI service would be needed to carry the expected number of MUNI passengers in and near Mission Bay during the p.m. peak hour in year 2015.

MUNI has conducted a cost analysis of two possible options. One option would add a second car to the one-car J-Church trains operating at six-minute headways during the p.m. peak period that are proposed for the Third Street light rail service. The other option would extend the route of the N-Judah line from its current terminus at the Embarcadero station to Mariposa Street. The extension of the N-Judah line would be more cost effective, based on MUNI's cost analysis, and would serve Mission Bay with capacity for about 2,380 more passengers; consequently, it is listed as the proposed mitigation measure. Table VI.6 shows the comparison of the year 2015 cumulative MUNI conditions in the vicinity of the Project Area with the 2015 conditions under each option. The increased capacity on the light rail service provided by the extension of the N-Judah line to Mariposa Street would improve conditions from 112% capacity utilization to 67% capacity utilization, eliminating the significant impact of the project on local transit. The measure would require 10 additional cars on the N-Judah line in order to maintain existing service frequency; funding for this service has not yet been obtained.

There are a number of possible sources that could provide funding for the acquisition and operation of these additional light rail vehicles. Federal and state funding, disbursed through the Metropolitan Transportation Commission, is often available to partially fund capital equipment purchases and light rail system extensions, as well as for portions of the annual operating budget. The Board of Supervisors could expand the area covered by the Transit Impact Development Fee (TIDF) Ordinance (Ordinance #224-81) to include office space constructed in Mission Bay South, and thereby apply the same fee to office development in Mission Bay South as is applied to office development north of China Basin Channel. MUNI could also obtain part of the needed funding, particularly for ongoing operation, with fare increases. The City could also approve an increased sales tax to partially fund the mitigation measure.

TABLE VI.6
YEAR 2015 CUMULATIVE MUNI DEMAND AND CAPACITY IN THE VICINITY OF THE MISSION BAY PROJECT ON THE MMX, THIRD STREET LRT
P.M. PEAK HOUR - PEAK DIRECTION

Mitigation Measure	Hourly Capacity/a/	Average Hourly Load/b/	Percent Capacity	Comments
No Mitigation	3,570	4,000	112%	
Add a second car to proposed J-Church one-car, 6-minute peak period headway trains for Third St. LRT	4,760	4,000	84%	
Extension of N-Judah route from the Embarcadero station to south of Mariposa Street, serving Mission Bay with existing two-car, 6-minute peak period headway trains	5,950	4,000	67%	According to MUNI, this measure is more cost-effective and is their preferred mitigation measure.

Notes:

a. Capacity based on *San Francisco Municipal Railway Ridership Projections to the Year 2015*, April 25, 1997; revised May 5, 1997. It assumes an appreciable number of standees per vehicle (somewhere between 60% and 80% of the number of seated passengers, depending on the specific transit vehicle configuration) and may not include the effect of late or missed runs.

b. Average load at maximum load point in the vicinity of the Mission Bay project.

Source: Wilbur Smith Associates.

The mitigation measure would be required after project development reaches a level that produces approximately 25,800 p.m. peak hour project person trips, including 2,240 project-related MUNI Metro trips, which would exceed the MUNI Metro capacity in the area when combined with the expected number of trips resulting from cumulative growth in San Francisco.

Transportation System Management

- E.46 Transportation Management Organizations. Applies to Mission Bay North and Mission Bay South.

  - E.46a Form a Mission Bay Transportation Management Association (TMA) to implement a Transportation System Management (TSM) Plan.

E.46b Form a Transportation Coordinating Committee (TCC) including representatives of Project Area property owners, UCSF, SFRA and appropriate city staff, including DPT, MUNI and DPW, to address area-wide transportation planning issues and coordinate with other uses and neighborhoods in nearby areas.

The Mission Bay TCC would work closely with the San Francisco Giants concerning issues related to parking and traffic that would affect both Mission Bay employees, visitors, and residents, as well as ballpark patrons.

E.47 Transportation System Management Plan.

Prepare a TSM Plan, which could include the following elements:

E.47a Shuttle Bus System. Applies to Mission Bay North and Mission Bay South.

Operate shuttle bus service between Mission Bay and regional transit stops in San Francisco (e.g., BART, Caltrain, Ferry Terminal, Transbay Transit Terminal), and specific gathering points in major San Francisco residential neighborhoods (e.g., Richmond and Mission Districts).

E.47b Transit Pass Sales. Applies to Mission Bay North and Mission Bay South.

Sell transit passes in neighborhood retail stores and commercial buildings in the Project Area.

E.47c Employee Transportation Subsidies. Applies to Mission Bay North and Mission Bay South.

Provide a system of employee transportation subsidies for major employers.

E.47d Pedestrian Signals at Owens Street near the Pedestrian Bridge. Applies to Mission Bay South.

Pedestrian signals at this location will provide continuity between the pedestrian bridge near Fifth Street and the pedestrian path adjacent to Owens Street, and the residential units in the central subarea of Mission Bay South.

E.47e Secure Bicycle Parking. Applies to Mission Bay North and Mission Bay South.

Provide secure bicycle parking areas in parking garages of residential buildings, office buildings, and research and development facilities. Provide secure bicycle parking areas by 1) constructing secure bicycle parking at a ratio of 1 bicycle parking space for each 20 automobile parking spaces, and 2) carrying out an annual survey program during project development to establish trends in bicycle use and to estimate actual demand for secure bicycle parking and for sidewalk bicycle racks, increasing the number of secure bicycle parking spaces or racks either in new buildings or in existing automobile parking facilities to meet the estimated demand.

Provide secure bicycle racks throughout Mission Bay for the use of visitors.

E.47f Appropriate Street Lighting. Applies to Mission Bay North and Mission Bay South.

Ensure that streets and sidewalks in Mission Bay are sufficiently lit to provide pedestrians and bicyclists with a greater sense of safety, and thereby encourage Mission Bay employees, visitors, and residents to walk and bicycle to and from Mission Bay.

E.47g Transit, and Pedestrian and Bicycle Route Information. Applies to Mission Bay North and Mission Bay South.

Provide maps of the local and citywide pedestrian and bicycle routes with transit maps and information on kiosks throughout the Project Area to promote multi-modal travel.

E.47h Parking Management Guidelines. Applies to Mission Bay North and Mission Bay South.

Establish parking management guidelines for the private operators of parking facilities in the Project Area.

The objective of these measures is to reduce the number of single occupant vehicle (SOV) trips, and therefore reduce traffic impacts of the project, but reductions have not been assumed in the transportation impact analysis discussed in Section V.E, Transportation: Impacts. Shuttle buses would provide more direct service to Mission Bay than public transit, and would provide alternatives to driving to and from Mission Bay. The Mission Bay TMA could manage the operation of the shuttle bus system, including the determination of scheduling and stop locations. The shuttle buses could be operated between specific pre-determined stops, and would have their own boarding and alighting zones separate from MUNI stops. Selling transit passes in neighborhood stores and Project Area commercial buildings would make it convenient for local employees, visitors, and residents to purchase the passes.

Transportation subsidies are monetary payments made by major employers to their employees to offset part or all of the cost of commuting. The amount of the subsidy should be set so as to offset the cost of transit fares. Although the subsidy could also be used to offset the cost of driving and parking a vehicle, the payment will often encourage transit use among individuals who find transit more convenient, but choose to drive because they perceive a lower associated cost./4/

The objective of the parking management guidelines should be to discourage long-term (commuter) parking without discouraging short-term (visitor) parking. The rates should be set sufficiently high so as not to encourage automobile use.

UCSF currently has an effective Transportation Management Plan including jitney service to UC Berkeley, Club Bus routes operated by Golden Gate Transit to and from the North Bay, shuttle bus service among UCSF sites, and a vanpool program. Most of the UCSF measures would be expanded to serve UCSF facilities in Mission Bay. Other Mission Bay employers could adopt similar measures.

E.48 Constrain Parking Supply within UCSF Site. Applies to Mission Bay South.

Provide parking in the UCSF site at the same ratios as called for in the remainder of the Project Area.

UCSF's proposed parking ratio of 2 spaces per 1,000 gross square feet would yield up to 5,300 parking spaces at the UCSF site. This ratio could be reduced to match the approximate supply rate provided in the rest of the Project Area (resulting in about 3,050 to 3,180 spaces on the UCSF site, using the same ratios as used for the rest of the Project Area). This would provide additional incentive for individuals to use transit, bicycle, or walk to travel to and from Mission Bay.

The UCSF LRDP FEIR indicates an estimated parking demand of 4,200 spaces, with Transportation Demand Management measures in place. UCSF parking would be developed in phases based on then-current demand. UCSF does not intend to develop off-street parking in excess of demand. If the supply of parking were reduced below the 4,200 spaces needed as a result of this measure, some individuals may seek parking outside of the Mission Bay Project Area.

E.49 Ferry Service. Applies to Mission Bay North and Mission Bay South.

Make a good faith effort to assist the Port of San Francisco and others in ongoing studies of the feasibility of expanding regional ferry service. Make good faith efforts to assist in implementing feasible study recommendations.

The Port of San Francisco plans to facilitate special ferry service for fans to and from baseball games in China Basin. The Mission Bay North TMA should coordinate with the Ballpark Transportation Coordination Committee to facilitate service for employees and visitors to other uses in Mission Bay as well. The planned baseball game service would provide transportation for individuals traveling to or from Mission Bay.

E.50 Flexible Work Time/Telecommuting. Applies to Mission Bay South.

Where feasible, offer employees in the Project Area the opportunity to work on flexible schedules and/or telecommute so they could avoid peak hour traffic conditions.

F. AIR QUALITY

PROJECT FEATURES THAT AVOID SIGNIFICANT IMPACTS

Operations/Transportation

F.1 Implement measures to decrease vehicle trips, as described in Mitigation Measures E.46 through E.50 in Section VI.E, Mitigation Measures: Transportation. Applies to Mission Bay North and Mission Bay South.

For development that would occur under the proposed project, all feasible transportation control measures to reduce the number of trips made by employees and visitors to the sites should be implemented. These mitigation measures would reduce the predicted increase in criteria air pollutants resulting from the project. However, due to the magnitude of the threshold exceedances and the limited effectiveness of the measures, this measure could not reduce the impact to a less-than-significant level.

Construction PM_{10}

F.2 As conditions of construction contracts, require contractors to implement the following mitigation program, based on the instructions in the BAAQMD CEQA Guidelines/5/, at all construction sites within the Project Area:

F.2a Water all active construction areas at least twice a day, or as needed to prevent visible dust plumes from blowing off-site.

F.2b Use tarpaulins or other effective covers for on-site storage piles and for haul trucks that travel on streets.

F.2c Pave, apply water three times daily, or apply (non-toxic) soil stabilizers on all *unpaved* parking areas and staging areas at construction sites.

F.2d Sweep all *paved* access routes, parking areas, and staging areas daily (preferably with water sweepers).

F.2e Sweep streets daily (preferably with water sweepers) if visible amounts of soil material are carried onto public streets.

F.2f Hydroseed or apply (non-toxic) soil stabilizers to inactive construction areas (previously graded areas inactive for ten days or more).

F.2g Enclose, cover, water twice daily or apply (non-toxic) soil binders to exposed stockpiles (dirt, sand, etc.)

F.2h Limit traffic speeds on unpaved roads to 15 mph.

F.2i Install sandbags or other erosion control measures to prevent silt runoff to public roadways.

F.2j Replant vegetation in disturbed areas as quickly as possible.

F.2k Install wheel washers for all exiting trucks, or wash off the tires or tracks of all trucks and equipment leaving the site.

F.2l Install wind breaks, or plant trees/vegetative wind breaks at windward side(s) of construction areas.

F.2m Suspend excavation and grading activity when winds (instantaneous gusts) exceed 25 mph.

F.2n Limit the area subject to excavation, grading and other construction activity at any one time.

Applies to Mission Bay North and Mission Bay South.

BAAQMD has determined that implementation of the above measures would be sufficient to establish that particulate (PM_{10}) emissions from construction activities would be less than significant./6/

MITIGATION MEASURES IDENTIFIED IN THIS SEIR

Toxic Air Contaminants

Individual Facilities within the Project Area

F.3 Prior to issuing a certificate of occupancy for a facility containing potential toxic air contaminant sources, obtain written verification from BAAQMD either that the facility has been issued a permit from BAAQMD, if required by law, or that permit requirements do not apply to the facility. Applies to Mission Bay North and Mission Bay South.

This mitigation measure would make sure that all applicants that use hazardous materials would be reviewed by BAAQMD. It does not apply to UCSF, which would not apply to the Department of Building Inspection for certificates of occupancy. The UCSF LRDP FEIR adopted, as its standard of significance, the BAAQMD significance criteria of incremental increased cancer risk of 10 in 1 million for the sum total of operational stationary sources at the UCSF site. A screening level health risk assessment would be prepared at the time UCSF requires additional project-specific environmental review. The assessment would identify, in particular, the location of any child care center at the Mission Bay site and assess the potential effects on that receptor. Mitigation measures, such as operational changes, would be identified as necessary to assure that the significance criteria could be met. To the extent that UCSF is required to comply with any BAAQMD permit conditions, additional risk assessments would be prepared under BAAQMD direction./7/

F.4 As soon as possible, to provide reliable wind data for informational purposes and, where applicable, to facilitate the preparation of risk assessment studies, locate and maintain a meteorology station at an appropriate location within the Project Area.

F.4a Hire a contractor to select appropriate sites for location of the meteorology station to ensure accuracy of data. Preferably the site would be located at a first phase building at the UCSF site, which is centrally located in the Project Area.

F.4b Once site selections are recommended, contact the BAAQMD for consultation and comment on the sites.

F.4c Hire a contractor to select certified equipment and software.

F.4d Consult BAAQMD on the equipment and software that is selected prior to purchase.

F.4e Construct and site the station according to BAAQMD standards (written guidelines may be obtained from the District).

F.4f Provide data from the station to the BAAQMD on a real-time basis.

F.4g At a minimum, take continuous wind speed and direction measurements for a period of at least two years.

Applies to Mission Bay South.

Implementing this measure would ensure the availability of appropriate meteorological data on which to base any health risk assessments required for permitting purposes or as a result of other mitigation measures set forth here. Without this measure, suitable meteorological data may not be available, and health risk studies would have to rely on data from less representative monitoring stations. UCSF may be able to accommodate a site in one of its first phase buildings if compatible with its operational requirements.

F.5 Prohibit dry cleaning facilities that conduct on-site dry cleaning operations in residential areas within the Project Area. For any dry cleaning operations within the Project Area, require vapor barriers in their design and construct so as to reduce exposure to perchloroethylene and any other toxic air contaminants handled at the facility. Applies to Mission Bay North and South.

Because the project would increase the population of San Francisco and the Project Area, it would likely increase the demand for dry cleaning services. Vapor barriers may be expensive to install in new dry cleaning facilities, but implementing this measure would greatly reduce risks to Project Area residents.

Mitigation Measures F.3 through F.5 would reduce, but not eliminate, the possibility that the risks from toxic air contaminant emissions from individual facilities within the Project Area and from cumulative development could result in risks above BAAQMD significance thresholds for projects.

Creation of Buffer Zones

● F.6 Require pre-school and child care centers to notify BAAQMD and the San Francisco Department of Public Health regarding the locations of their operations, and require these centers to consult with these agencies regarding existing and possible future stationary and mobile sources of toxic air contaminants. The purpose of these consultations is to obtain information so that pre-school and child care centers can be located to minimize potential impacts from toxic air contaminant emissions sources. Applies to Mission Bay North and Mission Bay South.

● Consultation of pre-school and child-care centers with the San Francisco Department of Public Health and the BAAQMD is intended to assist the managers of the pre-school and child-care centers and to assist City staff and officials in charge of building and other permits to make decisions that minimize potential impacts from toxic air contaminant emissions on these sensitive receptors.

Mobile Sources

●

● Implementation of Mitigation Measure F.1, which calls for implementation of Mitigation Measures E.46 through E.50 in Section VI.E, Mitigation Measures: Transportation, would decrease vehicle trips, thereby reducing emissions of toxic air contaminants from vehicles.

Mitigation measures identified in Section VI.E, Transportation, to decrease vehicle trips would limit the increase in total emissions of toxic air contaminants from mobile sources in the Project Area and beyond the Project Area. Therefore, implementing these measures could reduce possible health risks associated with mobile source toxic air contaminant emissions. Because the health risks posed by mobile source emissions cannot be quantified effectively, the benefits of these measures also cannot be quantified, but the effective reductions in risk would be expected to be roughly proportional to the foreseeable reductions in vehicle trips.

G. NOISE AND VIBRATION

Noise from driving piles would be noticeable throughout the Project Area and some Nearby Areas during the 20-year project build-out period, as is discussed in pp. 26-27 of the Initial Study (Appendix A). Vibration from Caltrain could affect the residential uses proposed in Mission Bay North on the mixed-use site located west of the I-280 freeway structure and immediately south of the Caltrain tracks. A measure to mitigate this potentially significant effect is included below.

PROJECT FEATURES THAT AVOID SIGNIFICANT IMPACTS

Noise

The San Francisco Noise Ordinance controls construction noise, including pile driving noise, as noted in the 1990 FEIR in Mitigation Measure G.2./8/ That measure remains applicable and is presented below, with minor modifications.

G.1 Use noise-reducing pile driving techniques such as pre-drilling pile holes (if feasible, based on soils) to the maximum feasible depth, installing intake and exhaust mufflers on piledriving equipment, vibrating piles into place when feasible, installing shrouds around the piledriving hammer where feasible, and restricting the hours of operation. Applies to Mission Bay North and Mission Bay South.

The Director of Public Works would establish the noise-reduction techniques appropriate to particular development sites. The ordinance limits noisy construction activities to the hours of 7 a.m. to 8 p.m. The Director has the authority under the ordinance to change these hours if it is found that hours outside those prescribed in the ordinance would reduce the noise impact of pile driving at some sites.

MITIGATION MEASURE IDENTIFIED IN THIS SEIR

Vibration

G.2 Analyze potential vibration from Caltrain on the western-most block of Mission Bay North at Berry and King Streets, adjacent to Caltrain tracks, based on information about localized soils, and, if the analysis shows vibration could be significant without mitigation, design and construct foundations of buildings proposed to be on that block with vibration-reducing features to reduce potential impacts from adjacent passenger trains. Applies to Mission Bay North.

H. SEISMICITY

MITIGATION MEASURES IDENTIFIED IN THIS SEIR

Population Concentration and Project Area Access

<u>Emergency Preparedness and Emergency Response</u>

H.1 During the build-out period, store heavy construction equipment in the Project Area that is capable of traveling on damaged roads, clearing debris, and opening access to, and within, the Project Area after a major earthquake. Applies to Mission Bay North and Mission Bay South.

H.2 Following build-out, coordinate emergency response plans with the City regarding use of heavy equipment from the City storage yard in the vicinity of the Project Area. Applies to Mission Bay North and Mission Bay South.

H.3 Require the formulation of a comprehensive preparedness and response plan for the entire Project Area (as opposed to the typical building-by-building plan), integrated with the City's emergency response plans and in coordination with the Mayor's Office of Emergency Services.

H.3a Formulate Project-Area-wide emergency response plan. An emergency response plan should include:

1. Community coordination and response;
2. Coordination with government services;
3. Outreach and training (not only for employees but also residents);
4. Food and water;
5. Shelter;

6. Sanitation;
7. Consideration of need and potential locations for special facilities (operations, medical, etc.) in the context of the citywide Emergency Response Plan and the Project Area's location in Emergency Response District 3;
8. Organization of employees into response teams; and
9. Employee training in response procedures, including setting up a command post, communications, first aid, evacuation, security, and clean-up.

H.3b In addition to the Project Area-wide plan, require each building or complex in the Project Area to prepare an Emergency Response Plan. Each plan would be the responsibility of the owners of each building or complex, and would be reviewed by the City periodically to ensure it is kept up to date. Applies to Mission Bay North and Mission Bay South.

H.4 Provide seismic rehabilitation of Fire Station No. 30 in the Project Area, if the building is to be reused for human occupancy. Applies to Mission Bay South.

H.5 At the time the San Francisco Fire Department determines the population or building density is high enough to warrant it, provide a new fire station in Mission Bay South to reduce the effects of limited emergency access to and from the site following a major earthquake. Applies to Mission Bay South (see Mitigation Measure M.6 in Section VI.M, Mitigation Measures: Community Services and Utilities).

H.6 As part of the comprehensive preparedness plan identified in Mitigation Measure H.3, identify and implement feasible measures to facilitate and improve emergency access routes to the site, especially in the vicinity of Seventh and Owens Streets. Such measures could include design of open spaces to allow use by emergency vehicles following a catastrophic event; designing underground utilities at the Owens and Seventh Streets connector to minimize severe damage or disconnection caused by earthquakes; constructing heavier pavement sections along critical routes if indicated through a geotechnical study; and siting buildings within the area bounded by Seventh Street, the Seventh Street connector, Owens Street, and 16th Street in a manner that would allow emergency vehicle access between these buildings in a catastrophic event. Applies to Mission Bay North and Mission Bay South.

These measures would reduce seismic hazard risks, including risks caused by increased amounts of hazardous materials in the Project Area, to acceptable levels. The potential for accidents involving hazardous materials and the related effects of a possible catastrophe, such as a major earthquake, are discussed in "Risk of Upset" under "Potential Environmental Impacts of Hazardous Materials and Waste Management," in "Emergency Response Capabilities," and "Potential Catastrophes" under "Other Issues" in Section V.I, Health and Safety: Impacts.

MITIGATION MEASURE FROM THE INITIAL STUDY

Corrosivity

H.7 Test soils for sulfate and chloride content. If necessary, use admixtures in concrete so it would not be susceptible to attack by sulfates, and/or use coated metal pipes so that pipes would be more resistant to corrosion by chlorides.

This measure is identified as K.8 in Appendix A, Initial Study. Applies to Mission Bay North and Mission Bay South.

MITIGATION MEASURES DISCUSSED IN THE INITIAL STUDY

Three mitigation measures from the 1990 FEIR dealing with settlement are discussed under "Geology/Topography" in Section IV.B of Appendix A, Initial Study. They would require flexible utility connections and means of protecting foundations. It was determined during the preparation of this SEIR that current building codes require flexible utility connections and means of protecting foundation from differential settlement. Because current building codes require equivalent actions, these measures are no longer necessary.

I. HEALTH AND SAFETY

This report has identified the following potentially significant environmental impacts related to health and safety issues:

- The lack of enforceable guidelines for handling biohazardous materials;
- The generation and disposal of hazardous wastes by larger waste generators who contribute incrementally to cumulative hazardous chemical, radioactive, and medical waste streams; and
- The potential for a catastrophic event (e.g., an earthquake) to result in accidents involving hazardous materials, requiring emergency response.

Mitigation measures to reduce risks from potential catastrophes to acceptable levels are identified in Section VI.H, Mitigation Measures: Seismicity. No feasible measures in addition to those already in place in San Francisco have been identified to further mitigate the impact of cumulative hazardous waste generation. Measures to mitigate the potentially significant impact related to biohazardous materials are identified below.

MITIGATION MEASURES IDENTIFIED IN THIS SEIR

I.1 Require businesses that handle biohazardous materials and do not receive federal funding to certify that they follow the guidelines published by the National Research Council and the U.S. Department of Health and Human Services Public Health Service, National Institutes of Health, and Centers for Disease Control as set forth in *Biosafety in Microbiological and Biomedical Laboratories*, *Guidelines for Research Involving Recombinant DNA Molecules (NIH Guidelines)*, and *Guide for the Care and Use of Laboratory Animals*, or their successors, as applicable./9/ Applies to Mission Bay South.

Although following these guidelines is common industry practice and is required for entities such as UCSF that receive federal funds, in many circumstances their implementation is not required by law. Enforcement of these guidelines would ensure that appropriate biological health and safety measures would be implemented, thereby avoiding significant risks related to biohazardous materials operations.

I.2 Require businesses handling biohazardous materials to certify that they use high efficiency particulate air (HEPA) filters or substantially equivalent devices on all exhaust from Biosafety Level 3 laboratories unless they demonstrate that exhaust from their Biosafety Level 3 laboratories would not pose substantial health or safety hazards to the public or the environment. Require such businesses to certify that they inspect or monitor the filters regularly to ensure proper functioning. Applies to Mission Bay South.

Some businesses could handle biohazardous materials that require Biosafety Level 3 containment (i.e., indigenous or exotic agents capable of causing diseases with serious or lethal consequence through aerosol transmission). Guidelines for Biosafety Level 3 allow for discretion in determining whether to filter air exhausted to the outdoors from such areas. Not filtering this air may, under some circumstances, pose substantial public safety risks; however, this would not always be the case.

I.3 Require businesses handling biohazardous materials to certify that they do not handle or use biohazardous materials requiring Biosafety Level 4 containment (i.e., dangerous or exotic materials that pose high risks of life-threatening diseases or aerosol-transmitted infections, or unknown risks of transmission in the Project Area. Applies to Mission Bay South.

The analysis of biohazardous materials impacts assumes that project occupants would not handle any biohazardous materials that require Biosafety Level 4 containment practices, and this measure would ensure that this critical assumption is correct. Because very few Biosafety Level 4 laboratories operate in the United States, this measure would probably affect very few potential project occupants, if any.

Implementing Mitigation Measures I.1, I.2, and I.3 would ensure that hazards posed by the potential use of biohazardous materials would be sufficiently low to result in a less-than-significant impact.

J. CONTAMINATED SOILS AND GROUNDWATER

PROJECT FEATURES THAT AVOID SIGNIFICANT IMPACTS

The project assumes the development and implementation of a Risk Management Plan or Plans (RMP). The RMP is not yet final nor approved by the Regional Water Quality Control Board (RWQCB). The mitigation program in this section describes the minimum broad parameters of the RMP. The mitigation program would reduce project impacts to a less-than-significant level.

Project Development

J.1 Prior to any site development activities in the Project Area, develop and implement an RWQCB-approved Risk Management Plan or Plans (RMP). The RMP shall address all site development activities and post-development activities and shall include specific measures that would be protective of human health and the aquatic environment. The human health standards to be applied in the RMP are a cumulative cancer risk of 1×10^{-5} and a Hazard Index of 1, or more stringent standards as may be required by the RWQCB. Amend the RMPs as required by the RWQCB to reflect new information regarding contamination, land use decisions, or as a result of Article 20 compliance.

RMP Enforcement

J.1a Provide an enforcement structure for RMPs, to be in place and effective during construction and after project development, including:

i. Develop and record a restrictive covenant as an Environmental Restriction and Covenant under California Civil Code Section 1471 that:

a. Places limits on future uses in the Project Area consistent with the provisions in the RMP;

b. Provides notice to current and future property owners that the RMP contains use restrictions and other requirements and obligates property owners to provide like notice to occupants; and

c. Provides notice to current and future property owners that the RWQCB maintains residual regulatory enforcement authority over all portions of the Project Area sufficient to compel enforcement of the entire RMP.

ii. As part of any future transfer of property title of any portion of the Project Area, require current property owners to provide a copy of the RMP to each of their future transferees.

Pre-Development

Include, at a minimum, the following elements in the RMP:

J.1b Limit direct access to areas with exposed native soils (defined as soils that exist at the site prior to project approval) and perform inspections to verify that measures taken to limit direct access are maintained. Alternatively, for each location with exposed native soils, provide risk management procedures for those areas. If this alternative is chosen, for each exposed soil location that would remain vacant and undeveloped at the initiation of development, and for each site that becomes vacant and includes exposed native soil, evaluate and document potential health risks to the general public that could occur before site development using the following process:

Evaluate sampling results to determine constituents that could pose a risk to the general public. Identify populations who could be exposed to the constituents in soils based on land uses within and adjacent to the Project Area. Exposed populations that would be considered would include adult and child visitors/trespassers, nearby residents (adults and children), and workers not involved in project construction within and adjacent to the Project Area. Using specific EPA- and DTSC-recommended exposure assumptions, identify the appropriate exposure pathways and assumptions in consultation with the RWQCB.

Using the specific exposure assumptions identified above, adopt contaminant-specific interim target levels (ITLs) following regulatory risk assessment guidelines established by DTSC and EPA.

Compare ITLs to the range of concentrations detected in exposed native soils to identify areas where ITLs are exceeded. No further action prior to development (other than that required under Article 20 or other applicable regulations) would be required in areas in which ITLs are not exceeded.

J.1c For areas where ITLs are exceeded, identify specific Interim Risk Management (IRM) measures that would reduce potential contamination-related risks to Project Area occupants and visitors during site build-out. Based on the results of the ITL evaluation and need for site controls, general IRM measures could include measures such as:

i. Limit Direct Access to Uncovered Native Soil on Undeveloped Portions of the Project Area. To effectively limit access, install fencing or other physical barriers around the identified areas, and post "no trespassing" signs.

ii. Hydroseed or Apply Other Vegetative or Other Cover to Uncovered Areas. Hydroseed or apply other vegetative or other cover to the uncovered areas to reduce the potential for windblown dusts to be generated, and to reduce the potential for individuals to have direct contact with the native soils.

iii. Include Safety Notices in Leases. Notify tenants of occupied portions of the Project Areas of the potential risks involved with the disturbance of existing cover (asphalt, concrete, vegetation) or exposed native soil.

iv. Conduct Periodic Inspections of Open Spaces. Conduct periodic inspections of the Project Area to reduce the illegal occupancy of open areas by transient populations, and to reduce the illegal dumping by unauthorized occupants or off-site populations. Implement additional security measures such as fencing and/or the use of security guards, if inspections show a need.

v. Periodic Monitoring. Perform inspections verifying that risk management measures remain effective by identifying disturbances to cover materials that could result in the exposure of underlying native soil and by identifying areas where temporary fencing or other physical barriers might need to be reinstalled. If the inspections identify areas where measures have been rendered ineffective, implement corrective action.

Development

J.1d Include in the RMP, health and safety training and health protection objectives for workers who may directly contact contaminated soil during construction and/or maintenance, including Cal/OSHA worker safety regulations appropriate to the type of construction activity, location, and risk relative to the potential types of hazards associated with contaminated soil or groundwater, and where appropriate, compliance with Title 8, Group 16, requirements.

J.1e Identify site access controls to be implemented during construction, such as:

i. Secure construction site to prevent unauthorized pedestrian/vehicular entry with fencing or other barrier of sufficient height and structural integrity to prevent entry and based upon the degree of control required.

ii. Post "no trespassing" signs.

iii. Provide on-site meetings with construction workers to inform them about security measures and reporting/contingency procedures.

J.1f Identify protocols for managing soil during construction, which will include at a minimum:

i. The dust controls found in Measure F.2 in Section VI.F, Mitigation Measures: Air Quality.

ii. Standards for imported fill (defined as fill brought onto the site from outside the Project Area) that are protective of human health and the aquatic environment and an identified minimum depth of fill to be required for landscaped areas.

iii. A requirement that prior to placement, if native soil in the Project Area is to be used on site in any manner that could result in direct human exposure, characterization of the soil be conducted to confirm that it meets appropriate standards approved by the RWQCB and would be appropriate for the intended use.

iv. Protocols for managing stockpiled and excavated soils.

v. A program for off-site dust monitoring, consisting of real-time monitoring for PM_{10} concentrations to demonstrate that the health and safety of all individuals not engaged in construction activities would not be adversely affected by chemicals that could be contained in dust generated by soil-disturbing activities. If monitoring shows dust levels exceeding 250 $\mu g/m^3$, implement additional dust control measures, such as continuous misting of exposed areas with water, until concentrations are reduced below the action level.

J.1g Identify protocols for managing groundwater, which will include at a minimum:

i. Procedures to prevent unacceptable migration of contamination from defined plumes during dewatering, such as monitoring, counter-pumping, or installing sheetpiles down to Bay Mud before dewatering.

ii. Procedures for the installation of subsurface pipelines and other utilities, where necessary, to prevent lateral transmission of chemicals in groundwater. Such procedures could include, but would not be limited to, selection of proper backfill materials and thickness and installation of clay plugs or barrier collars.

J.1h Include SWPPP requirements and BMPs as described in Mitigation Measure K.1 in Section VI.K, Mitigation Measures: Hydrology and Water Quality.

J.1i Include a requirement that construction personnel be trained to recognize potential hazards associated with underground features that could contain hazardous materials, previously unidentified contamination, or buried hazardous debris.

J.1j Develop and describe procedures for implementing a contingency plan, including appropriate notification and control procedures, in the event unanticipated subsurface hazards are discovered during construction. Control procedures could include, but would not be limited to, further investigation and removal of USTs or other hazards.

J.1k Establish procedures, as necessary, so that construction activities avoid interfering with any RWQCB-required site investigation and remediation in the free product area.

Post-Development

J.1l Except where testing demonstrates that native soils meet standards established by the RWQCB as being protective of human health and the aquatic environment, require that upon project completion, all native soils shall be capped, so as to preclude human contact by using buildings, paved surfaces (such as parking lots, sidewalks, or roadways), or fill of a kind and depth approved by the RWQCB.

J.1m Prohibit residences with unrestricted access to soils in front yards or backyards anywhere in the Project Area.

J.1n Prohibit access to native soils for private use. If disturbance of native subsurface soils or groundwater dewatering is planned, carry out these activities in accordance with the elements of the RMP called for in Measures J.1d through J.1k. Following construction or excavation or soil disturbance, restore the cap in accordance with the provisions of the RMP as called for in Measure J.1l.

J.1o Prohibit the use of shallow groundwater within the Project Area for domestic, industrial, or irrigation purposes. Permit installation of groundwater wells within the Project Area only for environmental monitoring purposes. Secure and lock environmental wells installed within the Project Area to prevent unauthorized access to the groundwater. In the event the use of shallow groundwater is proposed, perform an assessment of the risks from direct exposure to the groundwater prior to use and obtain RWQCB or other appropriate regulatory agency approval of the results of the assessment and proposed uses.

Applies to Mission Bay North and Mission Bay South.

Child Care Development

J.2 Carry out a site-specific risk evaluation for each site in a non-residential area proposed to be used for a public school or child care facility; submit to RWQCB for review and approval. If cancer risks exceed 1×10^{-5} and/or noncancer risk exceeds a Hazard Index of 1, carry out remediation designed to reduce risks to meet these standards or select another site that is shown to meet these standards. Applies to Mission Bay South.

MITIGATION MEASURES IDENTIFIED IN THIS SEIR

No additional mitigation measures beyond those included in the RMP are necessary for the construction or post-development period, assuming full build-out as planned, to protect human health and the aquatic environment. Implementation of the RMP under the regulatory oversight, jurisdiction, and administrative responsibility of the RWQCB would mitigate any potentially significant impacts identified in Section V.J, Contaminated Soils and Groundwater: Impacts, to a less-than-significant level.

K. HYDROLOGY AND WATER QUALITY

PROJECT FEATURES THAT AVOID SIGNIFICANT IMPACTS

Construction Activity Pollutants

K.1 Develop and implement a comprehensive Stormwater Pollution Prevention Plan (SWPPP) for all construction activities within the Project Area to avoid and minimize erosion and sedimentation in China Basin Channel and San Francisco Bay and to manage other aspects of the construction site. Include at least the following Best Management Practices, or substantially equivalent measures. Applies to Mission Bay North and Mission Bay South.

K.1a Minimize dust during demolition, grading, and construction by lightly spraying exposed soil on a regular basis.

K.1b Minimize wind and water erosion on temporary soil stockpiles by spraying with water during dry weather and covering with plastic sheeting or other similar material during the rainy season (November to April).

K.1c Minimize the area and length of time during which the site is cleared and graded.

K.1d Prevent the release of construction pollutants such as cement, mortar, paints and solvents, fuel and lubricating oils, pesticides, and herbicides by storing such materials in a bermed, or otherwise secured, area.

K.1e As needed, install filter fences around the perimeter of the construction site to prevent off-site sediment discharge. Prior to grading the bank slopes of China Basin Channel for the proposed channel-edge treatments, install silt or filter fences to slow water and remove sediment. As needed, properly trench and anchor in the silt or filter fences so that they stand up to the forces of tidal fluctuation and wave action, and do not allow sediment-laden water to escape underneath them.

K.1f Follow design and construction standards found in the *Manual of Standards for Erosion and Sediment Control Measures* for placement of riprap and stone size./10/

K.1g Install and maintain sediment and oil and grease traps in local stormwater intakes during the construction period, or otherwise properly control oil and grease discharges.

K.1h Clean wheels and cover loads of trucks carrying excavated soils before they leave the construction site.

K.1i Implement a hazardous material spill prevention, control, and clean-up program for the construction period. As needed, the program would include measures such as constructing swales and barriers that would direct any potential spills away from the Channel and the Bay and into containment basins to prevent the movement of any materials from the construction site into water.

MITIGATION MEASURES IDENTIFIED IN THIS SEIR

Changes in Sanitary Sewage Quality

K.2 In addition to developing and implementing a Stormwater Management Program for the Central/Bay Basin (see Mitigation Measure K.5), participate in the City's existing Water Pollution Prevention Program. Facilitate implementation of the City's Water Pollution Prevention Program by providing and installing wastewater sampling ports in any building anticipated to have a potentially significant discharge of pollutants to the sanitary sewer, as determined by the Water Pollution Prevention Program of the San Francisco Public Utilities

Commission's Bureau of Environmental Regulation and Management, and in locations as determined by the Water Pollution Prevention Program. Applies to Mission Bay North and Mission Bay South.

This mitigation measure could be implemented by including the Water Pollution Prevention Program in the review process, as each individual construction project is proposed. The Water Pollution Prevention Program would review each project, determine if one or more sampling ports should be installed in a particular building, and specify the location of the sampling port(s).

Project Contributions to Significant Cumulative Impacts

● K.3 Design and construct sewer improvements such that potential flows to the City's combined sewer system from the project do not contribute to an increase in the annual overflow volume as projected by the Bayside Planning Model by providing increased storage in oversized pipes, centralized storage facilities, smaller dispersed storage facilities, or detention basins, or through other means to reduce or delay stormwater discharges to the City system. Applies to Mission Bay North and Mission Bay South.

K.4 Implement alternative technologies or use other means to reduce settleable solids and floatable materials in stormwater discharges to China Basin Channel to levels equivalent to, or better than, City-treated combined sewer overflows. Such alternative technologies could include one or more of the following: biofilter system, vortex sediment system, catch basin filters, and/or additional source control measures to remove particulates from streets and parking lots. Applies to Mission Bay South.

Phased Development and Interim Uses

● K.5 Develop and implement a Stormwater Management Program applicable to new and interim development under the Redevelopment Plan in any area contributing to direct discharges of stormwater to near-shore waters. Develop the plan in coordination with City and County of San Francisco agencies such as the Water Pollution Prevention Program of the City and County of San Francisco Public Utilities Commission's (SFPUC) Bureau of Environmental Regulation and Management, and the Clean Water Program. Develop the Stormwater Management Program according to guidelines contained in California Municipal Storm Water Best Management Practice Handbook and in California Industrial/Commercial Storm Water Best Management Practice Handbook./11/ In addition, design the program with Best Management Practices consistent with the minimum control measures pursuant to the proposed Phase II stormwater regulations. Implement the Stormwater Management Program until a city-wide stormwater management program is developed that includes any area contributing to direct discharges of stormwater to near-shore waters. If the City and County of San Francisco develops a city-wide stormwater management program, such a program would supersede the stormwater management program for the Project Area. Periodically prepare and submit a monitoring report to the City detailing progress on implementation of Best Management Practices. Modify the Stormwater Management Program, as necessary, to respond to changes in conditions, and record any changes made (additions or deletions) in the monitoring report. Applies to Mission Bay South.

BMPs are feasible actions intended to protect water quality. Implementation of BMPs consistent with federal stormwater management program requirements and other permit provisions would constitute compliance with the standard of "reducing pollutants to the maximum extent practicable." The following is a summary of the minimum control measures proposed to be part of the Phase II stormwater regulations.

Public Education and Outreach on Stormwater Impacts

Public education and outreach consists of distributing educational materials to the community about the impacts of stormwater discharges on water bodies and the steps to reduce stormwater pollution. The materials or outreach programs should inform individuals and households about steps that can be taken to reduce stormwater pollution, such as properly disposing of used motor oil or household hazardous wastes, or should encourage individuals to participate in the municipal program by performing services such as roadside litter pickup.

Public Involvement/Participation

The goal of public involvement and participation is to obtain input and assistance from the public in the development and implementation of a municipality's stormwater management program. Opportunities for members of the public to participate in program development and implementation could include serving as citizen representatives on a local stormwater management panel, attending public hearings, working as citizen volunteers to educate other individuals about the program, assisting in program coordination with other pre-existing programs, or participating in volunteer monitoring efforts.

Illicit Discharge Detection and Elimination

Discharges from stormwater drainage systems often include wastes and wastewater from non-stormwater sources. For example, illicit discharges enter the system through either direct, mistaken, or deliberate connections or indirect connections (e.g., spills collected by drain inlets.) This problem is applicable only to those parts of San Francisco served by a separated sewer system. The Mission Bay Stormwater Management Program would need to address this issue for the Central/Bay Basin because a separated sewer system is proposed here.

Construction Site Stormwater Runoff Control

The proposed regulations would require pollutant control programs to reduce pollutants in stormwater runoff from construction activities that result in land disturbance of 1 or more acres. The requirements are similar to requirements currently applicable to construction areas of 5 acres or more in that appropriate site controls are required to address erosion, sedimentation, and other construction-related pollutants. See Mitigation Measure K.1.

Post-Construction Stormwater Management in New Development and Redevelopment

The proposed regulations would require small municipal separate storm sewer systems to address stormwater runoff from new development and redevelopment projects using site-appropriate and cost-effective structural and non-structural BMPs. Non-structural BMPs are preventative actions that involve management and source controls. Examples are policies and ordinances that result in protection of natural resources and prevention of runoff. Examples of structural BMPs include storage practices (wet ponds and extended-detention outlet structures), filtration practices (grassed swales, sand filters, and filter strips), and infiltration practices (infiltration basins, infiltration trenches, and porous pavement). The proposed initial-flow diversion system for the Central/Bay Basin is a structural BMP.

Pollution Prevention/Good Housekeeping for Municipal Operations

This control would require the operator of the separate storm sewer system (i.e., the Central/Bay Basin initial-flow diversion system) to develop and implement a cost-effective training program to ensure proper operation and maintenance of the system. This would be similar to the requirements of existing federal Phase I stormwater regulations.

MITIGATION MEASURE FROM THE INITIAL STUDY

Flooding

● K.6 Structures in the Project Area should be designed and located in such a way to assure the reasonable safety of structures and shoreline protective devices built in the Bay or in low-lying shoreline areas from the dangers of tidal flooding, including consideration of a rise in relative sea level. Detailed construction specifications to mitigate against impacts of a sea-level rise, however, would require specific flood protection engineering and building analysis by a licensed engineer; where structures are proposed below an elevation of -1 [negative one] foot, San Francisco City Datum (99 foot elevation, Mission Bay Datum). Measures include:

- K.6a Set back from the water's edge;
- K.6b Install seawalls, dikes, and/or berms during construction of infrastructure;
- K.6c Provide for dewatering basements;
- K.6d Construct streets and sidewalks above existing grades by reducing the amount of excavation for utilities or basements;
- K.6e Use topsoil to raise the level of public open spaces;
- K.6f Use half-basements and partially depressed garage levels to minimize excavation.

Measure is identified as L.15 in Appendix A, Initial Study. Applies to both Mission Bay North and Mission Bay South.

- Buildings above -1 [negative 1] foot, San Francisco City Datum (99-foot elevation, Mission Bay Datum) would be above the level of flooding hazard, including a margin for sea-level rise and a margin of safety.

L. CHINA BASIN CHANNEL VEGETATION AND WILDLIFE

MITIGATION MEASURES IDENTIFIED IN THIS SEIR

Wetlands

- L.1 Prepare and implement a salt marsh wetland habitat mitigation plan in accordance with the San Francisco District, U.S. Army Corps of Engineers Habitat Mitigation Planning Guidelines. Determine the details of the plan through the Section 404 permit process. Nothing in this mitigation measure is intended to constrain the flexibility needed to meet permitting agency requirements, or adjust to variability in field conditions, new information or technology, or other factors. Similarly, this condition is not intended to conflict with or constrain use of more natural alternative Channel edge treatments that are determined feasible and consistent with adopted Redevelopment Agency standards and guidelines applicable to Mission Bay as contained in Design for Development documents. Applies to Mission Bay North and Mission Bay South.

Guidelines for a Typical Salt Marsh Restoration Plan

One requirement of a successful wetland mitigation project is to allow flexibility for contingencies. To provide a level of detail to allow for assessment of the feasibility and effectiveness of the mitigation measure described above, however, the following <u>guidelines</u> (not mitigation measures) are provided to demonstrate what a typical salt marsh mitigation project would entail: To compensate for any temporal losses of wildlife value or extent, the mitigation salt marsh would likely be required to be constructed and maintained at a higher level of area and quality than the habitat it is meant to replace. This would be accomplished by removing rubble, rip-rap, and other debris, grading to a more gradual slope and planting with native salt marsh species in the following manner:

1. Plant Pacific cordgrass in the lowest marsh zone, from approximately 1 foot below mean sea level up to mean high water. Obtain cordgrass as sprigs from salt marshes in the region and grow into containers.
2. Plant common pickleweed in the middle marsh zone, from about mean high water to about 1 foot above mean higher high water. Obtain pickleweed as sprigs from salt marshes in the region.
3. Plant the upper marsh zone, from mean higher high water up to the top of bank, with a wide variety of native species such as alkali heath, salt grass, sea lavender, or jaumea. Obtain these as sprigs from salt marshes in the region.

To minimize shoreline erosion, construct the wetlands with gently sloping banks. Such a measure would reduce the probability of colonization by *Sphaeroma quoyana*, a destructive burrowing isopod that has been suspected of causing erosion of banks. Stabilize the wetland shoreline from wave and current erosion using a biotechnical approach such as installing coconut-fiber rolls and blankets. Grading and slope protection work should be monitored in a manner consistent with Section 404 permit requirements to have the least detrimental effect on wildlife habitat.

To ensure successful establishment of salt marsh vegetation, the Corps typically requires preparation and implementation of a five-year mitigation maintenance and monitoring plan which specifies performance criteria for success, maintenance measures to promote establishment of native wetland vegetation while discouraging non-native vegetation, corrective measures if performance criteria are not attained, and quantitative monitoring techniques for objective analysis of success. The Corps also typically requires establishment of a predominance of native salt marsh vegetation covering an area larger than the area of salt marsh vegetation lost to project activities.

L.2 Avoid salt marsh wetland habitat along the China Basin Channel shoreline during installation of suction inlets (and associated piping) used for fire-fighting water supply. Design the storm drain outfalls to minimize scouring and erosion of mudflats in coordination with relevant permitting agencies during the permitting process. Applies to Mission Bay North and Mission Bay South.

Herring

L.3 Do not conduct any construction activities (including movement of heavy equipment, materials or structures by barge or tugboat) with the potential to cause turbidity in Channel or Bay waters during the spawning season of Pacific herring (December 1-March 1)./12/ Applies to Mission Bay North and Mission Bay South.

Turbidity

L.4 To prevent turbidity and sediment resuspension caused by tugboat activity in the Channel, require the construction contractor to use shallow-draft tugboats. Shallow-draft tugboats float higher in the water than deep-draft tugboats. Because they float higher, the tugboat propellers are not as deep under the water surface, and therefore are farther away from the bottom of the Channel. This arrangement has less potential to disturb bottom sediments because the local currents created by the propellers would not extend as deeply into the water column. Require the construction contractor to operate the tugboats at the minimum speed necessary to maintain maneuverability of the barges. Slower speeds would reduce the spin of tugboat propellers, thus minimizing turbidity and sediment resuspension. Applies to Mission Bay North and Mission Bay South.

L.5 Confine resuspended sediments from construction activities in the Channel or Bay waters to the work site using submarine silt curtains around pile-driving or outfall construction sites, or silt fences properly anchored and trenched in place at the toe of slope below any grading or rubble-removing activities. Applies to Mission Bay North and Mission Bay South.

L.6 Prepare a written plan for removal and disposal, including a description of any methods incorporated to avoid or minimize potential surface water contamination, prior to removing existing support piles from China Basin Channel for the proposed Channel-edge treatments. Submit the plan to the San Francisco Bay Regional Water Quality Control Board for approval before implementation. Implement the plan during construction and have a qualified specialist monitor it to ensure adequate performance. Implement this plan during removal of pilings under the direction of a qualified specialist. Applies to Mission Bay North and Mission Bay South.

M. COMMUNITY SERVICES AND UTILITIES

PROJECT FEATURES THAT AVOID SIGNIFICANT IMPACTS

Schools

● M.1 Transfer the 2.2-acre school site to the San Francisco Unified School District in a developable condition prior to issuance of building permits for residential units that will make the total combined number of dwelling units in Mission Bay North and Mission Bay South equal to or greater than 3,200 dwelling units. Applies to Mission Bay North and Mission Bay South

Catellus proposes to dedicate a 2.2-acre site in the UCSF Subarea for a public school. About 1.5 acres of this site would be a playground and about 0.7 acre of the site would be available for the San Francisco School District (SFUSD) to construct a school facility.

The SFUSD has limited capacity to accommodate additional students because of state-mandated class ● size reductions. Therefore, the SFUSD would need a new school when about 300 public elementary school age children would be living in the Project Area./13/ About 300 public elementary school age children would live in about 3,350 dwelling units. The SFUSD staff estimate that it would take about 24 months to complete all phases of building design and construction./14/ The residential buildings establishing the "trigger" when school planning would need to begin could be constructed about 18 months after issuance of building permits. Therefore, to compensate for the 6-month lag time in school construction, the school site would be transferred when permits are issued for residential units that are equal to or exceed 3,200 total dwelling units for Mission Bay North and Mission Bay South.

Water Supply

M.2 Include methods of water conservation in Mission Bay buildings and landscaping. Water conservation methods include the following:

- M.2a Install water conserving dishwashers and washing machines in rental apartments and condominiums.
- M.2b Install water conserving dishwashers and water efficient centralized cooling systems in office buildings.
- M.2c Incorporate water efficient laboratory techniques in research facilities, where feasible.
- M.2d Provide information to residences and businesses advising methods to conserve water.
- M.2e Install water conserving irrigation systems (e.g., drip irrigation).
- M.2f Design landscaping using drought resistant and other low-water use plants.
- M.2g Include limited turf areas in open space.

Applies to Mission Bay North and Mission Bay South.

Fire Protection

M.3 Extend the Auxiliary Water Supply System (High-Pressure System) through the interior of the Project Area. The routing, design, and implementation of the AWSS extensions shall be determined by the Fire Department and the Department of Public Works. Applies to Mission Bay North and Mission Bay South.

Sewers and Wastewater Treatment

M.4 Construct a fence around any interim surface detention basins. Applies to Mission Bay South.

The fence would be needed to prevent children from nearby residences, visitors, and children at the school on UCSF property, if it were operating during this interim period, from entering detention basins while they held stored stormwater runoff.

● M.5 Drain stormwater runoff (up to a 5-year storm event) from newly constructed buildings and permanently covered surfaces in the Bay Basin into the City's combined sewer system until installation of a permanent sewer system. Applies to Mission Bay South.

The Bay Side drainage currently drains stormwater runoff directly to the Bay. This measure is designed to ensure that development and subsequent increased use in the Bay Basin before completion of the "initial flow" diversion system does not result in water quality impacts.

MITIGATION MEASURES IDENTIFIED IN THIS SEIR

Fire Protection

M.6 Construct or pay for the construction of a new fire station in the Mission Bay South Redevelopment Area to house equipment and personnel serving the Project Area south of China Basin Channel, either in a new building, or in the vacant Fire Station 30 after rehabilitation and expansion of the building. (See also Mitigation Measures D.2a and D.2b in Section VI.D, Mitigation Measures: Visual Quality and Urban Design) related to preservation of Fire Station 30.)/15/ The San Francisco Fire Department shall review each proposed development phase to determine when land for the new fire station shall be transferred and when planning and design for the fire station shall be initiated.

Provide or pay for the provision of an engine company and associated Fire Department personnel and equipment, and a truck company and associated personnel and equipment, to serve the Project Area south of China Basin Channel. The San Francisco Fire Department shall review each proposed development phase to determine when the engine company and truck company and related personnel and equipment shall be provided. Applies to Mission Bay North and Mission Bay South.

The proposed project would also require additional paramedic capabilities to provide adequate levels of service to project employees and residents. Additional paramedic staff and equipment could be housed in the fire station, and would be required after the fire station has been completed. The exact timing for additional paramedic staff and equipment would be determined during Fire Department review for each proposed development phase in Mission Bay and would be based on call volumes from the Project Area and surrounding uses, including the new Giants Ballpark. The need for paramedic staff and equipment is not identified as a significant environmental effect under CEQA, and so the measure does not include a trigger for providing this staff.

OTHER COMMUNITY SERVICES AND UTILITIES

The following topics were not found to have any significant impacts; therefore, they have not been included as subheadings in this chapter: Police Service, Public Health Services, Recreation and Parks, Solid Waste, Energy Transmission Capacity and Infrastructure, and Telecommunications.

N. GROWTH INDUCEMENT

Mitigation measures have not been identified because no significant impacts have been found.

O. SUMMARY TABLES OF 1990 FEIR MITIGATION MEASURES

This section contains two tables that list mitigation measures from the 1990 FEIR. Table VI.7 includes measures from the 1990 FEIR which are either project features or measures identified in this SEIR. Each 1990 FEIR measure includes a reference to the new mitigation measure number in this SEIR. The first two columns of the table indicate the role of the mitigation measure in the 1990 FEIR, i.e., whether it was needed to mitigate a potentially significant impact, or proposed to improve conditions that would not be considered a significant impact. The City now uses the phrase, "improvement measure," to refer to a measure that would improve conditions where the project impact would be less than significant. The rest of the columns in the table indicate the role of the 1990 FEIR measure in this SEIR.

Table VI.8 shows the remaining measures, along with a determination that no further discussion was needed in the SEIR because the measure: 1) would improve conditions that would not be considered a significant impact (an "improvement measure"); 2) is addressed by or incorporated in existing regulations adopted after the 1990 FEIR was certified; 3) is not applicable to the current project; 4) was previously rejected and the reasons for rejection remain valid.

Examples of items 3 and 4 may be useful. An example of item 3, a measure not applicable to the current project, is the measure to increase the amount of retail uses. This is not applicable to the current project, which includes a substantial amount of retail uses (whereas the previous plan did not). The measure to build a second Bay Bridge is an example of item 4, a measure that was previously found infeasible, and would remain so.

When the 1990 FEIR project was adopted, decision makers decided whether to adopt, reject, or modify the mitigation measures in the 1990 FEIR. The last column in Table VI.8, labeled "Disposition of Measure in 1990," indicates whether the measure was rejected or modified at that time.

Some areas are left blank in Table VI.8, under the heading "Role of 1990 FEIR Measure in the SEIR." The blank areas generally fall into one of the following two categories: 1) if a measure from the 1990 FEIR is identified as a mitigation measure, its disposition may only be addressed in the column marked "comments" where there is a reference to a discussion in the project description or mitigation section in the SEIR, and 2) if a measure from the 1990 FEIR is identified as an improvement measure, there may be no disposition of that improvement measure in the SEIR.

TABLE VI.7
1990 FEIR MITIGATION MEASURES DISCUSSED IN SEIR

		Purpose of 1990 FEIR Measure in the 1990 FEIR		Role of 1990 FEIR Measure in the SEIR		
	SUMMARIES OF 1990 MISSION BAY FEIR MITIGATION MEASURES (Page references below are to 1990 FEIR.)	**Measure to Mitigate Potentially Significant Impact**	**Improvement Measure to Reduce Less-Than-Significant Impact**	**Project Feature to Avoid Significant Impacts**	**Mitigation Measures Identified in this SEIR**	**Comments**
D	*Community Services and Infrastructure*					
D.1	Provide an engine company and associated personnel and equipment when out-of-service time demands exceed 80 hours, additional truck company when time demands exceed 230. (p. VI.D.115)	X			X	The measure has been revised to apply to the current project. See SEIR Mitigation Measure M.6.
D.2	Rehabilitate closed Fire Station 30 and construct a new station or extension next to it to house both an engine company and a truck company. (p. VI.D.115)	X			X	The measure has been revised to apply to the current project. See SEIR Mitigation Measure M.6.
D.3	Construct a new fire station in the Project Area to reduce response time to Project Area, Potrero Hill, and Showplace Square. (p. VI.D.115)	X			X	See SEIR Mitigation Measure M.6.
D.4	Extend Auxiliary Water Supply System into interior of Project Area, incorporate design measures for maximum resistance against earthquake damage. (p. VI.D.115)	X		X		See SEIR Measure M.2.
D.7	Implement measures to maintain emergency services and reduce damage to roadways and utilities during an earthquake. (p. VI.D.116)	X		X	X	See Section VI.H, Seismicity, for more information on these measures. These measures are all either included as part of the SEIR project or identified in this SEIR. See SEIR Mitigation Measures H.3 and H.6.

(Continued)

TABLE VI.7 (Continued)

SUMMARIES OF 1990 MISSION BAY FEIR MITIGATION MEASURES (Page references below are to 1990 FEIR.)		Purpose of 1990 FEIR Measure in the 1990 FEIR: Measure to Mitigate Potentially Significant Impact	Purpose of 1990 FEIR Measure in the 1990 FEIR: Improvement Measure to Reduce Less-Than-Significant Impact	Role of 1990 FEIR Measure in the SEIR: Project Feature to Avoid Significant Impacts	Role of 1990 FEIR Measure in the SEIR: Mitigation Measures Identified in this SEIR	Comments
D.11	Reserve public school site in the Project Area. (p. VI.D.117-118)	X		X		See SEIR Measure M.1.
E	***Transportation***					
E.1	Retain adequate space for maritime-related truck and rail freight activities on China Basin Street and provide for adequate capacity for maritime freight loading operations in the future. (p.VI.E.199) Note: China Basin Street is now Terry A. François Boulevard.		X			Tracks already removed from Terry A. François. Track relocation to 16th St. would not preclude rail access to Piers 48 and 50, and would permit continued access to Pier 80 via Illinois St.
E.3	*To have these intersections operate at LOS D, implement the following measures:*					
E.3a	• Restripe Mariposa Street between the I-280 ramps and Mississippi Street; Seventh Street north of 16th Street; Pennsylvania Avenue between Seventh and Mariposa Streets to four travel lanes (within existing right-of-way); and	X		X		No changes to Pennsylvania Ave. are proposed in the SEIR project. See Measures E.14 and E.17.
E.3b	• Install traffic signals when warranted by traffic volume approval criteria at the intersections of Mississippi and Mariposa Streets, Mississippi and Seventh / 16th Streets, and Pennsylvania Avenue and Mariposa Street. Measures would require funding and approval by the city Department of Public Works. (p.VI.E.200)	X		X		See SEIR Measure E.14e. No changes to Pennsylvania Avenue are included in SEIR project.

(Continued)

TABLE VI.7 (Continued)

		Purpose of 1990 FEIR Measure in the 1990 FEIR		Role of 1990 FEIR Measure in the SEIR		
SUMMARIES OF 1990 MISSION BAY FEIR MITIGATION MEASURES (Page references below are to 1990 FEIR.)		**Measure to Mitigate Potentially Significant Impact**	**Improvement Measure to Reduce Less-Than-Significant Impact**	**Project Feature to Avoid Significant Impacts**	**Mitigation Measures Identified in this SEIR**	**Comments**
E.5	Establish a Mission Bay Transportation Management Program (TMP) to reduce automobile use. The program would require developers or individual building owners to develop and maintain ongoing commute programs through the use of Transportation Management Coordinators. (p.VI.E.201)	X			X	See SEIR Mitigation Measure E.46 and E.47.
E.10	*In regard to MUNI bus and trolley routes serving the Project Area:*					
E.10b	• prohibit parking on streets used by MUNI during peak traffic periods; and	X		X		Included in project assumptions for many streets, consistent with trolley bus and Metro requirements not in mitigation.
E.10d	• install "Don't Block the Box" markings at congested intersections. (p.VI.E.204)	X		X		See SEIR Measures E.1, E.2, E.8, and E.9.
E.14	*To increase parking capacity and reduce spillover into areas adjacent to the Project Area:*					
E.14d	• Increase the cost of parking. (p.VI.E.208)	X			X	Transportation Management Plan described in 1990 FEIR somewhat different from parking management program described in SEIR due in part to changes in land uses and in planned transportation system. See SEIR Mitigation Measure E.47h.

(Continued)

TABLE VI.7 (Continued)

		Purpose of 1990 FEIR Measure in the 1990 FEIR		Role of 1990 FEIR Measure in the SEIR		
SUMMARIES OF 1990 MISSION BAY FEIR MITIGATION MEASURES (Page references below are to 1990 FEIR.)		**Measure to Mitigate Potentially Significant Impact**	**Improvement Measure to Reduce Less-Than-Significant Impact**	**Project Feature to Avoid Significant Impacts**	**Mitigation Measures Identified in this SEIR**	**Comments**
E.24	Reduce travel demand on the Bay Bridge by having MTC rescind its policy of discouraging AC Transit transbay service expansion. (p.VI.E.216)	X			X	Outside City jurisdiction. See SEIR Mitigation Measure E.44.
E.25	Increase Bay Bridge tolls for single-occupant vehicle trips, particularly during commute hours. (p.VI.E.216)	X			X	Outside City jurisdiction; partly implemented, for seismic retrofit. See SEIR Mitigation Measure E.43.
E.26	To reduce passenger crowding in order to meet an overall load factor standard of 1.25 passengers per seat on MUNI, increase capacity on the Northwest corridor by about 2% during the peak hour, and by about 5% on the Northeast corridor during the peak period. (p.VI.E.217)	X		X	X	Measure has been revised to reflect current and estimated future MUNI conditions and standards. See SEIR Mitigation Measures E.27, E28, and E.45.
	YEAR 2020 MITIGATION					
E.29	*To mitigate cumulative traffic impacts at the intersection of King Boulevard and Third Street:*					
E.29a	• Prohibit parking on King Boulevard during the peak period in the peak direction, providing three through lanes in each direction, with two left-turn lanes at Third Street and one left-turn lane at Fourth Street. (p.VI.E.218)	X		X		Lane configurations are different, but accomplish the same purpose. See SEIR Measures E.8 and E.24.
E.30	At King Boulevard and Fourth Street, provide a separate left-turn lane (southbound). (p.VI.E.219)	X		X		Different lane configurations. See SEIR Measures E.8 and E.24a.

(Continued)

TABLE VI.7 (Continued)

			Purpose of 1990 FEIR Measure in the 1990 FEIR		Role of 1990 FEIR Measure in the SEIR		
SUMMARIES OF 1990 MISSION BAY FEIR MITIGATION MEASURES (Page references below are to 1990 FEIR.)			**Measure to Mitigate Potentially Significant Impact**	**Improvement Measure to Reduce Less-Than-Significant Impact**	**Project Feature to Avoid Significant Impacts**	**Mitigation Measures Identified in this SEIR**	**Comments**
E.31		*To mitigate traffic impacts at the intersection of Third and Mariposa Streets:*					
E.31a	•	Widen the Third Street southbound approaches or prohibit parking to allow double right turn onto Mariposa, and provide an exclusive left turn on Mariposa Street onto Third Street. (p.VI.E.219)	X		X		Modified version is included. See SEIR Measure E.7.
E.31b	•	Align Owens Street with the I-280 on- and off-ramps at Mariposa Street, and widen Owens Street between King Boulevard and Mariposa to four lanes. (p.VI.E.219)	X		X		Modified version is included. See SEIR Measures E.16 and E.17.
E.32		On the LOS of MUNI Metro and bus routes serving the Project Area in 2020, provide capacity increases shown in Table VI.E.30 (listing MUNI lines expected to serve Project Area). (p.VI.E.220)	X			X	Measure has been revised to reflect current and estimated future MUNI service and has been divided into more than one measure. See SEIR Measures E.27, E.28, and Mitigation Measure E.45.
E.34		*Measures designed to change the habits of travelers during non-peak hours:*					
E.34c	•	Parking mitigation measures for the year 2000 are applicable in 2020. (p.VI.E.223)		X		X	Some of the year 2000 parking improvement measures are not discussed. See Measure E.14c in Table VI.8.

(Continued)

TABLE VI.7 (Continued)

	SUMMARIES OF 1990 MISSION BAY FEIR MITIGATION MEASURES (Page references below are to 1990 FEIR.)	Purpose of 1990 FEIR Measure in the 1990 FEIR: Measure to Mitigate Potentially Significant Impact	Purpose of 1990 FEIR Measure in the 1990 FEIR: Improvement Measure to Reduce Less-Than-Significant Impact	Role of 1990 FEIR Measure in the SEIR: Project Feature to Avoid Significant Impacts	Role of 1990 FEIR Measure in the SEIR: Mitigation Measures Identified in this SEIR	Comments
E.36	*City should coordinate with MTC, Caltrans, and other affected agencies to increase transbay travel capacity:*					
E.36g	• Provide competitive transbay ferry services, and construct new ferry terminals. (p.VI.E.230)	X			X	Measure has been or is being completed by public agencies. See SEIR Mitigation Measure E.49.
E.39	Increase transit capacity and service by 6% to 14% on the MUNI screenlines by adding more buses on new or existing routes. [See measure E.26, above] (p.VI.E.231)	X		X	X	Transit capactiy increase not discussed by percentages in SEIR; capacity increases would accommodate projected demand. See SEIR Measures E.27 and E.28, and Mitigation Measure E.45.
F	***Air Quality***					
F.1	Establish a dust control program for demolition, excavation, grading, construction, and other dust-generating activities which includes sprinkling unpaved construction areas at least twice daily, or as needed, imposing speed limits for vehicles on unpaved surfaces, covering haul trucks and storage piles, enclosing buildings with canvas drapes during the application of mineral-based insulation to building frames, and scheduling major dust-generating activities for periods when local winds are expected to be less than 12 mph. (p. VI.F.23)	X		X		See SEIR Measure F.2.
F.4	Implement measures to decrease vehicle trips. (p. VI.F.25)	X		X		See SEIR Measure F.1.

(Continued)

TABLE VI.7 (Continued)

	SUMMARIES OF 1990 MISSION BAY FEIR MITIGATION MEASURES (Page references below are to 1990 FEIR.)	Purpose of 1990 FEIR Measure in the 1990 FEIR		Role of 1990 FEIR Measure in the SEIR		
		Measure to Mitigate Potentially Significant Impact	**Improvement Measure to Reduce Less-Than-Significant Impact**	**Project Feature to Avoid Significant Impacts**	**Mitigation Measures Identified in this SEIR**	***Comments***
I	***Visual Quality and Urban Design***					
I.1	Rehabilitate closed Fire Station 30 consistent with appropriate historic preservation standards. (p.VI.I.72)	X			X	See SEIR Mitigation Measures D.2a and D.2b.
I.8	Proposition K will provide a general basis for evaluation of shadow effects of Mission Bay development on major open space. (p.VI.I.74)	X		X		Analysis showed no significant impacts as discussed in Initial Study.
I.10	Require review of designs for large buildings by a qualified wind consultant and to the extent feasible reduce wind speed and turbulence to facilitate public use of adjacent spaces. (p.VI.I.75)	X		X		Wind analysis is contained within the Initial Study and measure is discussed in Initial Study. See SEIR Mitigation Measure D.7.
J	***Cultural Resources***					
J.1	Retain the services of an archaeologist to instruct construction crews regarding potential historic archaeological resources and appropriate procedures to follow if they are uncovered, establish preconstruction testing programs and recommend any further mitigation measures required and supervise on-site monitoring during excavation in the six historic resource areas. (p. VI.J.22)	X		X		Discussed in Initial Study. See SEIR Mitigation Measure D.3.
J.2	Develop archaeological exploration programs for pre-identified sensitive historic archaeological areas. (p. VI.J.23)	X		X		Discussed in Initial Study. See SEIR Mitigation Measure D.4.

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TABLE VI.7 (Continued)

	SUMMARIES OF 1990 MISSION BAY FEIR MITIGATION MEASURES (Page references below are to 1990 FEIR.)	Purpose of 1990 FEIR Measure in the 1990 FEIR: Measure to Mitigate Potentially Significant Impact	Purpose of 1990 FEIR Measure in the 1990 FEIR: Improvement Measure to Reduce Less-Than-Significant Impact	Role of 1990 FEIR Measure in the SEIR: Project Feature to Avoid Significant Impacts	Role of 1990 FEIR Measure in the SEIR: Mitigation Measures Identified in this SEIR	Comments
J.3	Retain the services of an archaeologist to provide archaeological monitoring during construction in the area occupied by the late 19th-century city dump. (p. VI.J.25)	X		X		Discussed in Initial Study. See SEIR Mitigation Measure D.5.
J.4	Retain an architectural historian to prepare an evaluation of the architectural integrity and historical importance of closed Fire Station 30. The historian would complete a full archival and photographic record of the building. Upon completion, a copy of the report would be provided to the Environmental Review Officer in the San Francisco Department of City Planning and the President of the San Francisco Landmarks Preservation Advisory Board. (p. VI.J.25)	X			X	Discussed in Initial Study. See SEIR Mitgation Measure D.2a.
J.5	If the closed Fire Station 30 were found to be eligible for the National Register or for City Landmark designation, demolition of the structure would require additional mitigation measures, including the precise recordings of the structure through measurements, drawings and photographs. Provide sufficient detail in the documentation such that after demolition, the historical structure could be reconstructed from the survey data. (p. VI.J.26)	X			X	Discussed in Initial Study. See SEIR Mitigation Measure D.2b.
J.7	In the event that prehistoric archaeological deposits are discovered, consult local Native American organizations regarding acceptable testing and excavation procedures. (p. VI.J.27)	X		X		Discussed in Initial Study. See SEIR Mitigation Measure D.7.
K	***Geology***					
K.8	Test soils for sulfate and chloride content. If necessary, use admixtures in concrete and/or coated metal pipes to resist corrosion. (p.VI.K.49)	X		X		Addressed in Initial Study. See SEIR Mitigation Measure H.7.

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TABLE VI.7 (Continued)

	SUMMARIES OF 1990 MISSION BAY FEIR MITIGATION MEASURES (Page references below are to 1990 FEIR.)	Purpose of 1990 FEIR Measure in the 1990 FEIR: Measure to Mitigate Potentially Significant Impact	Purpose of 1990 FEIR Measure in the 1990 FEIR: Improvement Measure to Reduce Less-Than-Significant Impact	Role of 1990 FEIR Measure in the SEIR: Project Feature to Avoid Significant Impacts	Role of 1990 FEIR Measure in the SEIR: Mitigation Measures Identified in this SEIR	Comments
K.17	Require formulation of an emergency response plan for the Mission Bay Area and integrate it into emergency response planning for San Francisco. (p.VI.K.52)	X			X	See SEIR Mitigation Measure H.3.
K.21	Store within the Project Area heavy equipment that could travel on damaged roads, clear debris, and open access to the Project Area after a major earthquake. (p.VI.K.54)	X			X	See SEIR Mitigation Measure H.2.
K.22	*Construct infrastructure features with redundancy and flexibility to prevent failure during a major earthquake. Specifically:*					
	• Provide another east-west access road to the site under I-280, and prepare a seismic report on I-280 at 16th Street and retrofit as necessary.	X			X	See SEIR Mitigation Measure H.6.
	• Perform remedial strengthening and repair on Third and Fourth Street bridges.	X			X	See SEIR Mitigation Measure H.6.
L	***Hydrology and Water Quality***					
L.1	Minimize erosion of dirt storage piles, where appropriate, by installing filter fences and/or haybales to slow water and remove sediments; planting grasses; or covering soil with stabilizing coatings or plastic sheeting. (p.VI.L.35)	X			X	See SEIR Measures K.1b and K.1e.
L.6	To reduce sediments in the sewer system and at the treatment plants, install and maintain sediment and grease traps in local stormwater intakes during the construction period and clean wheels and cover loads of trucks carrying excavated spoils before they leave construction sites. (p.VI.L.37)	X			X	See SEIR Measures K.1g and K.1h.

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TABLE VI.7 (Continued)

SUMMARIES OF 1990 MISSION BAY FEIR MITIGATION MEASURES (Page references below are to 1990 FEIR.)		Purpose of 1990 FEIR Measure in the 1990 FEIR		Role of 1990 FEIR Measure in the SEIR		
		Measure to Mitigate Potentially Significant Impact	Improvement Measure to Reduce Less-Than-Significant Impact	Project Feature to Avoid Significant Impacts	Mitigation Measures Identified in this SEIR	Comments
L.7	Employ best management practices to reduce the accumulation of pollutants on the street surfaces. (p.VI.L.37)	X		X		See SEIR Measure K.5.
L.15	Protect low-lying areas from a potential rise in sea level.	X			X	Measure discussed in Initial Study. See SEIR Mitigation Measure K.6.
M	***Vegetation and Wildlife***					
M.5f	Develop wading bird and shorebird wetland habitat equal to or greater than the areal extent of the existing habitat. Planting in the area would need to include pickleweed and monitoring by a biologist for at least five years. (p.VI.M.22)	X			X	New measure is for five-year monitoring. See SEIR Mitigation Measure L.1.
M.11	Plant marsh areas with native salt marsh vegetation appropriate to the elevations of the wetland. (p.VI.M.24)	X			X	Part of wetland mitigation measure - not called out separately. See SEIR Mitigation Measure L.1.
M.13	Set criteria for measuring the success of wetland development and monitor development of marsh vegetation. If established criteria are not met, take remedial action. (p.VI.M.25)	X			X	Part of wetland mitigation measure - not called out specifically. See SEIR Mitigation Measure L.1.
M.14	Limit wet dredging operations to between the months of March and November to reduce potential impacts to the Pacific herring fishery. (p.VI.M.25a)	X			X	Mitigation for reducing impacts to herring addressed in SEIR. See SEIR Mitigation Measure L.3.

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TABLE VI.7 (Continued)

	SUMMARIES OF 1990 MISSION BAY FEIR MITIGATION MEASURES (Page references below are to 1990 FEIR.)	Purpose of 1990 FEIR Measure in the 1990 FEIR: Measure to Mitigate Potentially Significant Impact	Purpose of 1990 FEIR Measure in the 1990 FEIR: Improvement Measure to Reduce Less-Than-Significant Impact	Role of 1990 FEIR Measure in the SEIR: Project Feature to Avoid Significant Impacts	Role of 1990 FEIR Measure in the SEIR: Mitigation Measures Identified in this SEIR	Comments
M.16	Construct the wetlands with gently sloping banks. (p.VI.M.25a)		X		X	Part of wetland mitigation measure - not called out separately. See SEIR Mitigation Measure L.1.
N	***Hazardous Wastes***					
N.3c	Secure undeveloped portions of the Project Area and certain existing uses to prevent unauthorized access. (p.VI.N.43a)	X		X		See SEIR Mitigation Measure J.1e.
N.5	*Implement safety measures at cleanup sites to protect workers on the cleanup sites and other individuals living and working near the cleanup sites from hazardous airborne dust and toxic gases that could be released. (p.VI.N.44)*					Risk Management Plans will be used to control risks from contaminated soils and groundwater.
N.5a	Prevent direct contact with hazardous soils or liquids by workers at cleanup sites through the use of appropriate safety clothing and equipment, as determined on a site-specific basis. (p.VI.N.44)	X		X		See SEIR Measures J.1d and J.1i.
N.5b	Implement a dust control program if the dust from a site would otherwise be hazardous to on-site workers or nearby residents. Provide both routine and random oversight of the program by an industrial hygienist, who, if necessary, would evaluate monitoring results to determine if resultant exposure levels to dusts were within appropriate standards. (p.VI.N.45)	X		X		See SEIR Measures J.1f and F.2.
N.5c	If cleanup involves activities that present a risk of a toxic gas release, establish safety buffer zones around cleanup sites that are large enough to protect off-site individuals. (p.VI.N.45)	X		X		See SEIR Measures J.1i and J.1j.

TABLE VI.8
1990 FEIR MITIGATION MEASURES *NOT DISCUSSED* IN SEIR

	SUMMARIES OF 1990 MISSION BAY FEIR MITIGATION MEASURES (Page References below are to 1990 FEIR)	Purpose of 1990 FEIR Measure in the 1990 FEIR		Role of 1990 FEIR Measure in the SEIR		Comments	Disposition of Measures in 1990
		Measure to Mitigate a Potentially Significant Impact	Improvement Measure to Reduce Less-Than-Significant Impact	Addressed by or Incorporated in Existing Regulations	Not Applicable to SEIR Project		
B	***Land Use***						
B.1	Provide relocation assistance to those businesses with limited location options and specific site requirements. (p.VI.B.124)	X		X		Compliance assumed to extent required by state law.	Modified
B.2	Establish some means of achieving acceptable future container cargo handling capacity, such as a land exchange enabling substitution of a site in the vicinity of Piers 70 and 80 for the site adjacent to Mission Bay. (p.VI.B.124)	X			X	Previous land transfers provided back land closer to Pier 80 in exchange for property near Pier 70.	Modified
B.3	Provide a site suitable for stores with large floor areas, such as supermarkets or discount stores. (p.VI.B.124)	X			X	Does not apply to current project.	Adopted
D	***Community Services and Infrastructure***						
D.5	Install eight water cisterns each with 75,000-gallon capacity within the Project Area, cisterns to provide emergency water supply in the event mains are ruptured during earthquake. (p. VI.D.116)	X			X	No cisterns; cistern system is replaced with seven suction intakes from the Bay or Channel.	Modified
D.6	To increase the ability to fight fires after a major earthquake, provide a suction hydrant system in the Project Area consisting of nylon-neoprene hoses and portable bronze fire hydrants that can be deployed into interlocking grids linking water sources. (p. VI.D.116)		X			The suction hydrant system is included in project; includes the seven proposed suction inlets and hydrants. Hoses and portable hydrants are not included.	Adopted

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TABLE VI.8 (Continued)

	SUMMARIES OF 1990 MISSION BAY FEIR MITIGATION MEASURES (Page References below are to 1990 FEIR)	Purpose of 1990 FEIR Measure in the 1990 FEIR		Role of 1990 FEIR Measure in the SEIR		Comments	Disposition of Measures in 1990
		Measure to Mitigate a Potentially Significant Impact	Improvement Measure to Reduce Less-Than-Significant Impact	Addressed by or Incorporated in Existing Regulations	Not Applicable to SEIR Project		
D.8	Require building developers to confer with the San Francisco Police Department Crime Prevention Unit during building design and incorporate security-related concepts into building design. (p. VI.D.116)		X			Some security-related issues addressed in design guidelines.	Adopted
D.9	Provide 12,000 square feet of police facilities in the Project Area to accommodate increased police staffing, and an additional 1,000 square feet for a community/police conference room. (p. VI.D.117)		X			Land is included as part of the SEIR project. Catellus and/or the Redevelopment Agency would provide funds for a new police facility under the Mission Bay Conceptual Framework for a Proposal for the Catellus Development Portion of the South of Channel Redevelopment Plan Area, July 2, 1997, p. 25. The exact size of police facilities that would be needed has not been determined.	Adopted
D.10	Provide approximately 2,000 square feet of police facilities in the Southern District to accommodate increased police staffing needs. (p. VI.D.117)		X		X	District boundaries have changed and new Police Station has been completed (the Bayview Station). This mitigation concerned Alternative N, No Project, not Alternatives A and B.	Rejected

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TABLE VI.8 (Continued)

SUMMARIES OF 1990 MISSION BAY FEIR MITIGATION MEASURES (Page References below are to 1990 FEIR)	Purpose of 1990 FEIR Measure in the 1990 FEIR		Role of 1990 FEIR Measure in the SEIR		Comments	Disposition of Measures in 1990
	Measure to Mitigate a Potentially Significant Impact	Improvement Measure to Reduce Less-Than-Significant Impact	Addressed by or Incorporated in Existing Regulations	Not Applicable to SEIR Project		
D.12 Reopen unused or leased schools, expand existing schools, or develop new schools in the Project Area. (p. VI.D.118)		X			Improvement measure not required to mitigate significant impact.	Not within Board of Supervisors' jurisdiction
D.13 Provide additional public parkland over that provided in Alternatives A and B to meet NRPA criteria for neighborhood and district open space in the Project Area. (p. VI.D.118)		X		X	NRPA has revised its approach; not used to assess open space in SEIR.	Rejected
D.14 Provide active open space areas by the year 2000 to serve recreational needs of the Project Area residents. (p. VI.D.119)		X		X	This measure was intended for Alternative B, which contained more dwelling units and therefore a greater residential population. Also, it deals with the initial phase of development, not the project at full buildout.	Rejected
D.15 Provide centers for active recreation, such as gymnasium sports and recreational, cultural, and community programs for all age groups. (p. VI.D.119)		X			Improvement measure not required to mitigate significant impact.	Adopted
D.15a Consider guidelines provided by the Recreation and Park Department in the planning and design of Mission Bay recreation and open space, as they may apply to safety features, lighting, maintenance, activity levels, and sunlight access (among others). (p. VI.D.119)		X			Improvement measure not required to mitigate significant impact.	Adopted

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TABLE VI.8 (Continued)

	SUMMARIES OF 1990 MISSION BAY FEIR MITIGATION MEASURES (Page References below are to 1990 FEIR)	Purpose of 1990 FEIR Measure in the 1990 FEIR: Measure to Mitigate a Potentially Significant Impact	Purpose of 1990 FEIR Measure in the 1990 FEIR: Improvement Measure to Reduce Less-Than-Significant Impact	Role of 1990 FEIR Measure in the SEIR: Addressed by or Incorporated in Existing Regulations	Role of 1990 FEIR Measure in the SEIR: Not Applicable to SEIR Project	Comments	Disposition of Measures in 1990
D.16	Expand Agua Vista Park to extend into the Project Area to provide open space accessible to employees in the southern part of Mission Bay. (p. VI.D.119)		X		X	Applied to Alternative N, which added no new open space.	Rejected
D.17	Expand the South of Market Health Center to a new facility to serve health needs of Project Area and Nearby Area residents. (p. VI.D.119)		X		X	Expansion is part of South of Market Earthquake Recovery Area Redevelopment Plan.	Not within Board of Supervisors' jurisdiction
D.18	In the event of health danger following a sewage overflow, post signs prohibiting water contact. (p. VI.D.119)		X	X		San Francisco Department of Public Health already does this.	Not within Board of Supervisors' jurisdiction
D.19	Include water conservation features in Mission Bay buildings and landscaping, such as water-conserving irrigation systems, low-water use landscape materials, limited turf areas in open space, and water-conserving appliances. (p. VI.D.119)		X	X		Some conservation measures are required: low flow toilets, reclaimed water use and dual piping for it.	Modified
D.20	Remove water mains from abandoned streets and loop unconnected "dead-end" runs to improve system efficiency. (p. VI.D.120)		X		X		Modified
D.21	Install all sewer, water, and other utility lines during or before street construction for each development phase. (p. VI.D.120)		X			Proposed in Infrastructure Plan as part of each development phase.	Adopted

(Continued)

TABLE VI.8 (Continued)

	SUMMARIES OF 1990 MISSION BAY FEIR MITIGATION MEASURES (Page References below are to 1990 FEIR)	Purpose of 1990 FEIR Measure in the 1990 FEIR: Measure to Mitigate a Potentially Significant Impact	Purpose of 1990 FEIR Measure in the 1990 FEIR: Improvement Measure to Reduce Less-Than-Significant Impact	Role of 1990 FEIR Measure in the SEIR: Addressed by or Incorporated in Existing Regulations	Role of 1990 FEIR Measure in the SEIR: Not Applicable to SEIR Project	Comments	Disposition of Measures in 1990
D.22	Replace the existing 11-foot-by-11-foot box culvert along the south edge of the channel, as well as a portion of the 30-inch-by-40-inch Fourth Street Sewer, with an "L" shape further to the south to accommodate the proposed wetland. Connect the new line, under Hooper and Owens Streets, to the remaining portion of the original box culvert. (p. VI.D.120)	X			X	No wetland proposed; former wetland site not in Project Area.	Rejected
D.23	To facilitate collection of recyclable solid wastes, provide all buildings accessible on-site collection and storage areas for recyclable materials such as paper, glass, and metal. (p. VI.D.120)		X	X		In San Francisco Building Code; required by state law.	Modified
E	***Transportation***						
E.2	Provide adequate width for one vehicle lane, one bicycle lane, and a sidewalk in each direction on the new Owens Street Bridge. (p.VI.E.200)		X		X	The proposed Fifth Street Bridge would be for pedestrian traffic only. Bicycles could be walked across bridge.	Adopted
E.4	To mitigate traffic at the intersection of King Boulevard and Third Street, prohibit parking on King Boulevard during peak hours to provide three through lanes in each direction, and provide two left-turn lanes at Third Street. (p.VI.E.200)	X			X	Measure has been completed by public agencies.	Rejected

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TABLE VI.8 (Continued)

	SUMMARIES OF 1990 MISSION BAY FEIR MITIGATION MEASURES (Page References below are to 1990 FEIR)	**Purpose of 1990 FEIR Measure in the 1990 FEIR**		**Role of 1990 FEIR Measure in the SEIR**			
		Measure to Mitigate a Potentially Significant Impact	**Improvement Measure to Reduce Less-Than-Significant Impact**	**Addressed by or Incorporated in Existing Regulations**	**Not Applicable to SEIR Project**	**Comments**	**Disposition of Measures in 1990**
E.4a	To maintain and augment MUNI service, new office developments in the Project Area would be subject to the same fee requirements stated in the Transit Impact Development Fee (TIDF) Ordinance and any applicable amendments. (p.VI.E.201)	X			X	Discussed on p. VI. E.14, not a Mitigation Measure.	Rejected
E.6	Build a MUNI Metro storage, maintenance, and turnback facility. (p.VI.E.201b)		X		X	MUNI considering other sites for Metro storage facility.	Modified
E.7	Dedicate a right-of-way for an extension of MUNI Metro service south to 16th Street and provide an additional Metro stop near 16th Street. (p.VI.E.202)	X			X	Third and Fourth Streets now preferred route.	Modified
E.8	*To mitigate ridership loss caused by relocation of CalTrain terminal from Fourth and Townsend Streets to Seventh and Channel Streets, install the following terminal improvements and amenities:* • enclosed passenger waiting areas, ticket information, security offices, and food/beverage services; • sufficient parking spaces; • secure bicycle storage; • platform-to-platform connection between CalTrain and Muni Metro station;		X		X	Caltrain terminal no longer proposed to be relocated.	Rejected

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TABLE VI.8 (Continued)

SUMMARIES OF 1990 MISSION BAY FEIR MITIGATION MEASURES (Page References below are to 1990 FEIR)		Purpose of 1990 FEIR Measure in the 1990 FEIR: Measure to Mitigate a Potentially Significant Impact	Purpose of 1990 FEIR Measure in the 1990 FEIR: Improvement Measure to Reduce Less-Than-Significant Impact	Role of 1990 FEIR Measure in the SEIR: Addressed by or Incorporated in Existing Regulations	Role of 1990 FEIR Measure in the SEIR: Not Applicable to SEIR Project	Comments	Disposition of Measures in 1990
	• access along Seventh, Hooper, and Owens Streets for buses and automobiles at the CalTrain terminal. (p.VI.E.202)						
E.9	*Two approaches identified to eliminate ridership losses associated with the relocation of the CalTrain Station:*						
E.9a	• Install tunnel beneath King Boulevard right-of-way to retain a CalTrain station in the vicinity of Fourth and King Streets.(p.VI.E.203)	X			X	Caltrain terminal no longer proposed to be relocated.	Rejected
E.9b	• Provide bus service and travel times comparable to the accessibility provided at the Fourth and Townsend Street station. (p.VI.E.203)	X			X	Caltrain terminal no longer proposed to be relocated.	Rejected
E.10	*In regard to MUNI bus and trolley routes serving the Project Area:*						
E.10a	• maintain p.m. peak-period exclusive contraflow lanes for MUNI on Fourth Street between Townsend and King Streets; and		X		X	Measure has been completed by public agencies.	Not within Board of Supervisors' jurisdiction
E.10c	• design MUNI stops to require no movements across lanes at the intersections of King Boulevard with Third and Fourth Streets. (P.VI.E.204)		X		X	No MUNI stops proposed on King between Third and Fourth Streets.	Rejected

(Continued)

TABLE VI.8 (Continued)

	SUMMARIES OF 1990 MISSION BAY FEIR MITIGATION MEASURES (Page References below are to 1990 FEIR)	Purpose of 1990 FEIR Measure in the 1990 FEIR: Measure to Mitigate a Potentially Significant Impact	Purpose of 1990 FEIR Measure in the 1990 FEIR: Improvement Measure to Reduce Less-Than-Significant Impact	Role of 1990 FEIR Measure in the SEIR: Addressed by or Incorporated in Existing Regulations	Role of 1990 FEIR Measure in the SEIR: Not Applicable to SEIR Project	Comments	Disposition of Measures in 1990
E.11	Have all MUNI bus routes serving the Project Area operate at LOS D in 2000; require additional capacity for the 47-Van Ness. (p.VI.E.205)	X			X	MUNI no longer considering; other route extensions under consideration instead.	Not within Board of Supervisors' jurisdiction
E.12	Retain rail freight service to business in, and to the west of the Project Area through 2000, in accordance with applicable laws and statutes. (p.VI.E.206)		X		X	Services no longer provided.	Outside City jurisdiction
E.13	Reroute Belt Railroad, build new tracks north along China Basin Street, crossing the channel on Third Street Bridge. Retain Belt Line Service in 2000 by using 16th Street lead to access the China Basin Street tracks. (p.VI.E.206)		X		X	Belt line service no longer provided north of Channel. Project would not eliminate service to areas south of Channel.	Rejected
E.14	*To increase parking capacity:*						
E.14a	• Allow use of vacant land for temporary surface parking lots to reduce near-term development parking deficits. (p.VI.E.207)		X		X	Would not reduce significant impact.	Adopted
E.14b	• Increase parking requirements particularly for office and hotel uses, and accommodate existing parking demand for Caltrain. (p.VI.E.207)		X		X	Caltrain terminal and rail not part of Project Area; increasing parking not in conformity with General Plan (to encourage transit use).	Rejected
E.14c	• Require shared parking between complementary uses in individual buildings or building complexes in Mission Bay. (p.VI.E.207)		X			Inconsistent with General Plan policies; would not reduce significant impact.	Rejected

(Continued)

TABLE VI.8 (Continued)

	SUMMARIES OF 1990 MISSION BAY FEIR MITIGATION MEASURES (Page References below are to 1990 FEIR)	Purpose of 1990 FEIR Measure in the 1990 FEIR: Measure to Mitigate a Potentially Significant Impact	Purpose of 1990 FEIR Measure in the 1990 FEIR: Improvement Measure to Reduce Less-Than-Significant Impact	Role of 1990 FEIR Measure in the SEIR: Addressed by or Incorporated in Existing Regulations	Role of 1990 FEIR Measure in the SEIR: Not Applicable to SEIR Project	Comments	Disposition of Measures in 1990
E.15	Set curbside time limits and/or install parking meters in areas of high parking demand within the Project Area. (p.VI.E.209)		X		X		Not within Board of Supervisors' jurisdiction
E.16	Provide sidewalks of adequate widths and enforce standards regarding driveways, sidewalk lighting, crosswalks, and handicap ramps. (p.VI.E.209)		X			Incorporated as project features addressed by design guidelines and/or existing regulations.	Modified
E.17	*To reduce pedestrian conflicts for Caltrain and Metro passengers and to reduce high traffic volumes on King Blvd:*						
E.17a	Provide pedestrian crossing signals at the intersections of King with Fourth and Fifth Streets, coordinate signal "green time." (p.VI.E.209)		X		X	Measure has been completed by public agencies.	Rejected
E.17b	Provide grade-separated pedestrian crossing at the intersections of King with Fourth and Fifth Streets. (p.VI.E.209)		X			Analysis in SEIR does not show need for grade separation.	Rejected
E.18a-k	Require transportation standards tailored to special or unique conditions in the Project Area to address construction-related traffic, MUNI Metro and Caltrain stations, sidewalks, parking, traffic signals, driveways, transit pull-outs and shelters, loading docks and access, and building entrance locations. (p.VI.E.210)		X		X	Does not address significant impact. Some measures included in design standards, others not included, transit and Caltrain stations no longer part of project.	Adopted

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TABLE VI.8 (Continued)

	SUMMARIES OF 1990 MISSION BAY FEIR MITIGATION MEASURES (Page References below are to 1990 FEIR)	Purpose of 1990 FEIR Measure in the 1990 FEIR: Measure to Mitigate a Potentially Significant Impact	Purpose of 1990 FEIR Measure in the 1990 FEIR: Improvement Measure to Reduce Less-Than-Significant Impact	Role of 1990 FEIR Measure in the SEIR: Addressed by or Incorporated in Existing Regulations	Role of 1990 FEIR Measure in the SEIR: Not Applicable to SEIR Project	Comments	Disposition of Measures in 1990
E.19	To encourage HOV use to the North Bay, dedicate exclusive bus/HOV lanes during the p.m. peak commute period on the San Francisco roadway approaches to the Golden Gate Bridge. (p.VI.E.214)	X			X	Measure would add to substantial congestion on G.G. Bridge approaches; not clear that inducement for carpools and van pools would offset increased congestion.	Not within Board of Supervisors' jurisdiction
E.20	To relieve passenger crowding on Golden Gate Transit buses, increase transbay bus service capacity by about 5% over reasonably assured year 2000 capacity increases assumed in the impact analysis. (p.VI.E.214)	X			X	Capacity expected to be available for cumulative growth on Golden Gate Transit.	Outside City jurisdiction
E.21	Provide intercept parking areas in the North Bay to encourage the formation of more carpool trips. (p.VI.E.215)	X			X	Measure has been completed by public agencies.	Outside City jurisdiction
E.22	Encourage the use of transit and ridesharing by increasing tolls on Golden Gate Bridge for single-occupant vehicle trips. (p.VI.E.215)	X			X	Measure has been completed by public agencies for all vehicles.	Outside City jurisdiction
E.23	Deploy more trains up to BART's peak period service capacity of 2.25 minute headways between 10-car trains to meet carrier's load factor standard of 1.5 passengers per seat. (p.VI.E.215)	X			X	Measure has been completed by public agencies.	Outside City jurisdiction

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TABLE VI.8 (Continued)

	SUMMARIES OF 1990 MISSION BAY FEIR MITIGATION MEASURES (Page References below are to 1990 FEIR)	Purpose of 1990 FEIR Measure in the 1990 FEIR: Measure to Mitigate a Potentially Significant Impact	Purpose of 1990 FEIR Measure in the 1990 FEIR: Improvement Measure to Reduce Less-Than-Significant Impact	Role of 1990 FEIR Measure in the SEIR: Addressed by or Incorporated in Existing Regulations	Role of 1990 FEIR Measure in the SEIR: Not Applicable to SEIR Project	Comments	Disposition of Measures in 1990
E.27	Establish coordinated regional transit pass programs between MUNI and AC Transit, Golden Gate Transit, and SamTrans. (p.VI.E.217)		X		X	Measure outside City jurisdiction; other transit coordination measures such as shuttle service and transit information included in Mitigation Measure E.46.	Outside City Jurisdiction
E.28	Increase the state gas tax. (p.VI.E.217)	X			X	Measure has been completed by public agencies. Approved by vote in 1990.	Outside City jurisdiction
E.29	*To mitigate cumulative traffic impacts at the intersection of King Boulevard and Third Street:*						
E.29b	• Improve the capacity and capability of transit services connecting the rest of downtown San Francisco to the peninsula. (p.VI.E.218)	X			X	Impacts at King and Third proposed to be mitigated by other means.	Outside City jurisdiction
E.31	*To mitigate traffic impacts at the intersection of Third and Mariposa Streets:*						
E.31c	• New office developments in the project area would be subject to fee requirements in the Transit Impact Development Fee (TIDF) ordinance.	X			X	Not applicable to Mission Bay Area.	Rejected
E.33	*To maintain freight rail access to the Northern Container Terminal south of the Project Area at Islais Creek, provide access by a different lead track from the Southern Pacific mainline northbound tracks to replace the 16th Street lead that would be removed by development of the Mission Bay Alternatives.*						

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TABLE VI.8 (Continued)

SUMMARIES OF 1990 MISSION BAY FEIR MITIGATION MEASURES (Page References below are to 1990 FEIR)	Purpose of 1990 FEIR Measure in the 1990 FEIR: Measure to Mitigate a Potentially Significant Impact	Purpose of 1990 FEIR Measure in the 1990 FEIR: Improvement Measure to Reduce Less-Than-Significant Impact	Role of 1990 FEIR Measure in the SEIR: Addressed by or Incorporated in Existing Regulations	Role of 1990 FEIR Measure in the SEIR: Not Applicable to SEIR Project	Comments	Disposition of Measures in 1990
E.33a • Reconstruct the SP/Santa Fe Indiana track south to 25th Street, including restoration of the paved section at the intersection of Indiana and 25th Streets. Realign portions of Indiana Street Track. (p.VI.E.221)	X			X	SEIR project does not propose to eliminate rail access; would realign existing tracks on 16th Street.	Rejected
E.33b • Construct a new lead from under I-280 to the former Western Pacific track on Army Street. Add extra reinforcement to the sewer below freight trains. (p.VI.E.221)	X			X	SEIR project does not propose to eliminate rail access; would realign existing tracks on 16th Street.	Rejected
E.33c • Construct new track extending from the Quint Street lead via a new Islais Creek bridge to the North Container Terminal. Project Sponsor will contribute funds if this rail access alternative is selected. (p.VI.E.221a)	X			X	This measure is an alternative to measures 33a and 33b.	Modified
E.33d • If a new Islais Creek bridge is not constructed (see Measure E.33c), construct a new lead track parallel to or within 16th Street. (p.VI.E.221a)		X			Included in SEIR project.	Modified
E.34 *Measures designed to change the habits of travelers during non-peak hours:*						
E.34a • Increase off-peak transit frequencies on MUNI, as well as regional transit systems serving San Francisco, and extend regional transit service into the Project Area. (p.VI.E.222)		X		X	Would not address a significant impact.	Outside City jurisdiction

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TABLE VI.8 (Continued)

SUMMARIES OF 1990 MISSION BAY FEIR MITIGATION MEASURES (Page References below are to 1990 FEIR)		Purpose of 1990 FEIR Measure in the 1990 FEIR: Measure to Mitigate a Potentially Significant Impact	Purpose of 1990 FEIR Measure in the 1990 FEIR: Improvement Measure to Reduce Less-Than-Significant Impact	Role of 1990 FEIR Measure in the SEIR: Addressed by or Incorporated in Existing Regulations	Role of 1990 FEIR Measure in the SEIR: Not Applicable to SEIR Project	Comments	Disposition of Measures in 1990
E.34b	• If additional off-street spaces were to be provided to mitigate the effects of excess parking demand in the Project Area, up to 1,690 spaces would be needed to represent the upper limit of needed parking. (p.VI.E.222)		X		X	Contrary to General Plan policies; would not address a significant impact.	Rejected
E.34d	• Do not provide parking at MUNI Metro stations in the Project Area. (p.VI.E.223)		X			No parking proposed at Metro Stations in SEIR.	Approved
E.35	*The City could initiate a cooperative planning program with the MTC, the Golden Gate Bridge, Highway and Transportation District, Marin County, Sonoma County, and Caltrans to determine long-term transit improvements that will provide additional transbay travel capacity.*						
E.35a	• Establish an exclusive bus/HOV lane across a second deck on the Golden Gate Bridge. (p.VI.E.225)	X			X	Capacity expected to be available for cumulative growth on Golden Gate Transit.	Outside City jurisdiction
E.35b	• Establish a light rail line from the Larkspur Ferry Terminal south to San Francisco over a second deck of the Golden Gate Bridge. (p.VI.E.226)	X			X	Capacity expected to be available for cumulative growth on Golden Gate Transit.	Outside City jurisdiction
E.36	*City should coordinate with MTC, Caltrans, and other affected agencies to increase transbay travel capacity:*						

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TABLE VI.8 (Continued)

SUMMARIES OF 1990 MISSION BAY FEIR MITIGATION MEASURES (Page References below are to 1990 FEIR)	Purpose of 1990 FEIR Measure in the 1990 FEIR		Role of 1990 FEIR Measure in the SEIR		Comments	Disposition of Measures in 1990
	Measure to Mitigate a Potentially Significant Impact	Improvement Measure to Reduce Less-Than-Significant Impact	Addressed by or Incorporated in Existing Regulations	Not Applicable to SEIR Project		
E.36a • Construct a new bridge across the Bay, south of the San Francisco—Oakland Bay Bridge. (p.VI.E.227)	X				Inconsistent with City policy; would reduce congestion on Bridge but could cause impacts elsewhere; could increase auto-induced pollutant emissions.	Outside City jurisdiction; not recommended
E.36b • Expand the Oakland Bay Bridge by adding more lanes and ramps, or by providing electronic information signs and a vehicle guidance and control system. (p.VI.E.228)	X				Not within City jurisdiction.	Outside City jurisdiction; not recommended
E.36c • Expand the Hayward—San Mateo Bridge by widening the eastern section to provide six travel lanes. (p.VI.E.228)	X				Not within City jurisdiction.	Outside City jurisdiction; not recommended
E.36d • Increase BART computer capability to operate more trains. (p.VI.E.229)	X			X	BART has carried out this measure.	Outside City jurisdiction
E.36e • Construct a second BART tube, using the same right-of-way through San Francisco, or provide new BART services to areas like Geary Boulevard or south to the San Francisco Airport. (p.VI.E.229)	X			X	MTC studied a second tube in the 1980's and rejected. BART has expanded in the Region and approvals for future expansion to Airport obtained. Impact analysis in SEIR indicates that with these expansions sufficient capacity would exist.	Outside City jurisdiction

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TABLE VI.8 (Continued)

SUMMARIES OF 1990 MISSION BAY FEIR MITIGATION MEASURES (Page References below are to 1990 FEIR)		Purpose of 1990 FEIR Measure in the 1990 FEIR		Role of 1990 FEIR Measure in the SEIR			
		Measure to Mitigate a Potentially Significant Impact	Improvement Measure to Reduce Less-Than-Significant Impact	Addressed by or Incorporated in Existing Regulations	Not Applicable to SEIR Project	Comments	Disposition of Measures in 1990
E.36f	• Construct a new transbay tunnel for BART between Alameda and San Mateo Counties. (p.VI.E.230)	X			X	Not within City jurisdiction. Impact analysis in SEIR indicates that with these expansions sufficient capacity would exist.	Outside City jurisdiction
E.37	Extend CalTrain service from Santa Clara and San Mateo Counties into downtown San Francisco. (p.VI.E.230)	X			X	Under jurisdiction of Peninsula Joint Powers Board. Impact analysis in SEIR indicates that with these expansions sufficient capacity would exist.	Outside City jurisdiction
E.38	Extend light rail service from San Francisco to the San Francisco International Airport and extend BART south into Santa Clara County. (p.VI.E.231)	X			X	BART Extension approved to airport in San Mateo County. Impact analysis in SEIR indicates with these expansions, sufficient capacity would exist.	Outside City jurisdiction
F	*Air Quality*						
F.2	For dust control, request that the San Francisco Department of Public Works institute a street-cleaning program for streets within one to two blocks of the Project Area perimeter. (p. VI.F.24)		X			Does not address significant impact.	Not within Board of Supervisors' jurisdiction

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TABLE VI.8 (Continued)

	SUMMARIES OF 1990 MISSION BAY FEIR MITIGATION MEASURES (Page References below are to 1990 FEIR)	Purpose of 1990 FEIR Measure in the 1990 FEIR: Measure to Mitigate a Potentially Significant Impact	Purpose of 1990 FEIR Measure in the 1990 FEIR: Improvement Measure to Reduce Less-Than-Significant Impact	Role of 1990 FEIR Measure in the SEIR: Addressed by or Incorporated in Existing Regulations	Role of 1990 FEIR Measure in the SEIR: Not Applicable to SEIR Project	Comments	Disposition of Measures in 1990
F.3	PM_{10} ambient air quality data measured at the San Francisco BAAQMD station should be analyzed by the BAAQMD to monitor the effectiveness of the above dust control measures. If PM_{10} violations occur, implement the following measures: re-phase dust-generating construction activities, immediately remove any material spilled onto public roadways during hauling operations, and designate a person to monitor dust control and watering activities. (p. VI.F.24)	X		X		BAAQMD prepared suggested construction dust control measures in 1996 designed to accomplish necessary reductions.	*Modified*
G	*Noise*						
G.1	*Comply with the construction-related provisions of* the San Francisco Noise Ordinance. Construct noise barriers around construction sites and provide noise shielding for stationary construction equipment, such as compressors. (p. VI.G.30)	X		X		*Means of complying with* the San Francisco Noise Ordinance (Article 29, San Francisco Police Code).	*Adopted*
G.2	Implement appropriate measures to reduce pile-driving noise, as determined by the City in consultation with the construction engineers. (p. VI.G.31)	X		X		Regulated by section 2907(c) of the San Francisco Noise Ordinance.	Adopted
G.3	In order to reduce existing and future noise, the City can control which City-owned transit vehicles are used in the Project Area, where the routes are located, and how the tracks are installed. If possible, the MUNI electric bus should be used. (p. VI.G.31)		X		X	Electric trolley bus lines now proposed to be extended into Project Area, no diesel lines.	Not within Board of Supervisors jurisdiction; not recommended

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TABLE VI.8 (Continued)

	SUMMARIES OF 1990 MISSION BAY FEIR MITIGATION MEASURES (Page References below are to 1990 FEIR)	Purpose of 1990 FEIR Measure in the 1990 FEIR: Measure to Mitigate a Potentially Significant Impact	Improvement Measure to Reduce Less-Than-Significant Impact	Role of 1990 FEIR Measure in the SEIR: Addressed by or Incorporated in Existing Regulations	Not Applicable to SEIR Project	Comments	Disposition of Measures in 1990
G.4	Shield noise-sensitive receptors from high noise levels through various building design and construction techniques, as required by local and state law. (p. VI.G.32)	X		X		Required by State Law and San Francisco Building Code.	Modified
G.5	Use site planning considerations to help prevent high noise levels from reaching the exterior walls of living spaces. Design entire buildings to prevent or impede noise reaching outdoor common areas and indoor noise-sensitive areas. Place noise-compatible land uses between noise sources and sensitive receptors. (p.VI.G.32)		X			Does not address significant impact.	Rejected
G.6	Move housing from areas along Third Street to portions of the Project Area identified as being exposed to lower future noise levels, primarily along China Basin Channel. (p.VI.G.33)		X			No significant changes in noise levels shown in Project Area. Measure would be infeasible in already-developed locations outside Project Area.	Modified
G.7	Construct barriers other than buildings to lessen the magnitude of noise levels that would reach building exteriors. (p. VI.G.34)		X			No significant changes in noise levels shown in Project Area on Third Street.	Rejected
G.8	Use earthen beams along Third Street to help alleviate the exposure of Third Street residents to traffic noise levels. (p. VI.G.34)		X			Does not address significant impact.	Rejected

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TABLE VI.8 (Continued)

SUMMARIES OF 1990 MISSION BAY FEIR MITIGATION MEASURES (Page References below are to 1990 FEIR)		Purpose of 1990 FEIR Measure in the 1990 FEIR		Role of 1990 FEIR Measure in the SEIR			
		Measure to Mitigate a Potentially Significant Impact	**Improvement Measure to Reduce Less-Than-Significant Impact**	**Addressed by or Incorporated in Existing Regulations**	**Not Applicable to SEIR Project**	**Comments**	**Disposition of Measures in 1990**
G.9	Protect houseboat residents of the channel from high noise levels from the relocated Caltrain station by providing earthen berms or walls at some point between the station and the channel. Placement of such structures on the northern side of Owens Street would also help to reduce traffic noise originating there. (p. VI.G.34)	X			X	Caltrain station no longer proposed to be moved.	Rejected
H	***Energy (This topic was discussed in the Initial Study)***						
H.1	Where feasible replace energy-intensive materials and construction methods with less-intensive ones. (p. VI.H.21)		X			Measures to increase energy efficiency do not address a significant impact and would be beyond that required by law.	Rejected
H.2, a-n	Use energy-efficient appliances, require building system operation and maintenance plans, consider provision of recycling facilities, provide load management guidelines, use natural cooling, consider passive solar space heating, incorporate energy management and control systems where feasible, meter the electricity and natural gas use of residential units on an individual basis and commercial tenants on at least a floor-by-floor basis, consider the energy implications of landscaping and building orientation, optimize glazing, and study the use of photovoltaics. The City and PG&E are to conduct a five-year feasibility study of the potential for District Heating and Cooling, daylighting, and cogeneration. (p. VI.H.21)		X			Measures to increase energy efficiency do not address a significant impact and would be beyond that required by law.	Modified

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TABLE VI.8 (Continued)

	SUMMARIES OF 1990 MISSION BAY FEIR MITIGATION MEASURES (Page References below are to 1990 FEIR)	Purpose of 1990 FEIR Measure in the 1990 FEIR: Measure to Mitigate a Potentially Significant Impact	Purpose of 1990 FEIR Measure in the 1990 FEIR: Improvement Measure to Reduce Less-Than-Significant Impact	Role of 1990 FEIR Measure in the SEIR: Addressed by or Incorporated in Existing Regulations	Role of 1990 FEIR Measure in the SEIR: Not Applicable to SEIR Project	Comments	Disposition of Measures in 1990
H.3	Reduce transportation energy consumption through measures to decrease vehicle trips (p. VI.H.25)		X			Measures to increase energy efficiency do not address a significant impact and would be beyond that required by law.	Adopted
I	***Visual Quality and Urban Design***						
I.2	Adopt urban design guidelines for Mission Bay, which would include requirements for variation in building height, bulk, tower separation, mid-block paths or courts, and facade materials. (p.VI.I.72)		X		X	These are generally contained in the design guidelines and standards.	Adopted
I.3	Adopt urban design guidelines for Mission Bay that would require adequate sidewalk widths and street lighting and landscaping. (p.VI.I.72)		X		X	These are generally contained in the design guidelines and standards.	Adopted
I.4	Develop specific guidelines for landscaping, setbacks, parking location, and screening for locations where residential uses adjoin S/LI/RD uses. (p.VI.I.72)		X		X	These are generally contained in the design guidelines and standards.	Adopted
I.5	Formulate guidelines for building height, setbacks, and separation of towers for office or S/LI/RD development between Owens Street and I-280 to reduce visual impacts. (p.VI.I.72)		X		X	These are generally contained in the design guidelines and standards.	Adopted
I.6	Reduce the 200-foot height district in the center of the Project Area to 130 feet. (p.VI.I.73)		X		X	SEIR project does not include 200-ft. height district.	Rejected

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TABLE VI.8 (Continued)

	SUMMARIES OF 1990 MISSION BAY FEIR MITIGATION MEASURES (Page References below are to 1990 FEIR)	Purpose of 1990 FEIR Measure in the 1990 FEIR: Measure to Mitigate a Potentially Significant Impact	Purpose of 1990 FEIR Measure in the 1990 FEIR: Improvement Measure to Reduce Less-Than-Significant Impact	Role of 1990 FEIR Measure in the SEIR: Addressed by or Incorporated in Existing Regulations	Role of 1990 FEIR Measure in the SEIR: Not Applicable to SEIR Project	Comments	Disposition of Measures in 1990
I.7	To the extent consistent with other land use considerations and design criteria articulated in the Design Guidelines of the Specific Plan, minimize shading of open space through articulation of building faces, setbacks, building separation, tower separation and setbacks, use of mansard or gable roofs, and reduced building heights. (p.VI.I.73)		X			Discussed in the Initial Study. Does not address a significant effect.	Modified
I.9	Include design factors to reduce wind speeds and turbulence such as: • Building setbacks along street frontages; • Articulation of the building facade and balconies or bay windows; and • Trellises, walls, large mature trees, and other elements to break up wind flows through mid-block lanes and courtyards. (p.VI.I.74)		X			Discussed in Initial Study. Means of addressing wind conditions are now addressed in Measure D.7.	Modified
J	***Cultural Resources (This topic was discussed in the Intital Study)***						
J.6	Leave the cut-basalt block pavement on King and Sixth Streets intact, or remove and reuse it for road or pathway material in other Mission Bay locations, or remove and reuse it in other parts of the City. (p. VI.J.26)		X		X	Basalt blocks removed for MUNI light rail and new I-280 ramps.	Adopted

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TABLE VI.8 (Continued)

	SUMMARIES OF 1990 MISSION BAY FEIR MITIGATION MEASURES (Page References below are to 1990 FEIR)	Purpose of 1990 FEIR Measure in the 1990 FEIR		Role of 1990 FEIR Measure in the SEIR		Comments	Disposition of Measures in 1990
		Measure to Mitigate a Potentially Significant Impact	Improvement Measure to Reduce Less-Than-Significant Impact	Addressed by or Incorporated in Existing Regulations	Not Applicable to SEIR Project		
K	***Geology***						
K.1	For structures of three stories or greater, conduct a comprehensive boring, sampling, and testing program to determine the engineering properties of the soil as required by the building permit process. (p.VI.K.45)	X		X		Measures now are incorporated in the San Francisco Building Code./1/ Addressed in Initial Study.	Adopted
K.2	Use pile-supported foundations (or other comparable foundations) wherever engineering practices and soil reports indicate that they are needed. (p.VI.K.45)	X		X		Measures now are incorporated in the San Francisco Building Code./2/ Addressed in Initial Study.	Adopted
K.2a	Retain qualified soils engineers to design and evaluate the use of piles, as required by the building permit process. The following actions would occur:						
	• design, execution, and evaluation of a thorough test boring program;	X		X		Measures are now incorporated in the San Francisco Building Code./3/ Addressed in Initial Study.	Adopted

(Continued)

1. City and County of San Francisco Municipal Code, Building Code, adopted December 14, 1995, Sections 1804 and 1807.
2. City and County of San Francisco Municipal Code, Building Code, adopted December 14, 1995, Sections 1804 and 1807.
3. City and County of San Francisco Municipal Code, Building Code, adopted December 14, 1995, Sections 1804 and 1807.

TABLE VI.8 (Continued)

SUMMARIES OF 1990 MISSION BAY FEIR MITIGATION MEASURES (Page References below are to 1990 FEIR)	Purpose of 1990 FEIR Measure in the 1990 FEIR		Role of 1990 FEIR Measure in the SEIR		Comments	Disposition of Measures in 1990
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• determination that satisfactory materials are found along the bearing length of the piles as well as below the tips of the piles;	X		X		Measures are now incorporated in the San Francisco Building Code./4/ Addressed in Initial Study.	Adopted
• consideration of downdrag on the pile due to fill overlying compressible soils; and	X		X		Measures are now incorporated in the San Francisco Building Code./5/ Addressed in Initial Study.	Adopted
• engineering supervision by soils engineers for every pile installed. (p.VI.K.46)	X		X		Measures are now incorporated in the San Francisco Building Code./6/ Addressed in Initial Study.	Adopted
K.2b Design connections between pile-supported structures and unsupported sidewalks and driveways to reduce the likelihood of separation due to settlement. (P.VI.K.47)		X	X			Adopted

(Continued)

4. City and County of San Francisco Municipal Code, Building Code, adopted December 14, 1995, Sections 1804 and 1807.

5. City and County of San Francisco Municipal Code, Building Code, adopted December 14, 1995, Sections 1804 and 1807.

6. City and County of San Francisco Municipal Code, Building Code, adopted December 14, 1995, Sections 1804 and 1807.

TABLE VI.8 (Continued)

		Purpose of 1990 FEIR Measure in the 1990 FEIR		Role of 1990 FEIR Measure in the SEIR			
SUMMARIES OF 1990 MISSION BAY FEIR MITIGATION MEASURES (Page References below are to 1990 FEIR)		**Measure to Mitigate a Potentially Significant Impact**	**Improvement Measure to Reduce Less-Than-Significant Impact**	**Addressed by or Incorporated in Existing Regulations**	**Not Applicable to SEIR Project**	**Comments**	**Disposition of Measures in 1990**
K.2c	Design flexible connections for utilities serving pile-supported buildings to accommodate the settlement expected in the surrounding soil. (p.VI.K.47)	X		X		Measures now are incorporated in the San Francisco Building Code./7/ Addressed in Initial Study.	Adopted
K.3	Use existing piles to support new structures, to the extent feasible and appropriate. (p.VI.K.47)	X		X		Required by 1995 San Francisco Building Code.	Adopted
K.4	If shallow foundations are used for any buildings, install leveling jacks as part of the foundations or use other available methods to compensate for differential settlement, where feasible. (p.VI.K.47)		X				Adopted
K.5	Use surcharging and vertical drains to accelerate settlement if site-specific soils studies indicate need. (p.VI.K.48)	X			X	Current SEIR project design eliminates need for surcharging. Addressed in Initial Study.	Modified
K.5a	Cover, coat, or seed the bare dirt to protect it from wind and rainfall. (p.VI.K.49)	X		X		Required by 1995 San Francisco Building Code. Addressed in Initial Study.	Modified
K.5b	Where feasible, use soil excavated from other parts of the Project Area for surcharging to minimize the transport of soil. (p.VI.K.49)	X			X	Current SEIR project design eliminates need for surcharging. Addressed in Initial Study.	Modified

(Continued)

7. City and County of San Francisco Municipal Code, Building Code, adopted December 14, 1995, Sections 1804 and 1807.

TABLE VI.8 (Continued)

	SUMMARIES OF 1990 MISSION BAY FEIR MITIGATION MEASURES (Page References below are to 1990 FEIR)	Purpose of 1990 FEIR Measure in the 1990 FEIR: Measure to Mitigate a Potentially Significant Impact	Purpose of 1990 FEIR Measure in the 1990 FEIR: Improvement Measure to Reduce Less-Than-Significant Impact	Role of 1990 FEIR Measure in the SEIR: Addressed by or Incorporated in Existing Regulations	Role of 1990 FEIR Measure in the SEIR: Not Applicable to SEIR Project	Comments	Disposition of Measures in 1990
K.6	To the extent urban design priorities would allow, keep basements above the water table so that dewatering would not be required. Construct project streets at or above existing grades to reduce the amount of excavation and the potential to encounter groundwater. (p.VI.K.49)		X		X	Does not address a significant effect. Addressed in Initial Study.	Modified
K.7	As required by City guidelines, design surface drainage systems, storm drains, and sewers to accommodate future settlement. (P.VI.K.49)	X		X			Adopted
K.9	Adopt and enforce, as a minimum, the seismic standards of the 1988 Uniform Building Code (which have been incorporated into the 1990 San Francisco *Building Code*). (p.VI.K.50)	X		X		Required by 1995 San Francisco Building Code.	Adopted
K.10	Require studies that would test the performance of exterior cladding and glazing materials during seismic events and determine those least dangerous particularly to pedestrians. (p.VI.K.50)	X		X		Required by 1995 San Francisco Building Code.	Not within Board of Supervisors' jurisdiction
K.11	Consider establishing a group of qualified geotechnical and structural engineers to provide peer review of the seismic design of structures at Mission Bay to ensure that state-of-the-art practices are used and requiring the use of spectral response analysis to determine the behavior of specific midrise structures sited on thick, soft clay sediments in response to low-frequency seismic waves. (p.VI.K.50)		X			Not required to address significant impact; addressed by use of 1997 Uniform Building Code.	Modified

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TABLE VI.8 (Continued)

	SUMMARIES OF 1990 MISSION BAY FEIR MITIGATION MEASURES (Page References below are to 1990 FEIR)	Purpose of 1990 FEIR Measure in the 1990 FEIR: Measure to Mitigate a Potentially Significant Impact	Purpose of 1990 FEIR Measure in the 1990 FEIR: Improvement Measure to Reduce Less-Than-Significant Impact	Role of 1990 FEIR Measure in the SEIR: Addressed by or Incorporated in Existing Regulations	Role of 1990 FEIR Measure in the SEIR: Not Applicable to SEIR Project	Comments	Disposition of Measures in 1990
K.12	Implement measures during building construction, as required by the California Occupational Safety and Health Administration, which would reduce seismic-related hazards, including securing equipment overnight and using safety belts and attached lifelines where appropriate. (p.VI.K.51)	X		X		Required by CalOSHA and 1995 San Francisco Building Code.	Modified
K.13	Require and certify quality assurance/quality control (QA/QC) programs to ensure that materials and construction meet design standards. (p.VI.K.51)	X		X		Required by 1995 San Francisco Building Code.	Adopted
K.14	Require bracing or reinforcement of nonstructural features in non-residential structures to prevent casualties and property damage. Require that residential units have braced water heaters and that chimneys in wood-frame buildings should not be of masonry materials unless they are reinforced construction. (p.VI.K.51)	X		X		Required by 1995 San Francisco Building Code.	Modified
K.15	As deemed necessary by geotechnical studies, make sandy materials more dense to reduce the potential for liquefaction. (p.VI.K.52)	X		X		Required by 1995 San Francisco Building Code.	Adopted
K.16	Require automatic shutoff devices on natural gas lines leading to structures. (p.VI.K.52)	X		X		Required by 1995 San Francisco Building Code.	Adopted
K.18	*Site and design emergency facilities so that they would remain functional after a major earthquake. The following standards should be used if feasible:*	X				Superceded by Mitigation Measure H.3 (emergency response plan) and H.6 (emergency access routes).	Modified

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TABLE VI.8 (Continued)

SUMMARIES OF 1990 MISSION BAY FEIR MITIGATION MEASURES (Page References below are to 1990 FEIR)	Purpose of 1990 FEIR Measure in the 1990 FEIR: Measure to Mitigate a Potentially Significant Impact	Purpose of 1990 FEIR Measure in the 1990 FEIR: Improvement Measure to Reduce Less-Than-Significant Impact	Role of 1990 FEIR Measure in the SEIR: Addressed by or Incorporated in Existing Regulations	Role of 1990 FEIR Measure in the SEIR: Not Applicable to SEIR Project	Comments	Disposition of Measures in 1990
• Construct emergency facilities using foundation design techniques that provide maximum seismic safety.	X				Superceded by Mitigation Measure H.3 (emergency response plan).	Modified
• Do not site emergency facilities where more than two inches of settlement is expected during the next 30 years.	X				Superceded by Mitigation Measure H.3 (emergency response plan) and H.6 (emergency access routes).	Modified
• Locate emergency facilities away from elevated freeway structures which could shed debris or collapse.	X				Superceded by Mitigation Measure H.3 (emergency response plan).	Modified
• Design redundant infrastructure connections.	X				Superceded by Mitigation Measure H.3 (emergency response plan).	Modified
• Design a conservative structure which would be likely to suffer limited damage in a major earthquake.	X				Superceded by Mitigation Measure H.3 (emergency response plan).	Modified
• Provide emergency generators at all important facilities such as fire and police stations, hospitals, emergency shelters, and pump stations for water and sewage.	X				Superceded by Mitigation Measure H.3 (emergency response plan).	Modified
• Install emergency communication equipment.	X				Superceded by Mitigation Measure H.3 (emergency response plan).	Modified

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TABLE VI.8 (Continued)

SUMMARIES OF 1990 MISSION BAY FEIR MITIGATION MEASURES (Page References below are to 1990 FEIR)		Purpose of 1990 FEIR Measure in the 1990 FEIR: Measure to Mitigate a Potentially Significant Impact	Purpose of 1990 FEIR Measure in the 1990 FEIR: Improvement Measure to Reduce Less-Than-Significant Impact	Role of 1990 FEIR Measure in the SEIR: Addressed by or Incorporated in Existing Regulations	Role of 1990 FEIR Measure in the SEIR: Not Applicable to SEIR Project	Comments	Disposition of Measures in 1990
	• Brace, anchor, and protect non-structural components. (p.VI.K.53)	X				Superceded by Mitigation Measure H.3 (emergency response plan).	Modified
K.19	Build a mass care facility in the Project Area (or design school, if built, to function as one) and equip it with emergency medical supplies and provisions. Design community facilities so that they may be used to supplement the mass care facility. (p.VI.K.54)	X				Superceded by Mitigation Measure H.3 (emergency response plan) and H.6 (emergency access routes).	Adopted
K.20	Provide cisterns in the Project Area to store water and suction hydrants to use Bay water for fighting fires. (See Measure D.5 for another mitigation measure related to cisterns.) (p.VI.K.54)	X			X	High-pressure water system for fire-fighting (including suction inlets but not cisterns) would be installed in Project Area.	Adopted
K.22	*Construct infrastructure features with redundancy and flexibility to prevent failure during a major earthquake.*						
	• Prepare contingency plans to ensure that emergency repairs to bridge approaches can be made promptly.	X				Superceded by Mitigation Measure H.3 (emergency response plan) and H.6 (emergency access routes).	Adopted
	• Place MUNI Metro tracks west of the zones where settlement of more than two inches is expected where feasible.		X		X	Not part of project.	Rejected
	• Provide good anchorage for all electrical system components.		X	X			Adopted

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TABLE VI.8 (Continued)

	SUMMARIES OF 1990 MISSION BAY FEIR MITIGATION MEASURES (Page References below are to 1990 FEIR)	Purpose of 1990 FEIR Measure in the 1990 FEIR: Measure to Mitigate a Potentially Significant Impact	Purpose of 1990 FEIR Measure in the 1990 FEIR: Improvement Measure to Reduce Less-Than-Significant Impact	Role of 1990 FEIR Measure in the SEIR: Addressed by or Incorporated in Existing Regulations	Role of 1990 FEIR Measure in the SEIR: Not Applicable to SEIR Project	Comments	Disposition of Measures in 1990
	• Use flexible couplings or welded steel pipe for pipelines.		X	X			Adopted
	• Ensure that state-of-the-art information is applied to the design of infrastructure. (p.VI.K.54)	X		X			Adopted
K.23	Perform seismic rehabilitation of vacant Firehouse 30 at Third, Fourth, and Mission Rock Streets.	X		X		If retained, seismic strengthening would be required.	Adopted
K.24	In regard to use of hazardous materials at Mission Bay, conduct periodic inspections of non-structural features of buildings in which hazardous materials are located. (p.VI.K.55)		X	X			Not within Board of Supervisors' jurisdiction
L	***Hydrology and Water Quality***						
L.2	For all wet dredging: • Dredge during times when tide and runoff have high turbidity and would not carry excessive suspended material from the channel into the Bay. • Avoid dredging when herring are expected to spawn. (p.VI.L.35)	X			X	Project includes no dredging.	Modified
L.3	For wet dredging with suction equipment, employ the best available practices for reducing turbidity. (p.VI.L.35)	X			X	Project includes no dredging.	Adopted

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TABLE VI.8 (Continued)

	SUMMARIES OF 1990 MISSION BAY FEIR MITIGATION MEASURES (Page References below are to 1990 FEIR)	Purpose of 1990 FEIR Measure in the 1990 FEIR: Measure to Mitigate a Potentially Significant Impact	Purpose of 1990 FEIR Measure in the 1990 FEIR: Improvement Measure to Reduce Less-Than-Significant Impact	Role of 1990 FEIR Measure in the SEIR: Addressed by or Incorporated in Existing Regulations	Role of 1990 FEIR Measure in the SEIR: Not Applicable to SEIR Project	Comments	Disposition of Measures in 1990
L.4	For wet dredging with buckets, use equipment to minimize loss of sediment and install silt screens to minimize sediment movement away from the site. (p.VI.L.36)	X			X	Project includes no dredging.	Adopted
L.5	To reduce peak runoff flows and overflows, employ devices such as rooftop or surface detention structures to hold runoff so that it could be released more slowly. (p.VI.L.36)		X		X	"Clean" stormwater released with first flush diversion system.	Rejected
L.8	Study hydrology and water quality of China Basin Channel or the Bay at each wetland site to determine design constraints. (p.VI.L.37)	X			X	No wetland sites anticipated for SEIR project.	Adopted
L.9	If surface water or groundwater contamination at levels that would harm wetland vegetation or wildlife is present, perform necessary cleanup operations prior to development of the wetland. (p.VI.L.38)	X			X	No wetland sites anticipated for SEIR project.	Adopted
L.10	Design wetlands to ensure proper flushing and drainage throughout the tidal cycle. (p.VI.L.38)	X			X	No wetland sites anticipated for SEIR project.	Adopted
L.11	Construct wetlands and design stormwater collection systems in surrounding open space to reduce the flow of urban runoff into the wetland. (p.VI.L.38)	X			X	No wetland sites anticipated for SEIR project.	Adopted
L.12	Investigate existing and potential groundwater contamination prior to development and take appropriate remedial action for any existing problems. (p.VI.L.38)	X			X		Adopted

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TABLE VI.8 (Continued)

	SUMMARIES OF 1990 MISSION BAY FEIR MITIGATION MEASURES (Page References below are to 1990 FEIR)	Purpose of 1990 FEIR Measure in the 1990 FEIR: Measure to Mitigate a Potentially Significant Impact	Purpose of 1990 FEIR Measure in the 1990 FEIR: Improvement Measure to Reduce Less-Than-Significant Impact	Role of 1990 FEIR Measure in the SEIR: Addressed by or Incorporated in Existing Regulations	Role of 1990 FEIR Measure in the SEIR: Not Applicable to SEIR Project	Comments	Disposition of Measures in 1990
L.13	Use corrosion-resistant pipes and underground storage tanks to reduce leakage into the groundwater. (p.VI.L.39)	X					Not within Board of Supervisors' jurisdiction
L.14	To protect the public from health hazards posed by exposure to water in China Basin Channel following wet-weather sewage overflows or leaks caused by accidents or emergencies, such as earthquakes, install railings and barriers to restrict access to the channel. Place multi-lingual explanation and warning signs along the channel explaining potential health consequences of water contact or eating fish caught in the channel. (p.VI.L.39)	X		X		Not required of SEIR project because already implemented by City as part of Water Pollution Prevention Program.	Rejected
M	***Vegetation and Wildlife***						
M.1	Provide large blocks and wide strips of open space and parklands to maximize their value to wildlife, as included in Variant 12. (p.VI.M.21)		X			Does not address a significant effect. Addressed in Initial Study.	Adopted
M.2	Establish vegetation as soon as feasible after construction. (p.VI.M.21)		X			Does not address a significant effect. Addressed in Initial Study.	Modified
M.3	Plant fruit, nut, and berry producing trees and shrubs in open space areas to increase the primary productivity of the site, providing food for birds. (p.VI.M.21)		X			Does not address a significant effect. Addressed in Initial Study.	Rejected

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TABLE VI.8 (Continued)

	SUMMARIES OF 1990 MISSION BAY FEIR MITIGATION MEASURES (Page References below are to 1990 FEIR)	Purpose of 1990 FEIR Measure in the 1990 FEIR		Role of 1990 FEIR Measure in the SEIR		Comments	Disposition of Measures in 1990
		Measure to Mitigate a Potentially Significant Impact	Improvement Measure to Reduce Less-Than-Significant Impact	Addressed by or Incorporated in Existing Regulations	Not Applicable to SEIR Project		
M.3a	To the maximum extent practicable, use organic controls on pests and weeds in landscaping. Prepare a list of chemical pesticides and herbicides to be avoided by park personnel and property owners in Mission Bay. (p.VI.M.21)	X				Does not address a significant effect; Best Management Practices may include such measures.	Adopted
M.4	Plant foliage buffers between open space areas and roadways and areas of high human activity. (p.VI.M.22)		X			Does not address a significant effect. Addressed in Initial Study.	Rejected
M.5	*Provide wetland habitat opportunities in the Project Area. (p.VI.M.22)*						
M.5a	• Adjacent to the proposed China Basin wetlands develop at least 13.2 acres of additional wetlands. (p.VI.M.22)	X			X	Mitigation for loss of wetland habitat. Specific wetland mitigation addressed in SEIR.	Rejected
M.5b	• Develop the mid-channel area currently proposed as wetlands as park-like open space. (p.VI.M.22)		X		X	Does not address a significant effect.	Rejected
M.5c	• Eliminate the proposed Hooper Street between the proposed open space and the channel. (p.VI.M.22)		X		X	Does not address a significant effect.	Rejected
M.5d	• In lieu of developing seven acres of bayfront wetlands between Pier 54 and Pier 64 develop an additional seven acres of wetlands continuous with the China Basin wetlands at the Banana Triangle. (p.VI.M.22)	X			X	Mitigation for loss of wetland habitat. Specific wetland mitigation addressed in SEIR.	Rejected

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TABLE VI.8 (Continued)

SUMMARIES OF 1990 MISSION BAY FEIR MITIGATION MEASURES (Page References below are to 1990 FEIR)		Purpose of 1990 FEIR Measure in the 1990 FEIR		Role of 1990 FEIR Measure in the SEIR			
		Measure to Mitigate a Potentially Significant Impact	Improvement Measure to Reduce Less-Than-Significant Impact	Addressed by or Incorporated in Existing Regulations	Not Applicable to SEIR Project	Comments	Disposition of Measures in 1990
M.5e	• In conjunction with M.5d eliminate the proposed Daggett Street east of Fourth Street. (p.VI.M.22)		X		X	Does not address a significant effect.	Rejected
M.5g	• To ensure minimal displacement of individual birds, phase development of wetlands so that birds would have places to go while other wetlands are being developed. (p.VI.M.23)		X		X	Does not address a significant effect. Specific wetland mitigation addressed in SEIR.	Rejected
M.6	Remove existing debris/fill in proposed wetlands areas to an elevation at least 2 to 3 feet below the desired elevations of marsh restoration and then completely cap with clean dredge spoils. These spoils should preferably have a higher (greater than 90%) silt and clay content. (p.VI.M.23)	X			X	Part of wetland mitigation design. Specific wetland mitigation addressed in SEIR.	Rejected
M.7	Enclose wetland restoration areas with a hard edge, e.g., a concrete retaining wall. (p.VI.M.23)	X			X	Part of wetland mitigation design. Specific wetland mitigation addressed in SEIR.	Rejected
M.8	Maximize opportunities for education and observation of the wetland by providing educational displays and, possibly, an observation tower. Design public access to prevent intrusion into the wetland. (p.VI.M.24)		X		X	Wetland not included as part of project.	Modified
M.9	Level the design slope above the elevation of +2.8 feet NGVD to maximize the pickleweed zone within the wetland. (p.VI.M.24)	X			X	Part of wetland mitigation design. Specific wetland mitigation addressed in SEIR.	Rejected

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TABLE VI.8 (Continued)

	SUMMARIES OF 1990 MISSION BAY FEIR MITIGATION MEASURES (Page References below are to 1990 FEIR)	Purpose of 1990 FEIR Measure in the 1990 FEIR: Measure to Mitigate a Potentially Significant Impact	Purpose of 1990 FEIR Measure in the 1990 FEIR: Improvement Measure to Reduce Less-Than-Significant Impact	Role of 1990 FEIR Measure in the SEIR: Addressed by or Incorporated in Existing Regulations	Role of 1990 FEIR Measure in the SEIR: Not Applicable to SEIR Project	Comments	Disposition of Measures in 1990
M.10	Grade wetland islands to an elevation that would provide protected nest sites for birds and a refuge from high tides for small animals. (p.VI.M.24)	X			X	Part of wetland mitigation design. Specific wetland mitigation addressed in SEIR.	Adopted
M.12	Construct wetland islands with clean dredge spoils and clean upland soil (at the appropriate elevations) to provide a viable substrate for plant growth. (p.VI.M.25)	X			X	Part of wetland mitigation design. Specific wetland mitigation addressed in SEIR.	Adopted
M.15	Investigate potential hazardous waste contamination of wetland restoration areas prior to the establishment of wetlands (see Measures N.1 and N.2). (p.VI.M.25a)		X		X	Wetland not included as part of project.	Adopted
N	***Hazardous Wastes***						
N.1	Conduct a "Comprehensive Areawide Survey" to locate and identify hazardous waste deposits in the Project Area and monitor any migration of contaminated groundwater into or out of the Project Area. This measure is based on specifications in the *Mission Bay Hazards Mitigation Program* and includes surface soil sampling and analysis, a subsurface soil gas survey for volatile organic compounds, and installation and sampling of perimeter groundwater monitoring wells. (p.VI.N.39)	X				Completed more detailed and comprehensive sampling. Area wide survey intent was to identify acute problems requiring immediate attention. Completed sampling shows such conditions don't exist.	Adopted

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TABLE VI.8 (Continued)

	SUMMARIES OF 1990 MISSION BAY FEIR MITIGATION MEASURES (Page References below are to 1990 FEIR)	Purpose of 1990 FEIR Measure in the 1990 FEIR: Measure to Mitigate a Potentially Significant Impact	Purpose of 1990 FEIR Measure in the 1990 FEIR: Improvement Measure to Reduce Less-Than-Significant Impact	Role of 1990 FEIR Measure in the SEIR: Addressed by or Incorporated in Existing Regulations	Role of 1990 FEIR Measure in the SEIR: Not Applicable to SEIR Project	Comments	Disposition of Measures in 1990
N.2	Develop an Investigation Plan to evaluate portions of the Project Area in detail prior to each phase of development. Each Plan will evaluate development areas and appropriate buffer zones and will characterize hazardous wastes to a degree comprehensive enough to allow planning and initiation of remediation activities. After review and approval of the Investigation Plan, the investigation activities may commence, including soil borings and comprehensive subsurface soil sampling, collection of soil gas samples, sampling of foreign materials, drilling and sampling of groundwater monitoring wells, chemical analysis of samples, electromagnetic surveys for buried tanks and piping, and establishment and sampling of buffer zones. Make the draft and final Investigation Plans available for public comment. (p.VI.N.40)	X				Risk analysis should show greatest exposure risk during construction is to construction workers and risks to them are controllable through RMPs. Therefore, no need for buffer zones. Also, buffers were included because sampling was to be done in phases. So a sampling "buffer" was required. Now, entire site has been sampled and found not to contain any uncontrollable hazards. So, "buffer" no longer necessary.	Adopted

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TABLE VI.8 (Continued)

	SUMMARIES OF 1990 MISSION BAY FEIR MITIGATION MEASURES (Page References below are to 1990 FEIR)	Purpose of 1990 FEIR Measure in the 1990 FEIR: Measure to Mitigate a Potentially Significant Impact	Purpose of 1990 FEIR Measure in the 1990 FEIR: Improvement Measure to Reduce Less-Than-Significant Impact	Role of 1990 FEIR Measure in the SEIR: Addressed by or Incorporated in Existing Regulations	Role of 1990 FEIR Measure in the SEIR: Not Applicable to SEIR Project	Comments	Disposition of Measures in 1990
N.3, N.3a,b, e,f,g	Develop site remediation plans for each IRPDA within the Project Area to eliminate existing public health hazards and minimize future risks to public health and safety. Remediation plans will deal specifically with contaminants of concern detected during site sampling, in accordance with applicable state and federal guidance for cleanup. Remediation or cleanup measures might include activities such as soil removal, on-site containment, on-site treatment, groundwater pumping or dewatering, air stripping, or extraction and filtration. Site remediation activities will require approval and/or coordination with regulatory agency personnel. Form an advisory panel including relevant principal agency and City representatives to ensure agency coordination. (p.VI.N.41-43b)	X				To extent Mission Bay South, in the free product area for example, requires remediation, need will be addressed through RMPs. Agency coordination addressed through new state legislation (NISC 25260-25268).	Adopted
N.3d	Post background letter of credit or similar security to ensure that investigation and remediation, once begun, will proceed to completion; post bond, letter of credit, or similar security to ensure that each IRPDA is appropriately investigated and remediated. (p.VI.N.43a)		X			Rather than proposing remediation as the default choice, the current project would use Risk Management Plans to determine the steps necessary for control of risks from contaminated soil and groundwater.	Modified

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TABLE VI.8 (Continued)

	SUMMARIES OF 1990 MISSION BAY FEIR MITIGATION MEASURES (Page References below are to 1990 FEIR)	Purpose of 1990 FEIR Measure in the 1990 FEIR		Role of 1990 FEIR Measure in the SEIR		Comments	Disposition of Measures in 1990
		Measure to Mitigate a Potentially Significant Impact	Improvement Measure to Reduce Less-Than-Significant Impact	Addressed by or Incorporated in Existing Regulations	Not Applicable to SEIR Project		
N.4	Implement a planned, systematic cleanup of the entire Project Area as recommended in Measures N.1 and N.2 for Alternatives A and B. (p.VI.N.44)	X				Rather than proposing remediation as the default choice, the current project would use Risk Management Plans to determine the steps necessary for control of risks from contaminated soil and groundwater.	Rejected
N.5d	Develop an evacuation plan prior to drilling or excavation in areas having the possibility of a dangerous gas release. The plan would require that safety actions (including evacuation) be taken if a gas release was of a long-term nature or larger than expected. (p.VI.N.45)	X		X		Soil testing required by Article 20 is expected to determine if explosive hazard exists prior to excavation. Site mitigation plan required by Article 20 would address hazards associated with any explosive hazard found.	Adopted
N.5e	Monitor odors and fumes with appropriate explosive gas detectors or organic vapor analyzers during site remediation. (p.VI.N.45)	X				Soil testing required by Article 20 is expected to determine if explosive hazard exists prior to excavation. Site mitigation plan required by Article 20 would address hazards associated with any explosive hazard found.	Adopted

NOTES: Mitigation Measures

1. California Public Resources Code Section 21166 and State CEQA Guidelines Section 15162.

2. Peter Straus, Director of Service Planning, San Francisco Municipal Railway, telephone conversation with Wilbur Smith Associates, March 18, 1998.

3. The reconfiguration of the existing traffic circle at Townsend and Eighth Streets would provide the most effective intersection geometry with a traffic signal, based on anticipated volumes and existing lane configurations. Another possibility, signalizing the traffic circle without changing the existing geometric configuration, is not common practice for a traffic circle of this size.

4. UCSF studied a potential subsidy program as part of its LRDP, but because its TSM funds are fixed, and the TSM program must be self-supporting, it was not feasible to maintain and expand the existing TSM Plan while instituting a subsidy program that successfully diverts 5% or more of person trips from single occupancy vehicles to transit.

5. Bay Area Air Quality Management District (BAAQMD), *BAAQMD CEQA Guidelines; Assessing the Air Quality Impacts of Projects and Plans*, April 1996, Table 2, Feasible Control Measures for Construction Emissions of PM_{10}, p. 14.*

6. BAAQMD, *BAAQMD CEQA Guidelines; Assessing the Air Quality Impacts of Projects and Plans*, April 1996, p. 13.*

7. University of California San Francisco, *UCSF Long Range Development Plan Final Environmental Impact Report,* State Clearinghouse No. 95123032, certified January 1997, pp. 83-85, 357.

8. San Francisco Planning Department, *Mission Bay Final Environmental Impact Report*, Planning Department File No. 86.505E, State Clearinghouse No. 86070113, certified August 23, 1990, Volume II, p. VI.G.31.*

9. a) U.S. Department of Health and Human Services Public Health Service, Centers for Disease Control and Prevention, and National Institutes of Health, *Biosafety in Microbiological and Biomedical Laboratories*, 3rd ed., May 1993.

   b) U.S. Department of Health and Human Services, National Institutes of Health, *Guidelines for Research Involving Recombinant DNA Molecules (NIH Guidelines)*, January 1996.

   c) National Research Council, *Guide for the Care and Use of Laboratory Animals*, 1996.

10. Association of Bay Area Governments, *Manual of Standards for Erosion and Sediment Control Measures*, 2nd ed., May 1995, pp. 7.15-7.18.

11. Stormwater Quality Task Force, *Municipal Best Management Practice Handbook*, prepared by Camp Dresser & McKee, Larry Walker Associates, Uribe and Associates, and Resources Planning Associates, March 1993.

    Stormwater Quality Task Force, *Industrial/Commercial Best Management Practice Handbook*, prepared by Camp Dresser & McKee, Larry Walker Associates, Uribe and Associates, and Resources Planning Associates, March 1993.

12. Robert Tasto, Fisheries Biologist, California Department of Fish and Game, personal communication with EIP Associates, August 19, 1997.

13. Timothy Tronson, Director of Facilities Planning, San Francisco Unified School District, telephone conversation with EIP Associates, February 13,1998.

14. Timothy Tronson, Director of Facilities Planning, San Francisco Unified School District, telephone conversation with EIP Associates, February 13,1998.

15. The provision of funds by Catellus and/or the Redevelopment Agency for a new fire facility is called for in the *Mission Bay Conceptual Framework for a Proposal for the Catellus Development Portion of the South of Channel Redevelopment Plan Area,* July 2, 1997, p. 25.*

* A copy of this report is on file for public review at the Office of Environmental Review, Planning Department, 1660 Mission Street, San Francisco.

VII. VARIANTS TO THE PROPOSED PROJECT

This chapter evaluates variants to the project that are under consideration by the project sponsors, and provides a comparative analysis of the potential environmental impacts for each variant. A variant is the same as the proposed project and has substantially the same impacts and cumulative impacts, except where specifically noted. Unless otherwise stated, mitigation measures for the project would also apply to the variants. Variants typically modify one limited area or aspect of the project, whereas alternatives (see Chapter VIII, Alternatives to the Proposed Project) provide a different approach to the project as a whole. The variants selected for analysis are as follows:

- **Terry A. François Boulevard Variant**: Under this variant, the alignment of Terry A. François Boulevard would be moved west, away from the Bay, so that a portion of the proposed Bayfront public open space would be adjacent to port property fronting the Bay. A proposal for expanded bayfront open space, if adopted, would include development by Catellus of approximately 2 acres of adjacent open space on port property outside of the Project Area, and include provisions within Project Area open space for a 15,000-sq.-ft., port-owned, recreation-oriented retail space that could include related restaurant uses.

- **Esprit Commercial Industrial/Retail Variant (Esprit Variant)**: Under this variant, the land use designation for the Esprit site would be changed from Mission Bay South Retail (assumed for environmental analysis for the block under the project to be about 250,000 gross sq. ft. of city-serving retail uses) to Commercial Industrial/Retail (assumed for environmental analysis of the block under the variant to be about 460,000 gross sq. ft. of research, light-industrial and office uses and 40,000 gross sq. ft. of city-serving retail uses).

- **No Berry Street At-Grade Rail Crossing Variant (No Berry Street Crossing Variant)**: This variant would not include the at-grade railroad crossing at Berry Street that is proposed by the project. The rail crossing across from Hooper Street that is proposed as part of the project would also be proposed under the variant. Due to reduced access to and from the west, city-serving retail development in Mission Bay North on the block west of the I-280 King Street ramp is assumed to be reduced from 222,000 gross sq. ft. with the project to 111,000 gross sq. ft. with the variant. The number of dwelling units on that block would be reduced from 250 to 120 units, reducing the total number of dwelling units in Mission Bay North from 3,000 with the project to 2,870 with the variant.

- **Modified No Berry Street At-Grade Rail Crossing Variant (Modified No Berry Street Crossing Variant)**: As with the No Berry Street Crossing Variant (Variant 3), this variant would not include the at-grade railroad crossing at Berry Street that is proposed by the project. The rail crossing across from Hooper Street that is proposed as part of the project would also be proposed under the variant. In contrast to Variant 3, Berry Street would be extended around the end of China Basin Channel to intersect with The Common, immediately east of the Caltrain tracks. The Common would be widened. The intersection of Seventh Street, The Common, and the Berry Street extension would require additional right-of-way from the elimination of two of the five Caltrain tracks that run parallel to Seventh Street between Berry Street and The Common. The three remaining tracks would be shifted about 20 feet east in the area where The Common crosses to Seventh Street. As with Variant 3, due to reduced access to and from the west, city-serving retail development in Mission Bay North on the block west of the I-280 King Street ramp is assumed to be reduced from 222,000 gross sq. ft. with the project to 111,000 gross sq. ft. with the variant. In contrast to Variant 3, this variant would not reduce the number of dwelling units on that block.

- **Mission Bay North Retail Variant**: This variant would change the allocation of land uses between the two blocks bounded by Townsend, Third, Berry, and Fourth Streets in the proposed Mission Bay North Retail land use designation. Under the variant, each of the two blocks would contain nearly the same amount of entertainment-oriented commercial and residential land uses as the other. The amount of total development on the two blocks with the variant would be the same as the total with the project.

- **Castle Metals Block Commercial Industrial/Retail Variant (Castle Metals Block Variant)**: This variant would change the land use designation on the whole block containing Castle Metals from Commercial Industrial and Mission Bay South Retail to Commercial Industrial/Retail. The development program assumed for environmental analysis on the whole block would change from the 366,000 gross sq. ft. of Commercial Industrial, 310,000 gross sq. ft. of city-serving retail, and 3,200 gross sq. ft. of neighborhood-serving retail land uses under the project to 964,000 gross sq. ft. of Commercial Industrial, 50,000 gross sq. ft. of city-serving retail, and 3,200 gross sq. ft. of neighborhood-serving retail land uses under the variant. In addition, this variant would create a new height zone on a portion of the block fronting on Third and Mariposa Streets. It would permit development of up to 90 feet in height on 90% of the area and a (new) tower of up to 160 feet in height on 10% of the area. The rest of the block would remain in Height Zone 6.

Each variant is available for selection by the project sponsors, the City, and the public, and any combination of variants could be approved. This chapter focuses the analysis on topics where the effects of the variant could differ from those of the project due to the variant's different characteristics. Even if all variants were to be adopted, no new significant impacts other than those identified below for each variant would be expected to occur, because the variants under consideration by the project sponsors are geographically separated and because the majority of the variants' differing characteristics would have site-specific effects that would not combine with effects from other variants into larger, project-wide effects.

This chapter also assesses the environmental effects of the combination of variants presently under consideration by the project sponsors (see Section G). The project sponsors developed this combination of variants to the proposed project as a result of public comments and from refinements to the project made by the project sponsors since publication of the Draft SEIR. This combination of variants includes the following (see above for description):

- Variant 1, the Terry A. François Boulevard Variant;
- Variant 2, the Esprit Variant;

- Variant 3A, the Modified No Berry Street Crossing Variant; and
- Variant 5, the Castle Metals Block Variant.

As discussed below in Section VII.G, the combination of variants would not create significant impacts beyond those already identified in the SEIR based on the environmental assessment of the project and the individual variants.

A. VARIANT 1: TERRY A. FRANÇOIS BOULEVARD VARIANT

DESCRIPTION

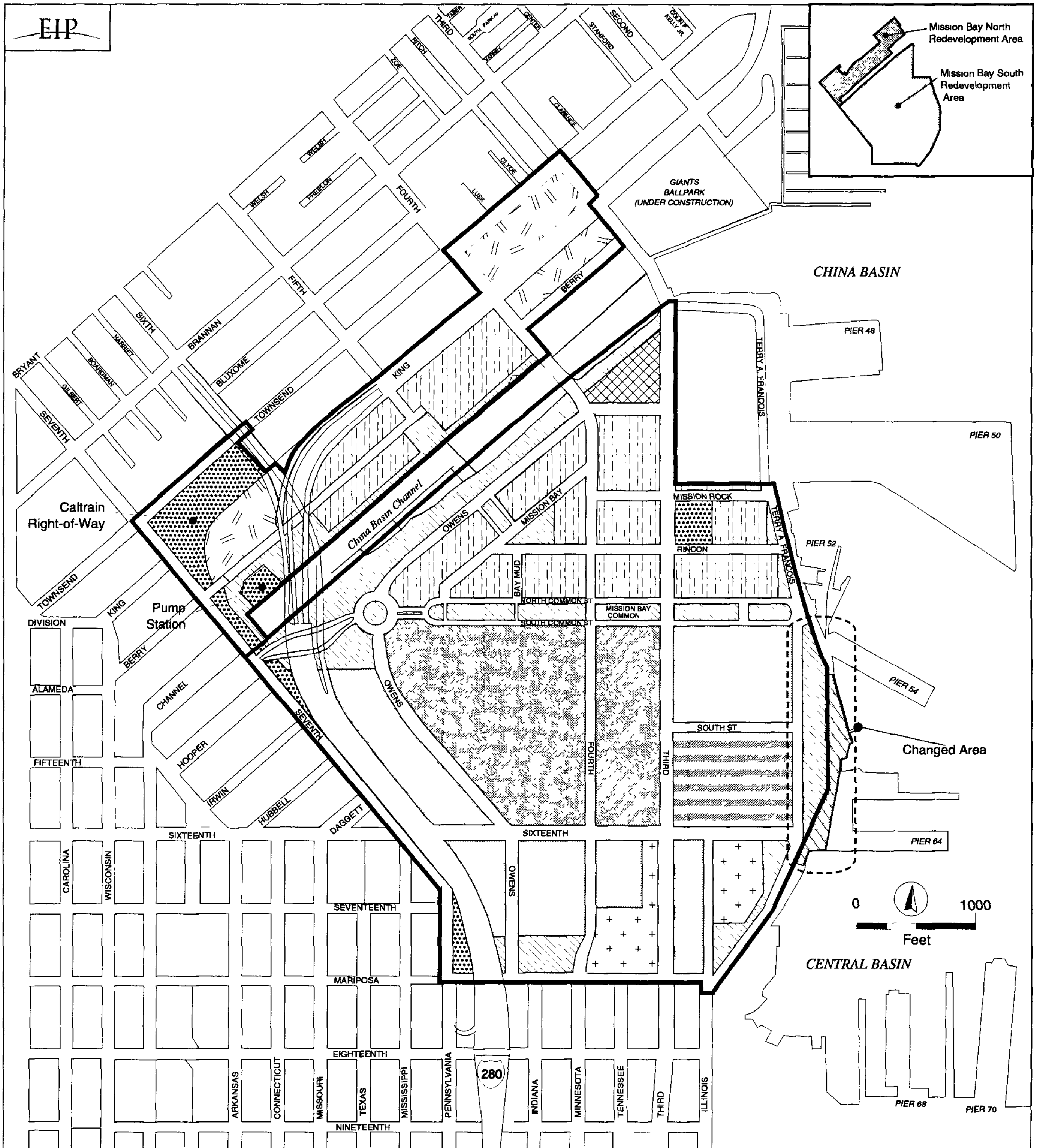
This variant would be the same as the proposed project, except that Terry A. François Boulevard would be realigned. The boulevard would run parallel to Third Street beginning south of The Common and extending to 16th Street. This new alignment would allow a portion of the project's Bayfront public open space to be adjacent to the waterfront, as shown in Figure VII.A.1. Preliminary plans for the proposed parking lot for the public boat launch ramp at Pier 52 indicate that it would be in the northern end of this open space, similar to the proposed project, with driveway access from Terry A. François Boulevard approximately opposite Pier 54. Access to Pier 54 would be provided through the proposed parking lot using the same driveway. The project sponsors' preliminary conceptual plans show access to the small-boat storage and repair uses located on port property between Pier 54 and 16th Street on a roadway extending south from the proposed parking lot to the south end of Pier 54. A 15-foot-wide pedestrian walkway would be provided in the public open space, similar to the proposed project. This walkway would connect the parking lot to the boat launch ramp north of The Common and would extend south to Mariposa Street.

The existing rail track alignment providing freight rail access to Pier 80 south of the Project Area would have to be modified in this variant to continue serving Pier 80 and to provide service to Piers 48 and 50. The existing tracks extend from 16th Street north along Terry A. François Boulevard./1/ The existing curve in the intersection of Terry A. François Boulevard at 16th Street is large enough for trains to negotiate safely; a realigned boulevard in this variant would establish a more typical right-angle intersection at 16th Street that could be used by trains. The track alignment currently contemplated by the project sponsors in this variant, described under "Transportation" below, would place the tracks in the proposed bayfront public open space east of the roadway for approximately 900 feet, with provisions to extend the tracks north either in or parallel to the pedestrian walkway to serve Piers 48 and 54 in the future if needed by the Port.

- **PROPOSAL FOR PROJECT/PORT INTEGRATED AND EXPANDED BAYFRONT OPEN SPACE**

- Since the publication of the Draft SEIR, additional detail has been developed regarding bayfront open space proposed to be located west of Terry A. François Boulevard as part of the Terry A. François Boulevard Variant. This proposal arose from conversations between the Port and project sponsors regarding how to implement the variant, including the coordination of improvement plans for Catellus- and port-owned lands to create an integrated and expanded bayfront open space.

- Under the expanded bayfront open space proposal, the Terry A. François Boulevard Variant would be modified as follows (see revised Figure VII.A.1). Open space within the Project Area would be integrated with 2 acres of additional public open space on port property outside the Project Area that Catellus also would develop. Development of the open space on port property would involve the demolition of two existing port-owned commercial buildings that currently house a boat repair business and small-boat storage facility. In addition, the Mission Bay South Redevelopment Plan would be revised to allow a port-owned building containing up to 15,000 gross square feet of recreation-serving retail space that could include related restaurant uses to be built within the bayfront open space area inside the Project Area. Other aspects of the Terry A. François Boulevard Variant would remain substantially the same.



REDEVELOPMENT PLAN LAND USE DESIGNATIONS

- COMMERCIAL INDUSTRIAL
- COMMERCIAL INDUSTRIAL / RETAIL
- MISSION BAY NORTH RETAIL
- MISSION BAY SOUTH RETAIL
- MISSION BAY RESIDENTIAL
- HOTEL
- MISSION BAY OPEN SPACE (allows recreation-serving retail building east of Terry A. Francois Blvd.)
- UCSF (includes City school site)
- COMMUNITY FACILITIES
- ADDITIONAL BAYFRONT OPEN SPACE (PORT PROPERTY)
- MISSION BAY PROJECT AREA

96555/8-20-98

SOURCE San Francisco Redevelopment Agency

FIGURE VII.A.1 LAND USES FOR TERRY A. FRANCOIS BOULEVARD VARIANT

ENVIRONMENTAL ISSUES

As described below, the Terry A. François Boulevard Variant would have the same significant impacts and require the same mitigation measures as the proposed project.

Plans, Policies, and Permits

The relationship of the variant to pertinent plans or policies would be substantially the same as with the proposed project. Realignment of Terry A. François Boulevard would not involve any changes. The General Plan recreation and open space analysis would remain unchanged for this variant.

While the Project Area is outside the boundaries of the Port of San Francisco's *Waterfront Land Use Plan*, provision of open space along the waterfront is consistent with those goals of the *Waterfront Land Use Plan* that call for new open space and public access. The *Waterfront Land Use Plan* also calls for existing maritime support uses to remain and would allow new recreational boating and water uses and small-scale commercial and accessory retail uses between Pier 52 and Mariposa Street. Realignment of Terry A. François Boulevard might make access to port property between Pier 52 and 16th Street more difficult, and could limit the Port's ability to foster a full range of such uses. If the proposal for creation of the integrated and expanded bayfront open space system is implemented, then amendments to the Waterfront Land Use Plan would be needed to reflect the development of the 2 port acres as an integrated whole with the project's bayfront open space.

Land Use

The realignment of Terry A. François Boulevard between The Common and 16th Street would create a public open space area for this segment of the waterfront with closer proximity to the Bay shore. Parking for the Public Boat Launch Ramp would be similar to the parking afforded with the project because a vehicle trailer parking lot would be located within the proposed open space immediately south of the launch ramp on the Bayside rather than on the west side of the boulevard. This parking would likely be permit-only parking and would not be available to visitors to the area. This variant would limit access to the existing maritime service uses on Pier 54 and the boat storage yard and small-boat repair use south of Pier 54 by realigning the roadway that now provides direct vehicular access for these uses. As currently contemplated by the project sponsors, these uses would have indirect access via a driveway through the parking lot proposed at the north end of the public open space to a roadway extending south. Future users of these port properties could not be assured of direct vehicular access for employees, patrons or deliveries, which, under the project, would continue to be provided by Terry A. François Boulevard. The limited access to this area provided in this variant could constrain the Port's ability to expand small-scale services for the boating activities in the area and to expand small-boat repair and storage services.

Reconfiguration of the roadway under this variant may entail the relocation of rail tracks through a portion of the waterfront public open space. If this were to occur, use of the southern portion of this variant's proposed public open space along the waterfront would be more constrained than would this portion of the project's proposed public open space areas along Terry A. François Boulevard. Although, as with the project, no significant land use effects have been found for this variant, the variant would involve a number of land use trade-offs compared with the project. Under the project, the proposed eastern public open space would be separated from the Bay by Terry A. François Boulevard, a street with traffic, parking and bike lanes, and freight rail tracks. Under this variant, the proposed public open space would be traversed by a multipurpose pedestrian path, a route for service delivery vehicles to access the piers and waterfront businesses, and freight rail trackage. Design options and routes for vehicular access to the piers and businesses, rail trackage, and a pedestrian path that could enhance compatibility with the proposed open space have not yet been fully explored.

If the expanded bayfront open space proposal were implemented, development of the additional 2 acres of open space on port property would enhance the project's open space under this variant. As described in the paragraph above, once the existing Terry A. François Boulevard is closed (thereby eliminating the direct access to waterfront uses existing now), and until such time as the existing waterfront uses were vacated, the project sponsors would provide indirect access via a driveway through the parking lot proposed at the north end of the public open space for the public boat launching ramp to a roadway extending south. Under this proposal, access to maritime service uses on Pier 54 would continue to be limited; removal of two commercial buildings, however, would address the issue of limited access to existing waterfront uses in these areas. However, the access difficulties could persist until the expanded open space were developed. This variant's multipurpose pedestrian path would not change, except that it would be constructed closer to the Bay on port property. It is likely that the 15,000-gross-sq.-ft. commercial building would be developed on a footprint not to exceed 7,500 square feet within the bayfront open space inside the Project Area under this variant and would be two stories tall. The Port expects to develop recreation-oriented retail space that could include restaurant use. The Port is proposing a minimum amount of parking to accommodate handicapped users, possibly using valet parking to serve other users.

Business Activity, Employment, Housing, and Population

There would be no substantial differences in the business activity, employment, housing, and population implications of this variant from the implications of the proposed project. Under the expanded bayfront open space proposal, the commercial development would support up to about 43 new retail employees, a 0.1% increase in the project's 29,994 estimated jobs.

Visual Quality and Urban Design

Views along Terry A. François Boulevard would change from the views associated with the proposed project. Under the variant, research and development, light-industrial, and retail buildings extending in height up to 90 feet, plus mechanical penthouses and stacks, would front the boulevard. The buildings would not step down toward the public open space, as with the proposed project, but would be separated from the public open space by the realigned street, forming a more urban edge. The public open space would be in closer proximity to the Bay. As a result, north-south views would be changed, and views along the waterfront would focus more on the open space east of Terry A. François Boulevard under the variant. Views of piers and land uses on port-owned property to the east of the existing Terry A. François Boulevard alignment would remain unchanged.

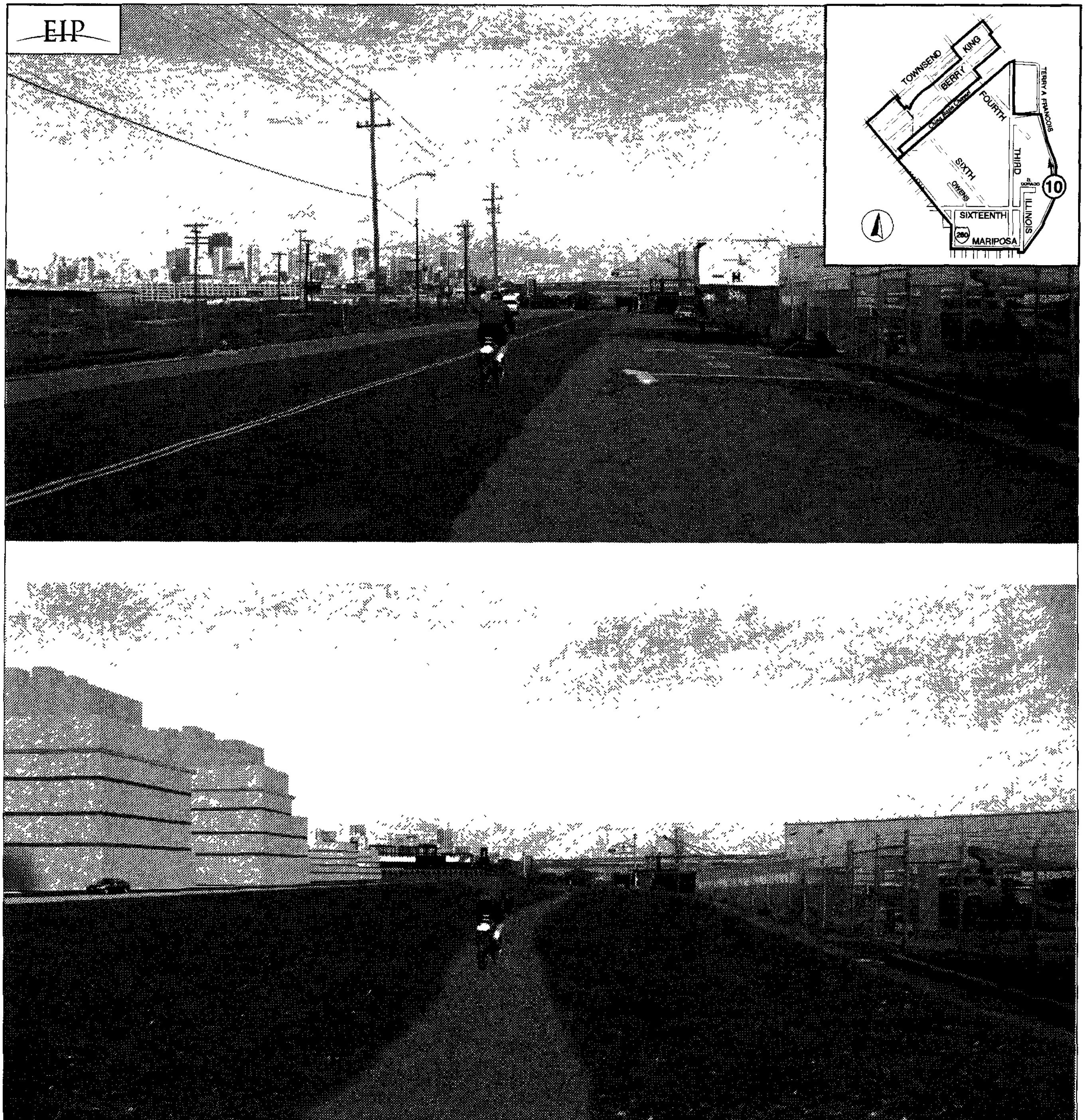
Figure VII.A.2 shows the view for the variant looking northerly in the vicinity of Pier 64 and the existing boulevard. For comparison with the project, see Viewpoint 10 of Figure V.D.13.

Under the expanded bayfront open space proposal, open space would be extended to the bay shore and views of the Bay between Pier 54 and Pier 64 from realigned Terry A. François Boulevard would be unobstructed. Additionally, a small commercial building, most likely two stories in height, would be visible within the bayfront open space inside the Project Area.

Transportation

The realignment of Terry A. François Boulevard would not change the operation of the transportation network. It is assumed that the boulevard would carry the same amount of vehicular and bicycle traffic under either alignment (see Appendix Figure D.7). The boulevard is not planned to be used by any transit provider; therefore, no transit service would be affected by the change in the boulevard location. The pedestrian path on the east side and adjacent to Terry A. François Boulevard under the proposed project would function in a similar manner under this variant, remaining relatively close to the waterfront, rather than adjacent to the roadway.

Access to the proposed parking area for the boat launch ramp near The Common would be relocated under this variant from the north end of the open space on the west side of Terry A. François Boulevard to the east side, remaining at the north end of the open space. The boat launch ramp at Pier 52 is slightly north of the proposed location of The Common, where realignment of Terry A. François Boulevard would begin. The proposed parking area for the boat launch ramp would be located just south of the east end of The Common, with access at its southern end from Terry A. François Boulevard, opposite Pier 54. An access/egress point would be provided at the boat launch



Top: View from Terry A. Francois Boulevard existing alignment near Pier 64
Bottom: Potential view from Terry A. Francois Boulevard existing alignment near Pier 64

96555/3-20-988

SOURCE: Square One Productions

NOTE: The visual simulation illustrates general height and massing permitted under the variant, but does not necessarily represent maximum development at any particular location nor specific architecture or urban design.

FIGURE VII.A.2 VARIANT 1: EXISTING AND POTENTIAL VIEWS FROM EXISTING TERRY A. FRANCOIS BOULEVARD ALIGNMENT NEAR PIER 64

ramp directly from Terry A. François Boulevard. An access drive and a separate 15-foot-wide pedestrian walkway also would be provided between the parking lot and the boat launch ramp. The project sponsors' preliminary conceptual plans show that access to Pier 54, the existing small-boat storage area, and the small-boat repair facility south of Pier 54 and north of 16th Street could be provided on an access road extending from the parking lot south to the existing B & I Boats facility.

The freight rail track on 16th Street and in Terry A. François Boulevard in the Project Area provides access to Pier 80 south of the Project Area; trains travel east from the main tracks, north on Terry A. François Boulevard and then travel in reverse from Terry A. François Boulevard to Illinois Street to the pier area. The alignment of these tracks connecting to Pier 80 would need to be modified compared to the proposed project if they were to remain in the realigned Terry A. François Boulevard because the turning radius necessary to turn from 16th Street onto the new boulevard alignment would be too small for trains. Various approaches to the rail realignment would be possible. The variant proposes that the tracks would curve beginning at the intersection of 16th Street and Terry A. François Boulevard, and extend into the proposed open space east of the boulevard. Possible effects on proposed public open space use are described above under "Land Use" and below under "Community Services and Utilities."

- If the expanded bayfront open space proposal is adopted, the retail space would not significantly alter the transportation impacts described for the project. The retail space would create a total of approximately 130 person trips and approximately 60 vehicle trips more than the project during the p.m. peak hour, and would create about 15 more transit trips than the project during the p.m. peak hour. Most of the additional vehicle trips would occur on 16th Street and Third Street and would not cause any significant impacts beyond those currently described for project conditions.

- The parking demand for the additional retail space would be approximately 65 spaces. No on-site parking spaces would be provided beyond a few handicapped and valet or drop-off spaces. Thus, the parking deficit for the project would increase by approximately 1% to approximately 4,820 spaces. Some visitors to the retail space would seek on-street parking in the area. The issues surrounding access to existing boat repair and storage area use, and possibly to other potential future uses, would remain until such time as the Port built the commercial structure and terminated use of the existing port properties.

Air Quality

As with the project, traffic emissions of reactive organic gases, nitrogen oxides, carbon monoxide, and particulate matter with the variant would exceed the Bay Area Air Quality Management District

(BAAQMD) thresholds of significance for regional air quality impacts. Trip reduction measures discussed in Mitigation Measures E.47-E.50 in Section VI.E, Mitigation Measures: Transportation, would not reduce emissions of criteria pollutants below these BAAQMD significance thresholds. Therefore, these vehicular emissions would be an unavoidable significant regional air quality impact. Vehicle emissions would not increase over project conditions. Since land uses for this variant are similar to those of the proposed project, it is not expected that the realignment of Terry A. François Boulevard would have an effect on health risks from toxic air contaminant emissions in the Project Area. Significant impacts, localized risk, and cumulative risk impacts would remain unchanged from those of the project.

Noise and Vibration

Since traffic volumes for this variant would not change at any of the noise study locations compared to volumes for the proposed project, noise levels would remain the same as those discussed for the proposed project. Residential areas would not be affected by traffic noise from the rerouting of Terry A. François Boulevard away from the Bay because the rerouting would not bring the boulevard closer to residential buildings. Freight rail tracks would remain near the water's edge, as they are now, and would not be in the realigned Terry A. François Boulevard right-of-way adjacent to commercial industrial land uses. Therefore, vibration effects would be the same as those described for the project. Other noise and vibration issues as discussed in Section V.G, Noise and Vibration: Impacts would remain the same as discussed for the proposed project.

Seismicity

The realignment of Terry A. François Boulevard under this variant would not alter the geologic, soils, or seismic conditions in the Project Area. The seismic hazards and potential impacts in Mission Bay South would be similar to those for the proposed project.

Health and Safety

There would be no change in the built land use program under this variant, therefore no substantive difference in health and safety impacts would occur.

Contaminated Soils and Groundwater

Most of the Project Area would experience the same soil and groundwater effects as those described for the proposed project. Relocation of Terry A. François Boulevard and establishment of public open space in the existing roadway right-of-way could expose users of the public open space to contaminants now under the paved roadway, unless mitigated. One soil or groundwater sampling site was located directly in the portion of Terry A. François Boulevard right-of-way that would become public open space in this variant. Part of the southern portion of the public open space in this variant location would be over the estimated location of the petroleum free product plume, as would the southern portion of the public open space in the location proposed with the project (see "Petroleum Free Product" under "Results of the 1997 Soil and Groundwater Investigations" in Section V.J, Contaminated Soils and Groundwater: Setting). The sampling location in the portion of Terry A. François Boulevard that would be in the proposed new open space is just north of 16th Street. Tests of samples from that location showed relatively lower levels of chemical contamination than sampling locations closer to existing and former petroleum storage tanks and pipelines, in 16th Street and in the area around 16th and Illinois Streets, that are thought to have caused the petroleum free product plume. The sample taken may not be fully representative of the entire Terry A. François Boulevard right-of-way (see "Existing Human Health Risks" under "Results of the 1997 Soil and Groundwater Investigations," in Section V.J, Contaminated Soils and Groundwater: Setting). Excavation of 50 cubic yards or more of soil for construction of the open space landscaping and any recreational facilities would require compliance with Article 20 of the San Francisco Public Works Code, as for the project. Soil testing would be carried out at that time, and if testing revealed hazardous materials in excess of state or federal standards, a site mitigation plan would be prepared.

As explained for the proposed project, while chemicals of various types and concentrations were found in the soil and groundwater throughout the Mission Bay Project Area, the main chemicals of concern that were detected are petroleum hydrocarbons and metals. Other chemicals were occasionally detected at elevated levels, but with no defined pattern indicating that specific sources of contamination remain in the Project Area other than the former petroleum facilities near 16th Street. The free product area in the southeastern part of Mission Bay South will be addressed independently of the proposed project or any variants, as required by the Regional Water Quality Control Board (see "Bulk Petroleum Handling Facilities" under "Site Background," in Section V.J, Contaminated Soils and Groundwater: Setting).

The analysis prepared for the project to assess impacts to human health from chemicals in the soil and groundwater assumed that access to soil and groundwater would be limited by buildings, paved areas, or landscaping. In open space areas, such as the area between Terry A. François Boulevard and the Bay in this variant, surface materials would consist of horticultural-quality fill, or approved excavated materials, or landscaped paved areas, thus preventing direct contact with chemicals that may be in soil or groundwater.

A Risk Management Plan (RMP) is proposed to be prepared for Mission Bay South under this variant, as for the proposed project; this plan would include measures to reduce any risks that might result from construction and from use of open space in the area of Terry A. François Boulevard in the future, as well as for the rest of the Project Area. The RMP would include restrictions on access to subsurface soils and protocols for future subsurface activities for trenching or other excavation after landscape treatments were installed. These measures would be applied to the variant as they would under the project. No additional measures are needed for this variant.

- If the expanded bayfront open space proposal is adopted, Article 20, Section 1000, et seq., of the San Francisco Public Works Code, commonly known as the Maher Ordinance (see p. V.J.51), would apply to the port property outside of the Project Area. Current discussions of the proposal include provisions to prepare an RMP for the port property based on the program developed for the Project Area and to include this provision in the environmental remediation agreement that would be part of the Mission Bay South Owner Participation Agreement between Catellus and the Redevelopment Agency.

Hydrology and Water Quality

The realigned Terry A. François Boulevard would be within the Central/Bay Basin, which is the drainage subbasin south of the Channel (see Figure V.K.2, in Section V.K, Hydrology and Water Quality). As described in "Proposed Drainage Plan," in Section V.K, Hydrology and Water Quality: Impacts, the Central/Bay Basin would have a separated sewer system which would divert the initial flows of each storm to the Southeast Water Pollution Control Plant, and would divert the rest of the stormwater (equivalent to approximately 20% of the average annual stormwater runoff from the Central/Bay Basin) for discharge to the Bay. As with the project, runoff from very intense storms that exceed the capacity of the storm drains would flow overland to the Bay. This variant's strip of open space adjacent to the waterfront as part of this variant would provide a potential filtering function for runoff flowing from the rerouted part of Terry A. François Boulevard to the Bay, depending on whether the open space is landscaped (i.e., with soil and plants) or paved (i.e., with asphalt or paved athletic areas). Due to the existing alignment of Terry A. François Boulevard, the project as proposed does not include a strip of open space immediately adjacent to the Bay shoreline that could perform as a filter. An open space design with impervious surfaces would have little filtering function, while a permeable, landscaped area could remove some pollutants prior to discharge of the runoff to the Bay. A landscape design that includes permeable, planted areas with minimal use of pesticides could be included as Best Management Practices for controlling stormwater quality as part of the Stormwater Management Program described in Mitigation Measure K.2, in Section VI.K, Hydrology and Water Quality. All other mitigation measures in Section VI.K would apply to this variant.

- If the expanded bayfront open space proposal is implemented, the additional open space adjacent to the waterfront as part of this variant would provide an additional potential filtering function for runoff flowing from the rerouted part of Terry A. François Boulevard to the Bay during major storm events.

Vegetation and Wildlife

Routing of the boulevard away from the Bay could slightly improve the quality of storm runoff into the Bay because vegetation in the public open space would provide some potential filtering of oil and grease as described under "Hydrology and Water Quality" above; however, the amount of pesticides and nutrients from park landscaping entering the Bay could increase. This effect would not be significant and could be addressed through Best Management Practices. The same mitigation measures identified for the proposed project would apply to this variant.

- If the expanded bayfront open space proposal were to propose any uses affecting the shoreline, a range of permits (Army Corp of Engineers), and approvals (Port of San Francisco, BCDC), along with possible subsequent environmental review would be required. Mitigation Measures L.2 (Herring) and L.3 (Turbidity) would be required as they would under the project. However, there is no sensitive wetland or mudflat habitat along the waterfront between Piers 54 and 64. Existing and long-standing land uses are maritime related and industrial in nature. The intertidal area is covered with rubble and sand. Abandoned piers on pilings extend out into the Bay.

Community Services and Utilities

This variant would affect the proposed open space system for the Project Area, as shown in Figure VII.A.1. If Terry A. François Boulevard were realigned and moved west, the proposed public open space located along Terry A. François Boulevard would shift to the east side of the street and would be closer to the Bay. The public open space would then be adjacent to port property along the Bay. This could increase the appeal of the public open space for passive uses including sitting and viewing the Bay. The quality of this as a waterfront open space would depend, in part, on the uses and condition of adjacent port property. This variant could enhance the usability of the open space for active uses by creating a more consistent width of about 190 feet through the center of the open space compared to a 110-foot width in the center of the open space with separate wider portions at each end as is proposed in the project.

As with the proposed project, the project sponsors would work with the Port to reserve land for a parking lot for the Pier 52 public boat launch ramp with this variant. The Port would need to reserve space for the Pier 52 parking lot for a minimum of 20 years within 600 feet from the top of the boat launch ramp in order to meet the requirements of a California Department of Boating and Waterways grant. Preliminary plans for this parking lot indicate a location east of, and accessible from, Terry A. François Boulevard within the block south of The Common./2/ This location would satisfy the conditions described above. The parking lot would be located in the open space along Terry A.

François Boulevard and would reduce the amount of useable open space by up to 1 acre, as for the proposed project.

- If the expanded bayfront open space proposal is implemented, the additional 2 acres of open space on port property developed in a manner that would integrate it with that of the proposed project would enhance the project's open space. It would increase total open space from 47 acres to 49 acres (2 acres outside of the Project Area on port property). The integration could increase the usefulness of the open space for active sports uses and increase access to the shore of the bay for passive and possibly active uses.

All other community services issues would remain the same as described under the project.

Growth Inducement

Generally, citywide and regional growth and growth inducement implications would be the same under this variant as under the proposed project. The one exception could be piers east of the Project Area. If vehicle access were limited, this variant could constrain development of those port properties.

SUMMARY OF MITIGATION MEASURES

- The significant impacts of this variant, and of the expanded bayfront open space proposal, would be the same as those of the project. No additional mitigation measures have been identified.

B. VARIANT 2: ESPRIT COMMERCIAL INDUSTRIAL/RETAIL VARIANT

DESCRIPTION

The Esprit Commercial Industrial/Retail Variant (Esprit Variant) would be the same as the proposed project, except that the land use designation on the Esprit site would be changed from Mission Bay South Retail to Commercial Industrial/Retail. The principal land uses within the Commercial Industrial/Retail designation include light manufacturing, wholesaling, and offices, as well as retail and personal services.

For the purposes of environmental analysis in this SEIR, the project assumed 250,000 gross sq. ft. of city-serving retail would be developed on this site. This variant assumes development on the Esprit site of 500,000 gross sq. ft., consisting of 460,000 gross sq. ft. of Commercial Industrial and 40,000 gross sq. ft. of city-serving retail uses. Under this variant, total Commercial Industrial development in Mission Bay South would increase by about 8% over that assumed for the project. City-serving retail development in Mission Bay South would be about 333,000 gross sq. ft., a decrease of about 57% from that assumed for the project. As with the project in the SEIR, 50% of the Commercial Industrial space is assumed for purposes of analysis to be occupied by light industrial and research and development uses and 50% to be occupied by office uses. The height limit for the site under the variant would be 90 feet, the same as under the project.

ENVIRONMENTAL ISSUES

As described below, the Esprit Variant would have the same significant impacts and require the same mitigation measures as the proposed project.

Plans, Policies, and Permits

This variant would result in an expansion of the area to be designated Commercial Industrial/Retail and reduction in the area to be designed Mission Bay South Retail in the proposed Mission Bay South Redevelopment Plan. All other implication regarding plans, policies, and permits would be the same as the proposed project.

Land Use

The variant would increase the amount of Commercial Industrial uses in Mission Bay South, but would not introduce any uses not already proposed for the project. This variant would increase the amount, but would not change the type, of uses proposed in the East Subarea of the Project Area. As with the project, Commercial Industrial uses in this portion of the Project Area generally would be compatible with other proposed project uses and with existing uses in the adjoining areas. The decrease in the amount of city-serving retail space in this portion of the Project Area would not substantially affect other proposed project uses or existing uses in adjoining areas.

Business Activity, Employment, Housing, and Population

This variant would have more Commercial Industrial development and less city-serving retail development than would the proposed project. Those differences in the types of building space in the East Subarea result in differences in projected Project Area employment. Compared to the proposed project, there would be about 600 fewer city-serving retail jobs, about 730 more office jobs, and about 540 more research and development or light industrial jobs./3/ Overall, there would be about 670 more jobs in the Project Area under the Esprit variant. This is 7% more jobs for the East Subarea and 2% more jobs for the Project Area overall.

Generally, the differences in building development and employment are not large enough to make a difference in most of the conclusions made for the proposed project. Because there would be more Project Area jobs and the same number of Project Area housing units, there would be more Project Area housing demand relative to supply with this variant than would be the case with the proposed project. Although relatively small, this variant's slight increase in the housing supply deficit could result in somewhat greater housing market impacts compared to those for the proposed project. As with the project, the variant's housing demand would not be a significant effect under CEQA. However, the Mission Bay South Redevelopment Plan, Section 304.10, "Fees and Exactions: Parcels X2, X3 and X4," stipulates that standard City fees and exactions would apply to private property other than properties owned by Catellus, except as provided in an owner participation agreement when the public benefits proposed under the Owner Participation Agreement exceed those of the City's standard fees or exactions. The City's OAHPP, or a housing exaction of equivalent or greater benefit, would apply to office development on non-Catellus property, including Esprit's property. Therefore, to the extent that office space is developed, some additional housing supply would be forthcoming to address the housing shortfall./3a/ With a lesser amount of city-serving retail development in the Project Area it would be more likely that other city-serving retail space would be developed in suitable locations of Nearby Areas to the south and west. Because there would still be substantial retail development elsewhere in the Project Area, the difference in impacts on development patterns between the Esprit Variant and the proposed project would be relatively small.

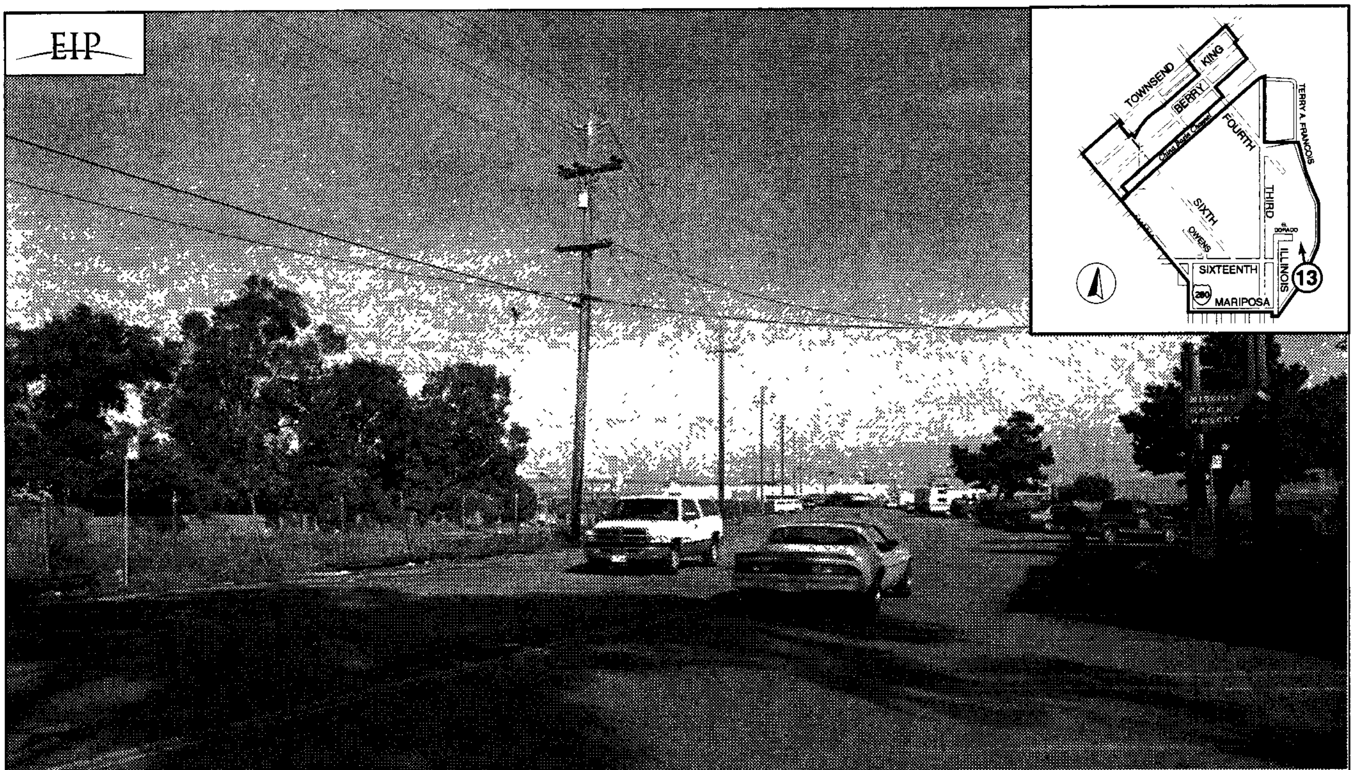
Visual Quality and Urban Design

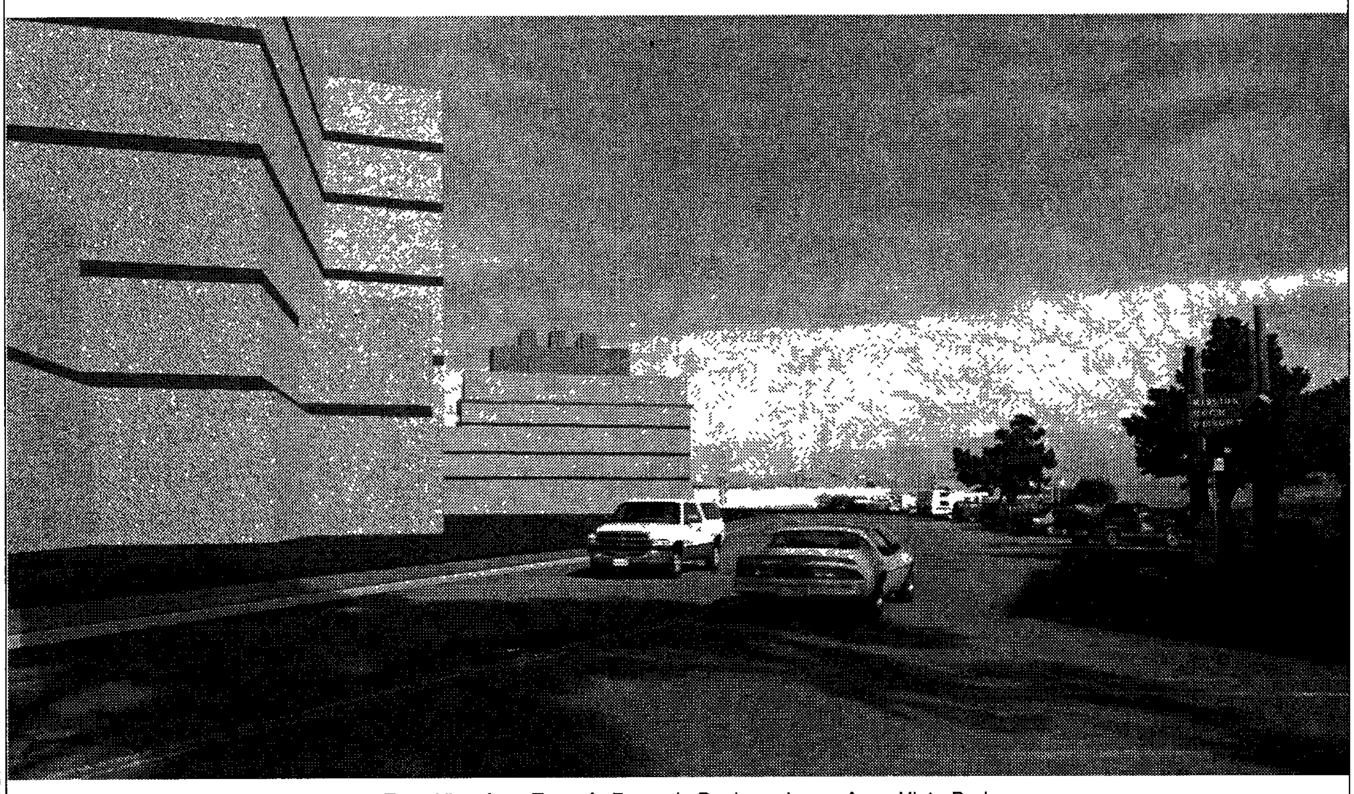
Under this variant, views of the Esprit site would change from the proposed project, from views of retail uses to views of uses such as office, light industrial, or research and development. As with the project, buildings could extend up to 90 feet in height. Expected heights of retail buildings are typically lower, however, than for the research and development or office buildings allowable with the variant. Therefore, views in this area could be of more intense development with the variant than with the project (see Figure VII.B.1, which shows the view looking northwest from near Agua Vista Park).

Transportation

Variant 2 is assumed to include office space, research and development space, and city-serving retail space on the Esprit site, in place of city-serving retail only. The land uses in the variant would generate approximately 1,245 fewer person trips than would the project during the p.m. peak hour, because city-serving retail generates a larger number of trips per unit area than the mix of uses proposed under this variant. In addition, a smaller portion of these person trips would be made by automobile compared to the mode split of project land uses. Thus, Variant 2 would create about 565 fewer automobile trips during the p.m. peak hour. Table VII.B.1 compares the p.m. peak hour trip generation of Variant 2 to that of the project.

The smaller number of automobiles in the Mission Bay street network suggests that overall traffic conditions would improve slightly under the variant compared with the proposed project. Table VII.B.2 compares some key intersection levels of service under the variant with those of the project. Operation of all of the intersections near the Esprit site would improve to some extent, with three intersections experiencing improvements in levels of service (LOS). The intersections of 16th Street and Seventh Street, 16th Street and Third Street, and Third Street and Mariposa Street would improve from LOS D to LOS C. No intersections projected to operate at unacceptable LOS E or LOS F would improve to acceptable levels with the variant. This variant does not reduce impacts identified under the project to below the level of significance.





Top: View from Terry A. Francois Boulevard near Agua Vista Park
Bottom: Potential view from Terry A. Francois Boulevard near Agua Vista Park

96555/3-20-98

SOURCE: Square One Productions

NOTE. The visual simulation illustrates general height and massing permitted under the variant, but does not necessarily represent maximum development at any particular location nor specific architecture or urban design

FIGURE VII.B.1 VARIANT 2: EXISTING AND POTENTIAL VIEWS FROM TERRY A. FRANCOIS BOULEVARD NEAR AGUA VISTA PARK

TABLE VII.B.1
PM PEAK HOUR PERSON TRIP GENERATION IN 2015
VARIANT 2 COMPARED WITH PROJECT

Area	Variant 2	Project	Difference
Mission Bay North	11,030	11,030	0
Mission Bay South	21,225	22,470	-1,245
Total	32,255	33,500	-1,245

Source: Wilbur Smith Associates.

The office, research and development, and city-serving retail uses would create approximately 25 more outbound transit trips, 28 more inbound bicycle and pedestrian trips, and about 113 more outbound bicycle and pedestrian trips than the proposed project during the p.m. peak hour. The increase in non-automobile trips under this variant is far less than the relative decrease in automobile trips. The bicycle and pedestrian network would be able to accommodate the additional trips produced under this variant. The additional transit trips created by these land uses would be distributed primarily to the East Bay and South Bay. Caltrain would have sufficient capacity to carry the individuals destined for the South Bay, and all of the additional East Bay passengers could be accommodated on BART with a less than 0.2% increase in the p.m. peak hour load factor compared with that predicted for the project.

Air Quality

The change in land use under Variant 2 would slightly alter traffic patterns and the number of vehicle trips in the Project Area. Vehicular emissions would be approximately equal to those of the proposed project. As shown in Table VII.B.3, vehicular emissions of ROG, NO_x, and PM_{10} would exceed the BAAQMD significance thresholds for regional air quality impacts. Trip reduction measures discussed in Mitigation Measure E.47 in Section VI.E, Transportation, would not reduce emissions of criteria pollutants below these BAAQMD significance thresholds. Therefore, as under the project, these vehicular emissions would be an unavoidable significant regional air quality impact.

Due to the level of carbon monoxide emissions expected, three of the 13 intersections modeled for the proposed project were selected for analysis for this variant. The CO concentrations would be slightly lower for the variant than for the project (see Table VII.B.4).

**TABLE VII.B.2 ●
YEAR 2015 INTERSECTION LEVEL OF SERVICE COMPARISON
VARIANT 2 COMPARED WITH PROJECT**

	Project		Variant 2	
Intersection	**Delay (sec/veh)**	**LOS**	**Delay (sec/veh)**	**LOS**
16th and Seventh Streets	32.2	D	16.1	C
16th and Third Streets	25.2	D	19.8	C
Third and Mariposa Streets	23.7	C	17.9	C
Mariposa and I-280 Off-ramp	35.9	D	27.8	D

Source: Wilbur Smith Associates.

In this variant, the decrease in overall traffic due to less retail use on the Esprit site would slightly reduce toxic air contaminant emissions from mobile sources. Toxic air contaminants, such as various organic solvents associated with research and development and light manufacturing operations, would increase. The variant might result in about 8% more emissions of toxic air contaminants from stationary sources than the proposed project, due to the increase in research and development and light industrial uses under the variant. As under the project, combined emissions of toxic air contaminants would be an unavoidable significant impact.

Noise and Vibration

A comparison of the traffic estimated for this variant with that for the proposed project shows that the variant would have traffic volumes similar to or less than the proposed project at all of the noise study locations. The noise levels for one-hour L_{eq} and 24-hour L_{dn} would be substantially the same at all of the locations studied. All other noise and vibration issues discussed in Section V.G, Noise: Impacts, would remain the same with this variant as for the proposed project.

Seismicity

The modification of the land use on the Esprit site under this variant would not alter the geologic, soils, or seismic conditions in the Project Area. The seismic hazards and potential effects that would occur in Mission Bay South would be similar to those discussed for the proposed project. The

**TABLE VII.B.3 ●
ESTIMATED VEHICULAR EMISSIONS
FROM VARIANT 2 TRAFFIC IN 2015**

Pollutant	BAAQMD Threshold (lb/day)	Project (lb/day)	Variant 2 (lb/day)
Reactive Organic Gases (ROG)	80/a/	865	856
Nitrogen Oxides (NO_x)	80/a/	1,324	1,310
Particulate Matter (PM_{10})	80/a/	1,968	1,944
Carbon Monoxide (CO)	550/b/	12,228	12,215

Notes:
a. The BAAQMD regards this amount of emissions as a threshold of significance for a regional impact.
b. For carbon monoxide, the BAAQMD does not regard 550 lb/day as a threshold of significance, but rather, an indicator to perform microanalysis.

Source: EIP Associates. Based on modeling using the California Air Resources Board's URBEMIS version 5 model.

concentration of population in an area designated as seismically hazardous would be higher on this specific site under the variant than under the project as proposed.

Health and Safety

This variant would increase the amount of Commercial Industrial space by about 8%; therefore, hazardous materials quantities estimated for Commercial Industrial activities in "Estimated Hazardous Materials Quantities," under "Hazardous Materials Use, Storage, and Disposal," in Section V.I, Health and Safety: Impacts, would be about 8% greater. This could result in a roughly proportional increase in the magnitude of environmental impacts related to handling biohazardous materials, handling materials that pose substantial hazards of release or explosions, and generating hazardous wastes. The nature of these environmental impacts would be essentially the same as with the project.

TABLE VII.B.4
ESTIMATED LOCAL CO CONCENTRATIONS AT SELECTED INTERSECTIONS IN 2015 FOR VARIANT 2

	Proposed Project (ppm)/a/		Variant 2 (ppm)	
Intersection	**One-Hour**	**Eight-Hour**	**One-Hour**	**Eight-Hour**
Third and 16th Streets	11.0	6.3	10.7	6.2
Third and King Streets	13.6	7.6	13.2	7.3
Fourth and Bryant Streets	8.3	5.3	8.3	5.2

Notes:
ppm = parts per million.
a. Refer to Table V.F.5 and associated text in "Criteria Air Pollutants" under Section V.F, Air Quality: Impacts.

Source: EIP Associates.

Contaminated Soils and Groundwater

There would be no substantial differences in the effects of contaminated soils and groundwater in the Project Area under this variant, compared with effects described for the proposed project.

Hydrology and Water Quality

The additional Commercial Industrial floor area and reduced retail space under this variant would have minor effects on the range and degree of hydrology and water quality impacts described for the proposed project. The 8% increase in Commercial Industrial space could slightly increase the potential discharge of pollutants in wastewater associated with light industry, research and development, or similar activities. Similarly, the decrease in city-serving retail could slightly decrease the discharge of pollutants associated with retail activities. The effects would be similar to those described in "Quality of Municipal Wastewater From the Project" and in "Evaluation of Potential Water Quality Impacts" in Section V.K, Hydrology and Water Quality: Impacts.

Vegetation and Wildlife

The changes in use on the Esprit site under the variant would not substantially alter the effects on the Channel or the Bay for the proposed project, as presented in Section V.L, China Basin Channel Vegetation and Wildlife: Impacts.

Community Services and Utilities

This variant would accommodate approximately 670 more jobs than the nearly 30,000 jobs forecast under the proposed project. An increase in projected employment of this size, and the changes in amount and type of use associated with this variant, would not cause an appreciable change in estimated project demand for community services or utilities.

Growth Inducement

The variant would create a small difference in potential development patterns for city-serving retail in Nearby Areas; more city-serving retail space would be expected to be developed in suitable locations of Nearby Areas to the south and west. Overall, the difference in Project Area jobs and in jobs/housing outcomes would not be substantial enough to result in different conclusions about the growth inducement implications of this variant compared with the proposed project. There would be no difference in cumulative citywide or regional growth.

SUMMARY OF MITIGATION MEASURES

The significant impacts of this variant are the same as those of the project. No additional mitigation measures have been identified.

C. VARIANT 3: NO BERRY STREET AT-GRADE RAIL CROSSING VARIANT

DESCRIPTION

The No Berry Street Crossing Variant would be the same as the proposed project for Mission Bay South. The *Mission Bay North Redevelopment Plan* and street grid would be modified to eliminate the at-grade rail crossing to Seventh Street at Berry Street. This would eliminate a primary access route for the mixed-use block west of I-280, as well as to the residential blocks west of Fifth Street. The fence that would be constructed adjacent to the rail tracks for safety reasons in the proposed project is assumed to be continuous across the end of Berry Street at the Caltrain tracks in this variant. The street grid would be the same as shown for the project in Figures III.B.3 and V.E.8, except that Berry Street would terminate on the west at the Caltrain tracks.

Vehicular access to the block west of I-280 and adjacent block would be from Third and Fourth Streets only. Motorists would use King Street to Fifth Street and then either continue west on the King Street frontage road adjacent to the north side of the freeway, or would turn south on Fifth Street to Berry Street to reach the block. Egress from the western blocks would be from Berry Street to Fifth Street to King Street, because no westbound King Street frontage road is proposed on the south side of the freeway. Pedestrians and bicyclists could access the block directly from Fourth or Third Streets, using the pedestrian walkway planned to follow the Berry Street alignment between Fourth and Fifth Streets.

Due to reduced access, city-serving retail proposed under the project on the mixed-use block west of I-280 is assumed to be reduced from 222,000 to 111,000 gross sq. ft. The total number of dwelling units in Mission Bay North is assumed to be reduced from 3,000 to 2,870. No other features of this variant would differ from the project.

ENVIRONMENTAL ISSUES

As described below, the No Berry Street Crossing Variant would have significant traffic and emergency access impacts and require measures, in addition to those identified for the proposed project, to mitigate those impacts.

Plans, Policies, and Permits

The project makes two assumptions about access to the Project Area along Seventh Street: 1) the existing at-grade rail crossing at King Street would be relocated near Hooper Street where the crossing would be reconstructed; and 2) the at-grade rail crossing at Berry Street would require approval by the California Public Utilities Commission (CPUC). This variant assumes that the Berry Street crossing proposed for the project would not be constructed.

The two agencies that have jurisdiction over existing or new at-grade rail crossings along Seventh Street are the CPUC and the Peninsula Corridor Joint Powers Board (JPB). The CPUC approves new rail crossings and rail crossing improvements, whereas the JPB grants easements, in this case to the City and County of San Francisco, for new public streets/crossings over its rights-of-way. The City and County of San Francisco would contract with the JPB to provide for operation and maintenance of the street and crossing. This variant assumes JPB support and CPUC approval of the proposed Hooper Street at-grade crossing and formal closing of King and Berry Street at-grade crossings.

Land Use

Because of reduced access to and from the west, this variant assumes that total development at the western end of Mission Bay North would be reduced by 130 residential units and 111,000 gross sq. ft. of city-serving retail space. The types of land uses in Mission Bay North would remain the same as the project. Land use implications would be similar to the proposed project.

Business Activity, Employment, Housing, and Population

This variant would have fewer housing units and less city-serving retail development in Mission Bay North than would the proposed project. As a consequence, there would be 220 fewer residents and 330 fewer jobs in Mission Bay North. This would be about 13% fewer retail jobs, but only about 1% fewer total jobs in the Project Area. Because of the reduction in both housing demand (jobs) and housing supply in the Project Area, there would be no material difference in the jobs/housing balance for this variant compared to the proposed project. Similarly, the differences in population, employment, and development are not large enough to change the conclusions of other aspects of the business activity, employment, housing and population impact analysis for the proposed project.

Visual Quality and Urban Design

Visual quality associated with this variant in Mission Bay North would be similar to the project. Height limits would remain the same, but the mass of buildings could be somewhat reduced in the block of Mission Bay North west of the I-280 Sixth Street ramps because of the reduced development program.

Transportation

Under the No Berry Street Crossing Variant, the Berry Street crossing of the Caltrain tracks at Seventh Street would not be improved. This change in infrastructure would affect, almost exclusively, vehicles traveling to and from Mission Bay North. Under this variant, access to the western portion of Mission Bay North would be constrained by physical barriers to the south, north, and west. Access to the mixed-use block west of I-280 would be via Fourth Street to westbound King Street using the frontage road to the block, or via Fourth Street to King Street to Fifth Street to Berry Street to the block. Traffic exiting from this site would be limited to eastbound Berry Street to Fifth

Street to King Street. Third and Fourth Streets would be the westernmost connections to the north for outbound and inbound traffic, respectively. The only direct vehicular connections to Mission Bay South would be at the Lefty O'Doul and Peter Maloney Bridges./4/

For this variant, development was assumed to be reduced slightly in the mixed-use parcel west of I-280 (i.e., the blocks bounded by Seventh Street, Berry Street, the I-280 freeway ramp structure, and the Caltrain tracks) to lessen traffic impacts on nearby intersections. The development assumed in this area of Mission Bay North was reduced to a level that would allow impacted intersections to be mitigated in the same or similar ways as described under project conditions. The reduced amount of housing and retail space would result in approximately 510 fewer person trips during the p.m. peak hour. Table VII.C.1 compares the p.m. peak-hour person-trip generation of the variant with that of the project.

The described network would force traffic generated by the western part of Mission Bay North (blocks west of Fifth Street) to travel to Third and Fourth Streets to enter or leave the area. Consequently, the intersections of Third and Fourth Streets with King and Townsend Streets and the intersection of Fifth Street and King Street would be the most affected. Levels of service at these intersections would be worse under this variant than under the project despite a small reduction in trip generation because vehicles would have fewer circulation options. The intersections with worse levels of service (LOS) under this variant compared to the project are shown in Table VII.C.2. The intersections of Third Street with Townsend Street and King Street and of Fourth Street with King Street would operate at unacceptable levels of service (LOS F) under the proposed project; delays would increase by 10% to 50% under this variant. The intersection of Fifth and King Streets would operate at an unacceptable LOS E under this variant, compared to LOS D under the project. The impact would result both from the focus of traffic accessing the mixed-use block west of I-280, and from traffic accessing the residential blocks south of King Street west of Fifth Street, because all traffic traveling between these three blocks and any other location would need to use the King and Fifth Streets intersection. In addition, some motorists might use the King Street I-280 on-ramps and off-ramps to access Mission Bay North who might otherwise have used the Mariposa Street ramps to I-280 and Seventh Street for access under the proposed project.

The LOS E at the King and Fifth Streets intersection with the variant could be mitigated to LOS D by eliminating the King Street pedestrian crosswalk to eliminate the need for a longer "green time" for pedestrians, providing additional time for eastbound and westbound travel (the north side of King is adjacent to Caltrain tracks with no pedestrian-accessible uses), or by widening Fifth Street by adding a third northbound travel lane and removing the proposed landscaped median.

TABLE VII.C.1
PM PEAK HOUR PERSON TRIP GENERATION IN 2015
VARIANT 3 COMPARED WITH PROJECT

Area	Variant 3	Project	Difference
Mission Bay North	10,517	11,030	-513
Mission Bay South	22,470	22,470	0
Total	32,987	33,500	-513

Source: Wilbur Smith Associates

The intersections of Third and King Streets and Third and Townsend Streets could be mitigated with the same mitigation measures as proposed for the project. The mitigation for the intersection of Fourth and King Streets under this variant would be slightly different from that proposed for the project. Mitigation under this variant would include an exclusive left-turn lane, one exclusive through lane, a shared right-through lane, and an exclusive right-turn lane for the southbound approach to the intersection on Fourth Street. Under the project there would be one exclusive left-turn lane, two exclusive through lanes, and one exclusive right-turn lane. Implementation of the mitigation measure for the variant would require the same increase in street width as for the proposed project.

The circulation system in this variant would make emergency access to the mixed-use parcel west of I-280 more difficult than it would be under the proposed project. Emergency vehicles would not have access from the west as there would be no rail crossing at Berry Street and it is assumed that there would be a fence parallel to the tracks for pedestrian safety. Therefore, all emergency vehicles, including those traveling from the west, would need to use Third Street or Fourth Street to King Street to access the block. They could also travel on Fourth Street and then along the proposed pedestrian way that would bisect the block between Fourth and Fifth Streets, to approach from the east. (See "Community Services and Utilities" below for further discussion of emergency access.)

Air Quality

Total development in Mission Bay North would be reduced in this variant. The reduction in development and the change in traffic flow would alter the vehicular emissions in the Project Area; however, the change in emissions would be small, and the air quality impacts would not be changed substantially. In this variant, total vehicular emissions would be approximately equal to those from

**TABLE VII.C.2
YEAR 2015 INTERSECTION LOS COMPARISON
VARIANT 3 COMPARED WITH PROJECT**

	Project		Variant 3	
Intersection	Delay (sec/veh)	LOS	Delay (sec/veh)	LOS
Fourth and Townsend Streets	14.4	B	39.2	D
Third and Townsend Streets	79.7	F	97.1	F
Fourth and King Streets	52.1	E	74.6	F
Third and King Streets	99.1	F	111.9	F
Fifth and King Streets	28.4	D	40.1	E

Source: Wilbur Smith Associates.

the proposed project. As indicated in Table VII.C.3, vehicular emissions of ROG, NO_x, and PM_{10} would exceed the BAAQMD significance thresholds for regional air quality impacts. As with the proposed project, trip reduction mitigation measures discussed in Mitigation Measure E.47 in Section VI.E, Mitigation Measures: Transportation, would not reduce emissions of criteria pollutants below these significance thresholds. Therefore, these vehicular emissions would be an unavoidable significant regional air quality impact. The four intersections studied indicate that no new significant impacts would occur as a result of traffic emissions associated with this variant (see Table VII.C.4). The CO concentrations for this variant at the intersections studied would be similar to those with the proposed project. There would not be a significant impact.

For this variant, it is unlikely that risks from stationary toxic air contaminant emission sources would change. Risks from mobile sources may be distributed differently along with changes in traffic patterns. For instance, increased traffic at the intersection of Fifth and Townsend Streets may result in an increased health risk to residential receptors in that vicinity. In areas where traffic volumes are smaller than the proposed project, risks from vehicle emissions would also be reduced. Risks associated with stationary and mobile toxic air contaminant emission sources would not change from those of the proposed project.

Noise and Vibration

A comparison of the traffic estimated for this variant with that for the proposed project shows that the variant would have similar traffic volumes as the proposed project at all of the noise study locations. Therefore, differences in noise levels at these locations for the variant as compared with the proposed project would not be expected.

Due to the closure of Berry Street at Seventh Street in this variant, an increase in traffic volume is projected at the intersection of Fourth and Berry Streets. A qualitative analysis of this increase suggests that because traffic volumes with the variant at this location would be about twice as much as traffic volumes with the project, noise levels would increase by about 3 dBA under the variant conditions when compared with traffic noise levels likely to result under the proposed project. The increase, while noticeable, would not be disruptive to most individuals. Other intersections in Mission Bay North near the Seventh and Berry Streets intersection do not show increases in traffic volumes greater than 50%; therefore any changes in traffic noise levels at these intersections would be less than 3 dBA and would not be noticeable to most people. Other noise and vibration issues discussed in Section V.G, Noise and Vibration: Impacts, would remain the same with this variant as for the proposed project.

Seismicity

This variant would not alter the geologic, soils, or seismic conditions in the Project Area. The seismic hazards in Mission Bay North could be more serious than those discussed for the proposed project because emergency access to interior portions of Mission Bay North would be impeded by a fence, erected for pedestrian safety. Ambulances and police cars are unable to drive over unpaved railroad tracks. Emergency vehicles would have no direct access to the mixed-use parcel west of I-280 from the west, south, or north; they would need to use a somewhat indirect route to approach the parcel from the east. Blocks west of Fourth Street also could be accessed only from the east using Third or Fourth and King Streets. Eliminating a primary access point to the west end of Mission Bay North would increase the response time for all emergency vehicles destined for this part of the Project Area.

Following a damaging earthquake, debris from older existing buildings nearby could block streets leading to the northern access points along Townsend Street, creating delays. The bridges across the Channel may not be passable immediately following a damaging earthquake. In such a situation, a new fire station, sited in Mission Bay South to reduce the effects of limited emergency access south of the Channel, may be hampered in providing primary or backup capability north of the Channel if a

TABLE VII.C.3 ● ESTIMATED VEHICULAR EMISSIONS FROM VARIANT 3 TRAFFIC IN 2015

Pollutant	BAAQMD Threshold (lb/day)	Project (lb/day)	Variant 3 (lb/day)
Reactive Organic Gases (ROG)	80/a/	865	847
Nitrogen Oxides (NO_x)	80/a/	1,324	1,297
Particulate Matter (PM_{10})	80/a/	1,968	1,928
Carbon Monoxide (CO)	550/b/	12,228	12,003

Notes:
a. The BAAQMD regards this amount of emissions as a threshold of significance for a regional impact.
b. For carbon monoxide, the BAAQMD does not regard 550 lb/day as a threshold of significance, but rather, an indicator to perform microanalysis.

Source: EIP Associates. Based on modeling using the California Air Resources Board's URBEMIS version 5 model.

Berry Street access is unavailable. Primary and backup response would be available from fire stations at Bluxome Street and at Howard Street, north of the Project Area.

If this variant were selected, a mitigation measure that would be a partial solution to the emergency access problem would be to provide a gated rail crossing at Berry Street for use by emergency vehicles. Because a gate might not be approved by the Peninsula Joint Powers Board, which operates Caltrain service, an alternative approach would be to develop secondary emergency access to the satisfaction of the San Francisco Fire Department. Such access could be provided on a pedestrian pathway to be located in the open space at the west end of the Channel. Emergency vehicles could access this pathway directly just east of the tracks from the Seventh Street connector roadway; locked, removable bollards or some other, similar limitation would be provided at the pathway entrance to preclude unauthorized vehicular use. Such access should be provided when development commences on the residential block south of King Street between Fifth and Sixth Streets.

TABLE VII.C.4
ESTIMATED LOCAL CO CONCENTRATIONS AT SELECTED INTERSECTIONS IN 2015 FOR VARIANT 3

	Proposed Project (ppm)/a/		Variant 3 (ppm)	
Intersection	**One-Hour**	**Eight-Hour**	**One-Hour**	**Eight-Hour**
Third and 16th Streets	11.0	6.3	10.8	6.2
Third and King Streets	13.6	7.6	13.2	7.3
Fourth and Bryant Streets	8.3	5.3	8.5	5.3
Eighth and Townsend Streets	9.9	5.4	9.1	5.4

Notes:
ppm = parts per million.
a. Refer to Table V.F.5 and associated text in "Criteria Air Pollutants" under Section V.F, Air Quality: Impacts.

Source: EIP Associates.

Health and Safety

There would be only minor changes in the built land use program under this variant. Therefore, no substantive difference in health and safety impacts would occur, except that by not constructing the at-grade crossing at Berry Street, emergency access to Mission Bay North would be more limited. Potentially, this could significantly hinder responses to emergencies involving hazardous materials. See the mitigation measure identified under "Seismicity," above.

Contaminated Soils and Groundwater

There would be no substantial differences in the effects of contaminated soils and groundwater in the Project Area under this variant, compared with effects described for the proposed project.

Hydrology and Water Quality

The decrease in sanitary sewage generated under this variant (see "Community Services and Utilities" below) would result in a proportional decrease in treated wastewater being discharged to the Bay and the consequential pollutant mass loading attributable to the project. Impacts and mitigation measures for this variant would be the same as those for the proposed project (see Section V.K, Hydrology and Water Quality: Impacts, and Section VI.K, Mitigation Measures: Hydrology and Water Quality).

Vegetation and Wildlife

This variant would not affect China Basin Channel differently than the proposed project.

Community Services and Utilities

This variant could make fire, ambulance, and police access to the mixed-use parcel west of I-280 more difficult in the event of an emergency, as described for this variant under "Transportation" and "Seismicity," above. Emergency vehicles would be able to access the mixed-use parcel via two routes from Fourth Street to the east. One access from the east would be on Berry Street from Fourth Street along a pedestrian path, which would allow emergency vehicles to pass through to Fifth Street and on to the western parcel. Another access would be from westbound King Street, which would be a frontage road adjacent to I-280 (no eastbound frontage road is planned) to Berry Street, which would be a two-way through street west of Fifth Street. Access to the residential blocks west of Fifth Street would be similarly limited, but would also be available from King Street by turning left on Fifth Street. No direct emergency access would be available from the south due to the Channel, or from the north and west due to the Caltrain tracks. Emergency vehicles could approach from the west using a recreational trail at the west end of the Channel near the Seventh Street connector, as described above under "Seismicity," if the trail is connected directly to the Seventh Street connector and is designed to be adequate to bear fire trucks.

If unmitigated, the restricted emergency access to the mixed-use parcel west of I-280 or to the residential parcels west of Fifth Street could cause delays in response time if traffic were severely congested along Fourth Street in the Project Area. First response fire service from Fire Station No. 8 at 36 Bluxome Street, ambulance service from Fire Station No. 1 at 676 Howard Street, and police service from Southern Station at 850 Bryant Street would access the site via Fourth Street (see Figure V.M.1 in Section V.M, Community Services and Utilities). Without alternate routes from the north, south, or west, emergency vehicles would be delayed by traffic backups on Fourth Street.

If first response fire service (Fire Station No. 8) were not able to respond to a call, the fire service to Mission Bay North would come from Fire Station No. 29 at 299 Vermont Street, located west of the Project Area. Fire trucks traveling from Fire Station No. 29 to the mixed-use parcel west of I-280 would need to travel along Townsend Street to Fourth Street and then west along King Street or the Berry Street emergency access route. This somewhat circuitous route would delay the fire service response time. Secondary ambulance and police service would come from Fire Station No. 17 and the Bayview Station, respectively, which are south of the Project Area. Emergency vehicles from these stations would use Third Street to access the Project Area. Therefore, this variant would not affect their response time under normal emergency conditions. In the event of a severe earthquake that damaged the bridges crossing the Channel, emergency access from the south, if it were to be provided by Fire Station No. 17, would be less direct.

The mitigation measure identified under "Seismicity," above, would address and reduce the emergency access problem to a less-than-significant level by providing secondary access when the typical routes along streets are experiencing severe congestion. This emergency access would also provide a more direct route for fire trucks from Fire Station No. 29, avoiding the circuitous route along Townsend Street.

This variant would include less retail and residential space than would the proposed project, but the reduction would not be large enough to change the demand for other community services analyzed for the project.

Growth Inducement

The small differences in project area population and employment under this variant compared with the proposed project would not result in material differences for cumulative citywide and regional growth.

SUMMARY OF MITIGATION MEASURES

All significant impacts identified for the project would also apply to this variant, and all mitigation measures in Chapter VI, Mitigation Measures, would apply, with the exception that the at-grade rail crossing at Berry Street would not be a feature of the project.

This variant would have new significant impacts not identified for the project. To address those impacts, the following mitigation measures are identified for this variant. After implementation of these measures, there would be no new unavoidable significant impacts.

Transportation

To mitigate LOS E at the intersection of King and Fifth Streets, eliminate the King Street pedestrian crosswalk or widen Fifth Street by adding a third northbound travel lane and removing the proposed median.

To mitigate LOS F at the intersection of Fourth and King Streets, in addition to widening as proposed in the project, restripe the intersection to provide one exclusive left-turn lane, one exclusive through lane, one shared right-through lane, and an exclusive right-turn lane for the southbound Fourth Street approach.

Both of the transportation mitigation measures would be included in construction of adjacent blocks between Fourth and Sixth Streets. If retail and residential uses were proposed for the block west of Sixth Street before the Fourth through Sixth Street blocks were developed, the building permits for the Sixth and Berry Streets block would trigger the need for the transportation mitigation measures.

Emergency Access

To mitigate insufficient access for emergency vehicles from the west, pave the area between the rails at Berry Street to allow police cars and ambulances to cross, and provide a locked knock-down gate for use by emergency vehicles, or develop secondary emergency access to the satisfaction of the San Francisco Fire Department. Such access could be provided on a pedestrian pathway to be located in the open space at the west end of the Channel. Emergency vehicles could access this pathway directly just east of the tracks from the Seventh Street connector roadway; locked, removable bollards or some other, similar limitation would be provided at the pathway entrance to preclude unauthorized vehicular use. Provide such secondary emergency access at the time that development commences on the residential block south of King Street between Fifth and Sixth Streets.

D. VARIANT 3A: MODIFIED NO BERRY STREET AT-GRADE RAIL CROSSING VARIANT (MODIFIED NO BERRY STREET CROSSING VARIANT)

INTRODUCTION

Variant 3, the No Berry Street At-Grade Rail Crossing Variant included in the Draft SEIR, eliminates the at-grade crossing of Berry Street and assumes that the proposed Berry Street crossing of the Caltrain tracks at Seventh Street would not be improved (see pp. VII.22-VII.23). This change from the project in infrastructure would affect, almost exclusively, vehicles traveling to and from Mission Bay North. Under Variant 3, access to the western portion of Mission Bay North would be constrained by physical barriers to the south, north, and west. Access to the mixed-use block west of I-280 would be via Fourth Street to westbound King Street using the frontage road to access the block, or via Fourth Street to King Street to Fifth Street to Berry Street to access the block. Traffic exiting the site would be limited to eastbound Berry Street to Fifth Street to King Street. Third and

Fourth Streets would be the westernmost connections to the north for outbound and inbound traffic, respectively. The only direct vehicular connections to Mission Bay South would be at the Lefty O'Doul and Peter Maloney Bridges.

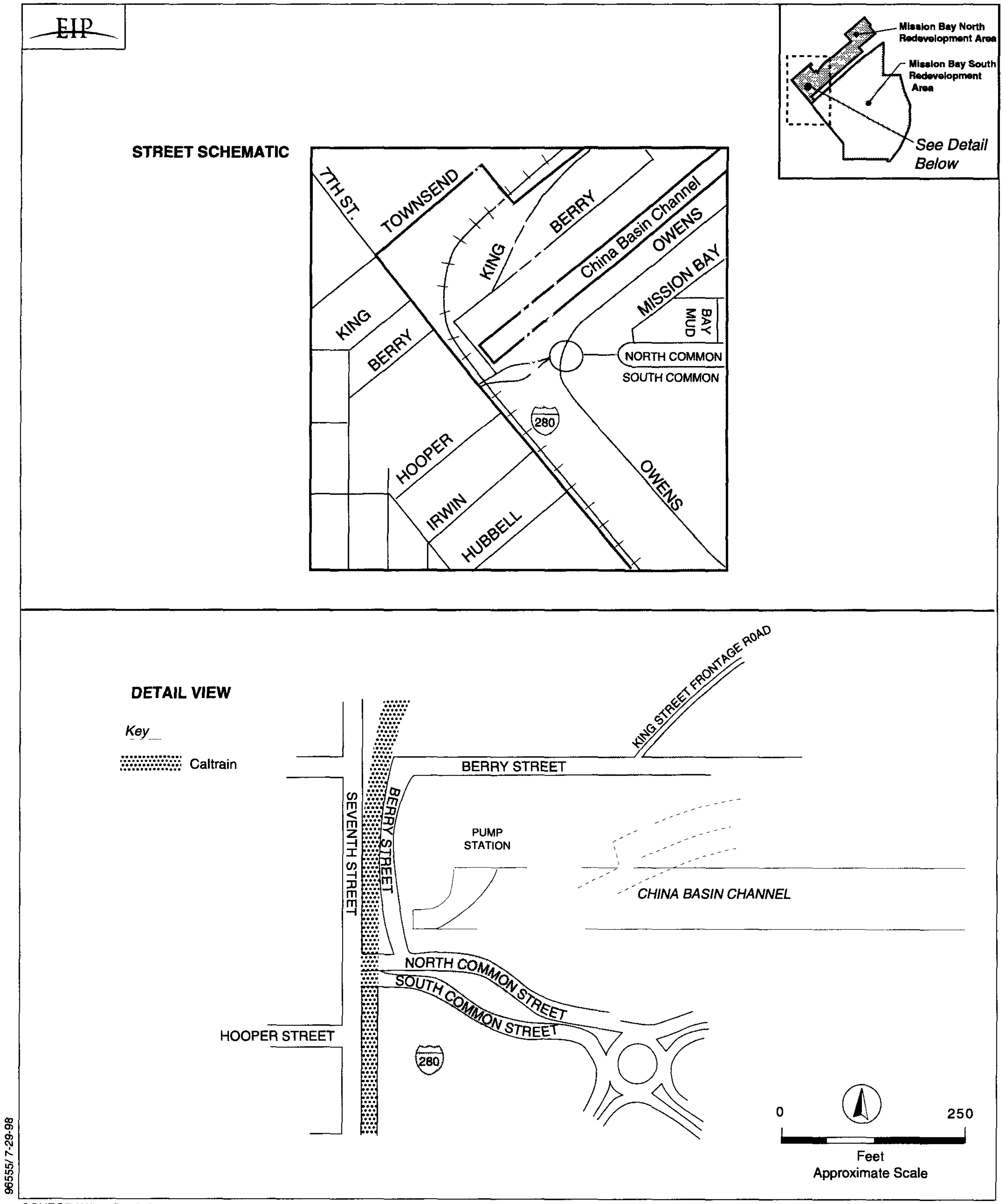
Since publication of the Draft SEIR, the project sponsors developed a second possible solution, which is to extend Berry Street around the western end of China Basin Channel to Common Street near the intersection of Common and Seventh Streets (see Figure VII.D.1). This solution is presented as Variant 3A, the Modified No Berry Street At-Grade Rail Crossing Variant (Modified No Berry Street Crossing Variant). It is described below in more detail.

DESCRIPTION

Under Variant 3A, the Modified No Berry Street Crossing Variant, the Berry Street crossing of the Caltrain tracks at Seventh Street would not be improved (similar to Variant 3), and Berry Street would be extended around the end of China Basin Channel to intersect with The Common, immediately east of the Caltrain tracks. The extension of Berry Street would be comprised of one lane in each direction, with the southbound lane widening to two right turn lanes at the intersection with The Common. The Common would be widened to provide three westbound lanes across the Caltrain tracks in order to allow traffic to clear the intersection more effectively. The eastbound direction would remain two lanes wide. This variant also includes two through lanes and an exclusive right-turn lane on Seventh Street for the northbound approach and two through lanes and an exclusive left-turn lane on Seventh Street for the southbound approach. These lane geometry improvements at the intersection of Seventh Street, The Common, and the Berry Street extension would be accomplished because additional right-of-way would be made available with the elimination of two of the five Caltrain tracks that run parallel to Seventh Street between Berry Street and The Common. The three remaining tracks would be shifted about 20 feet east in the area where The Common crosses to Seventh Street to provide space for the exclusive turn lanes on Seventh Street.

These roadway modifications would provide emergency access to Mission Bay North from Seventh Street by crossing the median between South and North Common Streets. They would provide direct egress from western Mission Bay North to Seventh Street. Also, they would provide direct access from Mission Bay South to Mission Bay North that would not be dependent on bridges.

Due to reduced accessibility to the northwestern-most block fronting on Berry Street between Sixth and Seventh Streets without the Berry Street crossing, city-serving retail development under Variant 3A would be reduced 50%, to 111,000 gross sq. ft. from the proposed project's 222,000 gross sq. ft. Residential development proposed under this variant would not be reduced from that assumed for the



SOURCE: Wilbur Smith Associates

MISSION BAY SUBSEQUENT EIR

FIGURE VII.D.1 MODIFIED NO BERRY STREET AT-GRADE RAIL CROSSING VARIANT: INTERSECTION LANE CONFIGURATION

project (as it would with Variant 3). Although realigning Berry Street would reduce the Caltrain easement by 0.5 acres, it would not reduce open space as proposed for the project.

ENVIRONMENTAL ISSUES

As described below and in comparison to the proposed project, the Modified No Berry Street Crossing Variant would have one significant traffic impact and would require an additional mitigation measure, in addition to those measures identified for the proposed project, to mitigate those impacts. Compared with Variant 3, Variant 3a would have the same traffic impact and the same mitigation measure that would avoid the impact, and would not have Variant 3's emergency response impact and associated mitigation measure.

Plans, Policies, and Permits

For this variant, concerns regarding plans, policies and permits are limited to issues relating to the railway and to railway crossings. The project makes two assumptions about access to the Project Area along Seventh Street: 1) the existing at-grade rail crossing at King Street would be relocated near Hooper Street where the crossing would be reconstructed; and 2) the at-grade rail crossing at Berry Street would require approval by the California Public Utilities Commission (CPUC). As with Variant 3, Variant 3A assumes instead that the Berry Street crossing proposed for the project would not be constructed. In addition, Variant 3A assumes that two of the five Caltrain tracks between Berry and Hooper Streets would be removed to provide additional right-of-way. Jurisdiction over existing or new at-grade rail crossings along Seventh Street by the CPUC and the Peninsula Corridor Joint Powers Board (JPB) is as described on pp. VII.21-VII.22.

Land Use

Because of reduced access to and from the west, this variant assumes that retail development at the western end of Mission Bay North would be reduced 50% to 111,000 gross sq. ft. of city-serving retail space as with Variant 3. Residential development would remain as proposed for the project and would not be reduced as it would in Variant 3. The types of land uses in Mission Bay North would remain the same as the project. Land use implications would be similar to the proposed project.

Business Activity, Employment, Housing, and Population

This variant would have less city-serving retail development in Mission Bay North than would the proposed project. As a consequence, there would be 310 fewer jobs in Mission Bay North. This would be about 7% fewer retail jobs for Mission Bay North, but only about 1% fewer total jobs in the Project Area. The differences in retail development and retail employment are not large enough to change the conclusions of the business activity, employment, housing and population impact analysis for the proposed project.

- **Visual Quality and Urban Design**

- Visual quality associated with this variant in Mission Bay North would be similar to the project. Height limits would remain the same, but the mass of buildings could be somewhat reduced in the block of Mission Bay North west of the I-280 Sixth Street ramps because of the reduced retail development program.

- **Transportation**

- This variant's change in infrastructure would most affect vehicles traveling to and from Mission Bay North, particularly those destined for the mixed-use development parcel located to the west of the I-280 freeway ramp structure. With this variant, access to the western portion of Mission Bay North would be less constrained than that described for Variant 3. The extension of Berry Street to The Common would provide an additional access point between Mission Bay South and Mission Bay North, and provide more direct access to the western portion of Mission Bay North. Access to the mixed-use block west of I-280 would be via Fourth Street to westbound King Street using the frontage road to the block, via Fourth Street or I-280 to King Street to Fifth Street to Berry Street to the block, or via Seventh Street to The Common to the roundabout to the extension of Berry Street to the block. Traffic exiting from this site would travel eastbound Berry Street to Fifth Street to King Street, or southbound to the Berry Street extension, and westbound to The Common to Seventh Street.

- As described above, for this variant, retail development was assumed to be reduced in the mixed-use parcel west of I-280 (i.e., the blocks bounded by Seventh Street, Berry Street, the I-280 freeway ramp structure, and the Caltrain tracks) to lessen the traffic impacts on nearby intersections. The retail development assumed in this area of Mission Bay North was reduced to a level that would allow impacted intersections to be mitigated in the same or similar ways as described under project conditions.

- The reduced amount of retail space would result in approximately 320 fewer person trips during the p.m. peak hour. Approximately 75 of these person trips would be made on transit. Nearly one-third of the reduction of transit trips, or about 25, would be to and from the East Bay, suggesting that this variant would have less impact on regional and local transit providers compared to the project./4a/

- This variant would also lessen the parking demand created by Mission Bay by approximately 490 spaces, or about 2% less than the total project demand. Table VII.D.1 compares the p.m. peak-hour person-trip generation of the variant with that of the project.

- The described network would require traffic generated by the western part of Mission Bay North (blocks west of Fifth Street) to either travel to King Street or The Common to enter and leave the area. Consequently, the intersections of Third and Fourth Streets with King and Townsend Streets, the intersection of Fifth and King Streets, and the intersection of The Common and Seventh Street would be most affected. Levels of service at all but one of these intersections would be worse under this variant than under the project despite a small reduction in trip generation, because vehicles would have fewer access points to and from the west end of the Mission Bay North area. The key intersections for this variant are shown in Table VII.D.2.

- The intersections of Third and King Streets, and Third and Townsend Streets would operate at LOS F with the project under 2015 cumulative conditions, and would continue to do so with this variant, with slightly higher average vehicle delays. The intersection of Fourth and King Streets would operate at LOS E under the project conditions, and would operate at LOS F under Variant 3A, as described for Variant 3. The delay at the intersections of Fourth and Townsend Streets and Fifth and King Streets would increase, but not to an unacceptable level of service. The intersection of Seventh Street with The Common would operate at LOS E under the project and would improve to LOS D under this variant due to the lane geometry improvements proposed at this intersection under this variant.

- In summary, future LOS at one intersection would improve from unacceptable LOS E under the project to acceptable LOS D under the variant, and one intersection would experience LOS F under the variant compared to LOS E under the project. Other intersection levels of service would remain approximately the same as under the project or would degrade under Variant 3A but not to unacceptable levels.

- **Air Quality**

- The change in land use under Variant 3A would slightly alter traffic patterns and the number of vehicle trips in the Project Area compared to the project. Vehicular emissions would be reduced by

TABLE VII.D.1 ●
PM PEAK HOUR PERSON TRIP GENERATION IN 2015
VARIANT 3A COMPARED WITH PROJECT

Area	Project	Variant 3A	Difference
Mission Bay North	11,030	10,710	-320
Mission Bay South	22,470	22,470	0
Total	33,500	33,180	-320

Source: Wilbur Smith Associates

TABLE VII.D.2 ●
YEAR 2015 CUMULATIVE INTERSECTION LEVEL OF SERVICE COMPARISON
VARIANT 3A COMPARED WITH PROJECT

	Project		Variant 3A	
Intersection	Delay (sec/veh)	LOS	Delay (sec/veh)	LOS
Fourth and Townsend Streets	14.4	B	32.4	D
Third and Townsend Streets	79.7	F	78.0	F
Fifth and King Streets	28.4	D	37.5	D
Fourth and King Streets	52.1	E	65.6	F
Third and King Streets	99.1	F	104.5	F
Seventh Street and The Common	42.3	E	25.5	D

Source: Wilbur Smith Associates

about 1% compared with those of the proposed project. As shown in Table VII.D.3, vehicular emissions of ROG, NO_x, and PM_{10} would exceed the BAAQMD significance thresholds for regional air quality impacts. Trip reduction measures discussed in Mitigation Measure E.47 in Section VI.E, Transportation, would not reduce emissions of criteria pollutants below these BAAQMD significance thresholds. Therefore, as under the project, these vehicular emissions would be an unavoidable significant regional air quality impact.

● Due to the level of carbon monoxide emissions expected, three of the 13 intersections modeled for the proposed project were selected for analysis for this variant. The CO concentrations would be slightly lower for the variant than for the project (see Table VII.D.4).

**TABLE VII.D.3 ●
ESTIMATED VEHICULAR EMISSIONS
FROM VARIANT 3A TRAFFIC IN 2015**

Pollutant	BAAQMD Threshold (lb/day)	Project (lb/day)	Variant 3A (lb/day)
Reactive Organic Gases (ROG)	80/a/	865	860
Nitrogen Oxides (NO_x)	80/a/	1,324	1,371
Particulate Matter (PM_{10})	80/a/	1,968	1,958
Carbon Monoxide (CO)	550/b/	12,228	12,163

Notes:

a. The BAAQMD regards this amount of emissions as a threshold of significance for a regional impact.

b. For carbon monoxide, the BAAQMD does not regard 550 lb/day as a threshold of significance, but rather, an indicator to perform microanalysis.

Source: EIP Associates. Based on modeling using the California Air Resources Board's URBEMIS version 5 model.

**TABLE VII.D.4 ●
ESTIMATED LOCAL CO CONCENTRATIONS AT
SELECTED INTERSECTIONS IN 2015 FOR VARIANT 3A**

	Proposed Project (ppm)/a/		Variant 3A (ppm)	
Intersection	One-Hour	Eight-Hour	One-Hour	Eight-Hour
Third and 16th Streets	11.0	6.3	10.9	6.2
Third and King Streets	13.6	7.6	13.4	7.4
Fourth and Bryant Streets	8.3	5.3	8.4	5.3

Notes:

ppm = parts per million.

a. Refer to Table V.F.5 and associated text in "Criteria Air Pollutants" under Section V.F, Air Quality: Impacts.

Source: EIP Associates.

- In this variant, the decrease in overall traffic would slightly reduce toxic air contaminant emissions from mobile sources. As under the project, combined emissions of toxic air contaminants would be an unavoidable significant impact.

- **Noise and Vibration**

- A comparison of the traffic estimated for this variant with that for the proposed project shows that the variant would have traffic volumes similar to or less than the proposed project at all of the noise study locations. The noise levels for one-hour L_{eq} and 24-hour L_{dn} would be substantially the same at all of the locations studied. All other noise and vibration issues discussed in Section V.G, Noise: Impacts, would remain substantially the same with this variant as for the proposed project.

- **Seismicity**

- The Modified No Berry Street Crossing Variant would not alter the geologic, soils, or seismic conditions in the Project Area and would not, therefore, create associated seismic impacts. However, this variant could create minor emergency access issues because of the somewhat circuitous routes between existing police/fire stations and the mixed-use parcel west of I-280 in Mission Bay North (see discussion of emergency access issues under "Community Services and Utilities," below). If the fire station is built in Mission Bay South (see Mitigation Measures H.5, p. VI.38, and M.6, p. VI.54), the circuitous routes would still exist for responses from outside the Project Area, but would be eliminated for responses within the Project Area.

- **Health and Safety**

- There would be only minor changes in the built land use program under this variant. Therefore, no substantive difference in health and safety impacts would occur, except that by not constructing the at-grade crossing at Berry Street, emergency access response times to Mission Bay North could be longer than under the project but shorter than under Variant 3. Potentially, this could hinder responses to emergencies involving hazardous materials. See the discussion of emergency access under "Seismicity," above, and "Community Services and Utilities," below.

- **Contaminated Soils and Groundwater**

- There would be no substantial differences in the effects of contaminated soils and groundwater in the Project Area under this variant, compared with effects described for the proposed project.

- **Hydrology and Water Quality**

- The decrease in sanitary sewage associated with the reduced retail space would reduce, somewhat proportionally, the discharge of treated wastewater to the Bay and the consequential pollutant mass loading attributable to the project. However, impacts and mitigation measures for this variant would be the same as those for the proposed project (see Section V.K, Hydrology and Water Quality: Impacts, and Section VI.K, Mitigation Measures: Hydrology and Water Quality).

- **Vegetation and Wildlife**

- This variant would not affect China Basin Channel differently than the proposed project.

- **Community Services and Utilities**

- The Modified No Berry Street Crossing Variant could create minor emergency access issues in comparison to the proposed project. Issues would arise from the circuitous routes that police and fire fighting vehicles would need to take, in the absence of the proposed project's Berry Street crossing, between existing police/fire stations outside the Project Area and the mixed-use parcel west of I-280 in Mission Bay North. The routes under Variant 3A would require a combination turn at the proposed intersection of Seventh Street, Common Street and the Berry Street extension. However, such routes from existing fire stations would be less circuitous under Variant 3A than under Variant 3. The longer emergency response time under Variant 3A in comparison to the proposed project (shorter than under Variant 3) would not be a new significant impact because the Berry Street extension would provide sufficient access, in contrast to the absence of access under Variant 3. This is not considered a new significant impact because the proposed emergency access routes, although slightly circuitous, would not be subject to closure if the Third or Fourth Street Bridges were raised or rendered inoperative (which could cause major delays or eliminate access); therefore the mitigation measure described for Variant 3 under "Seismicity" on p. VII.27, would not be needed for Variant 3A. Further, the issue would be ameliorated if the project's fire station were built (see Mitigation

Measure H.5 and M.6, pp. VI.38 and VI.54, respectively). The following discussion describes the circuitous nature of the routes and related access issues in more detail.

- As described for Variant 3 on pp. VII.26-VII.29, emergency vehicles would access the mixed-use parcel west of I-280 from the east via two routes: (1) from Fourth Street, and (2) from the south around the west end of China Basin Channel from Seventh and Common Streets. One access route would be from the east on Berry Street from Fourth Street along a pedestrian path. It would allow emergency vehicles to pass through to Fifth Street and onto the mixed-use parcel. Another access route to the mixed-use parcel would be from westbound King Street (no eastbound access is planned) to Berry Street, which would be a two-way through street west of Fifth Street.

- Under Variant 3A, access to and from Seventh Street would be from Common Street along a two-way extension of Berry Street adjacent to the Caltrain tracks. Similarly, access to the residential blocks west of Fifth Street would be limited, but also would be available from King Street by turning left on Fifth Street. No direct emergency access would be available from the north across the Caltrain tracks. Under Variant 3A, fire and ambulance emergency vehicles would negotiate a combination turn off Seventh Street onto Common Street, across a low raised median at the west end of Common Street, and onto the Berry Street extension. Police vehicles might not be able to cross the median, in which case they would need to drive along South Common Street to the roundabout and back along North Common Street to the proposed Berry Street extension. Because of the circuitous nature of the access route to the west end of Mission Bay North, the response time for all emergency vehicles destined for this part of the Project Area would be longer than the proposed project. Compared to the project, the restriction created by the combination turn or the trip through the roundabout could cause delays in emergency access to the mixed-use parcel west of I-280 or to the residential parcels west of Fifth Street. The return route from Berry Street to Seventh Street would be direct for all vehicles.

- First response fire service from Fire Station No. 8 at 36 Bluxome Street, ambulance service from Fire Station No.1 at 676 Howard Street, and police service from Southern Station at 850 Bryant Street would access the mixed-use parcel via Fourth Street (see Figure V.M.1 in Section V.M, Community Services and Utilities). Without alternate routes from the north or west, emergency vehicles would be delayed by any traffic backups on Fourth Street. If first-response fire service (Fire Station No. 8) were not able to respond to a call, the fire service to Mission Bay North would come from Fire Station No. 29 at 299 Vermont Street, located west of the Project Area. Fire trucks traveling from Fire Station No. 29 to the mixed-use parcel west of I-280 would need to travel along Townsend Street to Fourth Street and then west along King Street or the Berry Street emergency access route, or east on 16th Street to Seventh Street, north to Common Street, across Common Street to the Berry Street extension, and north on the extension to the mixed-use parcel. These somewhat circuitous routes would delay the fire service response time compared to the proposed project.

- Secondary ambulance and police service would come from Fire Station No.17 and the Bayview Station, respectively, which are south of the Project Area. Emergency vehicles from these stations would use Third Street or Seventh Street to access the Project Area. This variant could reduce secondary response time under normal (i.e. non-disaster) emergency conditions by providing an alternate route to Mission Bay North around the west end of China Basin Channel, rather than across the Channel on the Third or Fourth Street Bridges. In the event of a severe earthquake that damaged the bridges crossing the Channel, all emergency access from the south, if it were to be provided by Fire Station No.17, would be along this west-of-Channel route.

- The Berry Street extension proposed in this variant, in contrast to Variant 3, would reduce the emergency access problem. It would improve secondary access when the typical routes along through-streets experience severe congestion. Also, it would provide a less circuitous route for fire trucks from Fire Station No. 29, avoiding the longer route along Townsend Street. Constructing a new fire station in Mission Bay South as proposed in Mitigation Measures H.5, p. VI.38, and M.6, p. VI.54, would eliminate circuitous access routes and the access issues under this Variant 3A.

- Special emergency access issues arise in the aftermath of a damaging earthquake. Debris from older existing buildings nearby could block streets leading to northern access points along Townsend Street, thereby creating delays. The bridges across the Channel may not be passable immediately following a damaging earthquake. In such a situation, a new fire station sited in Mission Bay South to reduce the effects of limited emergency access south of the Channel could be hampered in providing primary or backup capability north of the Channel. The Berry Street extension could provide such access. Primary and backup response also would be available from fire stations at Bluxome Street and at Howard Street, north of the Project Area. The proposed low median near the intersection of Common Street with Berry Street would allow fire vehicles and ambulances sufficient room to make the combination turn from Seventh Street, across Common Street to the Berry Street extension.

- This variant's reduction of city-serving retail space and increase in Commercial Industrial space would not be large enough to substantially alter demand for other community services analyzed for the project.

- **Growth Inducement**

- The small differences in Project Area employment under this variant compared with the proposed project would not result in material differences for cumulative citywide and regional growth.

- **SUMMARY OF MITIGATION MEASURES**

- All significant impacts identified for the project would also occur with this variant, and all mitigation measures in Chapter VI, Mitigation Measures, would apply, with the exception that the at-grade rail crossing at Berry Street would not be a feature of the project nor would Mitigation Measures E.20a, E.20b, and E.20c for the intersection of Seventh Street and Berry Street (see p. VI.12). Further, if Variant 3A were adopted, Mitigation Measure E.31b (p. VI.19) for Seventh and Berry Streets would be modified as follows to remove references to left and right turn lanes that would cross the tracks and add turn lanes to the part of Berry Street west of Seventh Street:

  Restripe the northbound ~~and southbound~~ approaches to provide a shared left-through ~~left-turn~~ lane and a through lane, and restripe the southbound approach to provide a through lane and a shared right-through lane.

- Mitigation Measures E32a and E.32b (p. VI.19) for the intersection of Seventh Street and The Common are proposed features of Variant 3A and therefore are included in the transportation analysis for this variant.

- The mitigation measure for the intersection of Fourth and King Streets under this variant would be slightly different from that proposed for the project, in Mitigation Measure E.38 on p. VI.20. It would be the same as that proposed for Variant 3 on p. VII.24. This measure would include an exclusive left-turn lane, one exclusive through lane, a shared right turn/through lane, and an exclusive right-turn lane for the southbound approach to the intersection of Fourth Street. The project mitigation measure identifies one exclusive left-turn lane, two exclusive through lanes, and one exclusive right-turn lane for the southbound approach of Fourth Street at King Street. Implementation of the mitigation measure for the variant would require the same increase in street width as for the proposed project.

- Variant 3A includes reconfiguration of Seventh Street at Common Streets, and, in effect, implements Mitigation Measure E.32 identified for the project. In contrast to Variant 3, the intersection of Fifth and King Streets would not be significantly impacted and would not require mitigation under Variant 3A. Other transportation mitigation measures would be the same as those identified for the project.

- Because Variant 3A eliminates the significant emergency access impact found in Variant 3, the associated "Emergency Access" mitigation measure described on p. VII.31 would not be required.

E. VARIANT 4: MISSION BAY NORTH RETAIL VARIANT

DESCRIPTION

The Mission Bay North Retail Variant contemplates changing the mix of uses on the two blocks bounded by Townsend, Third, Berry, and Fourth Streets. The "Townsend Street" block is bounded by Townsend Street to the north and King Street to the south. The "King Street" block is bounded by King Street to the north and Berry Street to the south (see Figure III.B.3 for the locations of these blocks in the proposed land use plan)./5/ These blocks are in the Mission Bay North Retail land use designation. This variant to the project's development program proposes that the land uses for these two blocks be reallocated so that the Townsend Street block would include less residential space and more commercial/retail space, and the King Street block would include more residential units and less commercial/retail space. Overall, the total amount of each land use would remain the same in Mission Bay North; each of the two blocks would contain more nearly the same amount of entertainment-oriented commercial and residential land uses. It is assumed that for purposes of analysis that parking for each use would be located in the same blocks as that use.

ENVIRONMENTAL ISSUES

As described below, the Mission Bay North Retail Variant would have the same significant impacts and require the same mitigation measures as identified for the proposed project.

Transportation

The Townsend Street block is more accessible to vehicular traffic than the King Street block because Townsend Street (on the north side of the Townsend Street block) has more capacity than Berry Street (on the south side of the King Street block). This makes the Townsend Street block a more appropriate location for land uses with higher vehicle-trip generation (e.g., retail/commercial land uses), as called for in this variant.

Because the total amount of development and types of land uses would remain the same on these two eastern blocks of Mission Bay North, the overall transportation analysis results for this variant would not be substantially different from those presented for the proposed project in Section V.E, Transportation: Impacts. Localized circulation patterns around the two blocks could change somewhat, depending on the locations and amounts of parking. Delays at Fourth and King Streets might increase slightly, although it is not expected that the LOS E assessed for the project under 2015 cumulative conditions would degrade to LOS F with the variant. Third and King Streets might improve slightly, although the LOS F analyzed for the project with 2015 cumulative traffic would not improve to LOS E under this variant. The precise delays at surrounding intersections would depend in part on the locations of parking garage entrances and exits on the two blocks and the precise amounts of parking provided on each block.

Other Topics

Impact analysis for all environmental topics except transportation is essentially the same for Variant 4 as for the proposed project.

Changes in the distribution of traffic resulting from this variant compared to the project would result in minor local changes in foreseeable noise levels and air emissions from mobile sources. However, the nature of the noise and air quality effects would be the same as for the project, and the total increase in air emissions also would be the same.

SUMMARY OF MITIGATION MEASURES

The significant impacts of this variant are the same as those of the project. No additional mitigation measures have been identified.

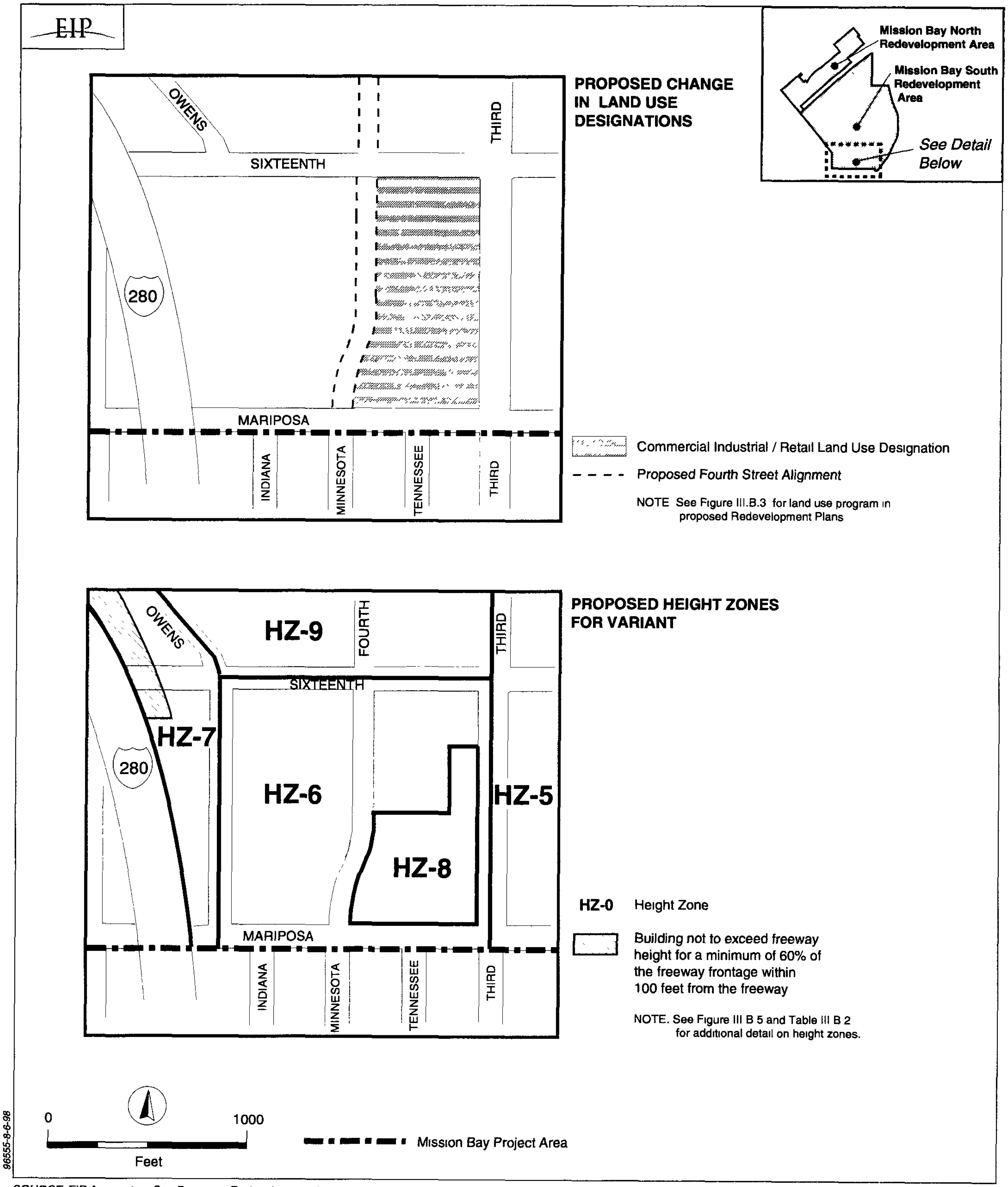
F. VARIANT 5: CASTLE METALS BLOCK COMMERCIAL INDUSTRIAL/RETAIL VARIANT (CASTLE METALS BLOCK VARIANT)

DESCRIPTION

The Castle Metals Block Variant would change the proposed land use designation on the entire block bounded by 16th, Third, and Mariposa Streets, and the proposed Fourth Street. As shown in Figure III.B.3, p. III.9, and Figure V.A.6, p. V.A.30, the project proposes two land use designations on the Castle Metals Block: 1) Commercial Industrial in the area fronting 16th Street and the proposed Fourth Street alignment, and 2) Mission Bay South Retail in the other area fronting Third Street and Mariposa Streets. As shown in Figure VII.F.1, the Castle Metals Block Variant proposes one land use designation for the entire block: Commercial Industrial/Retail.

This variant also would change the allowable development program for the Castle Metals Block. The proposed project would permit up to 366,000 gross sq. ft. of Commercial Industrial, 310,000 gross sq. ft. of city-serving retail, and 3,200 gross sq. ft. of neighborhood-serving retail land uses on the block. The variant would permit up to 964,000 gross sq. ft. of Commercial Industrial, 50,000 gross sq. ft. of city-serving retail, and 3,200 gross sq. ft. of neighborhood-serving retail land uses on the block. The variant would not change the amount of allowable neighborhood-serving retail uses.

The variant assumes the following development program for the areas shown in Figure VII.F.1. For the area at 1900 Third Street bounded by Third Street and Mariposa Street, the project proposes 310,000 gross sq. ft. of city-serving retail while the variant assumes development of up to 560,000 gross sq. ft. of Commercial Industrial and 50,000 gross sq. ft. of city-serving retail. For the three parcels at the northeastern end of the block at the intersection of Third Street and 16th Street, this variant assumes development of up to 44,000 gross sq. ft. of Commercial Industrial uses. For the rest of the block (fronting the proposed Fourth Street) the project proposes 366,000 gross sq. ft. of Commercial Industrial uses and 3,200 gross sq. ft. of neighborhood-serving retail uses, and the variant proposes the same.



SOURCE EIP Associates, San Francisco Redevelopment Agency

FIGURE VII.F.1 CASTLE METALS BLOCK COMMERCIAL INDUSTRIAL / RETAIL VARIANT: PROPOSED LAND USE DESIGNATIONS AND HEIGHT ZONES

- As with the proposed project, the principal land uses within the Commercial Industrial/Retail designation under the variant include light manufacturing, wholesaling, and offices, as well as retail and personal services. This variant assumes 50% of the commercial industrial uses within the Commercial Industrial/Retail land use designation would be light industrial or research and development, while 50% would be office, the same mix as under the project.

- Under this variant, total Commercial Industrial development for the project as a whole would increase by about 11% (6,161,000 gross sq. ft. under the variant, compared to 5,557,000 gross sq. ft. under the project), while total city-serving retail development would decline 32% to 545,000 gross sq. ft., compared to 805,000 gross sq. ft. under the project.

- In addition, this variant would create a new height zone as shown in Figure VII.F.1, for the area fronting on Third and Mariposa Streets. The new height zone would allow development of up to 90 feet in height on 90% of the area and a tower of up to 160 feet in height on 10% of the area. The rest of the block would remain in Height Zone 6. The creation of the new height zone would add one allowable new tower to Mission Bay South in comparison to the proposed project. The new height zone would be HZ-8; the height zone covering UCSF would be renumbered HZ-9.

- The primary vehicular access to the Castle Metals block would be from the proposed Fourth Street. Secondary access would be from Mariposa and 16th Streets.

- **ENVIRONMENTAL ISSUES**

- As described below, the Castle Metals Block Variant would have the same significant impacts and require the same mitigation measures as the proposed project.

- **Plans, Policies, and Permits**

- This variant would expand the area to be designated Commercial Industrial/Retail and reduce the area to be designated Mission Bay South Retail in the proposed Mission Bay South Redevelopment Plan. All other implications regarding plans, policies, and permits would be substantially the same as the proposed project.

- **Land Use**

- The variant would increase the amount of Commercial Industrial uses in Mission Bay South, but would not introduce any uses not already proposed for the project. This variant would increase the developable area of land uses proposed in the West Subarea of the Project Area, but would not change the type. As with the project, Commercial Industrial uses in this portion of the Project Area generally would be compatible with other proposed project uses and with existing uses in the adjoining areas. The decrease in the amount of city-serving retail space in this portion of the Project Area would not substantially affect other proposed project uses or existing uses in adjoining areas.

- **Business Activity, Employment, Housing, and Population**

- This variant would have more Commercial Industrial development and less city-serving retail development than the proposed project. Those differences in the types of building space in the West Subarea change estimates of Project Area employment. Compared to the proposed project, there would be about 750 fewer city-serving retail jobs, about 960 more office jobs, and about 700 more research and development or light industrial jobs./6/ Overall, there would be about 910 more jobs in the Project Area under the Castle Metals variant. This would be 11% more jobs for the West Subarea and 3% more jobs for the Project Area overall.

- The differences in building development and employment would not be large enough to make a difference in the conclusions made for the proposed project. Because there would be somewhat greater Project Area jobs and the same number of Project Area housing units, there would be more Project Area housing demand relative to supply with this variant than would be the case with the proposed project. Although relatively small, this variant's slight increase in the housing supply deficit could result in somewhat greater housing market impacts with the variant compared to the proposed project. As with the project, the variant housing demand would not be a significant effect under CEQA./7/ However, the Mission Bay South Redevelopment Plan, Section 304.10, "Fees and Exactions: Parcels X2, X3 and X4," stipulates that all standard city fees and exactions would apply to the private property other than properties owned by Catellus, except as provided in an owner participation agreement when the public benefits exceed those of the City's standard fees or exactions. The City's OAHPP, or a housing exaction of equivalent or greater benefit, would apply to office development on the non-Catellus owned property on the Castle Metals block. Therefore, some additional housing supply would be forthcoming.

- With a lesser amount of city-serving retail development in the Project Area, it would be more likely that other city-serving retail space would be developed in suitable locations of Nearby Areas to the south and west. Because there would still be substantial retail development elsewhere in the Project Area, the difference in impacts on development patterns between the Castle Metals Variant and the proposed project would be relatively small.

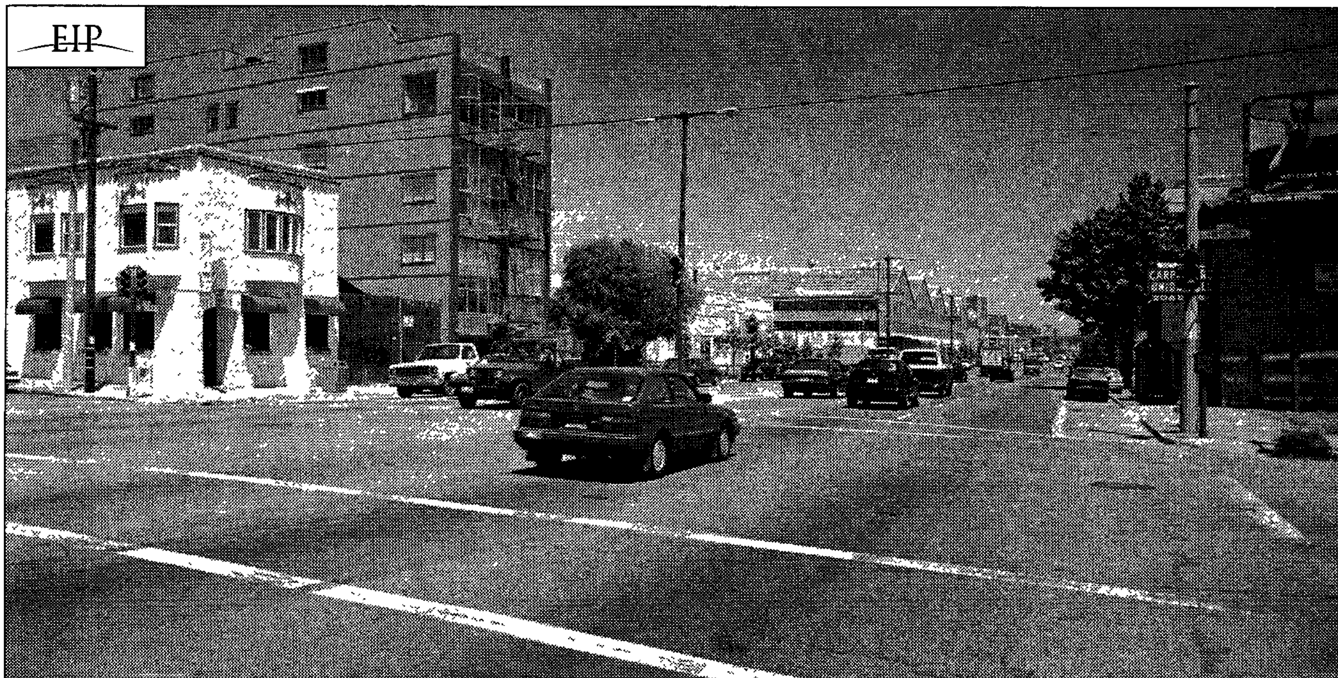
- **Visual Quality and Urban Design**

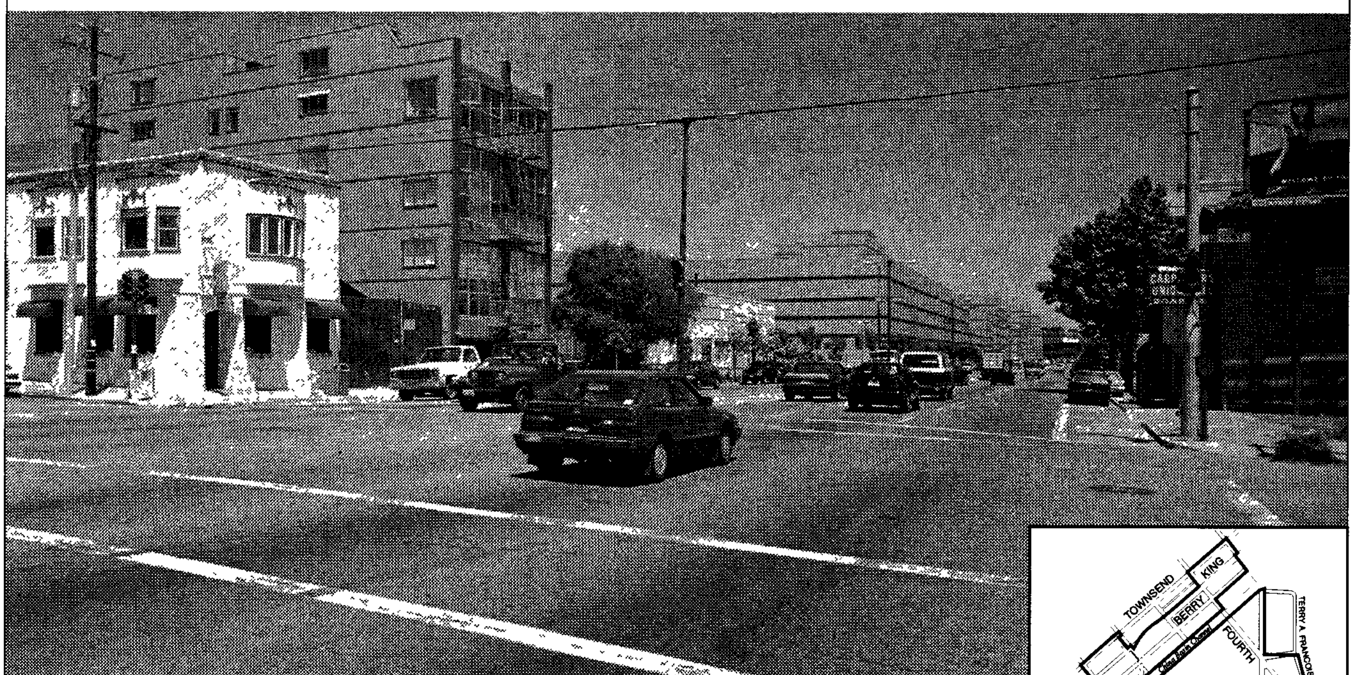
- Under this variant, views of the Castle Metals block bounded by Third Street and Mariposa Street would change from the proposed project's views of retail uses to views of office, light industrial, or research and development land uses. In contrast to the proposed project's height limit of 90 feet on the Castle Metals site, the new height zone would permit buildings up to 90 feet in height for 90% of the developable area and up to 160 feet in height for 10% of the developable area, allowing one additional tower (see "Description," above). As a result of the variant's change in type and height of land uses, views could be of more intense development with the variant than with the project.

- Figure VII.F.2 schematically illustrates existing and potential views under the proposed project looking northwest from Third Street at 18th Street toward the southern Project Area boundary, from the perspective of the motorist or pedestrian. Similarly, Figure VII.F.3 schematically illustrates the same existing and potential views under this variant. The view does not illustrate the proposed extension of MUNI Metro light rail vehicle service in the Third Street median. As shown in the figures, foreground and street-level views with the variant would be dominated by mid- to high-rise buildings (extending up to 160 feet at certain locations). Views of the area are local, with none of the downtown. Views of development would partially obscure views of open sky presently available at this view point, thereby focusing more attention on the proposed development. Although new development would alter the scale and character of the area, as with the proposed project, this variant would not create any significant visual impacts because important scenic views from public areas would not be substantially degraded or obstructed.

- **Transportation**

- The land uses in Variant 5 would generate approximately 1,320 fewer person trips than would the project during the p.m. peak hour, because city-serving retail generates a larger number of trips per unit area than the mix of uses proposed under this variant. In addition, a smaller portion of these





Top: Existing View Northwest from Third Street at 18th Street
Bottom: Potential View Northwest from Third Street at 18th Street with proposed project.

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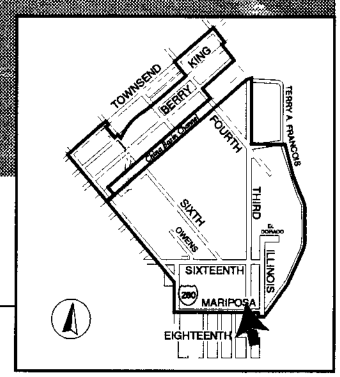
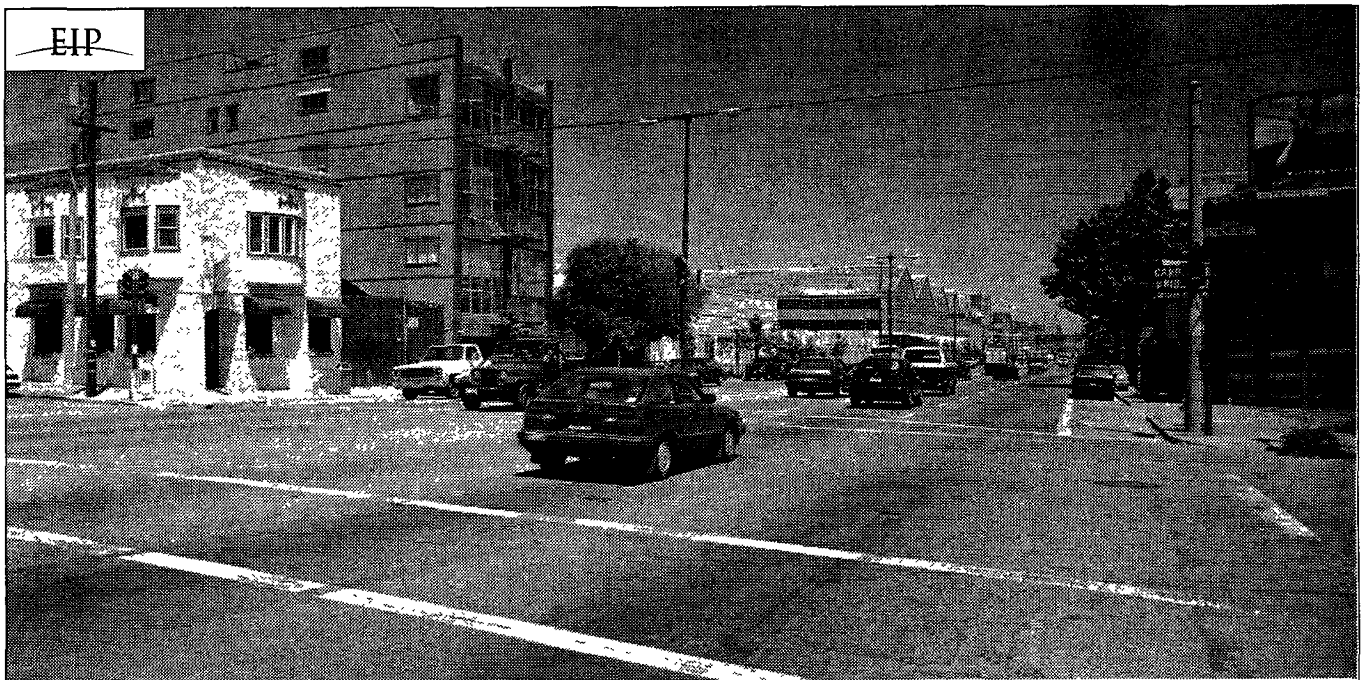
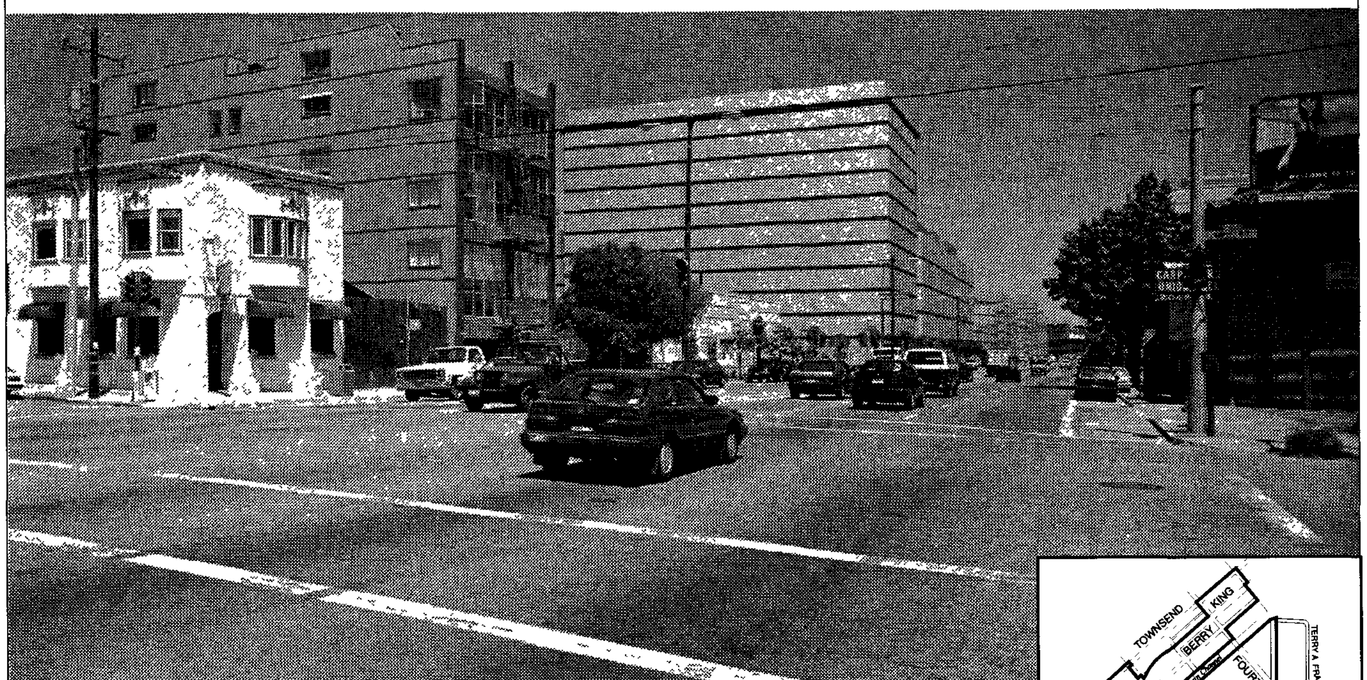


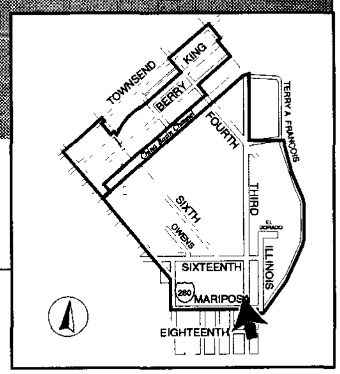
SOURCE Square One Productions

NOTE: The visual simulation illustrates general height and massing permitted under the variant, but does not necessarily represent maximum development at any particular location nor specific architecture or urban design.

FIGURE VII.F.2 EXISTING AND POTENTIAL NORTHWEST VIEWS FROM THIRD STREET AT 18TH STREET FOR PROPOSED PROJECT







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Top: Existing View Northwest from Third Street at 18th Street
Bottom: Potential View Northwest from Third Street at 18th Street with Variant 5.

SOURCE: Square One Productions
NOTE The visual simulation illustrates general height and massing permitted under the variant, but does not necessarily represent maximum development at any particular location nor specific architecture or urban design

FIGURE VII.F.3 CASTLE METALS BLOCK COMMERCIAL INDUSTRIAL/RETAIL VARIANT: EXISTING AND POTENTIAL NORTHWEST VIEWS FROM THIRD STREET AT 18TH STREET

person-trips would be made by automobile compared to the mode split of project land uses. Thus, Variant 5 would create about 570 fewer automobile trips during the p.m. peak hour. Table VII.F.1 compares the p.m. peak hour trip generation of Variant 5 to that of the project.

- The smaller number of automobiles in the Mission Bay street network suggests that traffic and parking conditions would be slightly better under the variant compared with the proposed project. The total parking demand for Mission Bay under Variant 5 would be approximately 580 fewer spaces, or approximately 2% less than that estimated for the project. Table VII.F.2 compares some key intersection levels of service (LOS) under the variant with those of the project in the vicinity of the 1900 Third Street site. Operation of four of the seven intersections near the 1900 Third Street site would improve to some extent, with one intersection experiencing an improvement in level of service. No intersections projected to operate at LOS E or LOS F would improve to an acceptable level of service under the variant. This variant does not reduce impacts identified under the project below the level of significance.

- The number of both inbound and outbound vehicle trips and inbound transit trips generated by the variant would be less than that created by the project, but the office, research and development, and city-serving retail uses would create approximately 50 more outbound total transit trips, 11 more inbound bicycle and pedestrian trips, and about 118 more outbound bicycle and pedestrian trips than the proposed project during the p.m. peak hour. The increase in non-automobile trips under this variant is far less than the relative decrease in automobile trips. The bicycle and pedestrian network would be able to accommodate the additional trips produced under this variant. The additional outbound transit trips created by these land uses represent less than a 1% increase compared to the total project. Some would use MUNI to travel to city locations, most would travel to the East Bay and South Bay; many of these additional transit riders would use MUNI to reach their primary transit carrier. Caltrain would have sufficient capacity to carry the individuals destined for the South Bay, and all of the additional East Bay passengers could be accommodated on BART with a less than 0.2% increase in the p.m. peak hour load factor compared with that for the project. The impact of the additional outbound transit trips would increase the load factor on Third Street light rail in the northbound direction in the vicinity of Mission Bay from 77% to 83%, but this would not be a significant impact. The load factor on Third Street light rail in the southbound direction would decrease slightly from 84% to 82%.

- **Air Quality**

- As described below, the Castle Metals Variant would have the same significant air quality impacts and require the same air quality mitigation measures as the proposed project. The change in land use

TABLE VII.F.1 ●
PM PEAK HOUR PERSON TRIP GENERATION IN 2015
VARIANT 5 COMPARED WITH PROJECT

Area	Variant 5	Project	Difference
Mission Bay North	11,030	11,030	0
Mission Bay South	21,150	22,470	-1,320
Total	32,180	33,500	-1,320

Source: Wilbur Smith Associates

TABLE VII.F.2 ●
YEAR 2015 INTERSECTION LEVEL OF SERVICE COMPARISON
VARIANT 5 COMPARED WITH PROJECT

	Project		Variant 5	
Intersection	Delay (sec/veh)	LOS	Delay (sec/veh)	LOS
16^{th} and Seventh Streets	32.2	D	32.9	D
16^{th} and Fourth Streets	29.2	D	30.8	D
16^{th} and Third Streets	25.2	D	22.0	C
Mariposa and I-280 on-ramp	16.6	C	16.6	C
Mariposa and I-280 off-ramp/Owens Street	35.9	D	31.6	D
Mariposa and Fourth Streets	13.6	B	11.9	B
Mariposa and Third Streets	23.7	C	22.9	C

Source: Wilbur Smith Associates

under Variant 5 would slightly alter traffic patterns and the number of vehicle trips in and around the Project Area. Vehicular emissions would be reduced by 5%, compared with those of the proposed project. As shown in Table VII.F.3, vehicular emissions of ROG, NO_x, and PM_{10} would exceed the BAAQMD significance thresholds for regional air quality impacts. Trip reduction measures discussed in Mitigation Measure E.47 in Section VI.E, Transportation, would not reduce emissions of criteria pollutants below these BAAQMD significance thresholds. Therefore, as under the project, these vehicular emissions would be an unavoidable significant regional air quality impact.

- Due to the level of carbon monoxide emissions expected, three of the 13 intersections modeled for the proposed project were selected for analysis for this variant. The CO concentrations would be slightly lower for the variant than for the project (see Table VII.F.4).

- In this variant, the decrease in overall traffic would slightly reduce toxic air contaminant emissions from mobile sources. Toxic air contaminants, such as various organic solvents associated with research and development and light manufacturing operations, would increase. The variant might result in about 11% more emissions of toxic air contaminants from stationary sources than the proposed project, due to the increase in research and development and light industrial uses under the variant. As under the project, combined emissions of toxic air contaminants would be an unavoidable significant impact.

- **Noise and Vibration**

- A comparison of the traffic estimated for this variant with that for the proposed project shows that the variant would have traffic volumes similar to or less than the proposed project at all of the noise study locations. The noise levels for one-hour L_{eq} and 24-hour L_{dn} would be substantially the same at all of the locations studied. All other noise and vibration issues discussed in Section V.G, Noise: Impacts, would remain substantially the same with this variant as for the proposed project.

- **Seismicity**

- The modification of the land use on the Castle Metals site under this variant would not alter the geologic, soils, or seismic conditions in the Project Area. The seismic hazards and potential effects that would occur in Mission Bay South would be similar to those discussed for the proposed project. The concentration of employees in an area designated as seismically hazardous would be somewhat higher on this specific site under the variant than under the project as proposed, but would not result in any new significant impacts or require additional mitigation.

**TABLE VII.F.3 ●
ESTIMATED VEHICULAR EMISSIONS
FROM VARIANT 5 TRAFFIC IN 2015**

Pollutant	BAAQMD Threshold (lb/day)	Project (lb/day)	Variant 5 (lb/day)
Reactive Organic Gases (ROG)/a/	80	865	830
Nitrogen Oxides (NO_x)/a/	80	1,324	1,270
Particulate Matter (PM_{10})/a/	80	1,968	1,889
Carbon Monoxide (CO)/b/	550	12,228	11,738

Notes:

a. The BAAQMD regards this amount of emissions as a threshold of significance for a regional impact.

b. For carbon monoxide, the BAAQMD does not regard 550 lb/day as a threshold of significance, but rather, an indicator to perform microanalysis (see text).

Source: EIP Associates. Based on modeling using the California Air Resources Board's URBEMIS model, version 5.

**TABLE VII.F.4 ●
ESTIMATED LOCAL CO CONCENTRATIONS AT
SELECTED INTERSECTIONS IN 2015 FOR VARIANT 5**

	Proposed Project (ppm)/a/		Variant 5 (ppm)	
Intersection	One-Hour	Eight-Hour	One-Hour	Eight-Hour
Third and 16th Streets	11.0	6.3	10.8	6.2
Third and King Streets	13.6	7.6	13.2	7.3
Fourth and Bryant Streets	8.3	5.3	8.5	5.3

Notes:

ppm = parts per million.

a. Refer to Table V.F.5 and associated text in "Criteria Air Pollutants" under Section V.F, Air Quality: Impacts.

Source: EIP Associates.

- **Health and Safety**

- This variant would increase the amount of Commercial Industrial space for the project as a whole by about 11%; therefore, hazardous materials quantities estimated for Commercial Industrial activities in "Estimated Hazardous Materials Quantities," under "Hazardous Materials Use, Storage, and Disposal," in Section V.I, Health and Safety: Impacts, would be about 11% greater. This could result in a roughly proportional increase in the magnitude of environmental impacts related to handling biohazardous materials, handling materials that pose substantial hazards of release or explosions, and generating hazardous wastes. With the reduction in retail space, there would be a reduction in hazardous waste associated with retail activities. The nature of these environmental impacts would be essentially the same as with the project, and, as with the project, would be reduced to a level of insignificance if the mitigation measures proposed for the project were implemented.

- **Contaminated Soils and Groundwater**

- The 1900 Third Street site is discussed in Section V.J, Contaminated Soils and Groundwater, on p. V.J.40. As noted there, three site assessments have been performed for the Castle Metals site. These assessments show that underground storage tanks have been removed from the site, that soil samples from the site show the presence of metals and petroleum hydrocarbons, and that no specific potential off-site sources of contamination were identified. The assessments recommended no immediate action with regard to potential soil contamination and noted that the provisions of Article 20 of the San Francisco Public Works Code would apply to any actions disturbing more than 50 cubic yards of soil.

- This variant would not change the results of the impacts analysis in Section V.J, Contaminated Soils and Groundwater in the SEIR, nor would it suggest that additional analysis should be carried out to account for the proposed change in use on the 1900 Third Street site. In summary, the analysis assumes that prior to development the property owner or developer for the 1900 Third Street site, as for all other sites in the Project Area, would prepare a Risk Management Plan or Plans (RMP) that would include measures to reduce any risks that might result from construction or from occupation and use of the sites. Various measures proposed to be included in the Risk Management Plan or Plans are listed in Section VI.J, Mitigation Measures: Contaminated Soils and Groundwater, on pp. VI.41-VI.45. Also, Article 20, Section 1000, *et seq.*, of the San Francisco Public Works Code would apply to the 1900 Third Street site, as it would to the remainder of the Project Area (see p. V.J.51), and its implementation would be coordinated with implementation of the RMP.

- **Hydrology and Water Quality**

The additional Commercial Industrial floor area and reduced retail space under this variant would have minor effects on the range and degree of hydrology and water quality impacts described for the proposed project. The increase in Commercial Industrial space could increase the potential discharge of pollutants in wastewater associated with light industry, research and development, or similar activities. Similarly, the decrease in city-serving retail could decrease the discharge of pollutants associated with retail activities. The effects would be similar to those of the proposed project described in "Quality of Municipal Wastewater From the Project" and in "Evaluation of Potential Water Quality Impacts" in Section V.K, Hydrology and Water Quality: Impacts, and would require the same mitigation measures.

- **Vegetation and Wildlife**

The changes in use on the Castle Metals site under the variant would not substantially alter the effects on the Channel or the Bay for the proposed project, as presented in Section V.L, China Basin Channel Vegetation and Wildlife: Impacts, and would require the same mitigation measures.

- **Community Services and Utilities**

This variant would accommodate approximately 910 or 3% more jobs than the nearly 30,000 jobs forecast under the proposed project. An increase in projected employment of this size, and the changes in amount and type of use associated with this variant, would not cause an appreciable change in estimated project demand for community services or utilities or require additional mitigation.

- **Growth Inducement**

The variant would create a small difference in potential development patterns for city-serving retail in Nearby Areas; more city-serving retail space would be expected to be developed in suitable locations of Nearby Areas to the south and west. Overall, the difference in Project Area jobs and in jobs/housing outcomes would not be substantial enough to result in different conclusions about the growth inducement implications of this variant compared with the proposed project. There would be no difference in cumulative citywide or regional growth.

SUMMARY OF MITIGATION MEASURES

The significant impacts of this variant would be the same as those of the project. No additional mitigation measures have been identified.

G. COMBINATION OF VARIANTS CURRENTLY UNDER CONSIDERATION BY THE PROJECT SPONSORS

INTRODUCTION

The project sponsors are considering a combination of variants to the proposed project. This combination evolved from responses to public comments and from refinements to the project made by the project sponsors since publication of the Draft SEIR. The project with the variants under consideration by the project sponsors would be similar to the proposed project without those variants. The purpose of this section is twofold: 1) to present in one place for ease of reference both the land use program currently under consideration by the project sponsors and the assessment of its environmental effects; and 2) to determine if there would be any new impacts and if additional mitigation measures would be required.

DESCRIPTION

The combination of variants currently under consideration by the project sponsors includes a variant from the SEIR, two modified SEIR variants, and a new variant, as follows:

- Variant 1: Terry A. François Boulevard Variant/Expanded Bayshore Open Space Proposal (see p. VII.2 regarding this variant).
- Variant 2: Esprit Commercial Industrial/Retail Variant (see p. VII.12).
- Variant 3A: Modified No Berry Street Crossing Variant (see p. VII.31).
- Variant 5: Castle Metals Block Commercial Industrial/Retail Variant (see p. VII.33).

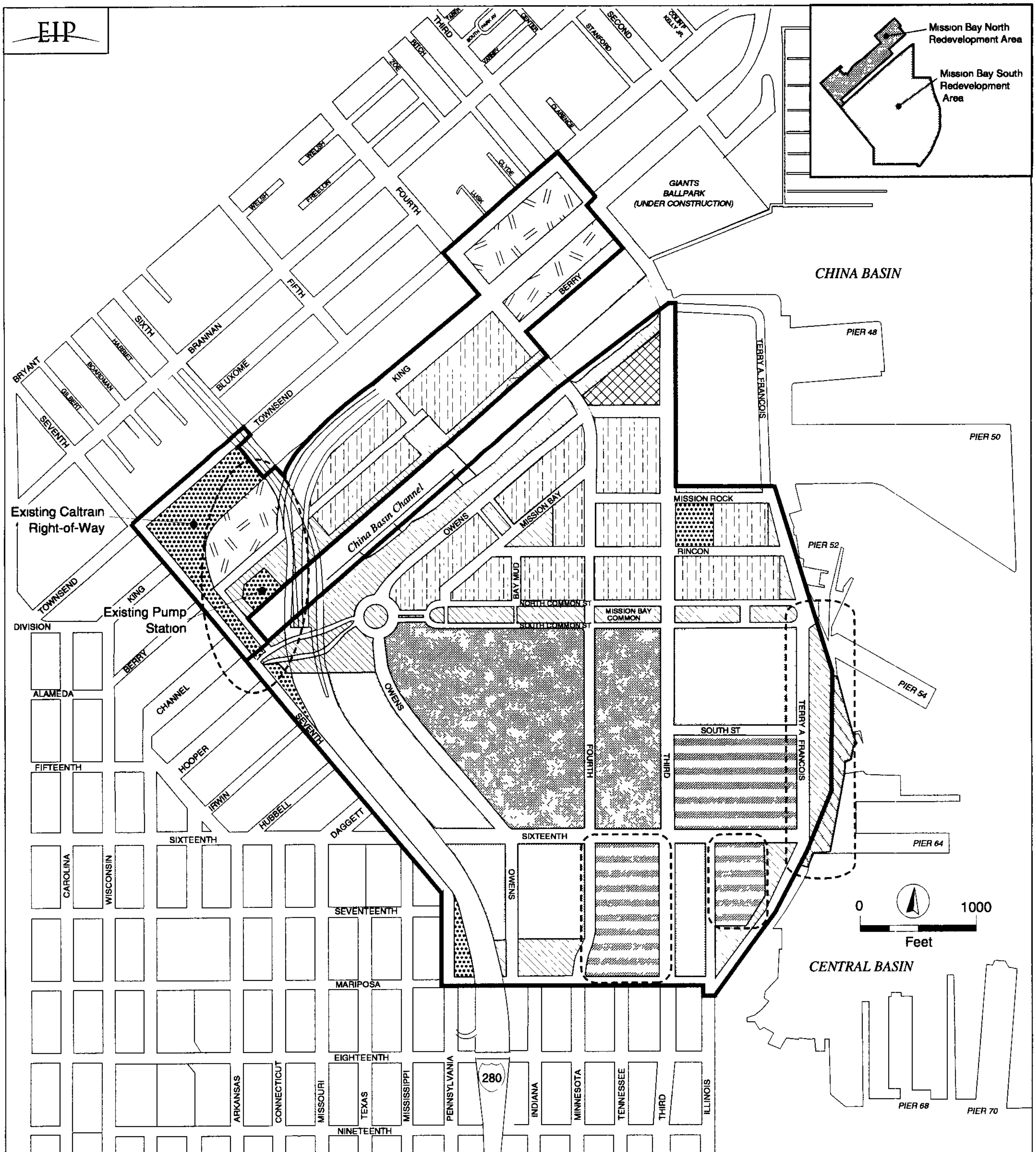
In summary, this combination of variants would be the same as the proposed project except for the following elements:

- The Terry A. Francois Boulevard would be realigned to the west to allow development of open space to the east closer to the San Francisco Bay. This Project Area open space would be integrated with open space to be developed by Catellus on 2 acres of adjacent port property outside the proposed Mission Bay South Redevelopment Area to create an expanded bayfront open space. A small commercial building would be permitted within the Project Area's open space to the east of Terry A. Francois Boulevard. Its anticipated use is recreation-oriented retail services that could include some restaurant uses (Variant 1 noted above).
- There would be no roadway crossing of the railroad tracks at Berry Street. Berry Street would be extended south to Common Street, and the retail space in the northwestern-most block of the Project Area would be reduced by 50% (Variant 3A noted above).
- The Mission Bay South Retail land use designation would be eliminated. The land use designation proposed for the Esprit site and the Castle Metals block would be changed to Commercial Industrial/Retail (Variants 2 and 5 noted above).

Figure VII.G.1 presents a land use designation map for the proposed project incorporating this combination of variants as summarized in the following discussion. (This map is also shown on the inside front cover.) Under this combination of variants, the alignment of Terry A. François Boulevard would be moved west, away from the Bay, and the proposed Project Area open space would be shifted east. Further, the Project Area open space would be integrated with the development of 2 acres of open space outside of the Project Area on the adjacent port property to create an expanded bayshore open space. A small commercial building (15,000 gross sq. ft.) would be allowed within the Project Area's open space to the east of Terry A. Francois Boulevard. Its anticipated use is recreation-oriented retail services that could involve restaurant use.

This combination of variants would eliminate the at-grade railroad crossing at Berry Street proposed in the project. To address the reduced access to the northwestern part of the Project Area, this combination of variants would add a new two-lane section of roadway extending Berry Street around the western end of China Basin Channel to connect with Common Street. The connection of Berry Street with Common Street would link east/west access to the northwestern section of the Project Area. However, the Berry Street extension would not fully compensate for the elimination of the Berry Street crossing of the railroad tracks. As a result, this combination of variants, compared to the project, would still reduce access to Mission Bay North from the west.

Due to the reduced access to the northwestern-most block fronting on Berry Street between Sixth and Seventh Streets, west of I-280 King Street ramps and east of the Caltrain tracks, the city-serving retail development anticipated for that block would be reduced 50%: from 222,000 gross sq. ft. under the proposed project to 111,000 gross sq. ft. under this combination of variants.



REDEVELOPMENT PLAN LAND USE DESIGNATIONS

- COMMERCIAL INDUSTRIAL
- COMMERCIAL INDUSTRIAL / RETAIL
- MISSION BAY NORTH RETAIL
- MISSION BAY RESIDENTIAL
- HOTEL
- MISSION BAY OPEN SPACE (allows recreation-serving retail building east of Terry A Francois Blvd)
- UCSF (includes City school site)
- MISSION BAY PUBLIC FACILITIES
- ADDITIONAL BAYFRONT OPEN SPACE (PORT PROPERTY)
- PROPOSED BOUNDARIES OF MISSION BAY REDEVELOPMENT AREAS
- COMBINATION OF PROJECT FEATURES AND VARIANTS CURRENTLY UNDER CONSIDERATION

96555/8-20-98

SOURCE San Francisco Redevelopment Agency

MISSION BAY SUBSEQUENT EIR

FIGURE VII.G.1 COMBINATION OF PROJECT FEATURES AND VARIANTS CURRENTLY UNDER CONSIDERATION BY THE PROJECT SPONSORS

- This combination of variants would eliminate the Mission Bay South Retail land use designation on the Esprit site and the Castle Metals block, and would change those areas so designated to Commercial Industrial/Retail.

- Finally, this combination of variants would create a new Height Zone for a portion of the block also containing 1900 Third Street fronting on Mariposa and Third Streets. The new Height Zone would allow development of up to 90 feet in height on 90% of the developable area and a tower of up to 160 feet in height on 10% of the developable area. The rest of the block would remain in Height Zone 6. The creation of the new Height Zone would add one more allowable new tower to Mission Bay South compared to the 16 towers allowed under the proposed project.

- Table VII.G.1 summarizes land use with the combination of variants and the resulting project totals. Table VII.G.2 summarizes the Redevelopment Plan land use designations with the project and the combination of variants. As shown in these tables, adoption of the project with this combination of variants would result in about 6,621,000 square feet of commercial industrial/office space, about 1,064,000 square feet more than the project; 239,000 square feet of city-serving retail space, about 566,000 square feet less than the project,/8/ and 47 acres of public open space, with the associated development of approximately 2 more acres on adjacent port property to create an expanded bayfront open space area. Other land use totals would not be different from the project.

- If the Combination of Variants (including Variant 2, regarding the Esprit parcel and Variant 5, for the Castle Metals block) were adopted, land use designations for Esprit and the Castle Metals block would be changed in the Redevelopment Plan for Mission Bay South and the land use program in Mission Bay North would be changed. Similarly, the objectives in the Redevelopment Plans for Mission Bay South and Mission Bay North would be expected to change to reflect the maximum development assuming the Combination of Variants Currently under Consideration by the Project Sponsors. Therefore, objective H listed on p. III.7 in "Project Sponsors and Their Objectives" would be revised to read:

  H. Strengthening the economic base of the Project Area and the community by strengthening retail and other commercial functions in the Project Area through the addition of approximately ~~1.5 million~~ <u>941,000</u> gross sq. ft. of retail space, a major hotel, and about ~~5,557,000~~ <u>6,621,000</u> gross sq. ft. of mixed office, research and development, and light manufacturing uses.

- ENVIRONMENTAL ISSUES

- The environmental effects of this combination of variants under consideration by the project sponsors would be similar to those of the proposed project (see the impacts subsection for each environmental topic in Chapter V, and the respective subsection for each topic in Chapter VI, Mitigation Measures). This combination of variants' minor differences from the project's effects are described in Chapter

TABLE VII.G.1 ●
SUMMARY OF PROPOSED DEVELOPMENT BY LAND USE /a/
PROJECT WITH COMBINATION OF VARIANTS
CURRENTLY UNDER CONSIDERATION BY THE PROJECT SPONSORS

Land Use	Mission Bay North Redevelopment Area	Mission Bay South Redevelopment Area	Grand Total /b/
Residential (dwelling units)	3,000	3,090	6,090/c/
Commercial Industrial and Office (gross sq. ft.)	0	6,621,000	6,621,000
UCSF (gross sq. ft.)	0	2,650,000	2,650,000
Retail			
Entertainment-Oriented Retail (gross sq. ft.)	389,000	56,000	445,000
City-Serving Retail (gross sq. ft.)	111,000	128,000	239,000
Neighborhood-Serving Retail (gross sq. ft.)	56,000	201,000	257,000
Hotel (rooms)	0	500	500
Public Open Space (acres)/d/	6	41/e/	47
Public Facilities (acres)	1.5 /f/	3.7/g/	5.2

Notes:

a. Parking is not included in the gross square footage totals given for each land use. Maximum parking allowances are outlined in this section under "Parking and Loading" under "Redevelopment Plans and Proposed Land Uses," and are discussed in Table V.E.17 and "Parking Impacts" in Section V.E, Transportation: Impacts, pp. V.E.95-V.E.101.

b. The conceptual agreements between the City and Catellus do not cover those portions of the proposed Redevelopment Areas not owned by Catellus. The components of the proposed development program summarized in the Grand Total that are not on land owned by Catellus consist of 90 dwelling units along Third Street, 604,000 gross sq. ft. of commercial/industrial and 50,000 gross sq. ft. of City-serving retail on the Castle Metals site, and 460,000 gross sq. ft. of commercial/industrial/retail and 40,000 city-serving retail on the Esprit site.

The changes from the proposed project include the reduction of 111,000 gross sq. ft. of city-serving retail in Mission Bay North and 455,000 gross sq. ft. in Mission Bay South, for a total reduction of 566,000 gross sq. ft.; the addition of 1,064,000 gross sq. ft. of Commercial Industrial and Office space in Mission Bay South; and the addition of the 15,000-gross-sq.-ft. commercial building in the open space near Pier 64.

c. Of the 3,000 dwelling units north of the Channel, 20% would be affordable units. Of the 3,090 dwelling units south of the Channel, the Redevelopment Agency would seek non-profit developers to build approximately 1,100 affordable units, i.e., 37%.

d. Additionally, approximately 2 more acres of public open space would be developed by Catellus on adjacent port property outside of the Project Area as an expanded bayfront open space area.

e. The 41 acres of public open space in Mission Bay South includes about 8 acres of open space on the proposed UCSF site.

f. The existing Channel Pump Station in Mission Bay North is on about 1.5 acres; the site is not proposed for redevelopment.

g. In addition to the acreages shown in the tables, land under the I-280 elevated freeway that is not otherwise designated Public Open Space would be designated Public Facilities.

Source: Catellus Development Corporation and San Francisco Redevelopment Agency.

TABLE VII.G.2 ●
PROJECT WITH COMBINATION OF VARIANTS
LAND USE DESIGNATIONS/a/

Land Use Designation	Mission Bay North Redevelopment Area	Mission Bay South Redevelopment Area	Grand Total/b/
Mission Bay Residential			
Dwelling Units/c/	1,920	3,090 /b/	5,010
Neighborhood-serving Retail (gross sq. ft.)	56,000	111,000	167,000
Mission Bay North Retail			
Entertainment-oriented Commercial (gross sq. ft.)	389,000	0	389,000
City-serving Retail (gross sq. ft.)/d/	111,000	0	111,000
Dwelling Units /c/	1,080	0	1,080
Hotel			
Hotel (rooms)	0	500	500
Entertainment-oriented Commercial (gross sq. ft.)	0	56,000	56,000
UCSF Site/e/			
UCSF uses (gross sq. ft.)	0	2,650,000	2,650,000
City School Site (acres)	0	2.2	2.2
Open Space (acres)	0	8	8
Commercial Industrial			
Commercial Industrial (gross sq. ft.)	0	4,163,000	4,163,000
Neighborhood-serving Retail (gross sq. ft.)	0	58,400	58,400
Commercial Industrial / Retail			
Commercial Industrial (gross sq. ft.)/d/	0	2,458,000	2,458,000
Neighborhood-serving Retail (gross sq. ft.)	0	31,600	31,600
City-serving Retail (gross sq. ft.)/d/	0	128,000	128,000
Mission Bay South Retail /d/			
City-serving Retail (gross sq. ft.)	0	0	0
Public Facilities (acres, excluding City school site) /g/	1.5 /f/	1.5	3.0
Public Open Space (acres, excluding UCSF)/h/	6	33	39

Notes:

a. The locations of the proposed land use designations are shown in Figure VII.G.1. Parking is not included in the gross square footage totals given for each land use. Maximum parking allowances are outlined in this section in "Parking and Loading," under "Redevelopment Plans and Proposed Land Uses," and are discussed in Table V.E.17 and "Parking Impacts" in Section V.E, Transportation: Impacts.

b. The conceptual agreements between the City and Catellus do not cover portions of the proposed Redevelopment Areas not owned by Catellus. The components of the proposed development program summarized in the Grand Total that are not on land owned by Catellus consist of 90 dwelling units along Third Street, 560,000 gross sq. ft. of Commercial Industrial and 50,000 gross sq. ft. of city-serving retail on the Castle Metals site, 44,000 gross sq. ft. of Commercial Industrial on the three small parcels at the northeastern corner of the Castle Metals site, and 460,000 gross sq. ft. of Commercial Industrial and 40,000 gross sq. ft. of city-serving retail on the Esprit site.

c. Of the 3,000 dwelling units north of the Channel, 20% would be affordable units. Of the 3,090 dwelling units south of the Channel, the Redevelopment Agency would select developers to build approximately 1,100 affordable units.

d. The changes from the project in gross floor area would be as follows: a reduction of 111,000 gross sq. ft. in Mission Bay North City Serving Retail; the addition of 1,169,000 gross sq. ft. of Commercial Industrial/Retail, of which 1,064,000 gross sq. ft. would be Commercial Industrial and 105,000 gross sq. ft. would be Retail; and the reduction of 560,000 gross sq. ft. of Mission Bay South Retail (thereby eliminating that land use designation).

e. Refer to Table III.B.1 for details on the UCSF development program.

f. The existing Channel Pump Station, on 1.5 acres of city-owned land, is not proposed for development.

g. In addition to the acreages shown in the tables, land under I-280 that is not otherwise designated Public Open Space would be designated Public Facilities.

h. Approximately 2 more acres of public open space would be developed on adjacent port property outside of the Project Area as an expanded bayfront open space area.

Source: Catellus Development Corporation and San Francisco Redevelopment Agency.

VII, Variants, and in Chapter XII, Summary of Comments and Responses, in Variants, "Combination of Variants Currently Under Consideration."

- This combination of variants currently under consideration by project sponsors would not create significant impacts beyond those already identified in the Draft SEIR based on the environmental assessment of the variants individually. In one case, the combination of variants would create a new significant transportation intersection impact in comparison to the proposed project. The impact, along with mitigation measures that would reduce it to a less-than-significant level, is identified in the assessment of Variant 3, No Berry Street Crossing (Chapter VII, pp. VII.23-VII.24).

- As stated on p. VII.1a, each variant is available for selection by the project sponsors, and any combination of variants could be approved.

- Even if all variants were to be adopted, the following assessment confirms that no new significant impacts other than those identified above for each individual variant (i.e., Variants 1, 2, 3A, and 5) would occur. The following assessment summarizes minor differences in environmental effects resulting from this combination of variants, as compared to those of the proposed project.

- **Plans, Policies, and Permits**

- The plans, policies, and permits issues of the combination of variants would be substantially the same as those of the proposed project. Development of the expanded bayfront open space between Piers 54 and 64 under this combination of variants would require additional amendments to the Waterfront Land Use Plan to reflect the proposed open space use. In the Mission Bay South Redevelopment Plan, the Mission Bay South Retail land use designation would be eliminated on the Castle Metals block and the Esprit site, and the area to be designated Commercial Industrial/Retail would expand. A new height zone would also be added to reflect the Castle Metals variant. These changes would not raise new plan, policy, or permitting issues.

- As with the proposed project, this combination of variants would require the Peninsula Corridor Joint Powers Board (JPB) support and the California Public Utilities Commission (CPUC) approval of the formal closing of the King and Seventh Street at-grade crossing and of the proposed construction of an at-grade crossing at The Common and Seventh Street. In contrast to the proposed project, this combination of variants would require the associated JPB support and CPUC approval of the removal of two sets of Caltrain tracks to widen the right-of-way along both sides of Caltrain, thus providing space for the extension of Berry Street to Common Street.

- **Land Use**

- In summary, this combination of variants would reduce city-serving retail space, increase commercial/industrial space, and develop an expanded bayfront open space area outside of the Project Area. A small commercial building would be permitted in the open space within the Project Area near Pier 64. This combination of variants would not have land use impacts substantially different from those of the proposed project. The realignment of Terry A. Francois Boulevard and the integrated development of the Project Area open space with the additional 2 acres of adjacent port property would create an expanded bayfront open space area. Until the existing buildings were demolished for the development of open space on the port-owned 2 acres, this variant would limit access to the existing maritime service uses—the boat storage yard and the small-boat repair use south of Pier 54—by realigning the roadway that now provides direct vehicular access for these uses. As currently contemplated by the project sponsors, these uses would have indirect access via a driveway through the parking lot proposed at the north end of the public open space to a roadway extending south. Future users of these port properties could not be assured of direct vehicular access for employees, patrons, or deliveries, which, under the project, would continue to be provided by Terry A. François Boulevard. The Port would consider whether alternative access and parking arrangements are required, depending on existing and proposed uses, in its assessment of the potential for disturbance and/or displacement of such uses. Once the port property was developed as open space, the access issues would no longer exist because the affected buildings would be demolished.

- In the Project Area's northeastern-most block, city-serving retail development would be reduced 50% (111,000 gross sq. ft.) due to the somewhat reduced access to that block without the Berry Street at grade railroad track crossing proposed by the project. The proposed Mission Bay South Retail land use designation on the Esprit site and the Castle Metals Block would be changed to Commercial Industrial/Retail. This change would eliminate the Mission Bay South Retail land use designation and would intensify uses on those sites, but it would not introduce new land uses compared to the proposed project. Commercial Industrial uses would increase by 1,064,000 gross sq. ft. and retail uses would decrease by 455,000 gross sq. ft.

- The reduction in city-serving retail would change retail development patterns in the Project Area and Nearby Areas for this combination of variants in comparison to the proposed project. Without the larger amount of city-serving retail development in Mission Bay under this combination of variants, it would be more likely that other city-serving retail space would be developed in suitable locations in Nearby Areas. Mission Bay residents, businesses, and employees would do more of their retail shopping outside the Project Area (see section on "Business Activity, Employment, Housing, and Population," below).

- **Business Activity, Employment, Housing, and Population**

- This combination of variants would reduce city-serving retail development and increase Commercial Industrial development compared to the proposed project. Those land use differences would change related employment estimates for the Project Area. Overall, there would be 1,313 more jobs in the Project Area, about 4% more employment than expected under the proposed project. There would be 1,617 fewer city-serving retail jobs, 1,690 more office jobs, and 1,240 more research and development or light industrial jobs. The net difference in employment between this variant and the proposed project would be 310 fewer jobs in Mission Bay North and approximately 1,003 more jobs in Mission Bay South. The additional non-residential development would create minor changes in four aspects of the business activity, employment, housing, and population assessment in comparison to that for the proposed project: 1) jobs/housing balance conclusions; 2) housing market impacts; 3) development patterns in Nearby Areas (see "Growth Inducement" below); and 4) the buildout period.

- Compared to the proposed project, housing demand in San Francisco associated with Project Area employment growth would be higher with this combination of variants while the housing supply of 6,090 units would be the same as under the proposed project. Consequently, this combination of variants housing demand in San Francisco associated with Project Area employment growth would exceed housing supply in the Project Area by about 4,100 units in contrast to the 3,700 units under the project (including UCSF employment-related demand). As a result, housing market impacts would be somewhat higher than those identified for the proposed project (but these would be socioeconomic effects, not significant impacts under CEQA). However, since the City's OAHPP Ordinance (or an exaction of equivalent or greater benefit) would apply to non-Catellus owned private property on the Castle Metals block and the Esprit site, some additional housing supply related to office development would occur under this combination of variants if office uses were developed on those sites./9/

- The variant would accommodate about 19% more Commercial Industrial development than would the proposed project. The most likely consequences of the higher commercial industrial development under this combination of variants is that it would take the market longer to absorb the additional development (i.e., build and occupy) than would be the case for the smaller amount of space proposed for the project. It would be expected that there would be little difference in Mission Bay employment and total San Francisco employment in 2015 compared to the proposed project; but all Commercial Industrial development in the Project Area would not be built and occupied by 2015 under this combination of variants as it would under the proposed project.

- Another possible consequence of the higher amount of commercial industrial development is that Mission Bay would attract more demand from businesses that would otherwise locate elsewhere in the City. Total employment growth in San Francisco would not be different but more of it would be concentrated in the Project Area by 2015. As a result, there would be less demand for new development and renovated warehouse and industrial space in Nearby Areas such as parts of the downtown near the Transbay Terminal, South of Market, North Potrero, Inner Mission, and the Central Waterfront and, therefore, more options in those areas for lower-rent-paying businesses.

- Overall for the Project Area, city-serving retail under this combination of variants would be about 28% of the amount associated with the proposed project (72% less). Without the larger amount of city-serving retail development in the Project Area, it would be more likely that city-serving retail space would be developed in suitable locations in Nearby Areas such as the western South of Market, Inner Mission, North Potrero, Central Waterfront, and South Bayshore. Mission Bay residents, businesses, and employees would do more of their retail shopping outside the Project Area, and Mission Bay would not attract as much retail spending from other San Francisco residents as would be the case under the proposed project.

- **Visual Quality and Urban Design**

- This combination of variants would not change the overall visual effect of the proposed project. The realignment of Terry François Boulevard would accentuate the project's eastern edge with the Boulevard relocated next to the developed areas, and would open up views of the bay from the expanded bayfront open space development. Views of the Esprit site and the Castle Metals block would be of office, light industrial, or research buildings instead of lower retail buildings under the proposed project.

- There would be a new Height Zone on a portion of the Castle Metals block fronting Third and Mariposa Streets. The allowable 160-foot tower in the new Height Zone would be in addition to the 16 permitted under the project in Mission Bay South, and would be in addition to the two 160-foot towers permitted under the project's Height Zone 6 on the Castle Metals block bounded by 16th, Third, Mariposa, and Owens Streets. One additional building of this height would not be substantially different from that of the project. The reduced retail development associated with no Berry Street crossing would reduce building massing on the northeastern-most block of the Project Area.

- **Transportation**

- Roadway modifications under this combination of variants include the realignment of Terry A. François Boulevard to the west to provide open space closer to the waterfront. There would be no at-grade rail crossing at Berry Street, and Berry Street would be extended around the end of China Basin Channel to intersect with The Common immediately east of the Caltrain tracks. These roadway modifications would provide emergency access from Seventh Street by crossing the median between South and North Common Streets. They would provide direct egress from Mission Bay North's west end to Seventh Street. They would also provide fairly direct access from Mission Bay South to Mission Bay North that would not be dependent on bridges. Pertinent land use changes are discussed above under "Description."

- In summary, these land use changes would change p.m. peak hour trip generation as follows: 2,765 fewer person trips; 1,150 fewer vehicle trips (in- and outbound); fewer inbound transit trips but 40 more outbound transit trips; 10 more inbound and 200 more outbound bicycle and pedestrian trips. The 2,765 fewer p.m. peak hour person trips under this combination of variants would be a reduction of approximately 8% in comparison to the proposed project. Table VII.G.3 compares the p.m. peak hour person trip generation from this combination with that of the project.

TABLE VII.G.3 ●
PM PEAK HOUR PERSON TRIP GENERATION IN 2015
COMBINATION OF VARIANTS COMPARED WITH PROJECT

Area	Project	Combination of Variants	Difference
Mission Bay North	11,030	10,710	-320
Mission Bay South	22,470	20,025	-2,445
Total	33,500	30,735	-2,765

Source: Wilbur Smith Associates

- The increase in non-automobile trips under this variant would be substantially less than the decrease in automobile trips. This is caused by the different trip generation rates of commercial industrial land use compared to retail land use. The bicycle and pedestrian network proposed for the project would be able to accommodate the additional trips produced under this combination of variants under consideration by project sponsors.

- The additional outbound transit trips created by these land uses represent an increase of less than 1% compared to the total project. They would be distributed primarily to the East Bay and South Bay. Caltrain would have sufficient capacity to carry the individuals destined for the South Bay, and all of the additional East Bay passengers could be accommodated on BART with an approximate increase of 0.4% in the p.m. peak hour load factor compared to the project. The additional outbound transit trips would increase the Third Street light rail northbound load factor in the vicinity of Mission Bay from 77% to 85%. The load factor would decrease from 84% to 80% for Third Street light rail in the southbound direction in the vicinity of Mission Bay.

- The reduction of automobiles in the Mission Bay street network suggests that overall traffic and parking conditions in 2015 would improve slightly under this combination of variants compared with the proposed project, particularly in Mission Bay South. The total parking demand for this combination of variants would be approximately 1,630 spaces, or 6% less than the total parking demand for the project. Parking supply would be about 1,135 fewer spaces than that calculated for the project (shown in Table V.E.17, p. V.E.97). The resulting deficit would be a total of about 4,300 spaces, or about 430 spaces less than the project parking deficit. The less direct access to the western portion of Mission Bay North would likely slightly increase traffic congestion at Third and Fourth Street intersections in and near the Project Area, and would cause the intersection of Seventh Street and The Common to carry more traffic than under the project.

- Table VII.G.4 compares some key intersection levels of service (LOS) under this combination of variants with those of the project. Average delays at all but four of these intersections would improve to some extent, with three intersections experiencing improvements in levels of service. The intersection of Seventh Street and The Common would improve from an unacceptable level of service to LOS D, due to the improved lane geometry proposed as part of Variant 3A, even with the greater number of vehicles. The intersections of Fourth and Townsend Streets, Fourth and 16th Streets, Third and King Streets, and Fourth and King Streets would experience an approximately 7% to 26% increase in average vehicle delay, with the intersection of Fourth and King Streets operating at an unacceptable LOS E under the project and an unacceptable level of service F under this combination of variants.

TABLE VII.G.4 ●
YEAR 2015 INTERSECTION LEVEL OF SERVICE COMPARISON
COMBINATION OF VARIANTS COMPARED WITH PROJECT

	Project		Combination of Variants	
Intersection	**Delay (sec/veh)**	**LOS**	**Delay (sec/veh)**	**LOS**
Fourth and Townsend Streets	14.4	B	18.2	C
Third and Townsend Streets	79.7	F	78.8	F
Fifth and King Streets	28.4	D	26.3	D
Fourth and King Streets	52.1	E	63.3	F
Third and King Streets	99.1	F	114.4	F
16th and Seventh Streets	32.2	D	16.9	C
16th and Fourth Streets	29.2	D	31.4	D
16th and Third Streets	25.2	D	17.3	C
Mariposa Street/I-280 on-ramp	16.6	C	16.4	C
Mariposa and I-280 off-ramp/Owens Street	35.9	D	29.2	D
Mariposa and Fourth Streets	13.6	B	10.2	B
Mariposa and Third Streets	23.7	C	18.6	C
Seventh Street and The Common	42.3	E	30.0	D

Source: Wilbur Smith Associates

● This significant impact at Fourth and King Streets would be similar to that described for Variant 3, in Table VII.C.2 and accompanying text. Thus, this combination of variants would cause significant traffic impacts at the same intersections as the project and would reduce significant traffic impacts at one intersection, compared to the project. The same mitigation measures proposed for the intersections of Fourth and King Streets, Third and Townsend Streets, and Third and King Streets for the project would also mitigate the operation of the intersections to acceptable levels of service under this combination of variants.

● Under this variant, the intersection of Seventh and Berry Streets would not require project features E.20a, E.20b, and E.20c, as described on p. VI.12, which include a traffic signal, opening the rail crossing, and providing rail crossing warning devices. Mitigation measure E.31b, noted on p. VI.19, which involves restriping the northbound and southbound approaches to this intersection, would need to be modified to include restriping the northbound approach to provide a left-through lane and a through lane, and the southbound approach to provide a right-through lane and a through lane, relating to the portion of Berry Street west of Seventh Street.

● **Air Quality**

● As described below, this combination of variants would have the same significant air quality impacts and require the same mitigation measures as the proposed project. The change in land use under this combination of variants would slightly alter traffic patterns and the number of vehicle trips in and around the Project Area. Vehicular emissions would be reduced by 8.5% compared with those of the proposed project. As shown in Table VII.G.5, vehicular emissions of ROG, NO_x, and PM_{10} would exceed the BAAQMD significance thresholds for regional air quality impacts, as would emissions under the project. Trip reduction measures discussed in Mitigation Measure E.47 in Section VI.E, Mitigation Measures: Transportation, would not reduce emissions of criteria pollutants below BAAQMD significance thresholds. Therefore, as under the project, these vehicular emissions would pose an unavoidable significant regional air quality impact.

TABLE VII.G.5 ●
ESTIMATED VEHICULAR EMISSIONS
FOR COMBINATION OF VARIANTS TRAFFIC, YEAR 2015

Pollutants	BAAQMD Threshold (lb/day)	Vehicular Emissions (lb/day)	
		Project	Combination
Reactive Organic Gases (ROG)	80/a/	865	791
Nitrogen Oxides (NO_x)	80/a/	1,324	1,211
Particulate Matter (PM_{10})	80/a/	1,968	1,801
Carbon Monoxide (CO)	550/b/	12,228	11,187

Notes:
a. The BAAQMD regards this amount of emissions as a threshold of significance for a regional impact.
b. For carbon monoxide, the BAAQMD does not regard 550 lb/day as a threshold of significance, but rather, an indicator to perform microanalysis.

Source: EIP Associates. Based on modeling using the California Air Resources Board's URBEMIS Model, Version 5.

- Due to the level of carbon monoxide emissions expected for the project overall as shown in Table VII.G.5, four of the 13 intersections modeled for the proposed project were selected for further micro-level analysis for this combination of variants./10/ No exceedances of federal or state one-hour or eight-hour standards would occur at any of the four intersections modeled as a result of traffic emissions associated with this combination of variants. These results, provided in Table VII.G.6, are similar to those for the proposed project.

- The decrease in overall traffic under this combination of variants would reduce toxic air contaminant emissions from mobile sources by about 8.5%. The significance of health risks from toxic air contaminants is unknown, but assumed to be at least potentially significant, as for the project. Toxic air contaminants from stationary sources, such as various organic solvents associated with research and development and light manufacturing operations, would increase. This combination of variants could result in about 19% more emissions of toxic air contaminants from stationary sources than the proposed project, due to the increase in research and development and light industrial uses under the variant. As under the project, combined emissions of toxic air contaminants from stationary sources would be a potentially significant impact under this combination of variants.

TABLE VII.G.6 ●
ESTIMATED LOCAL CARBON MONOXIDE CONCENTRATIONS AT SELECTED INTERSECTIONS FOR THE COMBINATION OF VARIANTS IN 2015

	CO Concentrations (ppm)			
	Proposed Project/a/		Combination of Variants	
Intersection	One Hour/b/	Eight Hour/c/	One Hour/b/	Eight Hour/c/
Third and 16th	11.0	6.3	10.7	6.2
Third and King	13.6	7.6	13.1	7.3
Fourth and Bryant	8.3	5.3	8.4	5.3
Eighth and Townsend	9.9	5.4	8.8	5.3

Notes:
ppm = Parts per million.
a. Refer to Table V.F.5 and associated text in Section V.F, Air Quality.
b. The state one-hour standard is 20 ppm; the federal one-hour standard is 35 ppm.
c. The state and federal eight-hour standards are 9 ppm.
Source: EIP Associates.

- **Noise and Vibration**

- Due to reductions in future traffic volumes projected for intersection links compared with the project, this combination of variants would generate noise levels lower than those projected for the project at the study locations of Potrero Avenue south of 16th Street; Berry Street west of Fourth Street; Fourth/Minnesota Streets, south of Mariposa Street; and Mariposa Street, west of DeHaro. At the intersections of Pennsylvania Street south of Mariposa Street, The Common south of Owens Street, and Third Street south of Mission Rock Street noise levels, would remain essentially unchanged under this combination of variants conditions compared to noise levels shown for the project because projected traffic volumes on these links would remain unchanged. Terry A. François Boulevard would not be realigned close enough to residential buildings for associated traffic noise to affect sensitive receptors.

- Vibration effects from the MUNI Third Street light rail vehicles along Third and Fourth Streets and from freight rail along 16th Street would be similar to the effects described for the project and would not be expected to be significant. Freight rail tracks would remain near the water's edge, as they are now, and would not be in the realigned Terry A. François Boulevard right-of-way adjacent to commercial industrial land uses. Therefore, vibration effects would be the same as those described for the project.

- **Seismicity**

- This combination of variants would not alter the geologic, soils, or seismic conditions in the Project Area, and would not, therefore increase associated seismic impacts. The increase in the additional Commercial/Industrial/Retail space would increase the daytime employment population in an area designated as seismically hazardous. The absence of a crossing of the railroad tracks at Berry Street and the extension of Berry Street south to Common Street would make emergency access more difficult in comparison to the proposed project (see discussion under "Community Services and Utilities").

- **Health and Safety**

- The nature of the combination of variants' health and safety impacts would be essentially the same as with the project. As with the project, impacts would be reduced to a less-than-significant level with the mitigation measure proposed for the project. This combination of variants would increase the amount of Commercial Industrial space for the project as a whole by about 19%; therefore, hazardous materials quantities estimated for Commercial Industrial activities in "Estimated Hazardous Materials Quantities," in Section V.I, Health and Safety: Impacts, would be about 19% greater. This could result in a roughly proportional increase in the magnitude of environmental impacts related to handling biohazardous materials, handling materials that pose substantial hazards of release or explosions, and generating hazardous wastes. With the reduction in retail space, there would be an associated reduction in hazardous waste generated by retail activities.

- **Contaminated Soils and Groundwater**

- The impacts of chemicals in the soil and groundwater of the Project Area for this combination of variants would be similar to those described for the project (see information about existing chemicals in soil and groundwater in the Project Area, including the petroleum free product plume in the southeastern part of Mission Bay South, remains as described in Section V.J, Contaminated Soils and Groundwater: Setting, pp. V.J.1 - V.J.57). As with the open space in the Project Area, the adjacent public open space on port property would be subject to an RMP. Users of the public open space proposed to be located along the Bay shore adjacent to Terry A. François Boulevard in this variant would not be exposed to chemicals under the existing paved roadway, because the RMP would require that the open space be covered with horticultural-quality fill or other approved materials or with landscaped paved areas (see description in Variant 1: Terry François Boulevard Variant, pp. VII.8-VII.10). The soil and groundwater affected by hydrocarbons in the southeast portion of the Project Area under 16th Street, a portion of Terry A. François Boulevard, and the Esprit site, will be addressed independently of the proposed project as required by the Regional Water Quality Control Board under its cleanup order. The increase in Commercial Industrial/Retail use and decrease in Retail space on the Castle Metals block or the Esprit site would not alter the project's analysis for these sites.

- The assumptions, results, and mitigation measures for the project would be applicable to this combination of variants. They would reduce to a level of insignificance any risks that might result from construction and occupancy of proposed sites in the Project Area and from use of public open space proposed to be located in the existing alignment of Terry A. François Boulevard and on adjacent port property in the future.

- **Hydrology and Water Quality**

- The hydrology and water quality effects of this combination of variants would be similar to those of the proposed project (see "Quality of Municipal Wastewater from the Project" and "Evaluation of

Potential Water Quality Impacts" in Section V.K, Hydrology and Water Quality, pp. V.K.1-V.K.70). Realigning Terry François Boulevard and developing the expanded bayshore open space area would add a minor potential filtering function for runoff flowing from the rerouted part of Terry A. François Boulevard to the Bay if the open space is landscaped as proposed by Catellus (i.e., soils and plants), but not if it is paved (i.e., with asphalt or paved athletic areas) (see p. VII.10). The increase in research and development and light industrial space would have minor effects on the range and degree of hydrology and water quality impacts described for the proposed project.

- **Vegetation and Wildlife**

- The land use changes under this combination of variants and the extension of Berry Street would not substantially alter the effects on the Channel or the Bay from those of the proposed project. If the expanded bayfront open space proposal were to include design features that would be constructed along the shoreline or in the bay, such activities would be subject to a range of agency permitting requirements. Other aspects of this combination of variants would be the same as the project.

- **Community Services and Utilities**

- The effects of this combination of variants on community services and utilities would be similar to those described for the proposed project (see Section V.M, Community Services and Utilities, pp. V.M.1-V.M.66). The expanded bayshore open space proposal would provide an additional 2 acres of integrated bayfront open space outside the Project Area. Employment would increase by about 4% compared to the proposed project. This would not cause an appreciable change in estimated project demand for community services or utilities. This combination of variants would make fire, ambulance, and police access to the mixed-use parcel west of I-280 more difficult than for the project, but not so difficult as to constitute a significant impact as would be the case under Variant 3, p. VII.29. Fire and ambulance emergency vehicles would negotiate a combination turn off Seventh Street onto Common Street, across a low raised median at the west end of Common Street, and onto the Berry Street extension. Police vehicles might not be able to cross the median, in which case they would need to drive along South Common Street to the roundabout and back along North Common Street to the proposed Berry Street extension. The restriction created by the combination turn or the trip through the roundabout could cause delays in emergency access to the mixed-use parcel west of I-280 or to the residential parcels west of Fifth Street. This would not be considered a new significant impact because the proposed emergency access routes, although slightly circuitous, would be available if the Third or Fourth Street Bridges were raised or rendered inoperational (which could cause major delays or eliminate access). The restriction would be ameliorated if the fire station for Mission Bay South were to be built (see Mitigation Measures H.5, p. VI.38, and M.6, p. VI.54).

- **Growth Inducement**

- The larger amount of Commercial Industrial Retail development under the variant has the potential to result in slightly more total employment growth in San Francisco (by attracting more new businesses to the City than would be the case under the proposed project), or to slightly change development patterns in the City (by attracting businesses that would otherwise locate in Nearby Areas). The most likely outcome, given the magnitude of the change, is that there would be little difference in Mission Bay development and employment growth by 2015, and therefore little difference in cumulative citywide and regional employment growth and in the growth inducement impact assessment for the proposed project. Although neither the pace of development at Mission Bay nor of economic growth city-and region-wide would change under this combination of variants, the larger amount of Commercial Industrial development would take longer to be built and occupied.

- **SUMMARY OF MITIGATION MEASURES**

- All significant impacts identified for the project would also occur with this variant. Correspondingly, all mitigation measures in Chapter VI, Mitigation Measures, would apply, with the exception that the at-grade rail crossing at Berry Street would not be a feature of the project, and therefore Mitigation Measures E.20a, E.20b, and E.20c for the intersection of Seventh Street and Berry Street (see p. VI.12) would not be applicable. Further, Mitigation Measure E.31b (p. VI.19) for Seventh and Berry Streets would be modified as follows if this combination of variants were adopted, to remove references to left and right turn lanes that would cross the railroad track and add turn lanes to the portion of Berry Street west of Seventh Street:

  Restripe the northbound ~~and southbound~~ approaches to provide a <u>shared</u> left-through ~~left-turn~~ lane <u>and</u> a through lane, <u>and restripe the southbound approach to provide a through lane</u> and a shared right-through lane.

- The mitigation measure for the intersection of Fourth and King Streets differs slightly from that proposed for the project as Mitigation Measure E.38 on p. VI.20. It would be the same as that proposed for Variant 3 on p. VII.24. The project mitigation measure identifies one exclusive left-turn lane, two exclusive through lanes, and one exclusive right-turn lane for the southbound approach of Fourth Street at King Street. The measure identified for the combination of variants would include an exclusive left-turn lane, one exclusive through lane, a shared right-through lane, and an exclusive right-turn lane for the southbound approach to the intersection of Fourth Street. Implementation of the mitigation measure for the variant would require the same increase in street width as for the proposed project.

- This combination of variants includes reconfiguration of Seventh Street at Common Streets, and, in effect, implements Mitigation Measure E.32 identified for the project.

- Other transportation mitigation measures would be the same as those identified for the project.

NOTES: Variants to the Proposed Project

1. These tracks permit freight trains to travel east on 16th Street from the main line, north on Terry A. François Boulevard, and reverse direction to head south along Illinois Street to Pier 80. The project would slightly realign the existing tracks at the main line and in 16th Street and would follow the existing track alignment in Terry A. François Boulevard.

2. Fred DeJarlais, Vice President, KCA Engineers, facsimile to EIP Associates, January 8, 1998.

3. The employment estimate for Commercial Industrial development under this variant assumes 50% of the Commercial Industrial space would be occupied by office activities and 50% would be occupied by research and development and light industrial activities, consistent with the assumptions of the project analysis of Commercial Industrial development. While less actual office development is expected, the assumption of more office development is conservative for EIR analysis purposes because there are more employees and, consequently, more vehicle trips for office use than for research and development and light industrial.

3a. As with the project, an imbalance of housing to jobs is not a physical environmental effect, but rather an economic and social issue that warrants attention by San Francisco policymakers and other jurisdictions in the Bay Area. Certain indirect project and cumulative effects caused by the imbalances in local employment and housing opportunities would be environmental impacts, primarily transportation and related air quality impacts, and are described in those sections of this SEIR. The geographic distribution of employment and housing is taken into account in the SEIR analysis. For example, commute patterns are considered in the trip distribution factors underlying the transportation and air quality impact analyses. The secondary physical impacts of the Project Area housing supply shortfall (i.e., significant traffic, transit, and air quality effects from both the project and project-plus-cumulative impacts), can be best mitigated through measures directly addressing those effects, such as those that encourage increases in transit use and reduce traffic congestion.

4. The route into Mission Bay South from Berry Street to Seventh Street to the proposed rail crossing at Hooper Street would not be available under this variant as it would with the project.

4a. Travel distribution is based on San Francisco Planning Department, Public Utilities Commission and Transportation Authority, *Citywide Travel Behavior Survey,* May 1993, Supplemental Tables.*

5. Under the proposed project, the Townsend Street block is assumed to be developed with 710 residential units, and 111,000 gross sq. ft. of entertainment-oriented retail and restaurant space. The King Street block is assumed to have 120 dwelling units and 278,000 gross sq. ft. of entertainment-oriented commercial/retail space, including a 25-screen, 6,500-seat movie theater.

6. The employment estimate for Commercial Industrial development under this variant assumes 50% of the Commercial Industrial space would be occupied by office activities and 50% would be occupied by research and development and light industrial activities, consistent with the assumptions of the project analysis of Commercial Industrial development. While less actual office development is expected, the assumption of more office development is conservative for EIR analysis purposes because there are more employees and, consequently, more vehicle trips for office use than for research and development and light industrial.

7. As with the project, an imbalance of housing to jobs is not a physical environmental effect, but rather an economic and social issue that warrants attention by San Francisco policy makers and other jurisdictions in the Bay Area. Certain indirect project and cumulative effects caused by the imbalances in local employment and housing opportunities would be environmental impacts, primarily transportation and related air quality impacts, and are described in those sections of this SEIR. The geographic distribution of employment and housing is taken into account in the SEIR analysis. For example, commute patterns are considered in the trip distribution factors underlying the transportation and air quality impact analyses. The secondary physical impacts of the Project Area housing supply shortfall (i.e., significant traffic, transit, and air quality effects from both the project and project-plus-cumulative impacts), can be best mitigated through measures directly addressing those effects, such as those that encourage increases in transit use and reduce traffic congestion.

8. The decrease of 566,000 gross sq. ft. of city-serving retail uses would include a decrease of 111,000 gross sq. ft. in Mission Bay North and 470,000 gross sq. ft. on the Esprit site and the Castle Metals block in Mission Bay South and an increase of 15,000 gross sq. ft. in the open space near Pier 64.

9. San Francisco Redevelopment Agency, Mission Bay South Redevelopment Plan, Section 304.10, Fees and Exactions: Parcels X2, X3, and X4.*

10. To account for a possible shift in traffic patterns, carbon monoxide concentrations at the intersections of Seventh and Townsend Streets and Potrero and 16th Streets were also analyzed, but not included in the comparison between the proposed project and the combination of variants, because the analysis showed that traffic increases at these intersections would not be substantially different.

* A copy of this report is on file for public review at the Office of Environmental Review, Planning Department, 1660 Mission Street, San Francisco.

VIII. ALTERNATIVES TO THE PROPOSED PROJECT

The California Environmental Quality Act (CEQA)/1/ and the State CEQA Guidelines/2/ require that an EIR "describe a range of reasonable alternatives to the project, or to the location of the project, which would feasibly attain most of the basic objectives of the project, but would avoid or substantially lessen any of the significant effects of the project, and evaluate the comparative merits of the alternatives."/3/ (The primary objectives of the project are listed in "Project Sponsors and Their Objectives" in Chapter III, Project Description.) If an alternative would lessen the significant environmental effects of a proposed project substantially, the decision maker should not approve the proposed project unless it is determined that specific technological, economic, social, or other considerations make the alternative infeasible./4/ The EIR also must identify alternatives that were considered by the lead agency but were rejected as infeasible during the scoping process, and should explain briefly the reasons underlying the lead agency's determination./5/

This chapter evaluates alternatives to the proposed Mission Bay project and, for each alternative, provides a comparative analysis of potential environmental impacts. The impacts of each alternative are compared to the proposed project. Mitigation measures for the alternatives include some measures that are similar to or the same as those for the proposed project. In addition, where appropriate, mitigation measures from the 1990 FEIR have been incorporated and, where appropriate, modified to account for changes in environmental conditions. A development profile is presented for each alternative, which specifies the types and amounts of land uses projected. The development profile is followed by an environmental assessment that discusses the environmental topics in the order presented in the main body of the SEIR. The boundaries of the Project Area have been modified from those analyzed in the 1990 FEIR. This SEIR assumes that all development alternatives would occur within the new project boundaries. For ease of reference, Mission Bay North refers to the Project Area north of the Channel and Mission Bay South refers to the Project Area south of the Channel. Three alternatives were selected for analysis in this SEIR. Table VIII.1 provides a comparison of the alternatives to the project.

- The **No Project/Expected Growth Alternative**, referred to as Alternative 1, is a reasonable estimate of development within the Project Area that could occur through 2015 under existing zoning regulations pursuant to Article 9 of the City Planning Code and the 1990 *Mission Bay Plan*. About one-half as much residential and nonresidential development is assumed to occur under this alternative by 2015 as would be the case under the proposed project. No Redevelopment Plans would be adopted under this alternative. The analysis for this

TABLE VIII.1

COMPARISON OF DEVELOPMENT UNDER THE ALTERNATIVES AND THE PROPOSED PROJECT ASSUMED TO BE BUILT BY 2015

Characteristics	Proposed Project/a/	ALTERNATIVE 1 No Project/ Expected Growth/b/	ALTERNATIVE 2 Mission Bay North/Expected Growth South	ALTERNATIVE 3 Residential/Open Space Development/a/	Percent Difference in 2015 Compared with Proposed Project: Alt. 1	Alt. 2	Alt. 3
Residential							
Residential Dwelling Units (number)	6,090	2,840	5,840	10,000	-53%	-4%	64%
Nonresidential							
Retail (gross sq. ft.)	1,510,000	329,000	949,000	300,000	-78%	-37%	-80%
500-Room Hotel (gross sq. ft.)	480,000	400,000	400,000	—	-17%	-17%	—
Service/Light Industrial/Research and Development/Office (gross sq. ft.)/c/	—	900,000	900,000	630,000	—	—	—
Commercial Industrial (gross sq. ft.)	5,560,000	—	—	—	—	—	—
UCSF (gross sq. ft.)	2,650,000	—	—	—	—	—	—
Warehouse (gross sq. ft.)	—	352,000	352,000	—	—	—	—
Office (gross sq. ft.)	—	2,970,000	—	1,000,000	—	—	—
Total Nonresidential Development	10,200,500	4,951,500	2,601,500	1,930,000	-51%	-74%	-81%
Employees	30,000	14,800	6,170	6,550	-51%	-79%	-78%
Residents	10,900	5,470	10,500	18,600	-50%	-4%	71%
Total Employees and Residents	40,900	20,270	16,670	25,150	-50%	-59%	-39%
Open Space (acres)	44	18	19.5	68.3 /d/	-59%	-56%	55%
Community Facilities w/o pump station (acres)	3.72 /e/	3.1	3.1	5.6	-17%	-17%	51%
Parking (spaces)	22,100	7,690	10,300	12,100	-65%	-53%	-45%

Notes:
— = Not applicable.
a. Build-out of development program by 2015.
b. Amount of development derived from ABAG Projections '96 to be built by 2015.
c. The Service/Light Industrial/Research and Development/Office designation for Alternatives 1 and 2 includes office uses; Alternative 3 does not include office uses in this designation.
d. Build-out of development program in 2015 under the proposed *Mission Bay North Redevelopment Plan* plus amount of development derived from ABAG Projections '96 to be built by 2015 in the Mission Bay South area. Includes 20 acres of wetlands.
e. For calculating the effects of the proposed project, Community Facilities acreage does not include the 1.5 acres of the Channel Pump Station.

Source: EIP Associates.

alternative begins with a separate assessment of existing conditions that would continue if no further development occurred in the Project Area (No Project/Existing Conditions).

- Under the **Redevelopment North of Channel/Expected Growth South of Channel Alternative**, referred to as Alternative 2, the proposed *Mission Bay North Redevelopment Plan* would be adopted and the Mission Bay North Area would be developed as described for the proposed project. The Mission Bay South area would be developed according to Alternative 1 (i.e., under existing 1990 *Mission Bay Plan* and City Planning Code Article 9 Zoning controls) through 2015. The *Mission Bay South Redevelopment Plan* proposed for adoption as part of the project would not be adopted for this alternative. Compared to the proposed project, Alternative 2 would result in about the same amount of residential development, but approximately 80% less non-residential development by 2015.

- Under the **Residential/Open Space Development Alternative**, referred to as Alternative 3, the Project Area would be developed with about 65% more housing units and about 80% less nonresidential development at build-out than the proposed project. This alternative is similar to full build-out of Alternative B from the 1990 FEIR. The alternative does not assume adoption of Redevelopment Plans for Mission Bay North or Mission Bay South.

The City, in conjunction with Catellus, has evaluated alternative uses for the Project Area for over 10 years. A brief description of other uses considered and rejected is presented later in "Other Alternatives Considered," with a brief explanation of the reasons underlying the determination, in accordance with CEQA Guidelines 15126(d) and applicable case law.

Due to the unique characteristics of the Project Area and the project sponsors' objectives, there is no other comparable site within San Francisco that could be a viable alternative location. There are no similarly sized, vacant, and underutilized areas in San Francisco with ownership consolidated largely under one owner. Further, many of the project's objectives are site-specific and could not be achieved at other locations, such as the 6,090 housing units relatively close to downtown, the major new site for UCSF plus room for related businesses, capture of retail/entertainment business activity that will be stimulated by and serve the San Francisco Giants Ballpark, and the reduction of blight and reuse of a centrally located but underdeveloped urban area with good transit and access to other services. Because of the infeasibility of developing the project and meeting its objectives elsewhere, this SEIR does not evaluate an alternative project location.

A. ALTERNATIVE 1: NO PROJECT/EXPECTED GROWTH ALTERNATIVE

NO PROJECT/EXISTING CONDITIONS

CEQA Section 15126(d)(4) requires that the "no project" alternative discuss the existing conditions, as well as what would reasonably be expected to occur in the foreseeable future if the project were not approved, based on current plans and consistent with available infrastructure and community services.

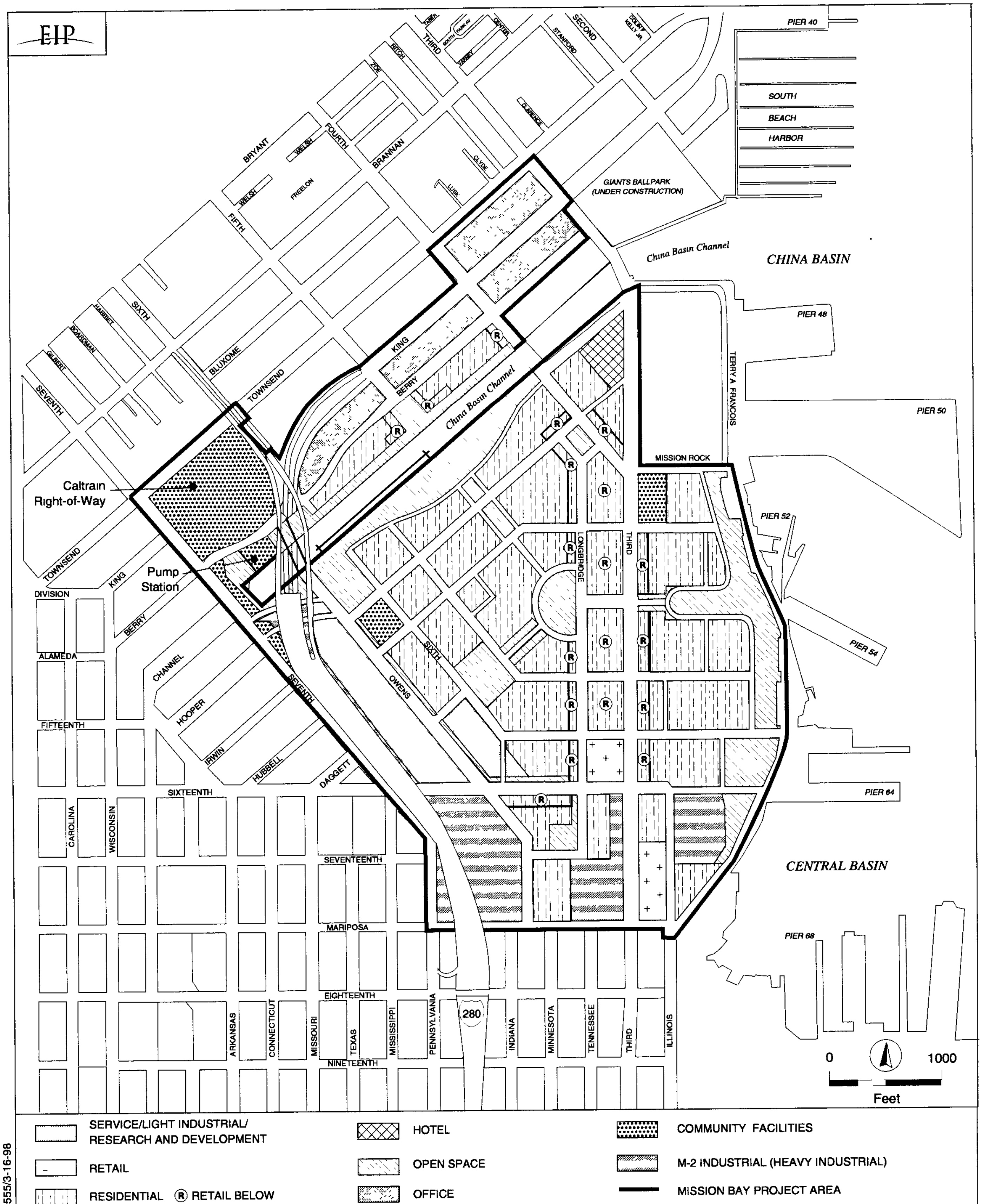
The term "existing conditions" means a scenario in which no physical change and no development occurs in the Project Area, with future conditions remaining as they are now. This scenario is already described in the Setting sections under each environmental topic in the SEIR; therefore, it is discussed briefly below. The analysis of reasonably foreseeable growth based on existing conditions is contained in the No Project/Expected Growth Alternative, based on ABAG *Projections '96* nployment and population projections for the Project Area.

If existing physical conditions were to continue into the foreseeable future, conditions in the Project Area would remain as described in detail in the Setting sections of each of the environmental topics included in Chapter V. Growth in Nearby Areas, the rest of the City, and the Bay Area would continue as described in Section V.C, Business Activity, Employment, Housing, and Population. Some of the uses that would have located in the Project Area under the project or other alternatives would likely locate elsewhere in the City, while others might locate outside the City. For example, of the three locations for a new UCSF site analyzed in the *University of California San Francisco Long Range Development Plan EIR*, one is in San Francisco at Mission Bay, one is outside San Francisco (in Alameda), and one is partially outside San Francisco (the Brisbane/Executive Park site). Some uses, such as some of the residential units included in the project, might not be developed anywhere in the region.

Existing conditions, however, also include existing zoning and land use controls which allow for development of the Project Area. For existing conditions to continue, the existing zoning and land use controls would need to be amended to permit only the amount of development now in the Project Area, or some other device would need to be assumed that would freeze conditions as they now exist at least through the year 2015. This is an unlikely scenario and has not been analyzed further in the SEIR. The focus of this alternative is therefore the No Project/Expected Growth Alternative, which represents reasonably foreseeable development without the project.

NO PROJECT/EXPECTED GROWTH

The No Project/Expected Growth Alternative reflects a level of development based on existing zoning regulations pursuant to Article 9 of the City Planning Code and the 1990 *Mission Bay Plan* that is consistent with population and employment projected through the year 2015 according to ABAG's *Projections '96*. Figure VIII.A.1 is the overall land use plan for this alternative and reflects full build-out (beyond year 2015). No redevelopment plans for the Project Area were assumed. ABAG's



SOURCE: EIP Associates, City and County of San Francisco
Planning Code Zoning Maps (as amended, 1996)

MISSION BAY SUBSEQUENT EIR

FIGURE VIII.A.1 ALTERNATIVE 1: LAND USES FOR NO PROJECT/EXPECTED GROWTH ALTERNATIVE UNDER EXISTING ZONING

growth scenario projects that about one-half of total development potential, that is about 40% of the total residential development potential and about 60% of the nonresidential development potential, proposed in the 1990 *Mission Bay Plan* would be built and occupied by 2015.

This alternative's project area is the same as that of the proposed project. As with the proposed project, the alternative's project area excludes the port property east of Third Street and south of the Channel, the surface water area of the Channel itself and the associated houseboat community, and the Caltrain tracks and terminal in the two blocks bounded by Fourth, Townsend, King, and Sixth Streets, all of which were included in the 1990 *Mission Bay Plan*. The alternative includes the Castle Metal property west of Third Street between 16th and Mariposa Streets that was not part of the 1990 *Mission Bay Plan*.

DEVELOPMENT PROFILE

The development profile for Alternative 1 is a hypothetical estimation of expected growth. The profile was developed as a reasonable approximation of Project Area development that may occur in the absence of the proposed project. It is assumed in this alternative that necessary infrastructure would be developed to serve the assumed uses. The profile was developed from ABAG's employment and population projections *(Projections '96)* with consideration for the location of land uses consistent with the zoning regulations pursuant to Article 9 of the City Planning Code and the 1990 *Mission Bay Plan,* and based on standard population per household and employment density factors also used in the 1990 FEIR. To assess environmental impacts of this alternative in a manner that provides a meaningful comparison to the proposed project, specific magnitudes (number of dwelling units, square footage, etc.) were estimated for each land use. In total, development formulated for this alternative would generate the population, household, and employment projections of ABAG in *Projections '96*. The actual development that would occur in the absence of the proposed project could vary from the estimates formulated for each land use category discussed below.

It was assumed for this alternative that infrastructure would be developed to serve the assumed uses. Build-out of the Project Area under Alternative 1 assumes infrastructure improvements since the City would not issue building permits without adequate sewer systems, roads, etc. As proposed in the 1990 *Mission Bay Plan*, this alternative would maintain and expand the existing combined sewer system in the Central Basin, and a bridge to carry traffic across China Basin Channel connecting Sixth Street with Owens Street would be built. Alternative 1 assumes the height and bulk limits of the 1990 *Mission Bay Plan* as implemented in Article 9 and on the Zoning Map and as shown in

Figure V.A.4. The street grid shown in Figure VIII.A.1 similarly reflects the approved 1990 *Mission Bay Plan* as implemented in Article 9 of the City Planning Code (see also Figure V.A.4).

Expected growth in Mission Bay North would include office and retail uses, with over 98% of the space being developed for office use. In Mission Bay South, expected development would include housing; retail; office, service, light industrial, research and development and warehouse space; hotel; community facilities; open space; and associated parking. For purposes of environmental analysis, this alternative assumes no UCSF site would be developed. Total development in both areas by 2015 would be about 2,840 residential units, 2.97 million gross square feet (gross sq. ft) of office space, 900,000 gross sq. ft. of commercial and light industrial space, 329,000 gross sq. ft. of retail space, 352,000 gross sq. ft. of warehouse space, a 500-room hotel, 7,700 parking spaces, 4.6 acres of community facilities, and 18 acres of open space. This level of development would accommodate about 14,800 jobs. There would be about 5,470 people living in the Project Area.

Residential

Expected growth without the project would include the development of approximately 2,840 housing units in Mission Bay South. No residential development would occur in Mission Bay North. In the absence of a development agreement specifying affordable housing production for the Project Area or the application of the City's Office Affordable Housing Production Program (OAHPP) to development in the Project Area, it is unclear whether and how affordable housing would be produced under Alternative 1. For this SEIR, it is assumed that, without the participation of the San Francisco Redevelopment Agency and the use of redevelopment tax increment for affordable housing, there would be less affordable housing associated with Alternative 1 than would be produced under the proposed project.

Office

About 2.97 million gross sq. ft. of office space would be developed in Mission Bay North. Potential office use is also included in the Service/Light Industrial/Research and Development/Office land use, discussed below.

Service/Light Industrial/Research and Development/Office

About 900,000 gross sq. ft. of Service/Light Industrial/Research and Development/Office/6/ space would be developed in Mission Bay South in the area bounded by Seventh, Mariposa, Third, 16th, and Owens Streets. This commercial space would house various types of enterprises including service businesses; small, light manufacturing companies; distribution and transportation service companies; research and development facilities; and office activities./7/

Retail

Retail space would be developed in both Mission Bay North (47,000 gross sq. ft.) and Mission Bay South (282,000 gross sq. ft.). Retail space would be provided on the ground floor of some office and residential buildings and would also occupy separate low-rise structures.

Hotel

A full-service, mid-rise, 500-room hotel would be developed in Mission Bay South. The hotel would be up to eight stories, or 110 feet, in height and would contain about 400,000 gross sq. ft., including lobby functions, service areas, and guest rooms. The hotel would serve both tourists and business travelers.

Warehouse

About 352,000 gross sq. ft. of warehouse space would be developed in the area bounded by Seventh, Mariposa, Third, and 16th Streets. In the 1990 FEIR, this area was the site of the proposed MUNI Metro East storage and maintenance yard. Since publication of the 1990 FEIR, MUNI has decided to select another site for the facility. It is assumed that warehouses would be developed as one-story structures.

Community Facilities

Community facilities would occupy 4.6 acres: 1.5 acres in Mission Bay North and 3.1 acres in Mission Bay South. In Mission Bay North, community facilities would include the Channel Pump Station, which pumps combined sanitary sewage and rainfall runoff to the Southeast Water Pollution Control Plant. No changes would be proposed to the pump station by this alternative. Community facilities in Mission Bay South would include an elementary school between Sixth and Owens Streets, and a combined police and fire station. This station would probably be located at the site of Fire Station No. 30, which would be preserved under this alternative.

Parking

Based on this alternative's level of development and on the parking rates used for various land uses in the 1990 FEIR, about 7,700 accessory spaces would be developed./8/ About 3,020 parking spaces would be developed in Mission Bay North, and 4,670 parking spaces in Mission Bay South. This parking would be primarily or entirely within buildings that include other uses, rather than in separate parking structures.

Open Space

About 19 acres of open space would be developed in the Project Area, generally based on the *Mission Bay Plan's* linkages between the amounts of open space housing that would be developed by 2015./9/ Six acres of open space is assumed to be developed in Mission Bay North and 13 acres in Mission Bay South by 2015. Because the Project Area boundaries have changed since preparation of the 1990 FEIR, the approximately 12 acres of surface water in China Basin Channel that were part of the Project Area in the 1990 FEIR are not part of the alternatives analyzed in this SEIR. Similarly, the 13.6-acre wetland on port property east of Third Street also is not part of this alternative.

ENVIRONMENTAL ASSESSMENT

The significant impacts of Alternative 1 for air quality, including toxic air contaminants; health and safety; contaminated soils and groundwater; and hydrology and water quality would be similar to or the same as those of the project. The effects of this alternative would vary from the proposed project in the areas of vegetation and wildlife, traffic, and seismicity. These similarities and differences are discussed for each topic and summarized at the end of this section on Alternative 1. The applicable mitigation measures for Alternative 1 would be those of the adopted 1990 *Mission Bay Plan*. Impacts and mitigation measures are summarized in a subsection at the end of each alternative's environmental assessment.

Plans, Policies, and Permits

Overall, Alternative 1 would not change the plans and policies framework governing Mission Bay land use, as would the proposed project. Alternative 1 would substantially comply with the 1990 *Mission Bay Plan* in terms of overall land use and street pattern, but not necessarily with all provisions of the Plan (e.g., office-housing linkages) because the rate of development is derived from ABAG's *Projections '96*. The 1990 *Mission Bay Plan* and Article 9 of the City Planning Code would be mostly retained, and amendments to the *San Francisco General Plan* would be limited to changes consistent with termination of the Development Agreement. Existing land uses would be covered by the 1990 *Mission Bay Plan*, except at the Castle Metals and Esprit sites, the development of which would remain subject to the Central Waterfront Plan. Planning Code controls would not be altered; the existing land use and height and bulk limits set forth in the 1990 *Mission Bay Plan* would be in effect (as shown in Figures V.A.3 and V.A.4 in Section V.A, Plans, Policies, and Permits). Since this alternative assumes that UCSF would not locate its major new site in the Project Area, the City would not need to prepare amendments to the General Plan or the City Planning Code incorporating the new site into the relevant plan and policy documents./10/

Any development that would occur in Alternative 1 would be subject to the applicable policies of the General Plan, including the 1990 *Mission Bay Plan*, and to the controls in Article 9 of the City Planning Code. As under the project, the City Planning Commission would evaluate street vacations associated with development against the policies set forth in the Urban Design Element of the City's General Plan. Development on port property would be subject to the *Waterfront Land Use Plan*. Development activities, including alterations to the Channel, within a 100-foot shoreline band inland from the mean high tide line would be subject to review and permitting by the Bay Conservation and Development Commission (BCDC). The U.S. Army Corps of Engineers and the U.S. Coast Guard would review the construction of a bridge connecting Owens and Sixth Streets over China Basin Channel, a navigable waterway.

Land Use

Project Area

Alternative 1 would develop the Project Area under the land use districts of the 1990 *Mission Bay Plan* as outlined in Article 9, Mission Bay Districts, of the City Planning Code. This alternative includes expected growth through the year 2015, which is about 40% of the total residential development potential and about 60% of the nonresidential development potential allowable under existing zoning. Although at a slower pace, this alternative would continue the established trend of converting deteriorating and low-intensity industrial areas near the waterfront to new uses, as the proposed project would.

Under this alternative, all existing buildings may not be demolished by 2015 as they are assumed to be under the proposed project. As with the project, the Channel Pump Station would be retained and not altered. Fire Station No. 30 would be preserved in accordance with the Mission Bay Plan. Under this alternative, the existing street system would be modified substantially; however, Fourth Street would not be reconfigured as a major thoroughfare, as under the project.

The mix and amount of uses developed under this alternative would be different from those proposed under the project. Almost 3 million gross sq. ft. of office uses would replace the residential and commercial entertainment retail uses in Mission Bay North. The area would not become a year-round regional destination center, although a hotel would be developed in Mission Bay South as it would for the project. The amount of development projected to occur by 2015 would include about 2,840 dwelling units. Residential land use districts of varying densities would replace the UCSF uses and some of the commercial industrial uses in Mission Bay South. Compared with the project, this alternative would result in more employees present during the daytime in Mission Bay North and about half the residents in Mission Bay South.

Surrounding Areas

As under the project, development of this alternative would create a new neighborhood with residential buildings, open space, and community facilities adjacent to the houseboat community. There would be more neighborhood-serving retail and personal services convenient to houseboat residents, as would be the case under the proposed project. The large amount of office development in Mission Bay North under Alternative 1 would result in a qualitatively different environment compared to the predominantly residential development proposed in the project for Mission Bay North. The houseboat community would experience increases in daytime pedestrians from the office uses in Mission Bay North and morning, evening, and weekend pedestrians from the residential uses in Mission Bay South.

Increased pedestrian and auto traffic would accompany development of the Project Area under this alternative, as with the project. With this alternative, as with the project, the South Beach and South Park neighborhoods would likely find their day-to-day travel patterns being altered. Under this alternative, the office development in Mission Bay North would mean that more drivers than under the project would use The Embarcadero, Third Street, and the re-aligned Fourth Street as major thoroughfares. Commuters to the substantial office development in Mission Bay North would likely travel during the peak periods. Under this alternative, Project Area employees would likely not park on streets on Potrero Hill and Lower Potrero since there would be fewer employees in the South of Channel area and parking opportunities in the Project Area would be increased.

South Beach and South Park residents would not find the variety and amount of new neighborhood-serving retail as great as in Mission Bay North under the project. Moreover, the demand for drinking and eating establishments, and pedestrian-serving retail associated with the San Francisco Giants Ballpark would not be addressed in the Project Area under the Alternative. Therefore, there would be more restaurants and demand for other pedestrian-serving retail uses in the South of Market area under this alternative as compared to the project. Because there would not be as much city-serving retail space developed in the Project Area as would be the case under the proposed project, there would be more demand for that kind of development elsewhere in the City, to serve the needs of future Mission Bay residents as well as the retail needs of the broader citywide market area. Locations that might experience more of this type of development and land use change than would be the case under the proposed project include: South of Market, Showplace Square, North Potrero, Lower Potrero, Central Bayfront, South Bayshore, and Inner Mission. This type of development has already occurred in most of these areas. Exceptions are the Central Bayfront and Lower Potrero Nearby Areas.

As with the project, this alternative includes residential development in Mission Bay South located adjacent to port property east of Third Street, where petroleum free product contamination has been identified. A school site at 16th and Owens Street south of the Channel would be adjacent to residential uses to the east and open space to the north and near I-280.

Existing recreational facilities north of the Channel, such as South Beach Harbor, would not be as affected by the number of pedestrians in the area at any one time as would occur under the project, primarily since office workers north of the Channel would not be present during weekends and the smaller number of residents south of the Channel may not compete for access to South Beach Harbor.

Users of the recreational waterfront facilities south of the Channel would compete for access with residents, employees, and visitors of the Project Area. Under this alternative, the number of new residents accessing existing recreational facilities would be about half those of the project, and the number of employees and visitors to the area would be substantially less since the office workers north of the Channel would not likely compete for access to the southern waterfront areas and Mission Bay would not be a year-round regional entertainment center attracting visitors.

Under the 1990 *Mission Bay Plan*, the Port would develop boat trailer parking directly across Terry A. François Boulevard from the Public Boat Launch Ramp between Piers 52 and 54. Under the project, the parking would likely be located farther away just south of The Common, though within 600 feet of the ramp as required under a California Department of Boating and Waterways grant.

Business Activity, Employment, Housing, and Population

Project Area Employment and Job Opportunities

Table VIII.A.1 shows the number of employees expected in the Project Area according to Alternative 1. By the year 2015, there would be about 14,800 jobs in the Project Area under this alternative. Overall, that would be about half as many jobs as estimated for build-out of the proposed project, and the geographic distribution of those jobs would be quite different. While employment

TABLE VIII.A.1
ALTERNATIVE 1: EMPLOYMENT BY LAND USE PROJECTED IN 2015

	Alternative 1				Comparison with Proposed Project	
Land Use/Business Activity/a/	**North of Channel**	**South of Channel**	**Total**	**Percent of Total**	**Total for Proposed Project**	**Alternative vs. Project**
Office	10,254	—	10,254	69%	8,790	17%
Service/Light Industrial/R&D/Office	—	2,221	2,221	15%	6,520	-66%
UCSF Site	—	—	—	—	9,100	—
Retail	135	807	942	6%	4,310	-78%
Hotel	—	370	370	3%	370	0%
Warehouse/b/	—	267	267	2%	—	—
Community Facilities/Open Space	1	210	211	1%	254	-17%
Building Maintenance/Security/Parking	278	106	384	3%	410	-6%
Housing-Related	—	113	113	1%	240	-53%
TOTAL	**10,668**	**4,094**	**14,762**	**100%**	**29,994**	**-51%**
Percent of Total	**72%**	**28%**	**100%**			

Notes:
— = Not applicable
Based on ABAG *Projections '96* by traffic analysis zone (unadjusted, except as noted below) as presented in Keyser Marston Associates 7/31/97 tables prepared for the San Francisco Redevelopment Agency.

a. Derived from ABAG employment estimates for retail, service, and other categories. Employment estimate for Mission Bay North derived from ABAG *Projections '96* for traffic analysis zone 658, subtracting 3,000 jobs to account for the China Basin buildings and other business activity in the South of Market area outside Mission Bay Project Area.
   Employment estimate for Mission Bay South derived from ABAG *Projections '96* for traffic analysis zone 657 and a portion of traffic analysis zone 662. Assumes about 700 jobs in traffic analysis zone 662 for Mission Bay Project Area south of 16th Street.
b. Represents MUNI Metro East site from *Mission Bay Plan*. Assumed to be developed as one-story warehouse.

Source: Hausrath Economics Group.

overall would be less, there would be almost five times more jobs in Mission Bay North, compared to the proposed project, because of the concentration of office space. By contrast, under Alternative 1, Mission Bay South would have only 15% of the total employment expected under the proposed project. The mix of types of business activities and job opportunities also would be substantially different from the proposed project. Without the UCSF site and associated research and development business activity that the proposed project would bring to the Project Area and to San Francisco, there would be fewer total job opportunities in San Francisco and a less diverse range of job options for city residents under Alternative 1.

Under this alternative, the Project Area would become another center for office development in San Francisco. Most of the jobs (70%) would be office jobs in Mission Bay North. This is more office employment for the Project Area than is estimated for the proposed project. There would be a cluster of service, light industrial, research and development (R&D), warehousing, distribution, and small office business activities in Mission Bay South—less of this type of employment than would be accommodated in the proposed project. There would also be less retail activity and employment. This alternative incorporates a hotel in Mission Bay South, as does the proposed project. Other employment related to community facilities, building maintenance, and security would be less than estimated for the proposed project, consistent with the lower level of total development expected through the year 2015 under Alternative 1.

Implications for Existing Project Area Business Activity

The pace of new development in the Project Area would be slower under Alternative 1 compared to the proposed project. Existing businesses in the Project Area might be able to remain in their current locations for a longer time./11/ It would be easier to accommodate those few tenants holding longer-term leases. Ultimately, however, as under the proposed project, there would not be many opportunities to accommodate existing Project Area businesses in new Mission Bay development. The new space would likely be too expensive, compared to other options. Other locations would become more attractive over time as the Project Area became more densely developed with a greater mix of land uses, and more congested. Although relocation assistance under the aegis of the Redevelopment Agency would not apply in Alternative 1, the 1990 *Mission Bay Plan*, upon which the development scenario for this alternative is based, included a Business Relocation Plan to assist industrial and maritime-related business displaced by new development in the Project Area./12/

Project Area Housing, Households, Population, and Employed Residents

Table VIII.A.2 shows the Project Area housing, population, and employed residents associated with Alternative 1. By 2015, there would be about 2,840 housing units with 5,470 residents, of whom

TABLE VIII.A.2
ALTERNATIVE 1: HOUSING UNITS, POPULATION, AND EMPLOYED RESIDENTS ASSUMED TO BE BUILT BY 2015

	Alternative 1			Comparison with Proposed Project	
	North of Channel	South of Channel	Total	Total for Proposed Project	Alternative vs. Project
Housing Units	—	2,836	2,836	6,090	-53%
Households	—	2,737	2,737	5,877	-53%
Population/a/	—	5,473	5,473	10,855	-50%
Employed Residents/b/	—	3,300	3,300	6,560	-50%

Notes:
— = Not applicable.

a. Number of people living in housing units built in the Project Area. Derived from ABAG *Projections '96* population estimates by traffic analysis zone. Includes all ABAG population estimated for traffic analysis zone 657 and 200 people (about 100 units) in traffic analysis zone 662 (south of 16th Street).

b. Residents of the Project Area who are also employed, regardless of place of work. Estimated using 1990 FEIR factors for age distribution of population and percentage of the population in each age group that would be working. See 1990 FEIR, Appendix A: The EIR Alternatives, p. XIV.A.13. Confirmed by review of ABAG *Projections '96* population and labor force projections by age for San Francisco. *Projections '96* estimates of employed residents by traffic analysis zone were not used because the estimates appear too large. The difference probably reflects the difficulty of using ABAG regional projections for micro-area analysis.

Source: Hausrath Economics Group.

3,300 would also be working. This is about half the housing and residential population expected under the proposed project. Following the pattern of the 1990 *Mission Bay Plan* land uses, all of the new residential development would be south of the Channel. About 40% of the total housing unit potential of the residential zoning districts established by the 1990 *Mission Bay Plan* for Mission Bay South would be developed by 2015 under Alternative 1./13/

Relationship Between Project Area Employment Growth and Housing Development and Implications for Citywide Housing Market Conditions

Analysis of the jobs/housing relationship for Alternative 1 follows the same approach applied to the proposed project—comparison of the housing demand in San Francisco associated with employment growth in the Project Area to the housing supply represented by Project Area housing development. The comparison provides a useful means of evaluating development alternatives for the Project Area, and it is an indicator of the consequences of the alternative land use mix for the City's housing market and for commute patterns (and therefore for potential transportation and air quality environmental impacts). For both the proposed project and this alternative, the evaluation considers the overall land use mix at full build-out, not estimated development for year 2015, and the following section discusses this land use mix.

Build-out of the Project Area according to the total development potential of the 1990 *Mission Bay Plan* would occur well after 2015 and would add more housing supply in the Project Area and less demand than would the proposed project. The 1990 *Mission Bay Plan* included almost 8,300 housing units/14/ and nonresidential development accommodating about 25,000 jobs./15/ Table VIII.A.3 presents the jobs/housing analysis for Alternative 1, assuming build-out at some point beyond 2015. Applying the updated jobs/housing analysis to build-out of Alternative 1 (see "Background on the Jobs/Housing Alternative" in Appendix C, Business Activity, Employment, Housing, and Population) results in an about even match between the San Francisco housing demand associated with Project Area employment growth and the housing supply proposed for Mission Bay./16/

Therefore, future housing market conditions after 2015 for some segments of the housing market in San Francisco would be better under Alternative 1 (the 1990 *Mission Bay Plan*) in the longer term (at build-out) than they would be under the proposed Redevelopment Plans for the Project Area. For market-rate housing, there would be more housing options in San Francisco relative to demand, resulting in more stable prices and rents than would be the case under the proposed project. On the other hand, with no mechanism for providing substantial amounts of affordable housing in the Project Area (e.g., no redevelopment tax increment), demand from very low-, low-, and moderate-income households not satisfied in the Project Area would result in worse housing market conditions for those segments of the market, compared to conditions under the proposed project.

Through the year 2015, differences between the jobs/housing outcomes and housing market implications of Alternative 1 and the proposed project would not be as pronounced. At 2015 under Alternative 1, there would not be an even match between housing demand and supply in the Project Area. While there would be more demand relative to supply, the Project Area housing supply deficit would be about one-half that estimated for the proposed project in 2015. Housing market implications would be more similar to those of the proposed project than would be the case in the longer term. In 2015, as at build-out, housing market conditions would be worse under Alternative 1 than would be the case under the proposed project, for very low-, low-, and moderate-income households requiring affordable housing.

TABLE VIII.A.3
ALTERNATIVE 1: JOBS/HOUSING ANALYSIS AT BUILD-OUT

	[Formulae]	Alternative 1	Proposed Project
Demand			
A. Employment growth accommodated in Project Area/a/		23,330	28,330
B. Percent representing additional workers living in San Francisco/b/		55.0%	55.0%
C. Average number of San Francisco workers in households with workers/c/		1.6	1.6
D. Additional households associated with Project Area employment growth	[(A*B)/C]	8,020	9,738
Supply			
E. Total Project Area Housing Units at Build-out (beyond year 2015)/d/		8,270	6,090
Comparison of Supply with Demand			
Surplus or (Deficit) in Project Area	[E - D]	250	(3,648)

Notes:
This jobs/housing analysis is not meant to imply that there should (or ever would) be a precise match between jobs and housing for any given project area. The calculation is a useful means of evaluating the proposed project and alternatives, and it provides an indication of the implications of the land use mix for the City's housing market.

a. Total Project Area employment at build-out (25,000 jobs per the 1991 *Mission Bay Plan*) minus existing Project Area employment (1,670 jobs).

b. Keyser Marston Associates, Inc. and Gabriel Roche, Inc., *Jobs Housing Nexus Analysis, City of San Francisco*, July 1997, pp. 51-52.

c. Keyser Marston Associates, Inc. and Gabriel Roche, Inc., *Jobs Housing Nexus Analysis, City of San Francisco*, July 1997, pp. 49-50.

d. Total units allowed under 1990 *Mission Bay Plan.*

Source: Hausrath Economics Group.

Implications for Citywide Growth

Alternative 1 represents what would be expected in the Project Area without a new land use plan as well as the development incentives, and financial and planning assistance embodied in the proposed Mission Bay Redevelopment Plans. The pace of growth would be slower under Alternative 1 than under the proposed project with its Redevelopment Plans. As a result, there would be less employment growth and less new housing development in San Francisco by 2015. Over the longer term, however, build-out of the Project Area under Alternative 1 has the potential to accommodate almost as many jobs as the proposed project, and more housing.

Nevertheless, from a perspective of citywide employment growth, the proposed project reflects a more current assessment of market potential. Moreover, because Alternative 1 would not accommodate the UCSF site and associated research and development business activity in the Project Area, most, and potentially all, of that economic development would be lost to San Francisco. Accordingly, total jobs and employment diversity would be lower for city residents in the future compared to the situation under the proposed project.

While the pace of development would be slower under Alternative 1, it would eventually (beyond year 2015) offer more to San Francisco's market rate housing inventory than would the proposed project. There would be less affordable housing development in the City under Alternative 1 than would be for case under the proposed project, however.

Implications for Nearby Areas

This alternative's more extensive development of office space in Mission Bay North would provide more competition for those areas that could accommodate large amounts of new office development in San Francisco than would office development in Commercial Industrial districts under the proposed project. This would be particularly true for the Transbay area; successful office development in Mission Bay under Alternative 1 would slow the pace of office absorption in the Transbay area.

On the other hand, less low-rise, flexible, campus-type development in the Project Area under Alternative 1 compared to the proposed project would mean somewhat more demand pressure for existing space in Nearby Areas and fewer options for lower-rent paying businesses in those areas. This conclusion would depend on whether or not the Commercial Industrial development under the Mission Bay South Redevelopment Plan would offer a combination of price, design features, and other amenities that would make it competitive with existing, generally lower-rent space.

The neighborhood-serving retail development in Mission Bay North under Alternative 1 would not accommodate the entertainment-oriented development or the eating and drinking establishments designed to capitalize on the adjacent San Francisco Giants Ballpark activity. Therefore, under Alternative 1, there would likely be more retail development in Nearby Areas, including the South Beach neighborhood, other South of Market locations, and at sites along the waterfront to both the north and south of the Project Area, than would be the case under the proposed project.

For the residential real estate market in Nearby Areas, Alternative 1 might result in somewhat more demand pressure in the short term, as a slower pace of Project Area residential development would be expected in the absence of the proposed Mission Bay North and South Redevelopment Plans. Over the longer term, however, housing market conditions in Nearby Areas might not be substantially different from conditions resulting from buildout of the project. While there would be more housing supply in the Project Area relative to housing demand associated with Project Area employment growth, under Alternative 1, there would be fewer affordable housing units in the Project Area compared to the proposed project. More demand for affordable units outside the Project Area would offset any benefits of the increased supply for other segments of the market.

Unlike the other sectors discussed above, affordable housing production depends on project sponsors and available subsidies, not on market demand. Therefore, less affordable housing in the Project Area under Alternative 1, compared with the proposed project, would not necessarily result in more affordable housing produced elsewhere in San Francisco. Instead, housing market conditions faced by households seeking affordable units would be worse than expected under the proposed project, as described in the preceding subsection.

Visual Quality and Urban Design

Alternative 1's lower heights are shown in Figure V.A.4 in Section V.A, Plans, Policies, and Permits. Alternative 1 would maintain certain views of the downtown area that the proposed project would eliminate. Similarly, Alternative 1 would reduce the magnitude of other visual changes under the proposed project due to the absence of any 160-foot-high towers in Mission Bay South and the decreased amount of overall development under this alternative. Under this alternative, new development would primarily follow the physical transition from the higher elevations of Potrero Hill to the lower elevations of the shoreline. The 1990 *Mission Bay Plan* calls for taller buildings up to 110 feet in Mission Bay North and up to 85 and 95 feet near Potrero Hill in Mission Bay South, with a stepping down to lower buildings (45 feet) that are more compatible with the shoreline (refer to Figure V.A.4). This approach reinforces the existing landform while maximizing Bay views. The proposed project would allow some buildings of up to 160 feet in every zone, occupying from 7% to 20% of the total zone area as shown in Table III.B.4 in Chapter III, Project Description. Under the proposed project, certain views of the Bay Bridge, Treasure Island, and the downtown skyline from I-280 would be nearly eliminated (as discussed in Section V.D, Visual Quality and Urban Design). Under this alternative, more of these views would be maintained.

Fire Station No. 30, located at the southeast corner of Third and Mission Rock Streets, may be of historical importance and may be eligible for the National Register. Under this alternative, Fire

Station No. 30 would be preserved and reused. Potential impacts associated with possible demolition of the fire station under the project would not occur.

Transportation

The street network assumed for the impact analysis of Alternative 1 is shown in Figure VIII.A.1 with the alternative land uses. This network includes Longbridge Street, which would parallel Third Street and is similar to the extended Fourth Street in the project network, but it would end south of 16th Street instead of at Mariposa Street. It would carry smaller volumes of traffic than the project's Fourth Street and it would run through a residential area with ground-floor commercial uses. The alternative's street network includes an at-grade rail crossing providing a connection between the Project Area and Seventh Street just south of China Basin Channel, as for the project, but does not include a continuous east-west street through the center of Mission Bay South, such as the North Common and South Common Streets couplet. The local street system under Alternative 1 includes a bridge to carry traffic across the Channel at Owens Street, unlike the proposed project.

Trip Generation

Alternative 1 assumes a level of development for the Project Area in the year 2015 consistent with the Association of Bay Area Governments (ABAG) forecast in *Projections '96*. This development is less than full build-out under the existing 1990 *Mission Bay Plan* and zoning and less than the full build-out assumed in the analysis of the currently proposed project./17/ The levels of employment and population estimated by ABAG for the year 2015 were, in turn, used to estimate future land use intensities in the Mission Bay Project Area using the population and employment density factors developed for the previous 1990 *Mission Bay Plan*.

Table VIII.A.4 compares the p.m. peak hour trip generation projections for the No Project/Expected Growth Alternative and the proposed project. Alternative 1 would generate about 19,770 fewer person trips than would the project in 2015, a reduction of about 60%.

Traffic Impacts

This alternative analysis focused on the traffic impact in the immediate vicinity of the Project Area; 11 of the 41 study intersections were analyzed and their levels of service were compared across alternatives. These include mostly intersections surrounding the Mission Bay Project Area, the intersection of 16th Street/Third Street within the Project Area, and those intersections near the

**TABLE VIII.A.4
PM PEAK HOUR PERSON TRIP GENERATION IN 2015:
ALTERNATIVE 1 COMPARED TO PROJECT**

Subarea	Alternative 1	Project	Difference
Mission Bay North	5,840	11,030	-5,190
Mission Bay South	7,887	22,470	-14,583
Total	**13,727**	**33,500**	**-19,773**

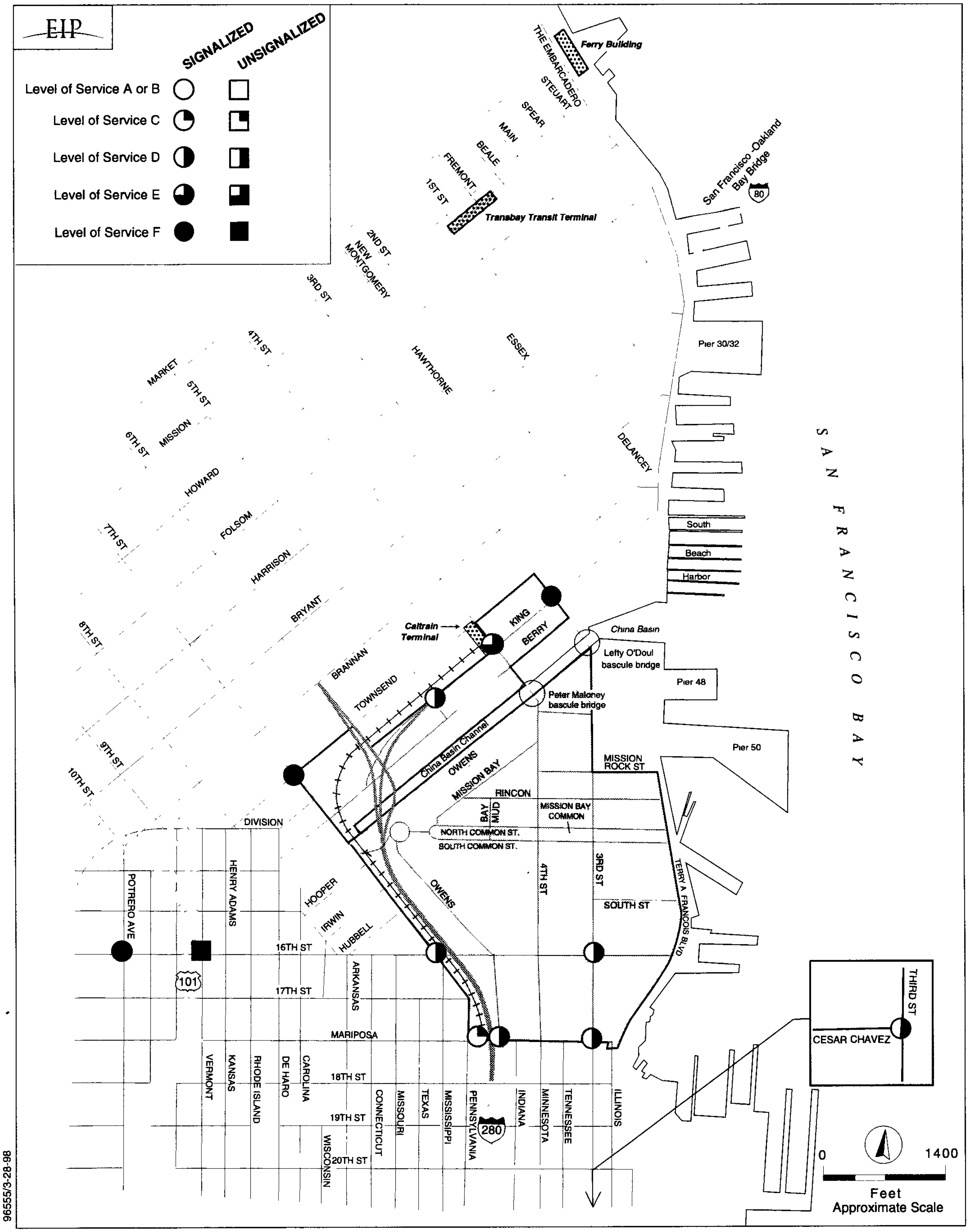
Source: Wilbur Smith Associates.

project that operated at LOS F under Year 2015 cumulative-with-project conditions (see Figure V.E.12, in "Local Streets" in Section V.E, Transportation).

The levels of service for the 11 intersections for year 2015 cumulative-with-project conditions are shown in Figure VIII.A.2, repeating information in Chapter V, Figure V.E.12, for convenience. As shown in Table VIII.A.5, all except 16th Street/Vermont Street and Seventh Street/Townsend Street would operate at LOS D or better under cumulative conditions with Alternative 1, while 5 of the 11 study intersections would operate at service levels worse than LOS D under cumulative-with-project conditions. The results of the analysis of Alternative 1 are shown in Figure VIII.A.3. The better level of service for the two intersections on King Street would be due to the lower trip generation and lower automobile mode choice (higher transit use) under Alternative 1 from office uses on parcels north of the Channel, plus the lower trip generation in Mission Bay South. The UCSF institutional use would not be part of this alternative and research and development/office uses would be considerably reduced in Mission Bay South, reducing traffic impacts at all intersections compared to intersection service levels with the project. More specifically, the better LOS for the intersection of 16th Street and Potrero Avenue under this alternative (LOS F in 2015 with cumulative growth plus the project, compared to LOS D with cumulative growth and Alternative 1 traffic) is attributable to the lower number of vehicle trips generated in Mission Bay South and the lack of development of the major new UCSF site.

Transit Impacts

Table VIII.A.6 compares the p.m. peak hour transit person trip generation estimates for Alternative 1 and the proposed project. The relatively large number of outbound transit person trips during the



SOURCE Wilbur Smith Associates

MISSION BAY SUBSEQUENT EIR

FIGURE VIII.A.2 YEAR 2015 CUMULATIVE LEVELS OF SERVICE WITH PROPOSED PROJECT AT SELECTED INTERSECTIONS, WEEKDAY P.M. PEAK HOUR

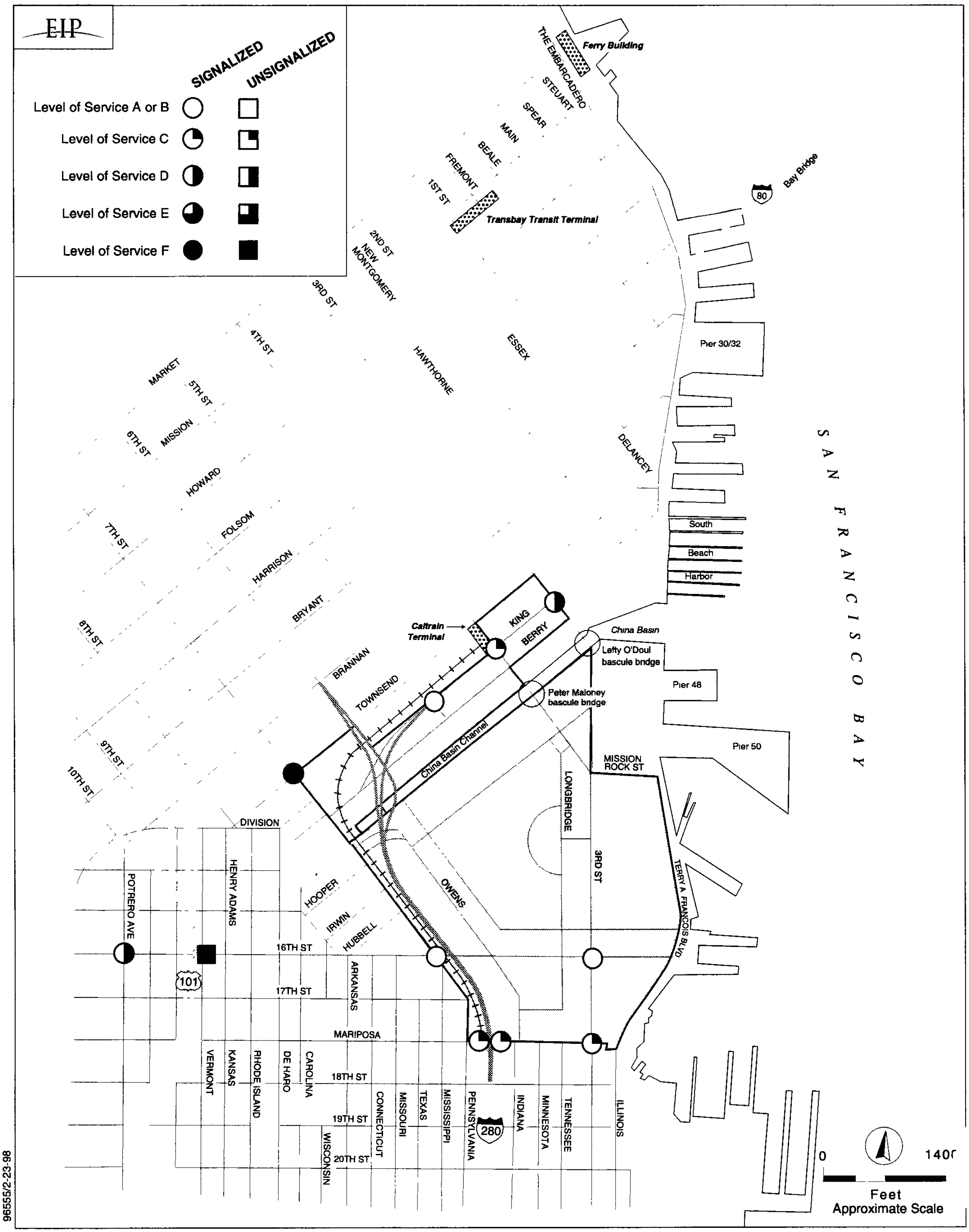
**TABLE VIII.A.5 ●
INTERSECTION LEVELS OF SERVICE
ALTERNATIVE 1 COMPARED TO PROJECT
PM Peak Hour 2015 Cumulative Conditions**

	2015 Cumulative with Project		2015 Cumulative with Alternative 1	
Study Intersection	**Avg. Delay (sec./veh.)**	**LOS**	**Avg. Delay (sec./veh.)**	**LOS**
Third St./King St.	99.1	F	39.7	D
Fourth St./King St.	52.1	E	23.0	C
Fifth St./King St.	28.4	D	11.5	B
Seventh St./Townsend St.	195.3	F	78.4	F
Sixteenth St./Potrero Ave.	162.7	F	28.8	D
Sixteenth St./Vermont St.	200.4	F	71.0	F
Sixteenth St./Seventh St.	32.2	D	7.5	B
Sixteenth St./Third St.	25.2	D	14.1	B
Mariposa/I-280 On-ramp	16.6	C	20.4	C
Mariposa/Owens St./I-280 Off-ramp	35.9	D	18.4	C
Third St./Mariposa St.	23.7	C	17.0	C

Source: Wilbur Smith Associates.

p.m. peak hour under Alternative 1 is due to the type of land use designated for Mission Bay North under this alternative. This alternative calls for over 98% of the space in Mission Bay North to be office space, as opposed to the project scenario, which calls for residential, retail, restaurant, and movie theater uses. Because workers are more likely than visitors to use transit, and the ratio of worker trips to visitor trips is substantially greater for office space than any other land use type, the transit usage would be relatively high for Alternative 1 in Mission Bay North.

As shown in Table VIII.A.6, the outbound AC Transit trips under Alternative 1 would be greater than those generated by the proposed project. This is because Alternative 1 has different land uses and



SOURCE: Wilbur Smith Associates

MISSION BAY SUBSEQUENT EIR

FIGURE VIII.A.3 YEAR 2015 CUMULATIVE LEVELS OF SERVICE WITH ALTERNATIVE 1 AT SELECTED INTERSECTIONS, WEEKDAY P.M. PEAK HOUR

TABLE VIII.A.6
PM PEAK HOUR TRANSIT PERSON TRIPS DISTRIBUTION BY TRANSIT MODE IN 2015
ALTERNATIVE 1 COMPARED TO PROJECT

	Alternative 1		Project		Difference	
Transit Mode	**In**	**Out**	**In**	**Out**	**In**	**Out**
BART	163	543	459	725	-296	-182
AC Transit	68	373	142	293	-74	+80/a/
Charter Bus	17	101	45	115	-28	-14
G.G. Bus	18	136	107	228	-89	-92
Ferry	4	29	23	49	-19	-20
SamTrans	17	100	45	143	-28	-43
CalTrain	37	202	106	305	-69	-103
MUNI Bus /b/	254	873	856	931	-602	-58
MUNI Metro /b/	703	1,897	1,806	2,859	-1,103	-962
Total	**1,281**	**4,254**	**3,589**	**5,648**	**-2,308**	**-1,394**

Notes:
a. AC Transit use was assumed to be greater for Alternative 1 than for the project because the large number of office employees in the Mission Bay North area would be closer to the Transbay Terminal in this Alternative than would the greater number of employees located south of the Channel in the proposed project.
b. MUNI ridership levels represent persons using MUNI as their primary travel mode, as well as those using MUNI to access regional carriers, such as BART, AC Transit, Golden Gate Transit, ferries and SamTrans.

Source: Wilbur Smith Associates.

would result in more office employees in Mission Bay North compared to the project scenario. Employees of offices in Mission Bay would be more likely to use transit than other Mission Bay workers and visitors, and office workers traveling to and from the East Bay would be more likely to use AC Transit than other types of workers and visitors./18/ This greater use of the bus system may indicate that everyday office commuters may be more aware of their transit options and have explored the relative alternatives, and/or that the schedule and area of coverage of the AC Transit system satisfies some commuters better than does BART.

The office worker trips of Alternative 1 would be more concentrated as *outbound* trips during the p.m. peak hour, whereas the retail and restaurant visitor trips associated with the project scenario would be more equally distributed between inbound and outbound. Finally, 22% of the office worker trips from Alternative 1 would travel to/from the East Bay, whereas only 10 to 14% of the retail/restaurant visitor trips in the project scenario would travel to/from the East Bay.

With fewer transit trips than the proposed project, Alternative 1 would not require mitigation measures for regional transit systems except for AC Transit. BART ridership generated by Alternative 1 would be about 60% of that generated by the proposed project, suggesting that 2015 BART capacity would be sufficient to accommodate Alternative 1 ridership. The same would occur with the Golden Gate Transit, where the bus ridership generated by Alternative 1 would be approximately 45% of the number of trips under the project scenario. Projected Alternative 1 ferry ridership would be approximately 45% of that estimated for the project, causing no significant impact. Similarly, Alternative 1 would generate about 60% of the SamTrans trips that would be generated by the project scenario, while Alternative 1 would also produce about 60% of the Caltrain trips estimated under the project scenario. Neither SamTrans nor Caltrain would experience a significant impact. Under Alternative 1, charter buses would be expected to carry approximately 25% fewer trips than under the project scenario. Alternative 1 would, however, generate more outbound AC Transit trips than would the project. The 370 new trips could be accommodated on existing AC Transit service; in combination with cumulative growth, the alternative would increase the load factor to 159% of capacity, slightly greater than the 157% load factor calculated for the project-plus-cumulative conditions in 2015. This would be a significant cumulative transportation impact. As with the project, Mitigation Measure E.44, in Section VI.E, Mitigation Measures: Transportation, would encourage provision of additional AC Transit bus service.

Table VIII.A.7 describes the general directional movement of MUNI passengers from the Project Area to locations in San Francisco that cross the Northeast, Northwest, Southeast, and Southwest screenlines. Both the project scenario and Alternative 1 are presented in the year 2015 cumulative environment. The table shows that both cumulative scenarios predict increased use of MUNI capacity, with the project generating slightly more trips at the screenlines, indicating an average corridor capacity utilization factor that is approximately 1.2% higher than that of Alternative 1. Although the overall land use intensity for Alternative 1 would be less than that of the proposed project, Alternative 1 would have more office space, as described in the land use development plan. Because offices generate higher transit usage than other land uses, the impact of the two scenarios on MUNI screenlines would be very similar. The excess demand on MUNI in the Kearny-Stockton corridor (lines 30, 30X, and 45) would be attributable to cumulative ridership for both the project and Alternative 1. Passengers crossing the Southwest screenline would use about 98% of the capacity.

TABLE VIII.A.7
MUNI RIDERSHIP SUMMARY BY SCREENLINE
YEAR 2015 CUMULATIVE WITH ALTERNATIVE 1, AND CUMULATIVE WITH PROJECT
(PM Peak Hour - Peak Direction)

		Existing Conditions			Year 2015 Cumulative with Alternative 1 Conditions						Year 2015 Cumulative with Project Conditions					
Screen-line/a/	Year 2015 MUNI Routes	Hourly Capacity /b/	Average Hourly Load/c/	Percent Capacity Used	Hourly Capacity /d/	New Cum-ulative Trips /e/	Cumu-lative Trips	Project Trips /f/	Average Hourly Load	Percent Capacity Used	Hourly Capacity /d/	New Cum-ulative Trips /e/	Cumu-lative Trips	Project Trips /f/	Average Hourly Load	Percent Capacity Used
Northeast	30, 30X, 45	3,387	2,256	67%	2,761	902	3,158	181	3,339	121%	2,761	902	3,158	230	3,388	123%
	41, 42X	1,733	877	51%	1,481	351	1,228	117	1,345	91%	1,481	351	1,228	149	1,377	93%
	Subtotal	*5,120*	*3,133*	*61%*	*4,242*	*1,253*	*4,386*	*298*	*4,684*	*110%*	*4,242*	*1,253*	*4,386*	*379*	*4,765*	*112%*
Northwest	38, 38L, 38AX, 38BX	2,823	1,986	70%	3,149	794	2,780	38	2,818	89%	3,149	794	2,780	48	2,828	90%
	1, 1AX, 1BX, 2, 3, 4, 5, 21, 22, 31,31AX, 31BX, 41, 45	7,679	5,537	72%	8,152	2,215	7,751	67	7,818	96%	8,152	2,215	7,751	85	7,836	96%
	Subtotal	*10,502*	*7,523*	*72%*	*11,301*	*3,009*	*10,531*	*105*	*10,636*	*94%*	*11,301*	*3,009*	*10,531*	*133*	*10,664*	*94%*
Southwest	K, L (MMX), M, N	6,783	4,876	72%	7,140	1,950	6,826	199	7,026	98%	7,140	1,950	6,826	290	7,116	100%
	6, 7, 71, F	1,418	1,096	77%	1,607	438	1,534	36	1,570	98%	1,607	438	1,534	46	1,580	98%
	Subtotal	*8,201*	*5,972*	*73%*	*8,747*	*2,388*	*8,360*	*235*	*8,596*	*98%*	*8,747*	*2,388*	*8,360*	*336*	*8,696*	*99%*
Southeast	J, 9	1,717	1,243	72%	1,895	497	1,741	123	1,864	98%	1,895	497	1,741	163	1,904	100%
	15	846	331	39%	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
	3rd. St. LRT Extension	N/A	N/A	N/A	1,190	132	464	232	696	58%	1,190	132	464	295	759	64%
	14, 14X	1,491	941	63%	1,538	377	1,318	98	1,416	92%	1,538	377	1,318	124	1,442	94%
	Subtotal	*4,054*	*2,515*	*62%*	*4,623*	*1,006*	*3,523*	*453*	*3,976*	*86%*	*4,623*	*1,006*	*3,523*	*582*	*4,105*	*89%*

Notes:

a. See Figure V.E.6 for Screenline location.
b. Capacity based on San Francisco Municipal Railway Ridership Projections to the Year 2015, May 5, 1997. It assumes an appreciable number of standees per vehicle (somewhere between 60% and 80% of the number of seated passengers, depending on the specific transit vehicle configuration) and may not include the effects of missed or late runs.
c. Average load at maximum load point, based on MUNI's monitoring data, FY 1995-96.
d. Capacity includes the elimination of bus lines 15, 32 and 81X, plus implementation of the MMX and the 3rd St. Extension LRT Services, and any other influencing modifications to service, equipment or operation.
e. Estimated from MTC Model projections and preliminary load estimates from MUNI Third Street LRT Extension Study.
f. Estimated number of project trips that would cross the screenlines.

Source: Wilbur Smith Associates.

This level of usage may encourage passengers to use less crowded lines that serve destinations, although willingness to do so may depend on the relative convenience offered to each passenger on alternate lines.

Many Mission Bay workers, visitors, and residents would ride MUNI to and from regional transit stops or transfer to other MUNI lines within the screenlines. These trips are included in the analysis of transit in the vicinity of Mission Bay, where Alternative 1 would impact MUNI service less than the project, but with a more sizable difference than at the screenlines. The trips generated by Alternative 1 would use approximately 40% less local MUNI capacity than the proposed project—a difference of approximately 2,490 p.m. peak trips.

Parking Demand and Supply

Table VIII.A.8 compares the demand and supply for parking under Alternative 1 and the project. An estimate of parking supply for Alternative 1 was based on parking supply rates for various land uses from 1990 FEIR Table VI.E.29, p. VI.E.185. Table VIII.A.8 shows that the largest shortage of parking spaces in Mission Bay North would result under Alternative 1, while in Mission Bay South the deficit would be greater under the project scenario. This is due to the additional office space expected in the Mission Bay North in Alternative 1, which would cause a relatively large number of daily automobile trips but would provide a smaller supply of parking based on standard parking supply rates for office buildings compared with parking supply rates for the retail and entertainment uses included in the proposed project./19/

However, while Mission Bay South would have approximately the same number of dwelling units under both Alternative 1 and the proposed project, the area would be occupied by only 900,000 gross sq. ft. of service/light industrial/R&D/office space under Alternative 1 and approximately 5.5 million gross sq. ft. of service/light industrial/R&D/office space and 2.65 million gross sq. ft. of UCSF space in the proposed project. Therefore, the demand for long-term parking would be less for Alternative 1 than for the project in Mission Bay South.

The shortage of parking under Alternative 1 would be approximately 15% less than the shortage described by the project, representing a shortfall for Alternative 1 of about 4,000 spaces, about 800 spaces smaller than the 4,800-space shortfall for the project.

On-street parking should be able to accommodate some of the excess demand estimated for Alternative 1, but it is expected to be sufficiently limited to discourage individuals from driving. However, some drivers to and from Mission Bay South who may be unable to find nearby on-street

TABLE VIII.A.8
PARKING DEMAND/SUPPLY IN 2015
COMPARISON OF ALTERNATIVE 1 AND PROJECT

	Total Demand (spaces)	Proposed Supply/a/ (spaces)	Surplus or Shortage
Alternative 1: No Project/Expected Growth			
Mission Bay North	5,808	3,015	-2,793
Mission Bay South	5,753	4,569	-1,184
Total	**11,561**	**7,584**	**-3,977**
Project			
Mission Bay North	6,585	5,454	-1,131
Mission Bay South	19,540	15,917	-3,623
Total	**26,125**	**21,371**	**-4,754**

Note:
a. Parking supply rates for Alternative 1 are those presented in 1990 FEIR, Volume Two, Table VI.E.29, p. VI.E.185.

Source: Wilbur Smith Associates.

parking may seek available parking in surrounding neighborhoods, including nearby commercial/industrial areas and residential areas in the Potrero Hill and Lower Potrero neighborhoods.

Pedestrians and Bicyclists

Pedestrian and bicycle traffic is expected to increase in Mission Bay under Alternative 1, but to a lesser degree than the increase expected under the project. The forthcoming Third Street light rail extension through Mission Bay, and the MUNI MMX service that will soon be directly accessible from King Street in Mission Bay North, are anticipated to increase the level of pedestrian traffic in the Project Area. The adoption of the San Francisco Bicycle Plan, with portions of its network in Mission Bay, is anticipated to increase the amount of bicycle traffic in the Project Area if it is implemented. The employment and population growth projected by ABAG would also contribute to notable increases in pedestrian and bicycle traffic in Mission Bay. Table VIII.A.9 shows the non-

TABLE VIII.A.9
NON-MOTORIZED (Pedestrians and Bicycle) PERSON TRIP GENERATION IN 2015
COMPARISON OF ALTERNATIVE 1 AND PROJECT
(PM Peak Hour)

Subarea	No Project/Expected Growth	Project	Difference
Mission Bay North	857	2,040	-1,183
Mission Bay South	1,274	2,763	-1,489
Total	**2,131**	**4,803**	**-2,672**

Source: Wilbur Smith Associates.

motorized person trips that would be generated by Mission Bay under Alternative 1 compared to those from the project.

Alternative 1 would generate fewer non-motorized trips, about 56% less than the project, in Mission Bay. These travelers, primarily comprised of pedestrians and bicyclists, would have little impact on Mission Bay's transportation network under the project scenario, as described in "Pedestrian Impacts" in Section V.E, Transportation: Impacts. Therefore, pedestrian and bicycle traffic generated by Alternative 1 would have a smaller impact on the crosswalks, sidewalks, and curb lanes in Mission Bay because volumes would be about half as large as those estimated for the project. Because Alternative 1 would also generate fewer transit trips that would require persons to walk to access their respective transit systems, the pedestrian facilities (crosswalks, sidewalks, and curb lanes) would remain at acceptable levels of service, as with the project.

Transportation impacts and mitigation measures are summarized at the end of this section on Alternative 1.

Air Quality

Regional Air Quality

In Alternative 1, vehicular emissions would be approximately 60% less than those from the proposed project. However, criteria pollutant emissions associated with daily peak vehicle trips would still exceed the significance thresholds established by the Bay Area Air Quality Management District

(BAAQMD), and therefore this alternative would not reduce the significant criteria pollutant emission impact to a less-than-significant level. Daily emissions of reactive organic gases (ROG), nitrogen oxides (NO_x), carbon monoxide (CO), and particulate matter (PM_{10}) from traffic were calculated for this alternative. As indicated in Table VIII.A.10, vehicular emissions of ROG, NO_x, and PM_{10} would exceed the 80 pound-per-day (lb/day) significance threshold. Emissions of ROG, NO_x, and PM_{10} would be several times greater than their respective thresholds. Because CO emissions would be more than 550 lb/day, a micro-scale analysis of CO concentrations at intersections is appropriate, as provided below.

As with the proposed project, all measures to decrease vehicle trips, as described in Chapter VI, Mitigation Measures, should be implemented. However, even with measures to reduce vehicle trips, the regional air quality impacts would remain significant, as they would under the proposed project.

Local CO Concentrations

Modeling results of local CO concentrations at worst-case (maximally exposed) receptor locations were studied at four intersections. Figure VIII.A.4 shows the intersections selected for modeling for all three alternatives. The results indicated that no exceedances of federal or state one-hour or eight-hour standards (e.g., significant impacts) would occur as a result of traffic emissions associated with Alternative 1. These results, provided in Table VIII.A.11, are similar to those for the proposed project.

Four of the 13 intersections modeled for the proposed project were selected for analysis for Alternative 1, based on their relatively elevated CO concentrations for the project. Figure VIII.A.2 shows the four intersections selected for comparison to the proposed project./20/

Modeling results indicate that the CO concentrations would be slightly less for Alternative 1 compared to the proposed project. Differences in one-hour concentrations at each of the four modeled intersections range from 0.2 to 2.4 parts per million (ppm). The highest one-hour CO concentrations would occur at the intersection of Third and King Streets, where concentrations of 13.6 ppm and 11.2 ppm were estimated for Alternative 1 and the proposed project, respectively. For eight-hour concentrations, differences in results for Alternative 1 and the proposed project ranged from 0.1 to 1.0 ppm. The highest concentrations for both Alternative 1 and the proposed project were modeled at the intersection of Third and King Streets.

TABLE VIII.A.10
ESTIMATED VEHICULAR EMISSIONS FROM ALTERNATIVE 1 TRAFFIC IN YEAR 2015

Pollutants	BAAQMD Threshold (lb/day)	Vehicular Emissions (lb/day)	
		Project	Alternative 1
Reactive Organic Gases (ROG)/a/	80	865	290
Nitrogen Oxides (NO_x)/a/	80	1,324	444
Particulate Matter (PM_{10})/a/	80	1,968	660
Carbon Monoxide (CO)/b/	550	12,228	4,104

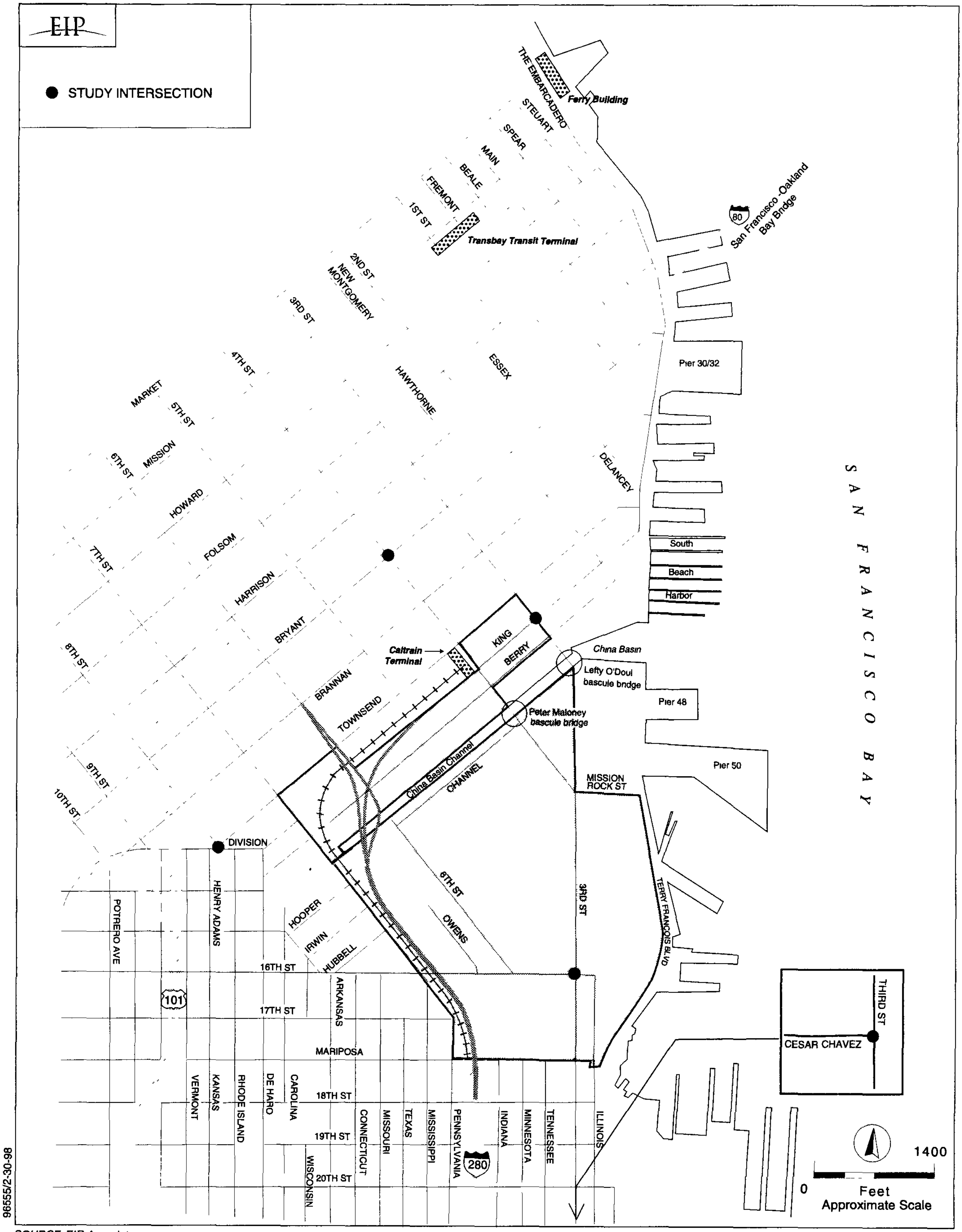
Notes:
a. The BAAQMD regards this amount of emissions as a threshold of significance for a regional impact.
b. For carbon monoxide, the BAAQMD does not regard 550 lb/day as a threshold of significance, but rather, an indicator to perform microanalysis.

Source: EIP Associates. Based on modeling using the California Air Resources Board's URBEMIS version 5 model.

Toxic Air Contaminants

In Alternative 1, toxic air contaminant emissions would result from facilities located in the Service/Light Industrial/Research and Development land use and retail areas in the South of Channel area. In the North of Channel area, offices would likely emit toxic air contaminants from burning of natural gas for boilers and chillers, and retail uses may emit toxic air contaminants, but no light industrial or research and development uses would be permitted. Vehicle trips associated with Alternative 1 would also cause toxic air contaminant emissions.

Due to the smaller amount of Service/Light Industrial/Research and Development/Office and retail uses in Alternative 1, compared to the Commercial Industrial and retail uses in the proposed project, there would likely be less toxic air contaminant emissions from stationary sources in Alternative 1, compared to the proposed project. (Although there would likely be more office space in Alternative 1 than in the proposed project, toxic air contaminant emissions are generally less for offices than for light industrial and research and development uses.) Also, in this alternative, the roughly 60% decrease in overall traffic would reduce toxic air contaminant emissions from mobile sources, compared to the proposed project.



SOURCE: EIP Associates

MISSION BAY SUBSEQUENT EIR

FIGURE VIII.A.4 INTERSECTIONS SELECTED FOR MODELING OF LOCAL CARBON MONOXIDE CONCENTRATIONS FOR ALTERNATIVES

TABLE VIII.A.11
ESTIMATED LOCAL CARBON MONOXIDE CONCENTRATIONS AT SELECTED INTERSECTIONS FOR ALTERNATIVE 1 IN 2015

	CO Concentrations (ppm)			
	Proposed Project/a/		Alternative 1	
Intersection	One Hour	Eight Hour	One Hour	Eight Hour
Third and 16th	11.0	6.3	9.6	5.6
Third and King	13.6	7.6	11.2	6.6
Fourth and Bryant	8.3	5.3	8.1	5.1
Eighth and Townsend	9.9	5.4	9.1	5.5

Notes:
ppm = Parts per million.
a. Refer to Table V.F.5 and associated text in V.F, Air Quality.

Source: EIP Associates.

As discussed in "Potential Emissions from the Proposed Project" under "Combined Risk of Individual Facilities Within the Mission Bay Project Area" in Section V.F, Air Quality: Impacts, toxic air contaminant emissions from multiple facilities within the proposed project could result in combined risks to individuals in certain locations that could be considered by some persons to be significant. Therefore, this SEIR conservatively characterizes toxic air contaminant emissions as a potentially significant impact of the project.

Whereas state law provides a mechanism to ensure that the school siting process considers potential exposure to toxic air contaminants, preschool and child care facilities would not be subject to California's school siting process. These facilities could be operated near or among the Service/Light Industrial/Research and Development/Office uses. A measure such as Mitigation Measure F.6 proposed for the project would be needed to ensure that preschool and child care facilities would consult with agencies regarding potential risks, and that the BAAQMD would have the opportunity to request updated emissions inventories from facilities emitting toxic air contaminants if a pre-school or child-care center locates within 1,640 feet of such a facility.

In sum, even though the toxic air contaminant emissions from stationary sources in Alternative 1 would likely be less than for the proposed project, toxic air contaminant emissions from multiple facilities could combine to increase risks; therefore this SEIR conservatively characterizes toxic air contaminant emissions from Alternative 1 as a potentially significant impact. All of the mitigation measures for the project would be appropriate for Alternative 1, except Measure F.4 could be modified so that the meteorological station would be located near the potential Service/Light Industrial/Research and Development/Office uses on Owens Street.

Demolition and Construction Air Pollutant Emissions

Criteria Pollutants

Criteria pollutants emissions, primarily in the form of PM_{10}, would be a less-than-significant impact after implementing BAAQMD-approved dust mitigation measures for demolition and construction activities, as under the proposed project.

Contaminated Soils

As for the proposed project, excavation could result in the generation and release of dust containing toxic air contaminants to the air and adverse impacts on construction workers and the public. Potential impacts for Alternative 1 would be the same as for the project, and would be mitigated through implementation of risk management plans, as explained under "Contaminated Soils and Groundwater," below.

Noise and Vibration

Noise

A qualitative analysis of the traffic information for Alternative 1 shows that traffic volumes at the study locations would remain the same or would decrease, compared with volumes for the proposed project and would, therefore, have correspondingly equal or smaller traffic noise increases at the same locations. While the noise analysis of project traffic showed that traffic increases would contribute to an increase in peak hour and daily noise levels at existing sensitive receptor and residential locations, as well as at sites of potential future sensitive receptors, the contribution would not be noticeable to most individuals at most locations. Noise levels for the study locations at Potrero Avenue south of 16th Street; Pennsylvania Street south of Mariposa Street; and Berry Street west of Fourth Street would essentially remain unchanged under Alternative 1 conditions compared to noise levels shown for the project. Decreases in traffic volumes, and concomitant reductions in noise levels, would occur at the study locations of Third Street south of Mission Rock Street; The Common south of Owens Street; and Fourth/Minnesota Streets, south of Mariposa Street.

To further assess the potential traffic noise impacts of Alternative 1, a quantitative analysis was performed at the sensitive receptor location at Mariposa and De Haro Streets (St. Gregory's Episcopal Church). Traffic volume data for the alternative were analyzed using the same SOUND 32 model that was used for the proposed project. Under this alternative, the increase in traffic noise levels would be 0.6 dBA less than the proposed project's noise increase, and the impact would be less than significant, as it would be for the proposed project. Alternative 1 traffic plus cumulative traffic in 2015 would increase 24-hour (L_{dn}) noise levels by up to 0.3 (dBA) in contrast to a 1.3 dBA change for the proposed project. The alternative's traffic would increase the 1-hour (L_{eq}) for p.m. peak hour traffic by 0.6 dBA—an increase that would not be noticeable to most individuals and would not interrupt church activities.

Vibration

Alternative 1 would have residential uses over ground floor retail on Third Street and Fourth Street in Mission Bay South. The MUNI Third Street light rail tracks would be installed down the center of these streets in the Project Area. Vibration effects from the light rail vehicles would be similar to the effects described for the project along Third and Fourth Streets and would not be expected to be significant.

Caltrain tracks in Mission Bay North would be adjacent to community facilities in Alternative 1 rather than the residential use over retail proposed in the project. Community facilities would be less sensitive than residential uses to vibration from heavy rail, because community facilities would not be expected to be used for sleeping. If a concert or theater activity were to be held occasionally in the community facilities, passenger train vibration could be annoying, but would not be considered a significant environmental impact. Therefore, Mitigation Measure G.2, described for the project in Section VI.G, Mitigation Measures: Noise and Vibration, would not be applicable to this alternative.

Existing freight rail tracks would be relocated to the center of 16th Street in Alternative 1, as with the project. Vibration from heavy rail activity would be noticeable in the residential buildings proposed to be on 16th Street east of Owens Street and might exceed the standard of 80 VdB for infrequent events suggested by the Federal Transit Administration./21/ However, given that the freight trains in this area move very slowly (often less than 20 miles per hour) and that the residential buildings are likely to be concrete rather than wood-frame, vibration levels could be 70 VdB or less and then would not be a significant impact. As it is not likely that vibration would be a significant impact on residential uses along 16th Street, no mitigation has been suggested; it might be useful to perform a more detailed evaluation of potential vibration effects from heavy rail as part of foundation design for residential buildings along 16th Street, or consider vibration-reducing design features in constructing the track.

The potential vibration effects on sensitive research instruments described in the project analysis for the UCSF site and other possible research facilities along Third Street and along 16th Street would not occur under this alternative.

Seismicity

Effects of Groundshaking

The Project Area under this alternative would be subject to the same seismic conditions as the proposed project described in "Project Area Characteristics," in Section V.H, Seismicity: Impacts: a 67% probability of at least one major earthquake within the 30-year period between 1990 and 2020; anticipated peak ground accelerations in excess of 0.5g; liquefaction and earthquake-induced settlement of some fill.

Under Alternative 1, some existing land uses in the Project Area could continue after 2015 during the build-out period. While existing structures would remain, some might be retrofitted to upgrade their seismic resistance; some new buildings would be constructed, although fewer by 2015 than for the proposed project. As with the project, new structures would be more resistant to seismic forces than retrofitted structures and, therefore, would suffer less damage during earthquakes. Although a retrofitted structure would reduce injury and loss of life, the structure itself might not survive the earthquake in as sound a condition as a new structure. If Fire Station No. 30 would be reused for a fire or fire and police station in this alternative, it would need seismic upgrades.

Existing structures that pre-date modern building codes, and have not been retrofitted, could tilt, deform, settle rapidly, or collapse, thereby exposing occupants to injury or death. Because of the slower pace of development under Alternative 1, more existing structures would remain in use in 2015 in comparison to the proposed project, in which existing structures would be removed. Conditions for the alternative in 2015 would be similar to those discussed for the project in "Phasing of Infrastructure and Development During the Build-Out Period" in Section V.H, Seismicity: Impacts.

Seismic Hazard Zones

The Project Area is in a Liquefaction Hazard Zone. Existing structures supported on the potentially liquefiable fill in the Project Area could deform, tilt, settle rapidly, or collapse, thereby exposing occupants to injury or death. Existing pile-supported foundations pre-date modern building codes and would not be expected to perform as well as new foundations during seismically induced liquefaction of the surrounding fill. In this alternative, it is assumed that the Project Area would be redeveloped gradually, with structures on appropriate foundations to accommodate the adverse effects of liquefaction. All new construction under San Francisco's jurisdiction throughout the Project Area would be required to meet the seismic safety provisions of the currently applicable San Francisco Building Code (1995 or future revisions). Existing structures would remain in use until they were replaced by new construction. Unless the South of Channel area were completely developed with new buildings, the effects of liquefaction would be more severe in Mission Bay South than for the proposed project's less-than-significant impact due to the continuation of existing conditions (see "Phasing of Infrastructure and Development During the Build-Out Period" in Section V.H, Seismicity: Impacts).

Exposure of Concentrated Populations to Seismic Hazards

As development occurred under this alternative, the population would rise from the current population of the Project Area (less than 2,000 employees) to about 20,300 people (5,470 residents, 14,800 employees) by the year 2015. In terms of the actual number of people in the Project Area, this represents about 50% of the population of the proposed project in 2015.

As development progressed in the Project Area, the percentage of the population in seismically resistant buildings that are on pile-supported foundations, have been retrofitted, or meet the seismic safety provisions of the currently applicable San Francisco Building Code, would increase because new structures in San Francisco's jurisdiction would comply with the currently applicable San Francisco Building Code. However, unless the Project Area were completely developed with new structures, the percentage would not be the same as that of the proposed project. Therefore, although build-out to 2015 would result in about 50% fewer people occupying the Project Area than the proposed project, this alternative would have slightly more severe seismic safety effects because existing seismic safety conditions would continue longer than for the proposed project. These existing conditions are described in the "Phasing of Infrastructure and Development During the Build-Out Period" in Section V.H, Seismicity: Impacts. As with the proposed project, these existing conditions would not be significant impacts under CEQA.

Under this alternative, the Mission Bay Plan would integrate such emergency response facilities as the fire station and the extension of the Auxiliary Water Supply System for fire-fighting into the South of Channel area, (it already exists in the North of Channel area) to reduce the remaining exposure to seismic hazards to an acceptable level.

Health and Safety

Like the proposed project, Alternative 1 would increase the use, storage, generation, and disposal of hazardous materials and waste. However, the increase would be substantially smaller with the alternative for two reasons. First, development of the UCSF site is not assumed under this alternative. Second, the amount of commercial space that could use or generate hazardous materials or waste would be smaller—approximately 80% less service/light industrial/R&D and industrial space (approximately 900,000 sq. ft. under Alternative 1 and 5.6 million gross sq. ft. under the proposed project). Under this alternative, the smaller amount of space where hazardous materials use and generation could occur would reduce the magnitude of potential use within the Project Area. Reduction in magnitude of potential use would reduce the potential risk, although it would not eliminate potentially significant impacts. Legal and regulatory requirements applicable to hazardous materials operations would reduce most of the common and potentially significant health and safety impacts to less-than-significant levels, as they would under the proposed project. However, the project's potentially significant impacts would also be significant under this alternative, and significant health and safety impacts are discussed below.

First, although the UCSF site would not be developed, it is possible that some occupants of the industrial space would conduct biomedical or related activities and generate biohazardous waste. In this case, the potential impact could be reduced to less-than-significant levels with mitigation measures identified for the project.

Second, development under this alternative would likely increase the generation of hazardous waste and contribute to existing impacts of hazardous waste disposal. However, the increase in hazardous waste generation would be substantially less than for the proposed project. As with the project, environmental impacts of hazardous waste disposal would be minimized, but not eliminated, by encouraging such pollution prevention measures.

Contaminated Soils and Groundwater

Chemicals of various types and concentrations were found in the soil and groundwater throughout the Mission Bay Project Area. With the exception of petroleum hydrocarbon contamination in a petroleum free product area (see "Glossary and Acronyms" at the end of Section V.J, Contaminated Soils and Groundwater, for definition) located in the southeast portion of the Project Area in the vicinity of Illinois and Third Streets, concentrations of contaminants in soil or groundwater do not present a human health or ecological risk under existing conditions. In the free product area, potential effects on near-shore aquatic organisms are being managed through additional investigation and any necessary remediation by oil companies responsible for the contamination. This remediation will be carried out regardless of whether the proposed project or this alternative is approved (see Section V.J, Contaminated Soils and Groundwater).

Most of the Project Area would experience soil and groundwater construction-related effects similar to those described for the proposed project, although the locations and extent of activities would vary because of differences in land use compared to the proposed project. As explained for the proposed project, some residual chemicals may remain in the Project Area soils or groundwater other than those associated with the free product (see "Impacts During Project Development," in Section V.J, Contaminated Soils and Groundwater). There would be fewer people who could be exposed to contaminants in soil or groundwater that could be released during site development. Potential construction-related effects on the aquatic environment would be similar to those identified for the proposed project.

To reduce potential hazards to human health and the environment during construction, Risk Management Plans (RMPs) would be prepared for development activities that would occur in Mission Bay North and Mission Bay South based on proposed land uses; the RMPs would be reviewed by the Regional Water Quality Control Board (RWQCB) staff. Measures identified in the RMPs, which would be modified to reflect the proposed land uses under this alternative, would reduce to a less-than-significant level any risks that might result during construction and from use of locations that would be developed and occupied during construction, under this alternative.

The alternative would not be expected to be fully built out by 2015. Therefore, unlike the proposed project, some sites in the Project Area would remain vacant and would allow rainwater to infiltrate the soil, potentially affecting concentrations of chemicals in groundwater. Thus, under Alternative 1 there could be less reduction in potential releases of residual contaminants to the environment by 2015 than under the project. It has been shown that there are no unacceptable risks to the aquatic environment from chemicals in soil or groundwater in the Project Area that may migrate in groundwater to surface water bodies, except possibly for the free product area. The fact that the alternative would not be fully built out by 2015 would not mean that the alternative would cause significant aquatic impacts.

Hydrology and Water Quality

The Project Area would be served entirely by a combined sewer system, and not by the separated sewer system for part of the Project Area that is proposed for the project. The resulting pollutant load under this alternative would be similar to that described for the Bayside Base Case plus Mission

Bay 100% Combined Sewer System scenario in "Changes in Discharges to Receiving Waters" in Section V.K, Hydrology and Water Quality: Impacts. That scenario assumes build-out of the proposed project, but with a 100% combined sewer system for the entire Project Area instead of both separate and combined systems. As discussed in that subsection, the pollutant load resulting from the 100% Combined Sewer System scenario would be about the same as that resulting from the proposed project.

Total development under Alternative 1 would be less than under the proposed project, but it would occur within the same land area. Municipal wastewater generated under Alternative 1 would be about 35% of that under the project. As with the project, land uses under this alternative would include businesses such as wet laboratories that could potentially release chemicals into the City's combined sewer system that could cause the City to exceed its permit limits. Mitigation Measure K.2 would apply to this alternative. More permeable surface area could conceivably result under this alternative based on the less-intensive development scheme. Therefore, stormwater runoff to the combined system potentially could be less under this alternative than under the proposed project. No direct stormwater discharge to the Bay or Channel would occur under Alternative 1.

As for the project, land uses under this alternative would be similar to the existing range of uses in the City. Therefore, pollutant concentrations in municipal wastewater effluent and treated combined sewer overflows (CSO) would remain essentially the same as existing conditions, as they would for the proposed project. Unlike the project, there would be no direct stormwater discharge to near shore waters of the Bay because the Project Area would be served by a combined sewer system. As for the project, no new toxicological effects to aquatic organisms in San Francisco Bay and no new effects on sediment quality would result from changes in discharges under this alternative. In addition, as with the project, water-contact recreation would not be substantially impacted by increased treated CSOs, as with the project. Therefore, Alternative 1 would have a less-than-significant project impact on water quality. The cumulative impacts of this alternative would be similar to those of the proposed project, in that cumulative impacts would be less-than-significant, but as with the project, the SEIR conservatively finds that this alternative would contribute to a potentially significant cumulative impact on the near-shore waters of San Francisco Bay. Because no direct stormwater discharges would occur under this alternative, Mitigation Measure K.4 would not apply to Alternative 1. Only Mitigation Measure K.3 would apply to this alternative for this cumulative impact.

Under Alternative 1, UCSF would not develop its major new site in the Project Area, but Alternative 1 would include development of interim Giants Ballpark parking lots in Mission Bay South. Therefore, interim drainage plans would not necessarily be the same as those proposed for the project (see "Proposed Drainage Plans for Interim Giants Ballpark and UCSF Parking" in Section V.K, Hydrology and Water Quality: Impacts), but could include a surface detention basin concept as for the project. As discussed in "Water Quality Effects of Phased Development and Interim Uses" in Section V.K, Hydrology and Water Quality: Impacts, if a surface detention basin were included in interim drainage plans until other improvements or upgrades could be made to the existing combined sewer system in the Project Area, pollutant load effects for phased development would be equal to, or less than, loading under built-out conditions under the 100% Combined Sewer System scenario for the proposed project. Because controls would be needed for stormwater under Alternative 1, prior to Project Area build-out, as for the proposed project, Mitigation Measure K.5 would apply.

Erosion and sedimentation impacts from construction would be similar to those of the proposed project. A construction Storm Water Pollution Prevention Plan would be required by existing stormwater regulations to reduce impacts to less-than-significant levels, as would be the case under the proposed project. Mitigation Measure K.1 specifies the minimum measures that must be included in the Storm Water Pollution Prevention Plan.

China Basin Channel Vegetation and Wildlife

The Channel edge treatments for Alternative 1 would be the same as those presented for the Mission Bay Plan/22/, with a hard edge on the north side of the Channel between Fourth Street and Owens Street composed of walls and decking. The hard-edge treatment on the north side of the Channel for Alternative 1 would result in the same amount of loss of existing salt marsh wetlands as the proposed project (totaling 0.13 acre). This would be more than offset, however, by proposed soft-edge treatments on the north side of the Channel between Sixth and Seventh Streets and on the south edge of the Channel between Owens Street and Third Street. The proposed soft-edge treatments would plant approximately 0.6 acre of native salt marsh vegetation where none currently exists./23/ This would result in a net gain of about 0.5 acre of salt marsh wetland acreage. It would result in a larger area of wetlands than the proposed project.

Installation of more structures (i.e., the proposed Owens Street Bridge) in the Channel under Alternative 1 would be similar to the proposed project but with increased area of disturbance. This would result in more potential impacts caused by resuspension of contaminated sediments. These impacts would be reduced to a less-than-significant level with mitigation measures similar to those proposed for the project.

Community Services and Utilities

Fire Protection

Alternative 1 assumes a level of development for the Project Area by the year 2015 that would be less than that of the proposed project and would, therefore, be expected to generate fewer emergency, fire, and false alarm incidents involving the San Francisco Fire Department. The number of hazardous materials incidents would also likely be less because there would be less research and development (R&D) and institutional space. Under this alternative, the resident and employee populations in 2015 would be about half of each forecast population for the proposed project at build-out (see Table VIII.1). There would be about 78% less retail development and 52% less office and service/light industrial/ R&D/office space.

Although the number of incidents generated by this alternative could reasonably be expected to be less than for the proposed project, this alternative would also require additional Fire Department resources as would the proposed project. An engine company and a truck company, and a station to house them would be provided under this alternative, as called for in the adopted 1990 *Mission Bay Plan*./24/ This alternative would also add new households and businesses into a previously underdeveloped area. The additional demand on citywide Fire Department resources, and emergency access to the South of Channel area in the event of an earthquake or during events at the San Francisco Giants Ballpark, would remain a concern for any substantial amount of new development in the Project Area.

Expansion of the high-pressure water system (also known as the Auxiliary Water Supply System, or AWSS) and installation of six cisterns would provide adequate fire-fighting capability to the interior of the Project Area in this alternative. Expansion of the AWSS in this alternative would be similar to the proposed expansion of the AWSS in the project. The six cisterns included in this alternative would provide a backup supply of water, if the AWSS fails. The project proposes to use suction inlets near the Bay and Channel as a backup water supply, instead of installing cisterns.

This alternative would include 3.1 acres south of the Channel for community facilities, which could include a police and/or fire station. Fire Station 30 could be rehabilitated for use, or a new station could be constructed. The proposed project would include about 3.7 acres for community facilities south of the Channel.

Police Protection

Because this alternative would have about half the employee and resident populations of the proposed project in 2015, demand on the SFPD for police personnel and resources would be about half as much (about 30 police personnel as opposed to about 60) in order to provide a level of police service comparable to the citywide level./25/ As with the proposed project, interior building space in an existing or new police station within or near the Project Area, would be needed, but would be about half as much (3,720 gross sq. ft.) as estimated for the proposed project (about 7,440 gross sq. ft.).

The number of squad cars needed would also be about half (10-11), and fewer parking spaces would be needed.

It is unlikely that additional personnel could be accommodated at existing stations. This alternative, which would include 3.1 acres south of the Channel for community facilities, could include a police and/or fire station. An approximately 1.5-acre site adjacent to and including the site of the closed Fire Station No. 30 at Third and Mission Rock Streets may be considered among those potentially available for a relocated Southern Station. If the Southern Station were to be expanded and/or relocated, it could accommodate some of the additional demand for space to serve this alternative.

Public Health Services

This alternative would generate less demand for public health services in the areas of environmental health, personal health care services, and mental health services than the proposed project would because there would be fewer employees and residents. Demand for the Bureau of Environmental Health Management's inspection and oversight services would be less than that for the proposed project because fewer retail establishments would serve food and fewer firms would be likely to use hazardous materials. In 2015 there would be approximately 78% less retail development and 52% less office and research and development space than in the proposed project (see Table VIII.1). Demand for personal health care services and mental health services would also be expected to be less than that for the proposed project due to the smaller resident and employee populations in the Project Area.

Recreation and Parks

Demand for open space in 2015 would be less for this alternative than for the proposed project because there would be about 50% fewer residents and workers in the Project Area by the year 2015. However, about 60% less open space would be provided. An estimated 19 acres of open space would be developed through 2015 with Alternative 1, which would provide a ratio of approximately 3.5 acres per 1,000 residents. The alternative would generate a total employee demand for 2.1 acres; employee demand would be satisfied by the same open space as that used by residents, as with the proposed project./26/ The project, which would include the development of approximately 47 acres of open space, would provide a ratio of approximately 4.3 acres per 1,000 residents, and would generate a total employee demand for approximately 4.2 acres.

The total amount of open space provided by this alternative in 2015 would be 28 acres less than that provided by the proposed project, and would also be comparatively less when measured in acres provided per 1,000 residents. Comparison of open space impacts based on the service area analysis done for the proposed project is not possible, however, since there is no plan at this time for the types or location of recreational facilities that would be provided by Alternative 1. This information would be necessary to determine whether open space planned for this alternative would be more or less likely to satisfy the needs of Project Area employees and residents than that provided by the proposed project.

Schools

Alternative 1 projects a resident population of about half that of the proposed project by 2015. Therefore, this alternative would be expected to generate about half as many school-age children as the proposed project: 810 compared to 1,615. The estimated number of students at each school level would be approximately 365 elementary-school-age students, 200 middle-school-age students, and 245 high-school-age students./27/

As with the proposed project, this alternative would include a site for a public school in Mission Bay South. As with the proposed project, the City and County of San Francisco would need to develop additional classroom space to accommodate students generated by this alternative. Demand for classroom space would be less with this alternative because there would be fewer new students; all of the elementary school students in this alternative could likely be accommodated at a new school in the Project Area, whereas with the proposed project they could not be. However, middle school and high school students would not be accommodated on-site. Options that could be considered by the SFUSD to increase the capacity of the school district include implementing year-round schools, using portable classrooms, or building new permanent classrooms at an existing or new school site. While constructing new schools might cause significant impacts at those locations, it is too speculative to identify impacts at this time from construction of additional school facilities without knowing what action or actions the SFUSD would take to accommodate the additional students, whether SFUSD would choose to accommodate the additional students in a manner that would result in physical changes to the environment, or exactly where those actions would occur. Any new facilities proposed by SFUSD would undergo appropriate environmental review for site-specific physical environmental impacts.

Development occurring with Alternative 1 would be subject to the same one-time development impact fee as the proposed project. As discussed in "Schools: Impacts," in Section V.M, Community Services and Utilities, this fee is collected for the school district at the time building permits are issued, and is $1.72/square foot (sq. ft.) for residential development, and varies from $0.08/sq. ft. to $0.24/sq. ft. for different types of commercial development./28/ The development impact fees were set by the state legislature and are reviewed every two years by the State Allocation Board. The San Francisco Board of Education than must set the fees within the state constraints. The fees do not necessarily increase annually./29/ Total fees would be less than those collected for the proposed project because there v uld be fewer square feet of residential and commercial development generating these fees. Alternative 1 would generate about $5.5 million in school fees, whereas the project would generate approximately $11.2 million./30/ Construction of an elementary school for 365 students costs about $9.2 million in 1998 dollars /31/, which would exceed the amount generated through development impact fees. Therefore, development impact fees would be insufficient to cover the cost of a new elementary school and provide funds for middle and high school students.

Solid Waste

Alternative 1 would generate approximately 10,000 tons of solid waste per year by 2015, which is about 50% of the projected solid waste generation for the proposed project at build-out (19,000 tons/year). At San Francisco's current diversion rate (35%), this alternative would contribute about 6,500 tons of solid waste per year to the Altamont Landfill. With a diversion rate of 50%, as required by state law by the year 2000, this alternative would contribute approximately 5,000 tons of waste to the landfill annually./32/ As with the proposed project, development under Alternative 1 is assumed in the Altamont Landfill Capacity Projections and would not affect the expected lifespan of San Francisco's landfill contract with Waste Management of Alameda County, due to expire between 2012 and 2016. Under this alternative, the disposal companies could potentially require additional staff and collection equipment to serve the Project Area, as they would under the proposed project.

Water Supply

Alternative 1 would use an estimated 1.0 million gallons per day (mgd) of water in 2015, which would represent approximately 35% of the water demand for the proposed project (2.9 mgd). The reclaimed water demand for this alternative would be approximately 0.50 mgd, or about 50% of the reclaimed water demand for the proposed project (0.98 mgd).

As with the proposed project, the low-pressure and high-pressure water systems would require expansion in order to provide adequate service to the central portion of the Project Area. The City's proposed reclaimed water system would require a new system of pipelines throughout the Project Area, as would be the case under the proposed project.

Sewers and Wastewater

Alternative 1 would generate approximately 0.87 mgd of sewage through 2015, which is about 35% of the estimated daily sewage generation for the proposed project (2.5 mgd). Under this alternative, unlike the proposed project, the Central/Bay Basin would continue to use the City's combined sewer system (see Figure V.K.2, in Section V.K, Hydrology and Water Quality). The combined sewer system in the Central/Bay Basin would require expansion and upgrading of sewer lines. This alternative would also include the construction of additional storage sewer capacity to accommodate increased stormwater runoff, as proposed in the approved 1990 *Mission Bay Plan*. Recent analysis by the San Francisco Public Utilities Commission, Clean Water Program indicates that the City's combined sewer system probably has adequate capacity to accommodate development from the proposed project in the Project Area without additional storage sewer capacity./33/ Further analysis of detailed, project-level, drainage plans of the combined sewer system for the Project Area, once they were developed, would be needed for confirmation. Growth in the North Basin and Mariposa Basin (Figure V.K.2) would require the same extensions of the existing combined sewer system to previously unserviced areas as would occur with the proposed project. Construction of new sewer lines would have impacts related to contaminated soils similar to those described for project construction in Section V.J, Contaminated Soils and Groundwater: Impacts.

Energy Capacity and Infrastructure

Energy demand would be less overall under this alternative than for the proposed project because there would be less residential and commercial development. However, the Project Area is an underdeveloped area, and any substantial amount of new development could be expected to require some amount of new infrastructure or upgrades to existing infrastructure. Therefore, although energy demand would be less than that for the proposed project, some upgrades would still be necessary.

Telecommunications

On the basis of preliminary information, Pacific Bell would serve the proposed project via fiber optic cable and remote terminal sites./34/ This alternative would likely generate less demand for telecommunications services than the proposed project because there would be approximately 50% less residential and commercial development in 2015. However, as discussed above under "Energy Capacity and Infrastructure," the Project Area is an underdeveloped area, and any substantial amount of new development may still require new infrastructure or infrastructure upgrades, although on a smaller scale than required for the proposed project.

SUMMARY OF MITIGATION MEASURES

Mitigation measures applicable under this alternative would be those of the 1990 *Mission Bay Plan*. Since this SEIR's analysis updates that of the 1990 FEIR in terms of environmental and regulatory conditions and information (as well as a changed project), it is reasonable to expect that mitigation measures similar to those identified for the proposed project would be developed and applied as necessary.

The significant impacts of Alternative 1 for air quality, including toxic air contaminants; health and safety; contaminated soils and groundwater; and hydrology and water quality would be similar to or the same as those of the project.

Hydrology and water quality mitigation measures for Alternative 1 would be the same as for the project, but Mitigation Measure K.4 would not apply. This is because no direct stormwater discharges to near-shore waters would occur that could cumulatively impact near-shore water quality. Potential cumulative impacts to near-shore water quality would only occur from treated combined sewer overflows.

Effects on existing wetlands in China Basin Channel would be about the same under Alternative 1 as they would be under the project and more acreage of wetlands would be restored. This *Mission Bay Plan* proposal for this alternative, to restore salt marsh wetlands along the south edge (and part of the north edge) of the Channel, would have essentially the same result as described for the proposed project in Section VI.L, Mitigation Measures: China Basin Channel Vegetation and Wildlife.

Traffic impacts in 2015 would be reduced under this alternative, and fewer intersections would degrade to LOS E or F. Traffic mitigation measures for this alternative would be similar in nature to those for the project, although some mitigation measures might be applied in different locations due to the proposed circulation pattern. On the other hand, some features of the proposed project would not be necessary, and some mitigation measures would not be needed, based on reduced numbers of intersections reaching significant levels. For example, the intersection of 16th Street and Potrero Avenue would not degrade to LOS F under the alternative and would not need the mitigation measures described for the project in Section VI.E, Mitigation Measures: Transportation. Measures also would not be needed at Third and King Streets and at Fourth and King Streets in 2015 under the alternative. As with the proposed project, Alternative 1 would contribute to congestion at intersections leading to freeway ramps; these intersections could not be mitigated to acceptable levels of service by typical signal timing or reconfiguration measures and would remain at LOS E or F, as they are under existing conditions.

Impacts on regional transit services, except for AC Transit, would be less (because demand for service other than AC Transit would range from 40% to 75% of the demand generated by the project) and would not require mitigation. The alternative would contribute a slightly greater amount to cumulative demand for AC Transit service because of the relatively larger amount of office space in Mission Bay North. Impacts on MUNI service would be similar to those of the project, and the same mitigation measures as described for the project would be applicable. Other transportation issues, such as parking and pedestrian effects, would not have significant environmental impacts, as with the project, and therefore would not require mitigation.

Existing seismic structural hazards in the Project Area would persist for a longer period of time under Alternative 1 because more of the Project Area's existing buildings would remain in use for a longer time (see "Phasing of Infrastructure and Development During the Build-Out Period" in Section V.H, Seismicity: Impacts). Although existing regulations may seismically strengthen some of those buildings, the Project Area's building stock would pose a higher degree of seismic safety risk through 2015 than the less-than-significant risks under the proposed project. The risk would not be a significant impact under CEQA because the majority of existing structures are relatively low-rise, light- weight buildings posing limited hazards.

Regarding toxic air contaminants, the 1990 FEIR did not address them other than from construction sources. As a result, measures similar to those proposed for the project would be needed, with Mitigation Measure F.4 modified so the meteorological station would be located near the potential Service/Light Industrial/Research and Development/Office, since UCSF is not assumed as part of the alternative. As with the proposed project, combined toxic air contaminant impacts would remain potentially significant and unavoidable after mitigation.

The 1990 FEIR did not identify water quality impacts as significant in the manner that the SEIR does. Thus, no mitigation measures were proposed in the 1990 FEIR. Because water quality impacts have been identified as significant, Mitigation Measures K.1-K.3 and K.5 would be recommended for Alternative 1.

This alternative's significant unavoidable project and cumulative impacts would be the same as those of the proposed project (see Chapter IX, e.g., intersection, bridge/ramp, vehicular air pollutant emissions, toxic air contaminants, hazardous waste generation and disposal, water quality), although their magnitude may vary.

B. ALTERNATIVE 2: REDEVELOPMENT NORTH OF CHANNEL/ EXPECTED GROWTH SOUTH OF CHANNEL ALTERNATIVE

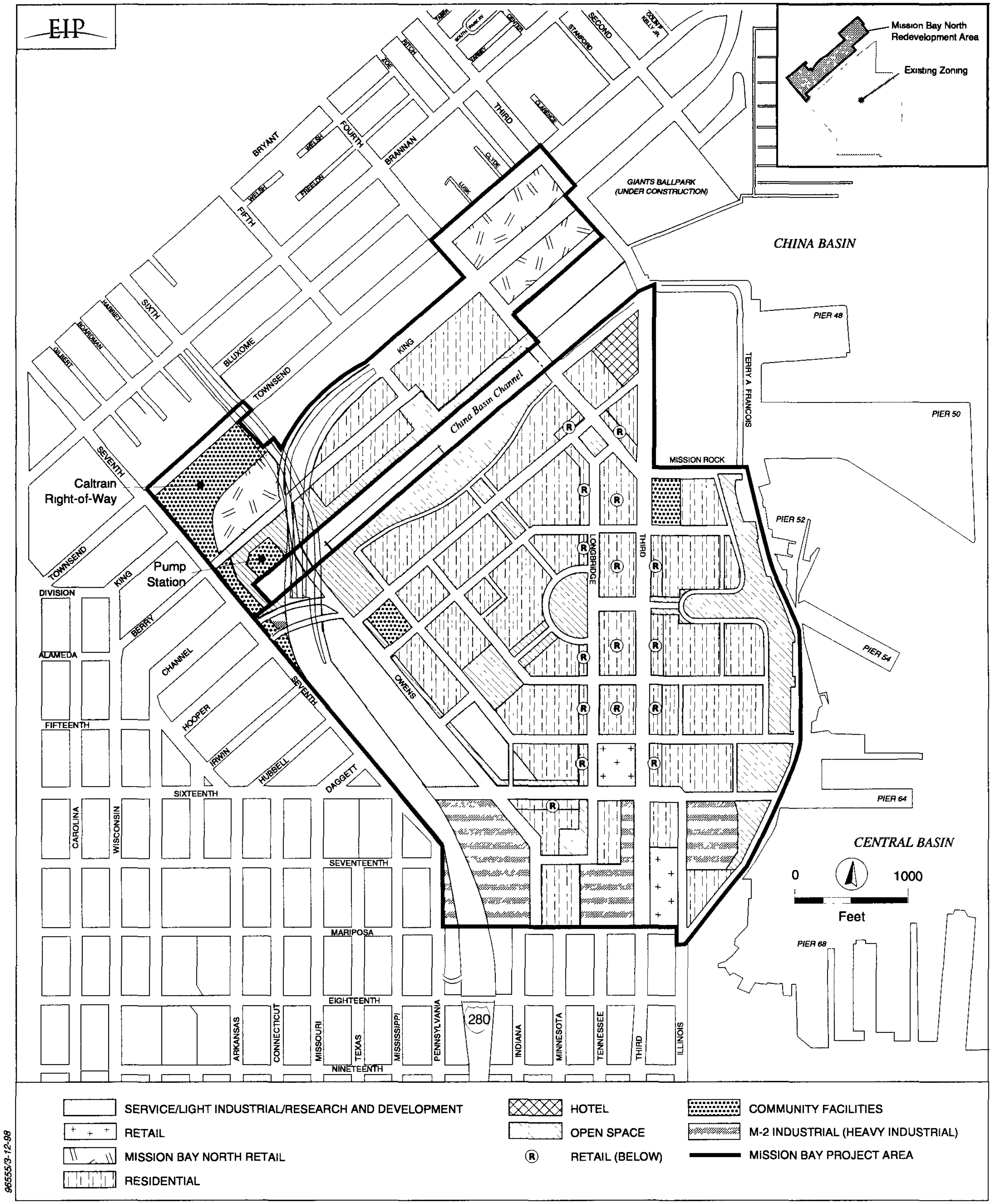
The Redevelopment North of Channel/Expected Growth South of Channel Alternative (Alternative 2) is a hybrid consisting of the proposed project for Mission Bay North, and Alternative 1 for Mission Bay South. Figure VIII.B.1 is a site plan for this alternative and reflects full build-out in 2015 for Mission Bay North and full build-out beyond year 2015 for Mission Bay South. This alternative assumes a redevelopment plan and associated documents for Mission Bay North as discussed in Chapter III, Project Description, of this SEIR. No redevelopment plan is assumed for Mission Bay South, but the partial build-out assumptions of Alternative 1 would occur, in accordance with the existing land use districts of the 1990 *Mission Bay Plan.*

This alternative's project area is the same as that for the proposed project. As with the proposed project, the alternative's project area excludes the port property east of Third Street and south of the Channel, the surface water area of the Channel itself and the associated houseboat community, and the Caltrain tracks and terminal in the two blocks bounded by Fourth, Townsend, King, and Sixth Streets, all of which were included in the 1990 *Mission Bay Plan.* The alternative includes the Castle Metal property west of Third Street between 16th and Mariposa Streets that was not part of the 1990 *Mission Bay Plan.*

DEVELOPMENT PROFILE

It was assumed for this alternative that infrastructure would be developed in Mission Bay South to serve the assumed uses. As proposed in the 1990 *Mission Bay Plan*, this alternative would maintain and expand the existing combined sewer system in the Central Basin and would construct a bridge across China Basin Channel connecting Sixth Street with Owens Street. For Mission Bay South, Alternative 2 assumes the height and bulk limits of the 1990 *Mission Bay Plan* as implemented in Article 9 and on the Zoning Map and as shown in Figure V.A.3. The street grid shown in Figure VIII.A.1 for Mission Bay South similarly reflects the approved 1990 *Mission Bay Plan* as implemented in Article 9 of the City Planning Code (see also Figure V.A.4).

In Alternative 2, the total combined development in Mission Bay North and Mission Bay South would be about 5,840 residential units, 900,000 gross sq. ft. of service/light industrial/research and development/office space, 949,000 gross sq. ft. of retail space, a 500-room hotel, 350,000 gross sq. ft. of warehouse space, 10,300 parking spaces, 4.6 acres of community facilities, and 19 acres of open space. For purposes of environmental analysis, Alternative 2 assumes no UCSF site would be developed. This level of development would accommodate about 6,170 jobs. The resident population



SOURCE: EIP Associates; City and County of San Francisco Planning Code Zoning Maps (as amended, 1996)

MISSION BAY SUBSEQUENT EIR

FIGURE VIII.B.1 ALTERNATIVE 2: LAND USES FOR REDEVELOPMENT NORTH/ EXPECTED GROWTH SOUTH ALTERNATIVE

would be about 10,500 people. In Table VIII.1, characteristics of Alternative 2 are compared with those of the project.

Residential

A total of about 5,840 dwelling units would be developed in the Project Area: 3,000 units in Mission Bay North and about 2,840 units in Mission Bay South. The residential development in Mission Bay North would occur as it would under the proposed project. Of the 3,000 units in Mission Bay North, 20% (600 units) would be affordable to very low-, low- and moderate-income households. Catellus Development Corporation (Catellus) would be responsible for developing approximately 255 of the affordable units. The Catellus affordable units would likely be rental units, integrated into Catellus' market-rate development within Mission Bay North. The balance of the affordable units (345 units) would be developed by non-profit housing developers sponsored by the San Francisco Redevelopment Agency (Redevelopment Agency) on land donated by Catellus. In Mission Bay South, without the participation of the Redevelopment Agency or affordable housing production requirements specified in a development agreement, there would be no clear mechanism for providing affordable housing in this part of the Project Area. For this SEIR, it is assumed that there would be less affordable housing in Mission Bay South under Alternative 2 than would be the case under the proposed project.

Service/Light Industrial/Research and Development/Office

About 900,000 gross sq. ft. of service/light industrial/research and development/office space would be developed in Mission Bay South, as described for Alternative 1.

Retail

Retail space would be developed in both Mission Bay North and Mission Bay South. Up to 667,000 gross sq. ft. of retail space would be developed in Mission Bay North. Of that, about 222,000 gross sq. ft. would be moderate-scale retail businesses intended to draw customers from the entire City. About 56,000 gross sq. ft. would be neighborhood-serving retail, and about 389,000 gross sq. ft. would be entertainment-oriented retail, possibly including such enterprises as a state-of-the-art theater complex, retail emphasizing sports, theme restaurants and fine-dining restaurants, new technology and/or game-related retail, and small stores that promote a street-level experience. In Mission Bay South, about 135,000 gross sq. ft. of neighborhood-serving retail would be developed, and about 147,000 gross sq. ft. of moderate-scale retail.

Hotel

As in Alternative 1, a full-service, mid-rise, 500-room hotel would be developed in Mission Bay South. The hotel would contain about 400,000 gross sq. ft., including lobby functions, service areas, and guest rooms serving tourists and business travelers.

Warehouse

As in Alternative 1, about 350,000 gross sq. ft. of warehouse space would be developed in Mission Bay South.

Community Facilities

Community facilities would occupy 4.6 acres–1.5 acres in Mission Bay North and 3.1 acres in Mission Bay South. In Mission Bay North, community facilities would include the Channel Pump Station. Community facilities in Mission Bay South would include an elementary school located between Sixth and Owens Streets, and a combined police and fire station. The police and fire station would probably be located at the site of Fire Station No. 30, which is no longer in service, but would be retained.

Parking

About 10,300 parking spaces would be developed. Mission Bay North parking estimates are derived from the proposed project, while Mission Bay South parking estimates are based on 1990 FEIR parking rates for the various land uses./35/ About 5,670 spaces would be developed in Mission Bay North, and about 4,670 spaces in Mission Bay South. This parking would be primarily or entirely within buildings that include other uses, rather than in separate parking structures.

Open Space

In Alternative 2, about 25 acres of public open space would be developed—6 acres in Mission Bay North (based on the proposed project), and 19 acres in Mission Bay South (generally based on the housing/open space linkage of the *Mission Bay Plan*)./36/ Because the Project Area boundaries have changed since preparation of the 1990 FEIR, the approximately 12 acres of surface water in China Basin Channel that were part of the Project Area in the 1990 FEIR are not part of the alternatives analyzed in this SEIR. Similarly, the 13.6-acre wetland on port property east of Third Street also is not part of this alternative.

ENVIRONMENTAL ASSESSMENT

The significant impacts of Alternative 2 for visual quality and urban design; air quality including toxic air contaminants; health and safety; contaminated soils and groundwater; and hydrology and water quality would be similar to or the same as those of the project. The effects of this alternative would vary from the proposed project in the areas of vegetation and wildlife, traffic, and seismicity. These similarities and differences are discussed for each topic and summarized at the end of this section on Alternative 2. In Mission Bay North, the proposed project's mitigation measures would be applicable to similar impacts. In Mission Bay South, the 1990 *Mission Bay Plan's* mitigation measures would apply. If conflicts were to arise between measures for the two areas, the City would resolve them as part of the approval process. Impacts and mitigation measures are summarized at the end of this environmental assessment section.

Plans, Policies, and Permits

In Alternative 2, the Redevelopment Plan and related documents for the Mission Bay North Redevelopment Plan Area would be adopted. Adoption would require rescission of the 1990 *Mission Bay Plan* and amendments to Article 9 of the City Planning Code and Zoning Map. For Mission Bay South, Alternative 2 would substantively comply with the 1990 *Mission Bay Plan* in terms of overall land use and street pattern, but not necessarily with all provisions of the Plan (e.g., office-housing and development-open space linkages). References pertaining to the Mission Bay North area would be removed from the *Mission Bay Plan* and Article 9 instead of the more substantive modifications necessary with the project. The City Planning Commission would evaluate street vacations associated with development against the policies set forth in the Urban Design Element of the City's General Plan. This alternative would require the same changes as the proposed project in the plans and policies framework governing Mission Bay North. The Redevelopment Agency would prepare the same new plans and documents to guide development in Mission Bay North.

As with Alternative 1, existing land uses in Mission Bay South would be covered by the 1990 *Mission Bay Plan*, except the Castle Metals and Esprit sites, which would be covered in the Central Waterfront Plan. Zoning controls would not be altered; the existing height and bulk limits set forth in the 1990 *Mission Bay Plan* would be in effect. Since this alternative assumes that UCSF would not locate its major new site in the Project Area, the City would not need to prepare amendments to the General Plan or the City Planning Code to incorporate that new site into the relevant plan and policy documents. No actions would be taken by the City Planning Commission or the Redevelopment Commission to prepare or revise plans pertaining to Mission Bay South.

Any development that would occur in Mission Bay South would be subject to the applicable policies of the General Plan, especially the 1990 *Mission Bay Plan*, and to the zoning controls presented in Article 9 of the City Planning Code. Any development on port property would be subject to the Port of San Francisco's *Waterfront Land Use Plan*. Any development activities, including alterations to the Channel, within a 100-foot shoreline band inland from the mean high tide line would be subject to review and permitting by BCDC. The U.S. Army Corps of Engineers and the U.S. Coast Guard would review the construction of the Owens Street bridge.

Land Use

Alternative 2 would develop Mission Bay North under the Mission Bay North Redevelopment Plan, as would the project. Alternative 2 would develop Mission Bay South under the land use districts of the existing 1990 *Mission Bay Plan* as discussed above for Alternative 1. As with the project, this alternative's development, both north and south of the Channel, would continue the trend of converting deteriorating and low-intensity industrial areas near the waterfront to new uses.

For Mission Bay North, the impacts would be the same on surrounding communities as would occur with development of the project. For Mission Bay South, effects on the surrounding communities would be similar to those of Alternative 1.

<u>Project Area</u>

Under this alternative, all buildings may not be demolished by 2015 as they are assumed to be under the proposed project. As with the project, the Channel Pump Station would be retained and not altered, and Fire Station No. 30 would be preserved. Under this alternative, the street system south of the Channel would be modified to resemble the existing 1990 *Mission Bay Plan*; however, Fourth Street would not be reconfigured to parallel Third Street, but would meet Third Street as it does now, and a "Longbridge" Street would be constructed parallel to Third Street (same as under Alternative 1). Relocation assistance under the California State Redevelopment Law as contained in the California State Health and Safety Code, Section 33300 *et seq.*; would be provided as legally required for residents and businesses in Mission Bay North.

In Mission Bay North, the commercial entertainment uses of the project would be built and a year-round regional destination center would be created. Development of commercial entertainment and retail uses north of the Channel would address some of the projected demand related to the San Francisco Giants Ballpark patrons and could increase demand in the South of Market for complementary development of restaurants, retail, and other commercial uses, as would occur under the project. Overall, however, for both Alternative 2 and the proposed project, there would be less new retail development in nearby South of Market locations than would be the case without the retail-entertainment complex in Mission Bay North.

Development under this alternative would change the mix and amount of uses for Mission Bay South compared with those proposed under the project. In Mission Bay South, residential land use districts of various densities would replace the UCSF site and some of the commercial industrial uses of the project. A 500-room hotel would be developed under this alternative as it would be for the project. Projected development to 2015 would include about 5,840 dwelling units; full build-out beyond year 2015 would allow for a total of about 10,400 dwelling units./37/

Surrounding Areas

This alternative would create a new neighborhood adjacent to the houseboat community. Under Alternative 2, the houseboat community would be bordered by residential buildings, open space, and community facilities (including the existing Channel Pump Station) as would occur under the project. Development of ground-floor retail space within residential buildings north and south of the Channel would increase the type and amount of personal services and retail stores accessible to the houseboat residents, as the project would. There would be more neighborhood-serving retail and personal services convenient to houseboat residents, as would be the case under the proposed project.

The effects of entertainment-oriented retail development in Mission Bay North under this alternative would be the same as those of the proposed project. As would the proposed project, Alternative 2 would provide neighborhood-serving retail development to meet the demands of Project Area residents. Alternative 2 would not provide as much city-serving retail development in the Project Area, however. Consequently, compared to the development pattern anticipated under the proposed project, there would be more city-serving retail development in surrounding nearby areas. Potential locations include: South of Market, Showplace Square, North Potrero, Lower Potrero, Central Bayfront, South Bayshore, and Inner Mission. This development would serve the retail demand of Project Area residents and residents of the rest of San Francisco.

As with the project, this alternative includes residential development south of the Channel located adjacent to port property east of Third Street, where petroleum free product contamination has been identified. A school site at 16th and Owens Street south of the Channel would be adjacent to residential uses to the east and open space to the north and near I-280.

Existing recreational facilities north of the Channel, such as South Beach Harbor, would be affected by the number of pedestrians in the area at any one time. Effects due to the number of residents in the area during mornings, evenings, and weekends would be similar to the project's effects. Recreational uses north of the Channel would be impacted by the demand generated by the development of Mission Bay North as a regional destination, as would occur under the project.

Under this alternative, users of the recreational facilities south of the Channel would not have to compete as much for access with Project Area employees and residents as they would under the project. Employee and resident traffic would be much less due to the less-intensive development south of the Channel. Under this alternative, these recreational users would primarily compete with visitors attracted to the regional entertainment uses.

Under the 1990 *Mission Bay Plan*, the Port would develop boat trailer parking directly across Terry A. François Boulevard from the Public Boat Launch Ramp between Piers 52 and 54. Under the project, the parking would likely be located further away, just south of The Common, though it would be within 600 feet as required by a California Department of Boating and Waterways grant.

Potrero Hill and Lower Potrero would not experience parking impacts on local streets under this alternative since the relatively high trip-generating office uses of the project would not occur.

Business Activity, Employment, Housing, and Population

<u>Project Area Employment and Job Opportunities</u>

Table VIII.B.1 presents estimates of the number of employees in the Project Area for Alternative 2. Under this alternative, Mission Bay North would develop as expected under the proposed project's *Mission Bay North Redevelopment Plan*. The South of Channel area would develop as projected for Alternative 1. The result would be about 6,170 jobs in 2015 in total—about 20% of the total employment expected under the proposed project. The primary reason for the lower employment total is the absence of both the UCSF site and the large amount of employment that could be accommodated in the 5.56 million gross sq. ft. of Commercial Industrial development proposed for Mission Bay South under the proposed project. As a consequence, there would be fewer total job opportunities in San Francisco and less diversity in job options for city residents compared to what the proposed project would bring to the Project Area and to San Francisco.

This alternative would include a smaller amount of commercial and industrial economic activity in Mission Bay South—a total of about 2,490 jobs in service, light industrial, research and development,

TABLE VIII.B.1
ALTERNATIVE 2: EMPLOYMENT BY LAND USE—2015

Land Use/Business Activity/a/	Alternative 2: Mission Bay North	Alternative 2: South of Channel	Alternative 2: Total	Alternative 2: Percent of Total	Comparison with Proposed Project: Total for Proposed Project	Comparison with Proposed Project: Alternative vs. Project
Service/Light Industrial/R&D/Office	-	2,221	2,221	36%	15,310	-85%
UCSF Site	-	-	-		9,100	-
Moderate-scale Retail	630	420	1,050	17%	2,300	-54%
Entertainment-oriented Retail	1,110	-	1,110	18%	1,270	-13%
Neighborhood-serving Retail	160	387	547	9%	740	-26%
Hotel	-	370	370	6%	370	0%
Warehouse	-	267	267	4%	—	—
Community Facilities/Open Space	1	210	210	3%	254	-17%
Building Maintenace/Security/Parking	50	106	156	3%	410	-62%
Housing-related	120	113	233	4%	240	-3%
TOTAL	**2,071**	**4,094**	**6,165**	**100%**	**29,994**	**-79%**
Percent of Total	**34%**	**66%**	**100%**			

Notes:
— = Not applicable
a. Mission Bay North estimates reflect the proposed project, see Table V.C.5.
b. South of Channel estimates reflect No Project/Expected Growth, see Table VIII.1.

Source: Hausrath Economics Group.

office, and warehouse space. All of the retail development proposed for Mission Bay North under the proposed project would also be accommodated in this alternative, along with smaller amounts of retail activity in the South of Channel area. Jobs in retail businesses would be about 60% of the level estimated for the proposed project; retail business activity and jobs would be a higher proportion of total Project Area jobs than would be the case under the proposed project. The level of hotel employment and community facility employment would be the same as anticipated under the proposed project.

Implications for Existing Project Area Business Activity

In Mission Bay North, the implications for existing business activity would be the same as those anticipated under the proposed project. In Mission Bay South, the implications for existing business activity would be the same as those described for Alternative 1.

Project Area Housing, Households, Population, and Employed Residents

Table VIII.B.2 presents estimates of Project Area housing, population, and employed residents for Alternative 2 in 2015. For Mission Bay North, this reflects full build-out of the proposed project. The Mission Bay South component reflects 2,840 units of the total residential potential allowed by the 1990 *Mission Bay Plan* for the South of Channel area (about 7,400 units in total)./38/

Overall, under Alternative 2, housing development by 2015 would be quite similar to that expected under the proposed project. There would be about 5,840 housing units, 10,500 residents, and 6,310 employed residents. This alternative would accommodate about 95% of the households, residents, and employed residents expected under the proposed project. As under the project, the residential development would be split fairly evenly between Mission Bay North and Mission Bay South.

Relationship Between Project Area Employment Growth and Housing Development and Implications for Citywide Housing Market Conditions

The jobs/housing analysis of Alternative 2 evaluates the overall land use mix represented by the alternative—Project Area housing demand and supply at build-out of total development potential (i.e., beyond year 2015 for Mission Bay South). Total jobs and total housing associated with build-out of Alternative 2 would be more than the 2015 estimates described above. Table VIII.B.3 presents the jobs/housing analysis.

TABLE VIII.B.2
ALTERNATIVE 2: HOUSING UNITS, POPULATION, AND EMPLOYED RESIDENTS—2015

	Alternative 2			Comparison with Proposed Project	
	Mission Bay North/a/	South of Channel/b/	Total	Total for Proposed Project	Alternative vs. Project
Housing Units	3,000	2,836	5,836	6,090	-4%
Households	2,895	2,737	5,632	5,877	-4%
Population/c/	4,980	5,473	10,453	10,855	-4%
Employed Residents/d/	3,010	3,300	6,310	6,560	-4%

Notes:
a. Mission Bay North estimates reflect proposed project; Table V.C.7 is source of data.
b. South of Channel estimates reflect No Project/Expected Growth; Table VIII.2 is source of data.
c. Number of people living in housing units built in the Project Area.
d. Residents of the Project Area who are also employed, regardless of place of work.

Source: Hausrath Economics Group.

Although both residential and nonresidential development in Mission Bay North would be built out by 2015, not all of the development in Mission Bay South would be completed by 2015. On the jobs (housing demand) side, most of the retail space in the South of Channel area would remain to be developed after 2015. This amount of development represents about 1,200 jobs. On the housing supply side, most of the 7,400 units allowed in the South of the Channel area under the 1990 *Mission Bay Plan* would remain to be developed after 2015. Only 2,840 units would be developed according to Alternative 2, leaving approximately 4,500 units to add to the potential build-out housing supply for Alternative 2.

Build-out (beyond year 2015 for Mission Bay South) of Alternative 2 would accommodate 5,700 additional jobs in the Project Area (after accounting for existing employment), representing demand in San Francisco for about 1,960 housing units. This would be only about one-fifth of the total housing demand associated with the proposed project. Total housing supply in the Project Area would exceed 10,000 units at build-out, counting the 3,000 proposed for Mission Bay North and the 7,370 allowed in the South of Channel area under the 1990 *Mission Bay Plan*, or 70% more housing supply than accommodated under the proposed project. Unlike the housing supply deficit (relative to demand) calculated for the proposed project, the jobs/housing analysis reveals a substantial surplus of Project Area housing supply relative to the housing demand in San Francisco associated with Project Area employment growth at build-out (beyond year 2015) under Alternative 2.

TABLE VIII.B.3
ALTERNATIVE 2: JOBS/HOUSING ANALYSIS AT BUILD-OUT

	[Formulae]	Alternative 2	Proposed Project
Demand			
A. Employment growth accommodated in Project Area/a/		5,700	28,330
B. Percent representing additional workers living in San Francisco/b/		55.0%	55.0%
C. Average number of San Francisco workers in households with workers/c/		1.6	1.6
D. Additional households associated with Project Area employment growth	[(A*B)/C]	1,959	9,738
Supply			
E. Total Project Area Housing Units at Build-out (beyond year 2015)/d/		10,370	6,090
Comparison of Supply with Demand			
Surplus or (Deficit) in Project Area	[E - D]	8,411	(3,648)

Notes:
This jobs/housing analysis is not meant to imply that there should (or ever would) be a precise match between jobs and housing for any given project area. The calculation is a useful means of evaluating the proposed project and alternatives, and it provides an indication of the implications of the land use mix for the City's housing market.

a. Total Project Area employment at build-out (7,370 jobs) minus existing Project Area employment (1,670 jobs). Build-out employment is about the same as 2015 employment. Mission Bay North would be built out. All non residential space in the Project Area south of the Channel would be developed except for about 420,000 gross sq. ft. of retail space which would accommodate about 1,200 jobs.

b Keyser Marston Associates, Inc. and Gabriel Roche, Inc., *Jobs Housing Nexus Analysis, City of San Francisco*, July 1997, pp. 51-52.

c. Keyser Marston Associates, Inc. and Gabriel Roche, Inc., *Jobs Housing Nexus Analysis, City of San Francisco*, July 1997, pp. 49-50.

d. Total housing units in Mission Bay Plan (8,270 units) minus 900 units in that plan for north of Channel, plus 3,000 units for Mission Bay North in the proposed project.

Source: Hausrath Economics Group.

Given the conclusions of the Project Area jobs/housing analysis, Alternative 2 would result in better long-term housing market conditions for some segments of the housing market in San Francisco than would the proposed project. For market-rate housing, better housing market conditions would be indicated by higher vacancy rates, more mobility and choice in the housing market, and more stable prices and rents than would otherwise be the case under the proposed project.

Regarding affordable housing, without the participation of the Redevelopment Agency in Mission Bay South, there would be limited opportunity for providing the proportion of new housing affordable to very low-, low-, and moderate-income households in the Project Area. Housing market conditions for this segment of the market would consequently be worse under Alternative 2 over the longer term and by 2015 than they would be under the proposed project.

Differences between the jobs/housing outcomes and housing market implications of Alternative 2 and the proposed project would be narrower at the 2015 analysis year. By 2015, there would be a smaller surplus of housing supply relative to demand in the Project Area under Alternative 2 (about half the surplus calculated for build-out of total development potential). It follows that housing market implications would be more similar to those of the proposed project at build-out than would be the case in the longer term.

Implications for Citywide Growth

Alternative 2 would result in a slower pace of job growth in San Francisco and less total job opportunities in San Francisco compared to the proposed project. Under Alternative 2, the South of Channel area would not accommodate the UCSF site and associated research and development businesses in San Francisco. Most, if not all, of this difference would represent a net loss to the City compared to the scenario under the proposed project. On the other hand, many of the other businesses that would be accommodated in the Project Area under the proposed project but not under Alternative 2 for Mission Bay South would have alternative location options in San Francisco. If those activities (some retail, most of the entertainment-oriented commercial development, office and other commercial and light industrial activities) were not located in Mission Bay, they would instead locate in the Transbay area, other parts of the South of Market, along the waterfront, and in the Potrero Hill and Inner Mission areas. Overall for the City, therefore, the difference between the proposed project and Alternative 2 in terms of employment growth would not be as great as the difference between each for employment totals within the Project Area. The primary difference would be the absence, under Alternative 2, of UCSF jobs and associated jobs in research and development and other business support services.

By 2015, Alternative 2 would add about the same number of units to San Francisco's housing supply as would be the case under the proposed project. This is because the pace of development in Mission Bay South would be slower without the impetus of the proposed project's Mission Bay South Redevelopment Plan. Ultimately, however, as described above for the jobs/housing analysis, Alternative 2, at build-out (beyond year 2015), represents the potential for more total housing supply in San Francisco than does the proposed project but fewer affordable housing options for very low-, low-, and moderate-income households.

Implications for Nearby Areas

In the office and commercial industrial real estate markets, Alternative 2 would result in more activity in the South of Market and other Nearby Areas than would be the case under the proposed project. Project Area office development under Alternative 2 would not be of the scale to compete much with other areas of the City that have the potential to accommodate large amounts of new office development. In fact, because there would be even less office development than expected under the proposed project, Alternative 2 might result in a faster pace of development in locations such as the Transbay area. Also, development in the South of Channel area would not provide the amount of flexible Commercial Industrial development envisioned for the proposed project under the *Mission Bay South Redevelopment Plan*. Therefore, there would be more demand pressure on existing space in the South of Market, North Potrero, Potrero Hill, Inner Mission, and Central Bayfront Nearby Areas from new and growing business activities. Resultant higher rents for that space, compared to the situation under the proposed project, would mean fewer space options for lower-rent paying uses in Nearby Areas.

The effects of Alternative 2 on retail development and the spread of retail activity in Nearby Areas would be similar to the effects of the proposed project in most cases. As under the proposed project, the large amount of retail and entertainment-oriented commercial development in Mission Bay North would accommodate retail shops, restaurants, and bars in the Project Area, thereby absorbing much of the demand for visitor-oriented retail and eating and drinking establishments in the vicinity. Successful Project Area retail development might also come at the expense (in the near term) of similar development at other locations along the waterfront north of the Channel that could accommodate large amounts of visitor-oriented retail and entertainment activity. On the other hand, Alternative 2 does not have the proposed project's large amounts of moderate-scale, city-oriented retail development in Mission Bay South. There would consequently be more potential for that type of development in western South of Market, Inner Mission, Central Bayfront, and South Bayshore locations than would be the case under the proposed project. See Figure IV.B.2 for the locations of the Nearby Areas.

Effects of Alternative 2 on the housing market in Nearby Areas would be similar to the effects of the proposed project. By 2015, Alternative 2 would add about the same number of housing units to the City's inventory. While there would be less employment growth in the Project Area compared to the amount expected under the proposed project, much of that employment growth and associated housing demand would still occur in San Francisco. Over the longer term, because of the greater housing supply potential in Mission Bay South under the 1990 *Mission Bay Plan*, Alternative 2 might result in somewhat less demand for housing in nearby residential areas than would be expected under the proposed project. However, housing market benefits would likely be offset by the stronger demand for affordable housing because of the lower supply in the Project Area under Alternative 2 compared to the proposed project.

Unlike the other sectors discussed above, affordable housing production depends on project sponsors and available subsidies, not on market demand. Therefore, less affordable housing in the Project Area under Alternative 2, compared with the proposed project, would not necessarily result in more affordable housing produced elsewhere in San Francisco. Instead, housing market conditions faced by households seeking affordable units would be worse than expected under the proposed project, as described in the preceding subsection.

Visual Quality and Urban Design

Visual impacts in Mission Bay South would be reduced compared with the project, due to the lower building heights associated with the alternative as shown in Table III.B.4 and Figure III.B.5 in Chapter III, Project Description. Under Alternative 2, fewer views of downtown would be eliminated, and new development would not appear as tall or dense to viewers at street level. Implementing the proposed Mission Bay North Redevelopment Plan under Alternative 2, with building heights of up to 160 feet, would affect the same viewpoints associated with the project. Short-range views from Potrero Hill and I-280 would consist of buildings with heights up to 110 feet, approximately 10 stories.

Fire Station No. 30, located at the southeast corner of Third and Mission Rock Streets may be of historical importance and may be eligible for the National Register. Under this alternative, Fire Station No. 30 would be preserved and reused. Potential impacts associated with the potential demolition of the fire station under the project would not occur.

Transportation

The street network assumed for the analysis of Alternative 2 is shown in Figure VIII.B.1 with the assumed alternative land uses. This street system is similar to the one assumed for Alternative 1, except that Berry Street in Mission Bay North would be closed to through traffic between Fourth and Fifth Streets. This feature would not affect the assignment of traffic to the major intersections in the network.

TABLE VIII.B.4
PM PEAK HOUR PERSON TRIP GENERATION IN 2015
ALTERNATIVE 2 COMPARED TO PROJECT

Subarea	Alternative 2	Project	Difference
Mission Bay North	11,030	11,030	0
Mission Bay South	7,887	22,470	-14,583
Total	**18,917**	**33,500**	**-14,583**

Source: Wilbur Smith Associates.

Trip Generation

Alternative 2 assumes development in Mission Bay South based on ABAG's *Projections '96* expected increases in population and employment levels in the southern portion of the Project Area through 2015, just as described in Alternative 1./39/ Mission Bay North is assumed to be developed as described in the project scenario, with housing and retail/entertainment uses.

Table VIII.B.4 compares the trip generation projections for Alternative 2 with those for the proposed project. Alternative 2 would generate about 14,580 fewer person trips (including walk trips) during the p.m. peak hour, about 45% less than the project's person trips in 2015.

Traffic Impacts

Table VIII.B.5 shows the intersection levels of service (LOS) under year 2015 cumulative conditions with Alternative 2 compared to those from project-with-cumulative conditions for a selected group of intersections (see "Traffic Impacts" in Alternative 1, above). Under this alternative in 2015, all study intersections except Fifth Street/King Street and Mariposa Street/I-280 on-ramp would operate with less delay than they would under the project. As shown in Figure VIII.B.2, all but the intersections of Third Street/King Street, 16th Street/Vermont Street, and Seventh Street/Townsend Street would operate at LOS D or better under cumulative-with-Alternative 2 conditions. Under Alternative 2, two intersections would improve their operating conditions from LOS E or F to acceptable conditions (LOS D or better), when compared to the proposed project. These are King Street at Fourth Street and 16th Street at Potrero Avenue. The better traffic conditions would be due to the lower (65%) trip generation of the South of Channel area under Alternative 2 in 2015, when compared to the project scenario.

TABLE VIII.B.5 ●
SUMMARY OF PROJECT INTERSECTION LEVELS OF SERVICE
ALTERNATIVE 2 COMPARED TO PROJECT
PM Peak Hour 2015 Cumulative Conditions

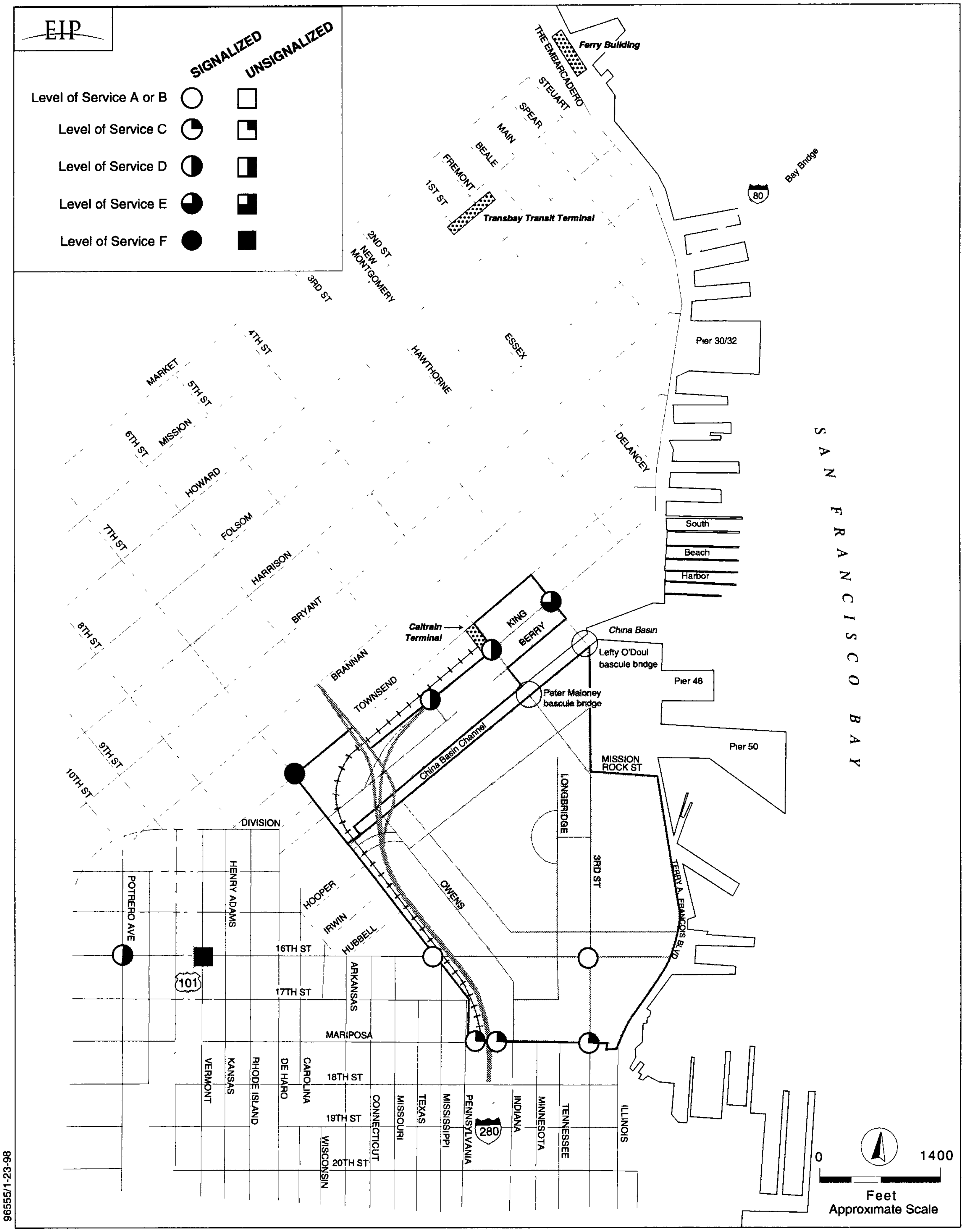
	2015 Cumulative with Project		2015 Cumulative with Alternative 2	
Study Intersection	**Avg. Delay (sec./veh.)**	**LOS**	**Avg. Delay (sec./veh.)**	**LOS**
Third St./King St.	99.1	F	58.1	E
Fourth St./King St.	52.1	E	29.0	D
Fifth St./King St.	28.4	D	36.9	D
Seventh St./Townsend St.	195.3	F	103.2	F
Sixteenth St./Potrero Ave.	162.7	F	30.2	D
Sixteenth St./Vermont St.	200.4	F	72.3	F
Sixteenth St./Seventh St.	32.2	D	7.6	B
Sixteenth St./Third St.	25.2	D	13.1	B
Mariposa/I-280 On-ramp	16.6	C	21.8	C
Mariposa/Owens St./I-280 Off-ramp	35.9	D	15.8	C
Third St./Mariposa St.	23.7	C	17.4	C

Source: Wilbur Smith Associates.

When comparing the average delay between this alternative and Alternative 1 discussed above, traffic generated by Alternative 2 would result in greater delay at most intersections. This is because the p.m. peak hour trip generation from the parcels north of the Channel under Alternative 1, with primarily office land uses, would be less than that under Alternative 2 with mostly retail/entertainment and residential uses as described in the project scenario.

Transit Impacts

Table VIII.B.6 compares the project transit trips with those calculated for Alternative 2. In all cases Alternative 2 would create less demand for regional transit service than the proposed project. The



SOURCE Wilbur Smith Associates

MISSION BAY SUBSEQUENT EIR

FIGURE VIII.B.2 YEAR 2015 CUMULATIVE LEVELS OF SERVICE WITH ALTERNATIVE 2 AT SELECTED INTERSECTIONS, WEEKDAY P.M. PEAK HOUR

TABLE VIII.B.6
PM PEAK HOUR TRANSIT PERSON TRIPS DISTRIBUTION BY TRANSIT MODE
ALTERNATIVE 2 COMPARED TO PROJECT—2015

	Alternative 2		Project		Difference	
Transit Mode	**In**	**Out**	**In**	**Out**	**In**	**Out**
BART	402	366	459	725	-57	-359
AC Transit	117	103	142	293	-25	-190
Charter Bus	33	32	45	115	-12	-83
G.G. Bus	87	103	107	228	-20	-125
Ferry	19	22	23	49	-4	-27
SamTrans	28	31	45	143	-17	-112
CalTrain	71	78	106	305	-35	-227
MUNI Bus/a/	740	482	856	931	-116	-449
MUNI Metro/a/	1,453	1,171	1,806	2,859	-353	-1,688
Total	**2,950**	**2,388**	**3,589**	**5,648**	**-639**	**-3,260**

Note:
a. MUNI ridership levels represent persons using MUNI as their primary travel mode, as well as those using MUNI to access regional carriers, such as BART, AC Transit, Golden Gate Transit, ferries and SamTrans.

Source: Wilbur Smith Associates.

most notable differences would occur on transit services that serve passengers traveling primarily to the South Bay, such as SamTrans and Caltrain, both of which combined would carry about 65% of the number of riders predicted to use transit to the South Bay under the proposed project. BART and MUNI would continue to carry the largest numbers of travelers under Alternative 2 similar to the proposed project.

BART ridership generated by Alternative 2 would be about 65% of that generated by the proposed project, suggesting that 2015 BART capacity would be sufficient to accommodate Alternative 2 ridership. Similarly, the number of AC Transit riders estimated by Alternative 2 would be approximately half the number of trips that would be generated under the proposed project, which would be accommodated by the existing AC Transit service. Cumulative ridership with the alternative would increase the AC Transit load factor to about 152% compared with 157% with the project; the alternative would contribute somewhat less than the project's contribution to cumulative ridership but would still be a significant cumulative impact. Sufficient capacity would also exist in the Golden Gate Transit bus system, where the ridership that would be generated by Alternative 2 would be approximately 55% of that produced under the project scenario. Similarly, estimated Alternative 2 ferry ridership would be approximately 55% of that generated by the proposed project, causing no significant impacts. SamTrans Alternative 2 ridership would be about 30% of that generated by the project scenario, while Caltrain, under Alternative 2, would carry about 63% less Mission Bay riders that those generated by the project. Neither SamTrans nor Caltrain would experience a significant impact under this alternative. Under Alternative 2, charter buses are expected to carry approximately 60% fewer trips than under the proposed project.

Alternative 2 assumes the largest amount of development would occur in Mission Bay North. Travelers' preferences for using transit in the northeast quadrant of the City closer to Market Street and the rest of downtown, compared to less transit use by residents and workers in Mission Bay South, means that more transit trips would occur under Alternative 2 than if development in this alternative were more equally distributed between Mission Bay North and Mission Bay South.

The comparison of Alternative 2 with the project in Table VIII.B.6 indicates that the number of inbound transit trips would be relatively similar (about 610 fewer in Alternative 2), with comparatively larger differences in outbound trips (nearly 3,060 fewer in Alternative 2 compared to the project). Thus, the comparison of the alternative to the proposed project is different for inbound and outbound transit trips. These characteristics influence the MUNI screenline analysis for Alternative 2 compared to the project scenario, as shown in Table VIII.B.7.

The level of MUNI use would increase for each screenline under Alternative 2 compared to existing conditions, with the Northeast screenline experiencing the greatest growth. This is because the high percentage of trips that would both begin and end in the northeast quadrant of the City, where Mission Bay North is located, would result in a larger number of transit passenger trips through the Northeast screenline. The excess demand on MUNI in the Kearny-Stockton corridor would be attributable to cumulative ridership for both scenarios. The capacity of MUNI lines crossing the Southwest screenline would be essentially matched by demand (97%). This could mean that some lines would operate with loads greater than those preferred by MUNI; either more riders would stand on some buses or metro cars, or some might shift to a less crowded parallel line crossing the Southwest screenline. The willingness of passengers to use an alternate line would determine whether

TABLE VIII.B.7
MUNI RIDERSHIP SUMMARY BY SCREENLINE
YEAR 2015 CUMULATIVE WITH ALTERNATIVE 2 AND WITH PROJECT
(PM Peak Hour - Peak Direction)

		Existing Conditions			Year 2015 Cumulative with Alternative 2 Conditions						Year 2015 Cumulative with Project Conditions					
Screen-line/a/	Year 2015 MUNI Routes	Hourly Capacity /b/	Average Hourly Load/c/	Percent Capacity Used	Hourly Capacity /d/	New Cum-ulative Trips /e/	Cumu-lative Trips	Project Trips /f/	Average Hourly Load	Percent Capacity Used	Hourly Capacity /d/	New Cumu-lative Trips /e/	Cumu-lative Trips	Project Trips /f/	Average Hourly Load	Percent Capacity Used
Northeast	30, 30X, 45	3,387	2,256	67%	2,761	902	3,158	109	3,266	118%	2,761	902	3,158	230	3,388	123%
	41, 42X	1,733	877	51%	1,481	351	1,228	70	1,298	88%	1,481	351	1,228	149	1,377	93%
	Subtotal	*5,120*	*3,133*	*61%*	*4,242*	*1,253*	*4,386*	*179*	*4,564*	*108%*	*4,242*	*1,253*	*4,386*	*379*	*4,765*	*112%*
Northwest	38, 38L, 38AX, 38BX	2,823	1,986	70%	3,149	794	2,780	23	2,803	89%	3,149	794	2,780	48	2,828	90%
	1, 1AX, 1BX, 2, 3, 4, 5, 21, 22, 31,31AX, 31BX, 41, 45	7,679	5,537	72%	8,152	2,215	7,751	40	7,791	96%	8,152	2,215	7,751	85	7,836	96%
	Subtotal	*10,502*	*7,523*	*72%*	*11,301*	*3,009*	*10,531*	*63*	*10,594*	*94%*	*11,301*	*3,009*	*10,531*	*133*	*10,664*	*94%*
Southwest	K, L (MMX), M, N	6,783	4,876	72%	7,140	1,950	6,826	135	6,961	97%	7,140	1,950	6,826	290	7,116	100%
	6, 7, 71, F	1,418	1,096	77%	1,607	438	1,534	22	1,556	97%	1,607	438	1,534	46	1,580	98%
	Subtotal	*8,201*	*5,972*	*73%*	*8,747*	*2,388*	*8,360*	*156*	*8,517*	*97%*	*8,747*	*2,388*	*8,360*	*336*	*8,696*	*99%*
Southeast	J, 9	1,717	1,243	72%	1,895	497	1,741	77	1,818	96%	1,895	497	1,741	163	1,904	100%
	15	846	331	39%	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
	3rd. St. LRT Extension	N/A	N/A	N/A	1,190	132	464	139	603	51%	1,190	132	464	295	759	64%
	14, 14X	1,491	941	63%	1,538	377	1,318	59	1,377	90%	1,538	377	1,318	124	1,442	94%
	Subtotal	*4,054*	*2,515*	*62%*	*4,623*	*1,006*	*3,523*	*275*	*3,798*	*82%*	*4,623*	*1,006*	*3,523*	*582*	*4,105*	*89%*

Notes:

a. See Figure V.E.6 for Screenline location.

b Capacity based on San Francisco Municipal Railway Ridership Projections to the Year 2015, May 5, 1997. It assumes an appreciable number of standees per vehicle (somewhere between 60% and 80% of the number of seated passengers, depending on the specific transit vehicle configuration) and may not include the effects of missed or late runs.

c. Average load at maximum load point, based on MUNI's monitoring data, FY 1995-96.

d. Capacity includes the elimination of bus lines 15, 32 and 81X, plus implementation of the MMX and the 3rd St. Extension LRT Services, and any other influencing modifications to service, equipment or operation.

e. Estimated from MTC Model projections and preliminary load estimates from MUNI Third Street LRT Extension Study.

f. Estimated number of project trips that would cross the screenlines.

Source: Wilbur Smith Associates.

substantial redistribution of passenger loads would occur. If a "second choice" line were a notable inconvenience, less shift would occur in that corridor.

A comparison of Alternative 2 MUNI ridership with that of the proposed project suggests that, under the project scenario, MUNI corridor capacity utilization would be approximately 2.6% more than that of Alternative 2. This difference is about double the difference between Alternative 1 and the project (1.2%).

Many Mission Bay workers, visitors, and residents would ride MUNI to and from regional transit stops or transfer to other MUNI lines within the screenlines. These trips would appear near the Project Area, where Alternative 2 would impact MUNI service substantially less than the project. MUNI trips generated by Alternative 2 would use approximately 38% less capacity than MUNI trips generated by the project—a difference of approximately 2,370 p.m. peak trips.

Parking Demand and Supply

Table VIII.B.8 compares the parking demand under the project with Alternative 2. Mission Bay North would produce the same parking demand in both Alternative 2 and the project because they include the same types and amounts of development. In Mission Bay North, the supply of parking spaces would also be the same as that for the proposed project. The South of Channel area, primarily comprised of residential and retail uses with a relatively small amount of service/light industrial/ R&D/office space, would require substantially fewer spaces under this alternative than under the project. The supply of parking in Mission Bay South would be the same as the supply for the area under Alternative 1, derived from the supply rates used in the 1990 FEIR./40/ The difference between the supply of spaces and the relative demand would be less for Alternative 2, indicating a parking space deficit of about 2,320 spaces, which is approximately 2,440 spaces, or 50%, less than that shown for the project. Thus, the overall parking deficit in the Project Area would be substantially less under Alternative 2 than with the proposed project. The smaller deficit is directly proportional to the 900,000 gross sq. ft. of office/R&D space described in this alternative, compared to more than six times that amount of office/R&D and institutional space under the project scenario.

On-street parking would be expected to accommodate some of the excess demand generated by Alternative 2, but would be sufficiently limited to discourage individuals from driving. However, some drivers to and from Mission Bay South that may be unable to find nearby on-street parking, may seek available parking in surrounding neighborhoods, possibly including Potrero Hill and Lower Potrero residential areas.

TABLE VIII.B.8
PARKING DEMAND/SUPPLY IN 2015
COMPARISON OF ALTERNATIVE 2 AND PROJECT

	Total Demand (spaces)	Proposed Supply/a/ (spaces)	Surplus or Shortage
Alternative 2: Redevelopment Mission Bay North/Mission Bay South, Expected Growth			
Mission Bay North	6,585	5,454	-1,131
Mission Bay South	5,753	4,569	-1,184
Total	**12,338**	**10,023**	**-2,315**
Project			
Mission Bay North	6,585	5,454	-1,131
Mission Bay South	19,540	15,917	-3,623
Total	**26,125**	**21,371**	**-4,754**

Note:
a. Parking supply rates for Alternative 2 are those presented in 1990 FEIR, Volume Two, Table VI.E.29, p. VI.E.185.

Source: Wilbur Smith Associates.

Pedestrians and Bicyclists

As previously discussed with regard to Alternative 1, pedestrian and bicycle traffic is expected to increase with the establishment of the forthcoming Third Street light rail and MMX service in the Project Area, and following implementation of the San Francisco Bicycle Plan. Under Alternative 2, Mission Bay North would be fully developed with the same types and amounts of land uses proposed for the project, while Mission Bay South would experience less growth by the year 2015, based on employment and population increases projected by ABAG. The development of Mission Bay North would further increase pedestrian traffic in that part of the Project Area, with many individuals walking from Mission Bay North to Caltrain or to the MMX stations on King Street, just as is expected under the project.

Table VIII.B.9 shows the non-motorized person trips that would be generated by Alternative 2 compared to the same types of modal trips generated by the project. The majority of the non-

TABLE VIII.B.9
NON-MOTORIZED (Pedestrians and Bicycle) PERSON TRIP GENERATION IN 2015
COMPARISON OF ALTERNATIVE 2 AND PROJECT
(PM Peak Hour)

Subarea	Alternative 2	Project	Difference
Mission Bay North	2,040	2,040	0
Mission Bay South	1,274	2,763	-1,489
Total	**3,314**	**4,803**	**-1,489**

Source: Wilbur Smith Associates.

motorized trips are assumed to be made by walking or bicycling. Alternative 2 would generate about 31% fewer pedestrian and bicycle trips than would the proposed project. The difference in the numbers of these types of trips between the project scenario and Alternative 2 would be primarily comprised of trips generated by the 4.6 million gross sq. ft. of service/light industrial/office/ R&D/institutional space proposed for the project that would not occur under Alternative 2. The impact of the smaller volumes of pedestrian and bicycle traffic generated by Alternative 2 would be minimal, as under the project scenario.

Transportation impacts and mitigation measures are summarized at the end of this section on Alternative 2.

Air Quality

Regional Air Quality

In Alternative 2, vehicular emissions would be approximately 50% less than those from the proposed project. However, criteria pollutant emissions associated with daily peak vehicle trips would still exceed the significance thresholds established by the BAAQMD, and this alternative would not reduce the significant impact of the proposed project to a less-than-significant level. Daily emissions from the traffic associated with Alternative 2 were calculated for reactive organic gases (ROG), nitrogen oxides (NO_x), carbon monoxide (CO), and particulate matter (PM_{10}). As indicated in Table VIII.B.10, vehicular emissions for ROG, NO_x, and PM_{10} would exceed the 80 pound-per-day (lb/day) significance threshold. Emission of ROG was estimated to be 416 lb/day. NO_x emission was estimated at 637 lb/day, and PM_{10} emission would be 947 lb/day. In addition, according to the modeling analysis, 5,884 lb/day of CO would be emitted from traffic associated with this alternative,

TABLE VIII.B.10
ESTIMATED VEHICULAR EMISSIONS FROM ALTERNATIVE 2 TRAFFIC IN 2015

Pollutant	BAAQMD Threshold (lb/day)	Vehicular Emissions (lb/day)	
		Project	Alternative 2
Reactive Organic Gases (ROG)/a/	80	865	416
Nitrogen Oxides(NO_x)/a/	80	1,324	637
Particulate Matter (PM_{10})/a/	80	1,968	947
Carbon Monoxide (CO)/b/	550	12,228	5,884

Notes:
a. The BAAQMD regards this amount of emissions as a threshold of significance for a regional impact.
b. For carbon monoxide, the BAAQMD does not regard 550 lb/day as a threshold of significance, but rather, an indicator to perform microanalysis.

Source: EIP Associates. Based on modeling using the California Air Resources Board's URBEMIS version 5 model.

exceeding the 550 lb/day screening threshold of the BAAQMD. Because CO emissions would be more than 550 lb/day, a micro-scale analysis of CO concentrations at intersection 1 is appropriate, as provided below.

As with the proposed project, all measures to decrease vehicle trips, as described in Section VI.F, Mitigation Measures: Air Quality, should be implemented. However, even with measures to reduce vehicle trips, the regional impacts on air quality would remain significant, as they would under the proposed project.

Local CO Concentrations

Modeling results of local CO concentrations at worst-case (maximally exposed) receptor locations were studied at the four intersections. Figure VIII.A.4 shows the intersections selected for modeling for all four intersections. The results indicated that no exceedances of federal or state one-hour or eight-hour CO standards (e.g., significant impacts) would occur as a result of traffic emissions associated with Alternative 2. Table VIII.B.11 provides the results.

Four of the 13 intersections modeled in the proposed project were selected for analysis for Alternative 2, based on their relatively elevated CO concentrations for the project. Figure VIII.A.4 shows the four intersections selected for comparison to the proposed project./41/

TABLE VIII.B.11
ESTIMATED LOCAL CARBON MONOXIDE CONCENTRATIONS AT SELECTED INTERSECTIONS FOR ALTERNATIVE 2 IN 2015

	CO Concentrations (ppm)			
	Proposed Project/a/		Alternative 3	
Intersection	One-Hour	Eight-Hour	One-Hour	Eight-Hour
3rd and 16th	11.0	6.3	9.7	5.7
3rd and King	13.6	7.6	11.7	8.1
4th and Bryant	8.3	5.3	8.3	5.7
8th and Townsend	9.9	5.4	10.0	6.9

Note:
ppm = Parts per million
a. Refer to Table V.F.5 and associated text in Section V.F, Air Quality.

Source: EIP Associates.

Modeling results indicate that the CO concentrations would be slightly less for Alternative 2 compared to the proposed project. Differences in one-hour CO concentrations between the project and alternative at each of the four modeled intersections ranged from 0.1 to -1.9 ppm. For example, the highest one-hour CO concentrations would occur at the intersection of Third and King Streets where concentrations of 11.7 ppm and 13.6 ppm were estimated for Alternative 2 and the proposed project, respectively. For eight-hour CO concentrations, differences in results ranged from -0.6 to 1.5 ppm. The greatest difference occurred at the intersection of Eighth and Townsend Streets.

Toxic Air Contaminant Emissions

The potential impacts of toxic air contaminant emissions for the Mission Bay North component of Alternative 2 would be the same as for the proposed project in Mission Bay North. The potential impacts of toxic air contaminant emissions from stationary sources in the South of Channel area in Alternative 2 would be the same as for Alternative 1, i.e., smaller emissions than for the project. Since vehicle trips associated with Alternative 2 would be approximately 45% less than for the proposed project, toxic air contaminant emissions from vehicles would be correspondingly less for Alternative 2, compared to the project.

Whereas state law provides a mechanism to ensure that the school siting process considers potential exposure to toxic air contaminants, preschool and child care facilities would not be subject to

California's school siting process. These facilities could be operated near or among the Service/Light Industrial/Research and Development/Office uses. A measure such as Mitigation Measure F.6 proposed for the project would be needed to ensure that preschool and child care facilities would consult with agencies regarding potential risks and that the BAAQMD would have the opportunity to request updated emissions inventories from facilities emitting toxic air contaminants if a preschool or child case center locates within 1,640 feet of such a facility.

In sum, even though the toxic air contaminant emissions from stationary sources in Alternative 2 would likely be less than for the proposed project, toxic air contaminant emissions from multiple facilities could combine to increase risks; therefore this SEIR conservatively characterizes toxic air contaminant emissions from Alternative 2 as a potentially significant impact. All of the mitigation measures for the project would be appropriate for Alternative 2, except Mitigation Measure F.4 could be modified so that the meteorological station would be located near the potential Service/Light Industrial/Research and Development/Office uses on Owens Street.

Demolition and Construction Air Pollutant Emissions

Criteria Pollutants

Criteria pollutants emissions, primarily in the form of PM_{10}, would be a less-than-significant impact after implementing BAAQMD-approved dust mitigation measures for demolition and construction activities, as under the proposed project.

Contaminated Soils

As for the proposed project, excavation could result in the generation and release of dust containing toxic air contaminants to the air and adverse impacts on construction workers and the public. Potential impacts for Alternative 2 would be the same as for the project, and would be mitigated through implementation of risk management plans, as explained under "Contaminated Soils and Groundwater," below.

Noise and Vibration

Noise

A qualitative analysis of the traffic volumes at the noise study locations shows that Alternative 2 would have lower traffic volumes than the proposed project and would, therefore, have correspondingly smaller traffic noise increases. For the study locations at Potrero Avenue south of 16th Street, Pennsylvania Street south of Mariposa Street, and Berry Street west of Fourth Street, traffic volumes would be the same under both alternative and project conditions. Therefore, there would not be any difference in traffic noise levels at each of these three study locations in the future. While the noise analysis of project traffic indicates that traffic increases would contribute to an increase in peak hour and daily noise levels at existing sensitive receptor and residential locations, as well as at sites of potential future sensitive receptors, the contribution would not be noticeable to most individuals at most locations.

To further assess the potential traffic noise impacts of Alternative 2, a quantitative analysis was performed at the sensitive receptor location at Mariposa and De Haro Streets. Traffic volume data for the alternative were analyzed using the same SOUND 32 model that was used for the proposed project. Alternative 2's increase in 24-hour L_{dn} levels would be 0.6 dBA less than the proposed project's less-than-significant increase. Alternative 2 traffic plus cumulative traffic in 2015 would increase 24-hour L_{dn} noise levels by up to 0.7 dBA at the church on Mariposa Street at De Haro Street compared with a 1.3 dBA increase for the proposed project. The alternative's 1-hour L_{eq} of 65.6 dBA for p.m. peak hour traffic would be the same as that analyzed for the proposed project, an increase of 1.6 dBA. This increase would not be noticeable to most individuals and would not interrupt church activities.

Vibration

Alternative 2 would have residential uses over ground floor retail on Third Street and Fourth Street in Mission Bay South similar to Alternative 1. The MUNI Third Street light rail tracks would be installed down the center of these streets in the Project Area. Vibration effects from the light rail vehicles would be similar to the effects described for the project along Third and Fourth Streets and would not be expected to be significant.

Caltrain tracks in Mission Bay North would be adjacent to residential uses and ground floor retail in Alternative 2, as for the project. Vibration effects from the passenger train would be the same as those described for the project.

Existing freight rail tracks would be relocated to the center of 16th Street in Alternative 2, as with the project and Alternative 1. Vibration from heavy rail activity would be noticeable in the residential buildings proposed to be on 16th Street east of Owens Street, similar to Alternative 1, and might exceed the standard of 80 VdB for infrequent events suggested by the Federal Transit Administration./42/ However, given that the freight trains in this area move very slowly (often less than 20 miles per hour) and that the residential buildings are likely to be concrete rather than wood-frame, vibration levels could be 70 VdB or less and, if so, would not be a significant impact. As it is not likely that vibration would be a significant impact on residential uses along 16th Street, no mitigation has been suggested; it might be useful to perform a more detailed evaluation of potential vibration effects from heavy rail as part of foundation design for residential buildings along 16th Street.

The potential vibration effects on sensitive research instruments described in the project analysis for the UCSF site and other possible research facilities along Third Street and along 16th Street would not occur under this alternative.

Seismicity

Effects of Groundshaking

The Project Area under Alternative 2 would be subject to the same seismic conditions as the proposed project described in "Project Area Characteristics" in Section V.H, Seismicity: Setting: a 67% probability of at least one major earthquake within the 30-year period between 1990 and 2020; anticipated peak ground accelerations in excess of 0.5g; liquefaction and earthquake-induced settlement of some fill.

In this alternative, Mission Bay North would be redeveloped according to the plan for the proposed project, containing residential, retail, and parking facilities. Many existing structures in Mission Bay South would remain, some of which might be retrofitted to upgrade their seismic resistance, and some new buildings would be constructed, although fewer than for the proposed project. The same mitigation measure would apply to this alternative as would under the proposed project. These existing conditions are described in the "Phasing of Infrastructure and Development During the Build-Out Period" in Section V.H, Seismicity: Impacts. Mission Bay North would consist entirely of new buildings. In general, the new structures would be more resistant to seismic forces than retrofitted structures and, therefore, would suffer less damage during earthquakes. Although a retrofitted structure would reduce injury and loss of life, the structure itself might not survive the earthquake in as sound condition as a new structure. If Fire Station No. 30 would be re-used for a fire or fire and police station in this alternative, it would need seismic upgrades.

Seismic Hazard Zones

The Project Area is in a Liquefaction Hazard Zone. Existing structures in Mission Bay South, supported on the potentially liquefiable fill, could deform, tilt, settle rapidly, or collapse, thereby exposing occupants to injury or death. In Mission Bay North, deep foundations (such as pile-supported foundations) would be constructed for new major buildings, as would occur for the proposed project, to prevent these adverse effects of liquefaction. Existing pile-supported foundations in the South of Channel area pre-date modern building codes. During seismically induced liquefaction of the surrounding fill, they would not be expected to perform as well as the new foundations to be constructed in Mission Bay North.

In this alternative, it is assumed that the South of Channel area would be developed gradually, with structures on appropriate foundations to accommodate the adverse effects of liquefaction. All new construction under San Francisco's jurisdiction throughout the Project Area would be required to meet the seismic safety provisions of the currently applicable San Francisco Building Code (1995 or future revisions). Existing structures would remain in use until they were replaced by new construction. Unless the South of Channel area were completely developed with new buildings, the effects of liquefaction would be more severe in Mission Bay South than for the proposed project's less-than-significant impact due to the continuation of existing conditions (see "Phasing of Infrastructure and Development During the Build-Out Period" in Section V.H, Seismicity: Impacts).

Exposure of Concentrated Populations to Seismic Hazards

With the development of Mission Bay North and the expected growth in the South of Channel area, this alternative would have about 59% (16,665 employees and residents) of the population of the proposed project (40,900 employees and residents) in the year 2015. In terms of exposure to seismic hazards, the population of Mission Bay North in this alternative would be in the same circumstances as in the proposed project. As development progressed in the Project Area, the percentage of the population in seismically resistant buildings that are on pile-supported foundations, have been retrofitted, or meet the seismic safety provisions of the currently applicable San Francisco Building Code, would increase because new structures in San Francisco's jurisdiction would comply with the currently applicable San Francisco Building Code. However, unless Mission Bay South were completely developed with new structures, the percentage would not be the same as that of the proposed project. Therefore, although build-out to 2015 would result in about 59% fewer people occupying the Project Area than the proposed project, this alternative would have slightly more severe seismic safety effects because existing seismic safety conditions would continue longer than for the proposed project. These existing conditions are described in the "Phasing of Infrastructure and Development During the Build-Out Period" in Section V.H, Seismicity: Impacts. As with the proposed project, these existing conditions would not be significant impacts under CEQA.

In this alternative, the proposed project's integrated seismicity mitigation measures related to project infrastructure would be applied to reduce the remaining exposure to seismic hazards in Mission Bay North to an acceptable level. For Mission Bay South, the existing Mission Bay Plan would integrate such emergency response facilities as the on-site fire and police station, and the extension of the Auxiliary Water Supply System for fire-fighting into the South of Channel area, and reduce the remaining exposure to seismic hazards in Mission Bay South to an acceptable level.

Health and Safety

Like the proposed project, Alternative 2 would increase the use, storage, generation, and disposal of hazardous materials and waste. However, the increase would be substantially smaller with the alternative for two reasons. First, UCSF is not assumed to be built. Second, the amount of commercial space that could use or generate hazardous materials or waste would be smaller—approximately 80% less R&D and industrial-related space (900,000 sq. ft. under Alternative 2 and approximately 5.6 million gross sq. ft. under the proposed project). Under this alternative, the smaller amount of space where hazardous materials use and generation could occur would reduce the magnitude of potential use within the Project Area compared with the project. Reduction in magnitude of potential use would reduce the potential risk, although it would not eliminate potentially significant impacts. Legal and regulatory requirements applicable to hazardous materials operations would reduce most of the common and potentially significant health and safety impacts to less-than-significant levels, as they would under the proposed project. However, the project's potentially significant impacts would also be significant under this alternative, and significant health and safety impacts are discussed below.

First, although the UCSF site would not be developed, it is possible that some occupants of the industrial space would conduct biomedical or related activities and generate biohazardous waste. In this case, the potential impact could be reduced to less-than-significant levels with mitigation measures identified for the project.

Second, development under this alternative would likely increase the generation of hazardous waste and contribute to existing impacts of hazardous waste disposal. However, the increase in hazardous waste generation would be substantially less than for the proposed project. As with the project, environmental impacts of hazardous waste disposal would be minimized, but not eliminated, by encouraging pollution prevention.

Contaminated Soils and Groundwater

Chemicals of various types and concentrations were found in the soil and groundwater throughout the Mission Bay Project Area. With the exception of petroleum hydrocarbon contamination in a petroleum free product area (see "Glossary and Acronyms" at end of Section V.J, Contaminated Soils and Groundwater, for definitions) located in the southeast portion of the Project Area in the vicinity of Illinois and Third Streets, concentrations of contaminants in soil or groundwater do not present a human health or ecological risk under existing conditions. In the free product area, potential effects on near-shore aquatic organisms are being managed through additional investigation and necessary remediation by oil companies responsible for the contamination. This remediation will be carried out regardless of whether the proposed project or this alternative is approved (see "Existing Human Health Risks," in Section V.J, Contaminated Soils and Groundwater: Setting).

Most of the Project Area would experience soil and groundwater construction-related effects similar to those described for the proposed project, although the locations and extent of activities would vary because of differences in land use compared to the proposed project. As explained for the proposed project, some residual contaminants may remain in the Project Area soils or groundwater other than those associated with the free product (see "Impacts During Project Development," in Section V.J, Contaminated Soils and Groundwater). There would be fewer people who could be exposed to contaminants in soil or groundwater that could be released during site development. Potential construction-related effects on the aquatic environment would be similar to those identified for the proposed project.

To reduce potential hazards to human health and the environment during construction, Risk Management Plans (RMPs) would be prepared for development activities that would occur in Mission Bay North and Mission Bay South based on proposed land uses; the RMPs would be reviewed by the RWQCB. Measures identified in the RMPs, which would be modified to reflect the proposed land uses under this alternative, would reduce to a less-than-significant level any risks that might result during construction and from use of locations that would be developed and occupied during construction under this alternative.

The area south of the Channel in this alternative would not be expected to be fully built out by 2015. Therefore, unlike the proposed project, some sites in the Project Area south of the Channel would remain vacant and would allow rainwater to infiltrate the soil, thereby potentially affecting concentrations of chemicals in groundwater. Thus, under Alternative 2 there could be less reduction in potential releases of residual contaminants to the environment than under the project. It has been shown that there are no unacceptable risks to the aquatic environment from chemicals in soil or groundwater in the Project Area that may migrate in groundwater to surface water bodies, except possibly for the free product area. The fact that the alternative would not be fully built out by 2015 would not mean that the alternative would cause significant aquatic impacts.

Hydrology and Water Quality

As for Alternative 1, Alternative 2 assumes a combined sewer system for the entire Project Area rather than both combined and separated systems proposed under the project. As with the project, land uses under this alternative would include businesses such as wet laboratories that could potentially release chemicals into the City's combined sewer system that could cause the City to exceed its permit limits. Mitigation Measure K.2 would apply to this alternative.

As with Alternative 1, a comparison of the pollutant load resulting under Alternative 2 is made with the Bayside Base Case plus Mission Bay 100% Combined Sewer System scenario analyzed in "Changes in Discharges to Receiving Waters," in Section V.K, Hydrology and Water Quality: Impacts. Alternative 2 would have a more-intensive development scheme than Alternative 1 and would more closely resemble the scale of development proposed by the project. Therefore, mass pollutant loading under Alternative 2 would be more than under Alternative 1, but still less than the load resulting from the 100% Combined Sewer System scenario under the proposed project. As with the project, pollutant concentrations in municipal wastewater effluent, treated CSOs, and direct stormwater discharges, would not change to the point where toxicological effects to aquatic organisms, adverse effects on sediment quality, or substantial impacts on water-contact recreation could occur. Therefore, as with the proposed project, this would be a less-than-significant impact. The cumulative impacts of this alternative would be similar to those of the proposed project, in that cumulative impacts would be less-than-significant, but as with the project, the SEIR conservatively finds that this alternative would contribute to a potentially significant cumulative impact on the near-shore waters of San Francisco Bay. Because no direct stormwater discharges would occur under this alternative, Mitigation Measure K.4 would not apply to this alternative. Only Mitigation Measure K.3 would apply to this alternative for this cumulative impact.

As discussed for Alternative 1, impacts associated with phased and interim development would be equal to, or less than, those under built-out project conditions for the 100% Combined Sewer System scenario. Because stormwater quality controls would be needed for this alternative as for the proposed project, Mitigation Measure K.5 would apply.

Erosion and sedimentation impacts from construction would be similar to the significant impact of the proposed project; a construction Storm Water Pollution Prevention Plan would be required for this alternative to reduce impacts to less-than-significant levels, as would be the case under the proposed project. Mitigation Measure K.1 specifies the minimum measures that must be included in the Storm Water Pollution Prevention Plan.

China Basin Channel Vegetation and Wildlife

This alternative would propose a hard-edge treatment for the north side of the Channel (the same as for the proposed project), resulting in the same impact as the proposed project, loss of approximately 0.13 acre of salt marsh wetlands. The south edge of the Channel would be treated as in the "No Project" alternative, based on the *Mission Bay Plan*/43/ to preserve and restore salt marsh vegetation for a "soft-edge" approach.

Under Alternative 2, the impacts and mitigation requirements would be about the same as those discussed for Alternative 1. In summary, Alternative 2 would have about the same wetland impact as the proposed project because of the hard-edge treatment on the north Channel edge and would result in a net increase of salt marsh wetlands because of restoration on the south Channel edge. It would have more in-channel construction and disturbance impacts than the proposed project because of the proposed Owens Street Bridge in addition to walls and decking on the north edge.

Community Services and Utilities

<u>Fire Protection</u>

Alternative 2 assumes a level of development for the Project Area with approximately 4% less residential development than the proposed project, and about 80% fewer employees. There would be 37% less retail development and about 90% less office and service/light industrial/R&D/office space (see Table VIII.1). Therefore, the number of emergency, fire, hazardous materials, and false alarm incidents involving the San Francisco Fire Department for Alternative 2 would be expected to be substantially less than for the proposed project.

Although the number of incidents generated by this alternative could reasonably be expected to be less than the number generated by the proposed project, this alternative would still require additional resources. An engine and a truck company, and a station to house them would be provided under this alternative as required in the adopted 1990 *Mission Bay Plan.*/44/ This is because there would still be an addition of new households and businesses into a previously underdeveloped area, which would place additional demand on citywide Fire Department resources. Emergency access to the South of Channel area in the event of an earthquake or during events at the San Francisco Giants Ballpark would also be a concern for any substantial amount of new development.

Expan of the high-pressure water system (also known as the Auxiliary Water Supply System, or AWSS) and installation of six cisterns would be necessary to provide adequate fire-fighting capability to the interior of the Project Area in this alternative. Expansion of the AWSS in this alternative would be similar to the proposed expansion of the AWSS in the project. The six cisterns included in this alternative would provide a backup supply of water, if the AWSS fails. The project proposes to use suction inlets near the Bay and Channel as a backup water supply, instead of installing cisterns.

This alternative would include 3.1 acres in the South of Channel area for community facilities, which could include a police and/or fire station. Fire Station 30 would be preserved and reused under Alternative 2. The proposed project would include about 3.7 acres for community facilities in the South of Channel area.

Police Protection

This alternative would have a resident population of about 4% less than the proposed project (about 10,500 as opposed to 10,900) and approximately 80% fewer employees (6,170 compared with the project's 30,000). Total resident and employee population for the alternative would be approximately 16,600, or about 60% less than the proposed project's approximately 41,000 employees and residents. Using the same ratio of police personnel per number of residents and employees that was used for the proposed project, an estimated 25 police personnel would be needed under Alternative 2 to provide a level of police service comparable to the citywide level./45/ This is approximately 40% of the estimated 62 police personnel needed for the proposed project. As with the proposed project, interior building space would be needed for these additional personnel, either in an existing or new police station in or near the Project Area. The amount of space needed would be less (about 3,000 gross sq. ft. compared with the project's 7,440 gross sq. ft.), as would the number of squad cars (about 8 to 9) and parking spaces. However, this would likely be a minimum demand, with the actual number of officers needed falling somewhere within the range between this estimate and estimated demand for the proposed project. This is because the residential population would be only 4% less than that estimated for the proposed project. These residents would occupy the Project Area overnight, while many of the employees would likely leave the area at the close of business.

It is unlikely that additional departmental personnel could be accommodated at existing police stations. This alternative would include 3.1 acres in the South of Channel area for community facilities, which could include a police and/or fire station. An approximately 1.5-acre site adjacent to and including the site of the closed Fire Station No. 30 at Third and Mission Rock Streets may be considered among those potentially available for a relocated Southern Station. If the Southern Station were to be expanded and/or relocated, it could accommodate some of the additional demand for space to serve this alternative.

Public Health Services

This alternative would be likely to generate about the same demand for some public health services as the proposed project, and less demand for other services. The residential population of the Project Area in Alternative 2 would be 4% less than expected in the proposed project. Demand could be about the same as the proposed project for personal health care services and mental health services because these services would be used primarily by residents rather than employees in the area.

In this alternative, there would be approximately 37% less retail development and about 90% less office and service/light industrial/research and development/office space than in the proposed project (see Table VIII.1). Demand on the City's Department of Public Health's Bureau of Environmental Health Management for inspection and oversight service could be less than that of the proposed project because there may be fewer retail establishments serving food and fewer firms would be likely to use hazardous materials.

Recreation and Parks

Residential demand for open space would be similar for Alternative 2 to that for the proposed project because this alternative would have about 96% of the projected residential population of the proposed project. Employee demand would be about 80% less. Fifty-five percent less open space would be provided as part of this alternative, which would have approximately 60% fewer residents and employees. An estimated 26.5 acres of open space would be developed through 2015 with Alternative 2, and would provide a ratio of approximately 2.5 acres per 1,000 residents. This alternative would generate a total employee demand for about 0.9 acres of open space; employees would use the same open space as residents./46/ The proposed project would include development of approximately 47 acres of open space, providing a ratio of approximately 4.3 acres per 1,000 residents, and would generate an employee demand for approximately 4.2 acres.

The total amount of open space provided by this alternative would be 20.5 acres less than the amount provided by the proposed project, and would also be comparatively less when measured in acres provided per 1,000 residents. Comparison of open space impacts based on the service area analysis done for the proposed project is not possible, since there is no complete plan at this time for the location of or types of recreational facilities that would be provided in the open space under Alternative 2. This information would be necessary to determine whether open space planned for this alternative would be more or less likely to satisfy the needs of Project Area employees and residents than that provided by the proposed project.

Schools

Alternative 2 would have a resident population of approximately 10,500 by the year 2015 (4% less than the proposed project's resident population). Therefore, this alternative would be expected to generate 4% fewer school-age students than the proposed project (1,550 compared to 1,615). The estimated number of students at each school level would be as follows: approximately 700 elementary-school-age students, 380 middle-school-age students, and 470 high-school-age students./47/

Like the proposed project, this alternative would include a site for a public school. Demand for classroom space would be slightly less with this alternative because there would be fewer new students. If an elementary school were developed, it is unlikely that all new elementary-school-age students with this alternative could be accommodated on-site because City elementary schools are generally built for 500 or fewer students. Middle school and high school students would not be accommodated on-site. Therefore, as with the proposed project, the City and County of San Francisco would need to develop additional classroom space to accommodate students generated by the proposed project. Options that could be considered by the SFUSD to increase the capacity of the school district include implementing year-round schools, using portable classrooms, or building new permanent classrooms at an existing or new school site. While constructing new schools might cause significant impacts at those locations, it is too speculative to identify impacts at this time from construction of additional school facilities without knowing what action or actions the SFUSD would take to accommodate the additional students, whether SFUSD would choose to accommodate the additional students in a manner that would result in physical changes to the environment, or exactly where those actions would occur. Any new facilities proposed by SFUSD would undergo appropriate environmental review for site-specific physical environmental impacts.

Development occurring with Alternative 2 would be subject to the same one-time development impact fee as the proposed project. As discussed in "Schools: Impacts" in Section V.M, Community Services and Utilities, this fee is collected for the school district at the time building permits are issued, and is $1.72/ sq. ft. for residential development, and varies from $0.08/sq. ft. to $0.24/sq. ft. for different types of commercial development./48/ The development impact fees were set by the state legislature and are reviewed every two years by the State Allocation Board. The San Francisco Board of Education then must set the fees within the State constraints. The fees do not necessarily increase annually./49/ Total fees would likely be slightly less than those collected for the proposed project because although there would be a similar amount of residential development, there would be fewer square feet of commercial development generating these fees. Alternative 2 would generate about $9.7 million in school fees, whereas the project would generate approximately $11.2 million./50/ Construction of a 500-student elementary school facility costs about $12.6 million in 1998 dollars /51/, which would exceed the amount generated through development impact fees. Therefore, development impact fees would be insufficient to cover the cost of a new elementary school and provide funding for middle and high school students.

Solid Waste

Alternative 2 would generate approximately 10,000 tons of solid waste per year by 2015, which is about 50% of the projected solid waste generation of the proposed project at build-out (19,000 tons/year). At San Francisco's current diversion rate (35%), this alternative would contribute about 6,500 tons of solid per year to the Altamont Landfill. With a diversion rate of 50%, as required by state law by year 2000, this alternative would contribute approximately 5,000 tons of waste to the landfill annually./52/ As with the proposed project, development under Alternative 2 is assumed in the Altamont Landfill Capacity Projections and would not affect the expected lifespan of San Francisco's landfill contract with Waste Management of Alameda County, due to expire between 2012 and 2016. Under this alternative, the disposal companies could potentially require additional staff and collection equipment to serve the Project Area, as they would under the proposed project.

Water Supply

Alternative 2 would use an estimated 1.5 million gallons per day (mgd) of water in 2015, which would represent approximately 50% of the water demand for the proposed project (2.9 mgd). The reclaimed water demand for this alternative would be approximately 0.37 mgd, or about 40% of the reclaimed water demand for the proposed project (0.98 mgd).

As with the proposed project, the low-pressure and high-pressure water systems would require expansion in order to provide adequate service to central portion of the Project Area. The City's proposed reclaimed water system would require a new system of pipelines throughout the Project Area, as would be the case under the proposed project.

Sewers and Wastewater

Alternative 2 would generate approximately 1.3 mgd of sewage through year 2015, which is about 50% of the estimated daily sewage generation for the proposed project (2.5 mgd). Under this alternative, unlike the proposed project, the Central/Bay Basin would continue to use the City's combined sewer system (see Figure V.K.2, in Section V.K, Hydrology and Water Quality). The combined sewer system in the Central/Bay Basin would require expansion and upgrade of sewer lines. This alternative would also include the construction of additional storage sewer capacity to accommodate increased stormwater runoff, as proposed in the approved 1990 *Mission Bay Plan*. Recent analysis by the San Francisco Public Utilities Commission, Clean Water Program indicates that the City's combined sewer system probably has adequate capacity to accommodate development from the proposed project in the Project Area without additional storage sewer capacity. Further analysis of detailed, project-level, drainage plans of the combined sewer system for the Project Area, once they were developed, would be needed for confirmation./53/ Growth in the North Basin and Mariposa Basin (Figure V.K.2) would require extension of the existing combined sewer system to previously unserviced areas. Construction of new sewer lines would have impacts related to contaminated soils similar to those described for project construction in "Utility Trench Excavation" in Section V.J, Contaminated Soils and Groundwater: Impacts.

Energy Capacity and Infrastructure

Under Alternative 2, energy demand would be the same in Mission Bay North as under the proposed project. In the South of Channel area, energy demands would be less. There would be about 250 fewer dwelling units than under the proposed project (3,090), but about 87% less retail, office, and R&D space (1,180,000 gross sq. ft. of retail, service/light industrial/R&D/office space vs. 9,050,000 gross sq. ft. of office, R&D, including the UCSF site, and retail space). Even though there would be less development in the South of Channel area under this alternative, the Project Area is underdeveloped, and any amount of new development would require some amount of new infrastructure or upgrades to existing infrastructure.

Telecommunications

Alternative 2 would likely generate the same demand for telecommunications services in Mission Bay North as with the proposed project because there would be the same amount of residential and commercial development in the area by the year 2015. As discussed under "Energy Capacity and Infrastructure," there would be substantially less development in Mission Bay South by 2015 under this alternative than with the proposed project. There would still be the potential need for new infrastructure or infrastructure upgrades throughout the Project Area in order to provide for new development in an underdeveloped area.

SUMMARY OF MITIGATION MEASURES

In Mission Bay North, the proposed project's mitigation measures would be applicable to similar impacts. In Mission Bay South, the 1990 *Mission Bay Plan's* mitigation measures are generally assumed to apply. If conflicts were to arise between measures for the two areas, the City would resolve them. Since this SEIR's analysis updates that of the 1990 FEIR in terms of environmental, informational, and regulatory conditions (as well as a changed project), it is reasonable to expect that mitigation measures similar to those identified for the proposed project would be developed and applied as necessary.

The significant impacts of Alternative 2 for visual quality and urban design; air quality including toxic air contaminants; health and safety; contaminated soils and groundwater; and hydrology and water quality would be similar to or the same as those of the project. Therefore, mitigation measures for these environmental issues under Alternative 2 would be the same as those described in Chapter VI for the proposed project in Mission Bay North. They would be expected to be similar to those of the proposed project for Mission Bay South as discussed in the preceding paragraph.

Hydrology and water quality mitigation measures for Alternative 2 would be the same as for the project, but Mitigation Measure K.4 would not apply. This is because no direct stormwater discharges to near-shore waters would occur that could cumulatively impact near-shore water quality. Potential cumulative impacts to near-shore water quality would only occur from treated combined sewer overflows.

Effects on existing wetlands in China Basin Channel would be greater under Alternative 2 than they would be under the project. The mitigation measures in Section VI.L, Mitigation Measures: China Basin Channel Vegetation and Wildlife, would remain applicable under this alternative and could be extended in scope to account for the greater impact.

Traffic impacts in 2015 would be reduced under this alternative, with fewer intersections degrading to LOS E or F compared with the project. Therefore some of the mitigation measures described for the proposed project would also be applicable to Alternative 2, but some features of the project or mitigation measures might be somewhat different due to the different street configuration in this alternative, and some measures would not be necessary. For example, as with Alternative 1, the intersection at 16th Street and Potrero Avenue would not require mitigation in Alternative 2 because it would not degrade to unacceptable levels. The intersection of Third and King Streets could be mitigated with either one of the two measures called for in the project (see Measures E.1, E.21a, and Mitigation Measures E.37 and E.40 in Section VI.E, Mitigation Measures: Transportation).

Impacts on regional transit services would be less than those of the project and would need the same mitigation. Impacts on MUNI would be similar to those of the project, with somewhat less demand for service near the Project Area leading to other MUNI routes and to regional transit. The same mitigation measures as described for the project would be applicable to the alternative, with potentially somewhat smaller demand for additional service on the new Third Street Light Rail in 2015. As the Project Area built out after 2015, however, the demand on this MUNI Metro line would grow, and could approach that of the project.

Other transportation topics, such as parking and pedestrians, would not be significant, as with the project, and would not require mitigation.

Existing seismic structural hazards in the Project Area would persist for a longer period of time under Alternative 2 because more of the Project Area's existing buildings would remain in use a longer time (see "Phasing of Infrastructure and Development During the Build-Out Period" in Section V.H, Seismicity). Although existing regulations may seismically strengthen some of those buildings, the Project Area's building stock would pose a higher degree of seismic safety risk through 2015 than the less-than-significant risks under the proposed project. The risk would not be a significant impact under CEQA because the majority of existing structures are low-rise, light-weight buildings, posing limited hazards.

Regarding toxic air contaminants, the 1990 FEIR did not address them other than from construction sources. As a result, measures similar to those proposed for the project would be needed, with Mitigation Measures F.4 modified so the meteorological station would be located near the potential Services/Light Industrial/Research and Development/Office, since UCSF is not assumed as part of the alternative. As with the proposed project, combined toxic air contaminant impacts would remain potentially significant and unavoidable after mitigation.

The 1990 FEIR did not identify water quality impacts as significant in the manner that the SEIR does. Thus, no mitigation measures were proposed in the 1990 FEIR. Because water quality impacts have been identified as significant, Mitigation Measures K.1, K.2, K.3, and K.5 would be recommended for Alternative 2.

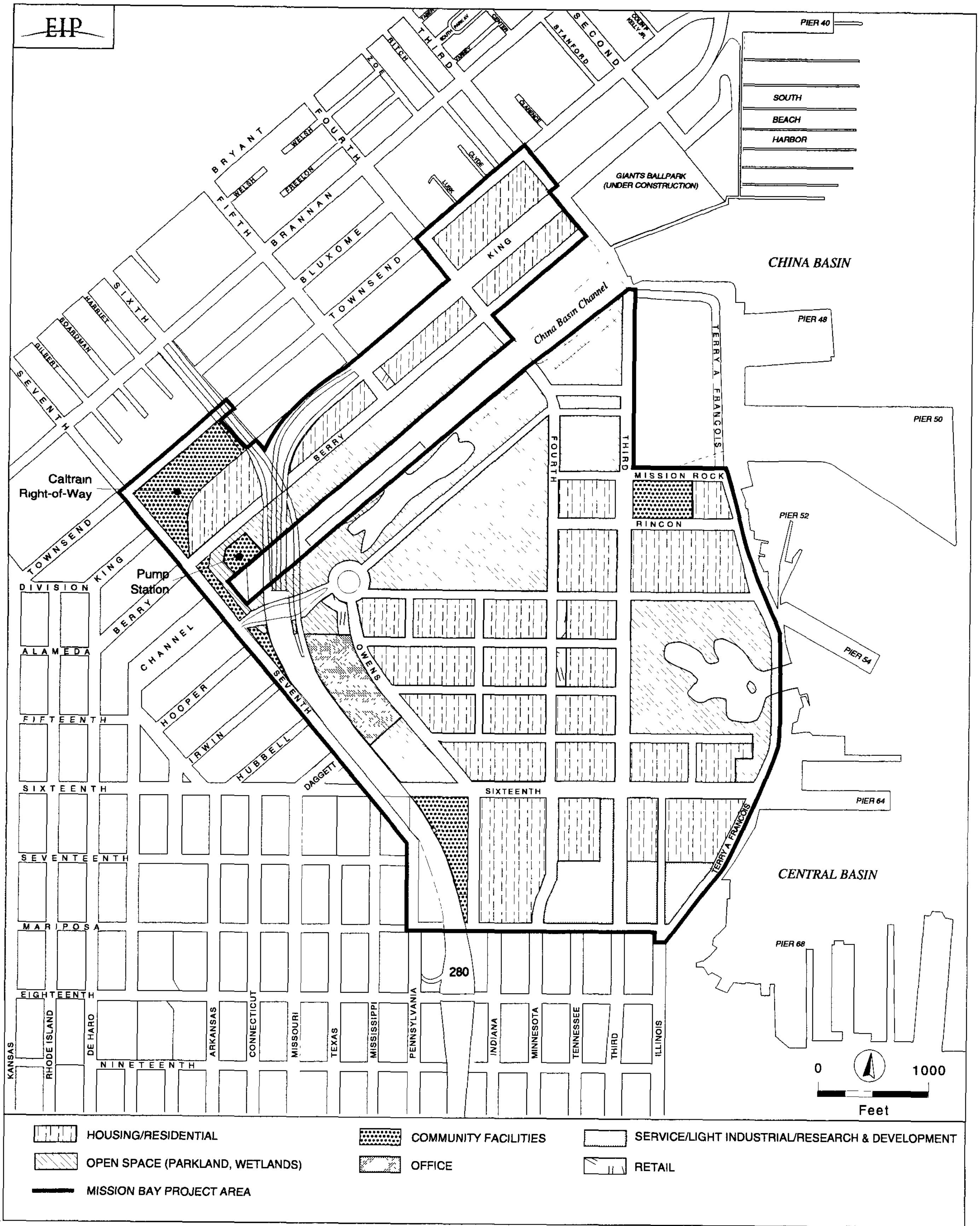
This alternative's significant unavoidable project and cumulative impacts would be the same as those of the proposed project (see Chapter IX, e.g., intersection, bridge/ramp, vehicular air pollutant emissions, toxic air contaminants, hazardous waste generation and disposal, water quality), although their magnitude may vary.

C. ALTERNATIVE 3: RESIDENTIAL/OPEN SPACE DEVELOPMENT ALTERNATIVE

The Residential/Open Space Development Alternative (Alternative 3) is a modified version of full build-out of Alternative B from the 1990 FEIR./54/ No redevelopment plans for the Project Area were assumed. Figure VIII.C.1 shows a site plan for Alternative 3. There are four differences in the project boundaries between Alternative 3 and the 1990 FEIR Alternative B: 1) Alternative 3 includes the Castle Metals property west of Third Street between 16th Street and Mariposa, whereas 1990 FEIR Alternative B did not; 2) Alternative 3 excludes the Pier 48 backland area, whereas 1990 FEIR Alternative B included this area, and proposed a wetland for it; 3) Alternative 3 excludes most of the surface water area of China Basin Channel and the associated houseboat community and pleasure boat berths, whereas 1990 FEIR Alternative B included these areas; and 4) Alternative 3 excludes the Caltrain terminal, the two blocks bounded by Fourth, Townsend, King, and Sixth Streets, whereas Alternative B included this area, and proposed residential with some ground-floor retail for it in the 1990 FEIR.

DEVELOPMENT PROFILE

Build-out of the Project Area under Alternative 3 assumes infrastructure improvements, since the City would not issue building permits without adequate sewer systems, roads, etc. As proposed in the 1990 FEIR, this alternative would maintain and expand the existing combined sewer system in the Central Basin and would create two wetlands, one located northwest of Fourth and Owens Streets, and the other located southeast of Third and Mission Rock Streets. The street grid shown in Figure VIII.C.1 is a modified version of the project street grid to account for the wetlands and open space areas that would not have streets traversing them. Unlike Alternatives 1 and 2, there would be no bridge across China Basin Channel connecting Sixth Street with Owens Street. The wetland near the San Francisco Bay would require off-site improvements along the bayfront to permit tidal access from the Bay to the wetland and a full bridge. The wetlands would require removal of an existing boat storage yard on port property between the southern edge of Pier 54 and the northern edge of Pier 64. Alternative 3 would include about 10,000 residential units, 1 million gross sq. ft. of office space, 630,000 gross sq. ft. of service/light industrial/research and development space, 300,000 gross sq. ft. of retail space, 12,100 parking spaces, 7.1 acres of community facilities, 48 acres of open space, and 20 acres of wetlands. For purposes of environmental analysis, Alternative 3 assumes no UCSF site would be developed. This level of nonresidential development would accommodate about 6,550 jobs. There would be about 18,600 residents in Project Area housing. In Table VIII.1, characteristics of Alternative 3 are compared to those of the project.



SOURCE: EIP Associates

MISSION BAY SUBSEQUENT EIR

FIGURE VIII.C.1 ALTERNATIVE 3: LAND USES FOR RESIDENTIAL/OPEN SPACE ALTERNATIVE

Residential

In the absence of a development agreement specifying affordable housing production requirements to development in the Project Area, it is unclear whether and how affordable housing would be produced under Alternative 3. Affordable housing provided through the City's Office Affordable Housing Production Program would be limited since Alternative 3 has little office development. For this SEIR, it is assumed that, without participation of the San Francisco Redevelopment Agency and the use of redevelopment tax increment for affordable housing, there would be less affordable housing associated with Alternative 3 than would be produced under the proposed project.

Office

About 1 million gross sq. ft. of office space would be developed in Mission Bay South.

Service/Light Industrial/Research and Development

Service/light industrial/research and development space would occupy about 630,000 gross sq. ft. in Mission Bay South, including on the Castle Metals site which was not included in Alternative B in the 1990 FEIR.

Retail

A total of 300,000 gross sq. ft. of retail space would be developed in the Project Area. There would be 80,000 gross sq. ft. of ground-floor retail space in Mission Bay North. Most of the retail space (220,000 gross sq. ft.) would be developed in Mission Bay South; it would include both ground-floor space and stand-alone retail development.

Community Facilities

About 7.1 acres of community facilities would be developed in the Project Area. Mission Bay North would contain 1.5 acres of community facilities, including the Channel Pump Station. Mission Bay South would contain 5.6 acres of community facilities, including community rooms, a combined police and fire station on the site of Fire Station No. 30, and an elementary school west of 16th and Owens Street. Fire Station No. 30 could be preserved or demolished as assumed for the project.

Parking

About 12,100 parking spaces would be developed in the Project Area in association with the various land uses assumed./55/ About 3,750 spaces would be in Mission Bay North and about 8,350 in Mission Bay South. Most or all of the parking would be within buildings that include other uses, rather than in separate parking structures.

Open Space and Wetlands

Open space would be emphasized in this alternative. There would be 48.3 acres of open space (11 acres north of the Channel, and 37.3 acres south of the Channel); an additional 20 acres would be developed as wetlands in Mission Bay South. The wetlands would be developed northwest of Fourth and Owens Streets and southeast of Third and Mission Rock Streets, as shown in Figure VIII.C.1. Because the Project Area boundaries have been changed since preparation of the 1990 FEIR, the approximately 12 acres of surface water in China Basin Channel that were part of the Project Area in the 1990 FEIR are not part of the alternatives analyzed in this SEIR. Similarly, the 13.6-acre wetland on port property east of Third Street also is not part of this alternative.

ENVIRONMENTAL ASSESSMENT

The significant impacts of Alternative 3 for visual quality and urban design; air quality including toxic air contaminants; seismicity; health and safety; contaminated soils and groundwater; and hydrology and water quality would be similar to or the same as those of the proposed project. Therefore, mitigation measures for these environmental issues under Alternative 3 would be the same as those described in Chapter VI for the project. Other impacts and mitigation measures would vary from those of the proposed project in the area of vegetation and wildlife, traffic, and toxic air contaminants. These similarities and differences, discussed for each topic, are summarized at the end of this section on Alternative 3.

Plans, Policies, and Permits

Alternative 3 would change the existing plans and policies framework governing the Project Area. As with the project, Alternative 3 would require that the 1990 *Mission Bay Plan* be amended to change land use designations, zoning controls, and other land use policies to accommodate potential development.

Since Alternative 3 assumes that UCSF would not locate its major new site in the Project Area, the City would not need to prepare amendments to the General Plan or the City Planning Code incorporating the new site into relevant plan and policy documents.

Development on port property would be subject to the Port of San Francisco's *Waterfront Land Use Plan*. Development of the wetlands east of Third Street would require removal of an existing boat storage yard. Any development activities, including alterations to the Channel, within a 100-foot shoreline band inland from the mean high tide line would be subject to review and permitting by the Bay Conservation and Development Commission (BCDC).

Land Use

Project Area

Alternative 3 would develop the Project Area under the land use districts of Alternative B of the 1990 FEIR, as shown in Figure VIII.C.1. Alternative 3 includes 10,000 units of housing, 48 acres of open space, and 20 acres of wetlands at build-out. It would continue the trend of converting deteriorating and low-intensity industrial areas near the waterfront to new uses, as the proposed project would. Effects on the surrounding communities that relate to the overall development of the Project Area would be similar under this alternative as for the project except for effects on the port property between Piers 54 and 64.

For the project and under this alternative, almost all buildings would be demolished over time and the Channel Pump Station would be retained and not altered. Under this alternative, the street system would be modified substantially, and Fourth Street would be reconfigured as a major thoroughfare as would occur for the project. Fire Station No. 30 could be preserved or demolished.

Development under this alternative would change the mix and amount of uses in the Project Area. Uses would be primarily residential and open space compared with the proposed project's mix of commercial industrial, institutional (UCSF), and residential. Mission Bay North would not become a year-round regional destination center since the project's regional entertainment center of year-round use would not be created. A 500-room hotel would not be developed. Full build-out of the land use districts under Alternative 3 would allow for about 67% more residential development compared with the project, for a total of about 10,000 dwelling units. More intense residential development would occur in Mission Bay North, and a variety of residential densities and open space and wetlands would be developed in Mission Bay South. While this alternative would result in substantially more residents in the Project Area, it would result in fewer jobs.

As with the project, this alternative includes residential development in Mission Bay South located south of port property east of Third Street, where petroleum free product contamination has been identified. A school site southwest of 16th and Owens Streets would be adjacent to residential uses to the east and open space to the north and I-280 to the west.

Surrounding Areas

This alternative would maintain the existing relative isolation of the Mission Creek houseboat community. Under this alternative, the houseboat community would be surrounded by wetlands, other open space, and community facilities (including the existing Channel Pump Station). As under the proposed project, residents of the houseboat community would see an increase in convenient retail stores and personal services.

Increased pedestrian and auto traffic in the South of Market Nearby Area would occur in tandem with build-out of the Project Area under this alternative as with the project.

Compared to the proposed project, there would be more retail development, including entertainment-oriented retailing, restaurants, and bars in the South of Market Nearby Area (including South Beach and South Park) under Alternative 3 because the retail-entertainment complex in Mission Bay North would not be developed in the Project Area. Demand associated with the Giants Ballpark would be satisfied by retail development elsewhere in the vicinity. In addition, there would be more demand in surrounding areas for city-serving retail development oriented to both Mission Bay and the broader market area under Alternative 3 than would be the case under the proposed project. Because the Project Area would not provide sites for large amounts of this larger-scale retail development, there would be more of it in other suitable locations such as South of Market, Showplace Square, North Portrero, Lower Portrero, Central Bayfront, South Bayshore, and Inner Mission locations. Many of these locations have already experienced some of this type of development over the last five to ten years.

Existing recreational facilities north of the Channel, such as South Beach Harbor, would be affected by the increased number of pedestrians in the area at any one time, primarily since a larger number of residents would be present during weekends. Users of the recreational waterfront facilities south of the Channel would primarily compete for access with residents of the Project Area. Under this alternative, the number of residents accessing existing recreational facilities potentially could be about 67% more than under the project.

Under this alternative, the Port would develop boat trailer parking directly across Terry A. François Boulevard from the Public Boat Launch Ramp between Piers 52 and 54. Under the project it is likely that the parking would be located farther away just south of The Common, although it would be located within 600 feet of the ramp as required under a California Department of Boating and Waterways grant. The development of a wetlands east of Third Street requires removal of an existing boat storage yard on port property. The Port's *Waterfront Land Use Plan* would allow new open space and public access, the retention of existing maritime recreational uses, and new small-scale commercial and accessory retail uses in this area. The wetlands in this area would provide new open space.

Under this alternative, Project Area employees might park on streets on Potrero Hill and Lower Potrero; however, the number of employees would be about one-fifth that of the project. Thus, employee spillover parking from this alternative would be less than under the project.

Business Activity, Employment, Housing, and Population

Project Area Employment and Job Opportunities

Build-out of Alternative 3 would result in only about 20% of the total Project Area employment accommodated by the project. Table VIII.C.1 presents the employment estimates by business activity. Of the approximately 6,550 jobs expected under this alternative, almost all (95%) would be in Mission Bay South. Without the UCSF site and associated business activity that the proposed project offers to the Project Area and to San Francisco, there would be fewer total job opportunities and less diversity in job options for City residents under Alternative 3.

While there would be no UCSF site or hotel in Mission Bay South, there would be some office activity, representing the largest share of jobs under this alternative, as well as some service, light industrial, and R&D activity. Under Alternative 3, the South of Channel area would accommodate a substantial amount of retail development and employment, although not as much moderate-scale retail as envisioned for the proposed project. In Mission Bay North, there would be only a small amount of retail business activity and some service and support jobs for the residential development.

Implications for Existing Project Area Business Activity

As under the proposed project, there would not be sites in Mission Bay under this alternative for many of the types of businesses now operating there. The transition would be gradual and would be an expected element of the pattern of land use change in this part of the City. A few existing

TABLE VIII.C.1
ALTERNATIVE 3: EMPLOYMENT BY LAND USE AT BUILD-OUT

	Alternative 3				Comparison with Proposed Project	
Land Use/Business Activity/a/	**North of Channel**	**South of Channel**	**Total**	**Percent of Total**	**Total for Proposed Project**	**Alternative vs. Project**
Office	—	3,450	3,450	53%	8,790	-61%
Service/Light Industrial/R&D/a/	—	1,280	1,280	20%	6,520	-80%
UCSF Site	—	—	—	—	9,100	—
Retail	230	640	870	13%	4,310	-80%
Hotel	—	—	—	—	370	—
Community Facilities/Parkland	1	373	374	6%	254	47%
Building Maintenance/Security/Parking	6	162	169	3%	410	-59%
Housing-related	150	260	410	6%	240	71%
TOTAL	**388**	**6,165**	**6,553**	**100%**	**29,994**	**-78%**
Percent of Total	**6%**	**94%**	**100%**			

Notes:
— = Not applicable.
For consistency with current Project Area boundaries, employment associated with the Caltrain terminal is not included in this table.
a. For consistency with current Project Area boundaries, includes non-Catellus property fronting on Third Street, south of 16th Street. Likely development for this site would be S/LI/RD space comparable to that across Third Street to the east.

Source: Hausrath Economics Group.

businesses, particularly those with substantial investments in buildings or equipment and businesses requiring large amounts of open land, might have difficulty finding suitable sites elsewhere in the City.

Project Area Housing, Households, Population, and Employed Residents

Alternative 3 emphasizes housing and open space. At build-out, there would be 10,000 units developed in the Project Area, over 60% more than under the proposed project. Table VIII.C.2 shows the associated population and employed residents estimates for the alternative. The housing units and households would accommodate 18,600 residents, of whom 11,200 would be working.

Relationship Between Project Area Employment Growth and Housing Development and Implications for Citywide Housing Market Conditions

The Project Area employment and housing estimates presented above for Alternative 3 represent build-out of Alternative 3. The updated jobs/housing analysis used for the proposed project and the other alternatives was also applied to Alternative 3./56/ Table VIII.C.3 presents the results of the comparison of housing demand in San Francisco, associated with Project Area employment growth, to Project Area housing supply.

Consistent with its intent, Alternative 3 would provide a substantial surplus of housing supply relative to the housing demand in San Francisco associated with employment growth under the alternative. Employment growth accommodated in the Project Area under Alternative 3 would result in demand for about 1,700 housing units in San Francisco, less than 20% of the demand associated with the larger amount of employment growth under the proposed project. The alternative would provide 10,000 housing units — over 60% more than would the proposed project.

The jobs/housing surplus calculated for Alternative 3 would result in a more favorable housing market condition for some segments of the housing market in San Francisco than would the situation identified for the proposed project. For market-rate housing, because there would be more housing supply relative to demand, vacancy rates would be higher, and there would be greater mobility compared with the housing market situation under the proposed project. In the longer term, prices and rents for market-rate housing would be more stable than would be the case under the proposed project.

For housing affordable to very low-, low-, and moderate-income households, market conditions would be worse, and there would be fewer affordable housing options under Alternative 3 compared with the

TABLE VIII.C.2
ALTERNATIVE 3: HOUSING UNITS, POPULATION, AND EMPLOYED RESIDENTS AT BUILD-OUT

	Alternative 3			Comparison with Proposed Project	
	North of Channel	South of Channel	Total	Total for Proposed Project	Alternative vs. Project
Housing Units/a/	3,680	6,320	10,000	6,090	+64%
Households	3,551	6,099	9,650	5,877	+64%
Population/b/	6,268	12,339	18,607	10,855	+71%
Employed Residents/c/	3,790	7,450	11,240	6,560	+71%

Notes:
For consistency with current Project Area boundaries, the houseboats in the China Basin Channel are not included in this table.

a. All new housing units are included, even though some (about 400) were originally designated for port property east of Third Street not in the current Project Area. Those units are included in the Mission Bay South totals.

b. Number of people living in housing units built in the Project Area.

c. Residents of the Project Area who are also employed, regardless of place of work.

Source: Hausrath Economics Group.

proposed project. Without the participation of the Redevelopment Agency, there would be no mechanism that could supply the number and proportion of affordable units assumed for the proposed project.

Implications for Citywide Growth

Compared with the proposed project, Alternative 3 would result in less job growth in San Francisco, but, as would be the case under Alternative 2, the difference in job growth overall for the City would not be as great as the difference in job growth for the Project Area. This is because many of the business activities and jobs accommodated in the Project Area under the proposed project would have location options elsewhere in the City. If the business activities were not accommodated in the Project Area, there would be more growth in those other locations; office, retail, entertainment-oriented commercial, and hotel business activity not accommodated in the Project Area under Alternative 3 would instead locate in Nearby Areas. The absence of the UCSF site and associated economic activity in the Project Area under Alternative 3 would represent a loss of most, if not all, of that economic activity and job opportunity in San Francisco compared with the outcome for the

TABLE VIII.C.3
ALTERNATIVE 3: JOBS/HOUSING ANALYSIS AT BUILD-OUT

	[Formulae]	Alternative 3	Proposed Project
Demand			
A. Employment growth accommodated in Project Area/a/		4,880	28,330
B. Percent representing additional workers living in San Francisco/b/		55.0%	55.0%
C. Average number of San Francisco workers in households with workers/c/		1.6	1.6
D. Additional households associated with Project Area employment growth	[(A*B)/C]	1,678	9,738
Supply			
E. Total Project Area Housing Units at Build-out		10,000	6,090
Comparison of Supply with Demand			
Surplus or (Deficit) in Project Area	[E - D]	8,323	(3,648)

Notes:
This jobs/housing analysis is not meant to imply that there should (or ever would) be a precise match between jobs and housing for any given project area. The calculation is a useful means of evaluating the proposed project and alternatives, and it provides an indication of the implications of the land use mix for the City's housing market.

a. Total Project Area employment at build-out (6,550 jobs) minus existing Project Area employment (1,670 jobs).

b. Keyser Marston Associates, Inc. and Gabriel Roche, Inc., *Jobs Housing Nexus Analysis, City of San Francisco*, July 1997, pp. 51 - 52.

c. Keyser Marston Associates, Inc. and Gabriel Roche, Inc., *Jobs Housing Nexus Analysis, City of San Francisco*, July 1997, pp. 49 - 50.

Source: Hausrath Economics Group.

proposed project. Moreover, under this alternative, in addition to UCSF and associated economic activity, some other business activity not accommodated in the Project Area might also choose a location outside San Francisco, rather than competing for limited space in Nearby Areas. Most of this other employment growth would find a location in San Francisco, as described above, however.

On the housing side, the results are reversed. Alternative 3 would provide more total housing supply in San Francisco than would the proposed project. There are not many other location options in the City for the large amount of new housing that could be accommodated in the Project Area, so similar numbers of units would not be provided elsewhere in the City if they were not built in the Project Area. On the other hand, Alternative 3 would result in fewer affordable housing units in San Francisco than would be the case under the proposed project.

Implications for Nearby Areas

Alternative 3 would result in more office and commercial industrial activity in South of Market and other Nearby Areas than would be the case under the proposed project. There would be very little Project Area office development under Alternative 3 to compete with new office development districts such as the Transbay area. Similarly, without the flexible Commercial Industrial development envisioned for Mission Bay South under the proposed project, Alternative 3 would result in more demand pressure on existing space in the South of Market, North Potrero, Potrero Hill, Inner Mission, and Central Bayfront Nearby Areas from new and growing business activities. Higher rents for that space, compared to the situation under the proposed project, would mean fewer space options for lower-rent paying uses in Nearby Areas.

This demand pressure would be compounded in the South of Market area by the pressure for retail expansion under Alternative 3. There would be very little retail development in Mission Bay North under Alternative 3 to accommodate the demand expected as a result of San Francisco Giants Ballpark activities. Therefore, compared to the situation with the proposed project's large amounts of retail and entertainment-oriented commercial development, there would be more retail development in Nearby Areas, including South Beach, other South of Market locations, and at sites along the waterfront to both the north and south of the Project Area.

The results for the housing market situation in Nearby Areas would not be as pronounced. Under Alternative 3, there would be less demand pressure on the housing stock in Nearby Areas than would be the case under the proposed project. The larger additions to the City's housing supply under Alternative 3 would absorb more market-rate demand, resulting in less potential for some demand-induced increases in housing prices and rents than would be the case under the proposed project, those benefits would be offset in Nearby Areas by demand pressure associated with the lack of affordable housing in the Project Area compared to what would be possible under the proposed project.

Unlike the other sections discussed above, affordable housing production depends on project sponsors and available subsidies, not on market demand. Therefore, less affordable housing in the Project Area under Alternative 3 compared to the proposed project would not necessarily result in more affordable housing produced elsewhere in San Francisco. Instead, housing market conditions faced by very low-, low-, and moderate-income households seeking affordable units would be worse than expected under the proposed project, as described in the preceding section.

Visual Quality and Urban Design

Alternative 3 would represent a substantial change in visual character compared with the proposed project and other alternatives. This alternative focuses on residential and open space uses rather than the more-intense urban development associated with industrial, commercial, retail, and UCSF uses. The reduced scale of building heights and massing under Alternative 3 would create a more open street-level environment. Building heights would be in the three- to eight-story range, with a maximum height of 100 feet, instead of up to 160 feet under the proposed project. Views of downtown and the Bay Bridge would still be affected, but not to the extent shown for the proposed project.

Fire Station No. 30, located at the southeast corner of Third and Mission Rock Streets may be of historical importance and may be eligible for the National Register. As with the project, potential demolition impacts associated with the fire station could be addressed by Mitigation Measure D.2 in Section VI.D, Mitigation Measures: Visual Quality and Urban Design.

Transportation

The street network assumed for Alternative 3 is shown in Figure VIII.C.1 along with land uses. It is similar to that of the proposed project, with smaller blocks providing additional street access in the residential areas of Mission Bay South. Neither The Common, nor the east-west couplet north and south of The Common in the proposed project are included in this alternative because different and larger open space areas are provided.

Trip Generation

Alternative 3 assumes the same types of land uses as the project but substantially less commercial development and substantially larger numbers of dwelling units in the Project Area. It would result in about 14,620 fewer p.m. peak hour person trips or about 44% less than the project. Table VIII.C.4 shows the projected trip generation for Alternative 3 compared with that of the project.

Traffic Impacts

The levels of service for the 11 alternative study intersections under year 2015 cumulative with Alternative 3 conditions are shown in Table VIII.C.5. Since the trip generation for Alternative 3 would be higher than either of the previously discussed alternatives, but lower than the project's, the levels of service under this scenario are expected to be better than those under cumulative-with-project

TABLE VIII.C.4
PM PEAK HOUR PERSON TRIP GENERATION IN 2015
ALTERNATIVE 3 COMPARED TO PROJECT

Subarea	Alternative 3	Project	Difference
Mission Bay North	5,802	11,030	-5,228
Mission Bay South	13,074	22,470	-9,396
Total	**18,876**	**33,500**	**-14,624**

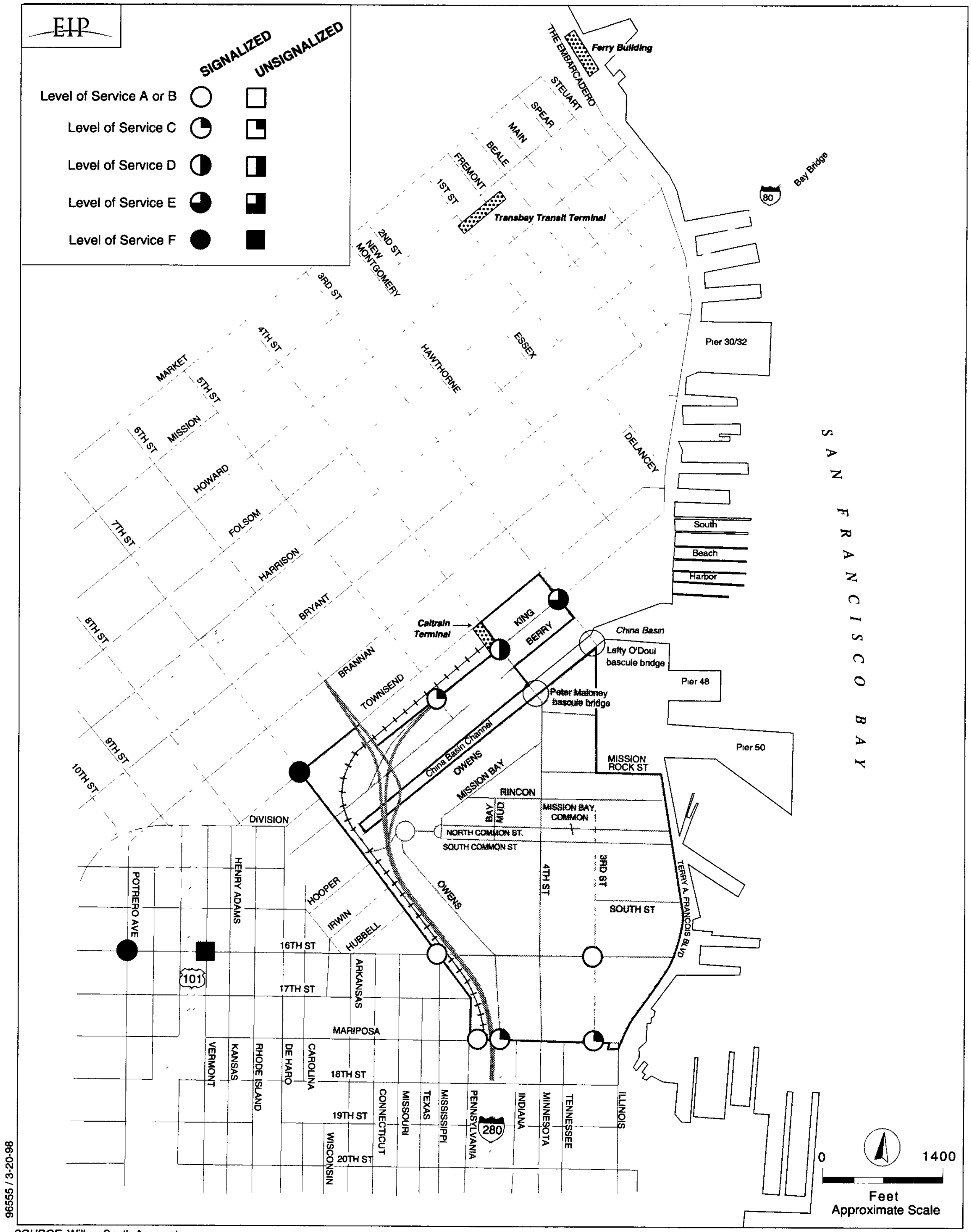
Source: Wilbur Smith Associates.

conditions but worse than under Alternatives 1 and 2. As shown in Table VIII.C.5 and Figure VIII.C.2, 7 of the 11 study intersections would continue to operate at LOS D or better under cumulative with the Alternative 3 conditions. Six of the same 11 intersections would operate at LOS D or better under project conditions. The intersection of Fourth and King Streets would operate at an acceptable LOS D under Alternative 3, in contrast to LOS E under the project scenario. All six intersections that operate at an acceptable level of service under the project conditions would operate at better levels of service under Alternative 3. The four intersections operating at LOS E or F under Alternative 3 are also included in the group of five intersections that would fail under the project scenario. The intersection of King Street at Third Street would operate at LOS E, and the intersections of Seventh and Townsend Streets, 16th Street and Potrero Avenue, and 16th and Vermont Streets would operate at LOS F. Delays would be less than those caused by the cumulative-with-project scenario, even when LOS values would be the same.

Transit Impacts

Table VIII.C.6 compares the transit trip generation of the project to that of Alternative 3. As Alternative 3 would include substantially less office, R&D, and instruction/research space than described under the project scenario and no major institutional space, it would generate fewer transit trips than the project.

Table VIII.C.6 shows that in 2015 there would be relatively small differences in numbers of inbound transit trips between Alternative 3 and the proposed project compared to the difference in total outbound trips. The smaller amount of office/research and development space included in



SOURCE: Wilbur Smith Associates

MISSION BAY SUBSEQUENT EIR

FIGURE VIII.C.2 YEAR 2015 CUMULATIVE LEVELS OF SERVICE WITH ALTERNATIVE 3 AT SELECTED INTERSECTIONS, WEEKDAY P.M. PEAK HOUR

**TABLE VIII.C.5 ●
INTERSECTION LEVELS OF SERVICE
ALTERNATIVE 3 COMPARED TO PROJECT
(PM Peak Hour 2015 Cumulative Conditions)**

	2015 Cumulative with Project		2015 Cumulative with Alternative 3	
Study Intersection	Avg. Delay (sec./veh.)	LOS	Avg. Delay (sec./veh.)	LOS
Third St./King St.	99.1	F	41.8	E
Fourth St./King St.	52.1	E	38.2	D
Fifth St./King St.	28.4	D	18.3	C
Seventh St./Townsend St.	195.3	F	122.9	F
Sixteen St./Potrero Ave.	162.7	F	85.7	F
Sixteenth St./Vermont St.	200.4	F	137.8	F
Sixteenth St./Seventh St.	32.2	D	8.8	B
Sixteenth St./Third St.	25.2	D	11.9	B
Mariposa/I-280 On-ramp	16.6	C	14.5	B
Mariposa/Owens St./I-280 Off-ramp	35.9	D	20.4	C
Third St./Mariposa St.	23.7	C	15.0	C

Source: Wilbur Smith Associates.

Alternative 3 would produce substantially fewer outbound trips than inbound trips (17% versus 83%), compared with the project, during the afternoon peak commute period.

Because Alternative 3 would generate fewer total regional transit trips than the project, the impact of these trips would also be less than the project's impact. The number of BART riders generated by Alternative 3 in 2015 would be about 50% of that generated by the proposed project, suggesting that 2015 BART capacity would be sufficient to accommodate Alternative 3 ridership. Similar to Alternative 2, Alternative 3 would generate about 220 AC Transit riders, approximately half the number that would be generated under the proposed project. This ridership would be accommodated on the existing AC Transit service, and would contribute less to cumulative excess demand on AC Transit in the future. Cumulative ridership on AC Transit with this alternative would increase the load factor to about 152% compared with 157% with the project; the alternative would contribute

TABLE VIII.C.6
PM PEAK HOUR TRANSIT PERSON TRIPS DISTRIBUTION BY TRANSIT MODE
ALTERNATIVE 3 COMPARED TO PROJECT IN 2015

	Alternative 3		Project		Difference	
Transit Mode	**In**	**Out**	**In**	**Out**	**In**	**Out**
BART	340	284	459	725	-119	-441
AC Transit	106	112	142	293	-36	-181
Charter Bus	24	31	45	115	-21	-84
G.G. Bus	9	31	107	228	-98	-197
Ferry	2	7	23	49	-21	-42
SamTrans	20	35	45	143	-25	-108
Caltrain	48	77	106	305	-58	-228
MUNI Bus /a/	759	497	856	931	-97	-434
MUNI Metro /a/	1,457	1,167	1,806	2,859	-349	-1,692
Total	**2,765**	**2,241**	**3,589**	**5,648**	**-824**	**-3,407**

Note:
a. MUNI ridership levels represent persons using MUNI as their primary travel mode, as well as those using MUNI to access regional carriers, such as BART, AC Transit, Golden Gate Transit, ferries and SamTrans.

Source: Wilbur Smith Associates.

somewhat less than the project's contribution to the cumulative ridership. This would be a significant cumulative impact. Sufficient capacity would exist on the Golden Gate Transit bus system, where the ridership that would be generated by Alternative 3 would be approximately 12% of that produced under the project. Similarly, estimated Alternative 3 ferry ridership would be approximately 13% of that generated by the proposed project, causing no significant impacts. SamTrans Alternative 3 ridership would be about 30% of that generated by the project scenario, while Caltrain would carry about 30% of the Mission Bay riders than would be generated by the proposed project. Neither SamTrans nor Caltrain would experience a significant impact under this alternative. Charter buses are expected to carry approximately 35% of the trips that would be produced under the project scenario.

Table VIII.C.7 shows the year 2015 cumulative Alternative 3 MUNI screenline analysis compared with that of the project. The table shows the slightly smaller MUNI capacity that would be used

TABLE VIII.C.7
MUNI RIDERSHIP SUMMARY BY SCREENLINE
YEAR 2015 CUMULATIVE WITH ALTERNATIVE 3 AND WITH PROJECT
(PM Peak Hour - Peak Direction)

		Existing Conditions			Year 2015 Cumulative with Alternative 3 Conditions						Year 2015 Cumulative with Project Conditions					
Screen-line/a/	Year 2015 MUNI Routes	Hourly Capacity /b/	Average Hourly Load/c/	Percent Capacity Used	Hourly Capacity /d/	New Cumu-lative Trips /e/	Cumu-lative Trips	Project Trips /f/	Average Hourly Load	Percent Capacity Used	Hourly Capacity /d/	New Cumu-lative Trips /e/	Cumu-lative Trips	Project Trips /f/	Average Hourly Load	Percent Capacity Used
Northeast	30, 30X, 45	3,387	2,256	67%	2,761	902	3,158	115	3,273	119%	2,761	902	3,158	230	3,388	123%
	41, 42X	1,733	877	51%	1,481	351	1,228	75	1,303	88%	1,481	351	1,228	149	1,377	93%
	Subtotal	*5,120*	*3,133*	*61%*	*4,242*	*1,253*	*4,386*	*190*	*4,576*	*108%*	*4,242*	*1,253*	*4,386*	*379*	*4,765*	*112%*
Northwest	38, 38L, 38AX, 38BX	2,823	1,986	70%	3,149	794	2,780	24	2,804	89%	3,149	794	2,780	48	2,828	90%
	1, 1AX, 1BX, 2, 3, 4, 5, 21, 22, 31,31AX, 31BX, 41, 45	7,679	5,537	72%	8,152	2,215	7,751	43	7,794	96%	8,152	2,215	7,751	85	7,836	96%
	Subtotal	*10,502*	*7,523*	*72%*	*11,301*	*3,009*	*10,531*	*67*	*10,598*	*94%*	*11,301*	*3,009*	*10,531*	*133*	*10,664*	*94%*
Southwest	K, L (MMX), M, N	6,783	4,876	72%	7,140	1,950	6,826	159	6,986	98%	7,140	1,950	6,826	290	7,116	100%
	6, 7, 71, F	1,418	1,096	77%	1,607	438	1,534	23	1,557	97%	1,607	438	1,534	46	1,580	98%
	Subtotal	*8,201*	*5,972*	*73%*	*8,747*	*2,388*	*8,360*	*182*	*8,543*	*98%*	*8,747*	*2,388*	*8,360*	*336*	*8,696*	*99%*
Southeast	J, 9	1,717	1,243	72%	1,895	497	1,741	84	1,825	96%	1,895	497	1,741	163	1,904	100%
	15	846	331	39%	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
	3rd. St. LRT Extension	N/A	N/A	N/A	1,190	132	464	148	612	51%	1,190	132	464	295	759	64%
	14, 14X	1,491	941	63%	1,538	377	1,318	62	1,380	90%	1,538	377	1,318	124	1,442	94%
	Subtotal	*4,054*	*2,515*	*62%*	*4,623*	*1,006*	*3,523*	*294*	*3,817*	*83%*	*4,623*	*1,006*	*3,523*	*582*	*4,105*	*89%*

Notes:

a. See Figure V.E.6 for Screenline location.
b. Capacity based on *San Francisco Municipal Railway Ridership Projections* to the Year 2015, May 5, 1997. It assumes an appreciable number of standees per vehicle (somewhere between 60% and 80% of the number of seated passengers, depending on the specific transit vehicle configuration) and may not include the effects of missed or late runs.
c. Average load at maximum load point, based on MUNI's monitoring data, FY 1995-96.
d. Capacity includes the elimination of bus lines 15, 32 and 81X, plus implementation of the MMX and the 3rd St. Extension LRT Services, and any other influencing modifications to service, equipment or operation.
e. Estimated from MTC Model projections and preliminary load estimates from MUNI Third Street LRT Extension Study.
f. Estimated number of project trips that would cross the screenlines.

Source: Wilbur Smith Associates.

under the less developed Alternative 3 in 2015 compared with that used under the proposed project. Similar to the previously discussed alternatives, the greatest increase in MUNI ridership would occur crossing the Northeast screenline.

The greatest use of capacity would be experienced at the Northeast screenline, where cumulative demand with the project is expected to greatly exceed capacity as with the project. Passengers traveling through the Southwest screenline are projected to use approximately 98% of capacity essentially the same as with the project. This level of use would cause some transit riders to find the least crowded line traveling to their destination, creating an equilibrium between lines serving the same direction and providing similar levels of service. However, this behavior is largely dependent upon the convenience offered by alternate MUNI lines to each individual, as well as personal preferences of these riders.

The larger amount of residential space in Alternative 3, which would generate primarily inbound trips, explains the larger ratio of inbound to outbound trips for MUNI buses in the alternative as seen in Table VIII.C.6. The lesser proportion of outbound trips is also reflected in the alternative's smaller impact on MUNI screenlines than would be seen if the ratio of outbound to inbound trips were similar to that of the proposed project.

A comparison of Alternative 3 with the proposed project suggests that the project would use approximately 2.4% more MUNI corridor capacity than Alternative 3. The corresponding impact of Alternative 3 and the project on MUNI service at the screenlines would be similar.

Many Mission Bay workers, visitors, and residents would ride MUNI to and from regional transit stops or transfer to other MUNI lines within the screenlines. These trips would occur near the Mission Bay Project Area, where Alternative 3 would impact MUNI service less than the project. MUNI riders generated by Alternative 3 would use approximately 39% less capacity than MUNI trips generated by the project scenario—a difference of approximately 2,380 p.m. peak trips.

Overall, impacts on MUNI from Alternative 3 would be essentially the same as those of the project at the citywide screelines, and would be less than impacts of the project on MUNI lines leading from the Project Area to regional and MUNI transfer points near Market Street.

Parking Demand and Supply

Table VIII.C.8 shows the parking demand for Alternative 3 compared to that for the project. The alternative would include less development in Mission Bay South, mostly of retail and residential,

TABLE VIII.C.8
PARKING DEMAND/SUPPLY IN 2015
COMPARISON OF ALTERNATIVE 3 AND PROJECT

	Total Demand (spaces)	Proposed Supply/a/ (spaces)	Surplus or Shortage
Alternative 3: Residential/Open Space Alternative			
Mission Bay North	5,050	3,760	-1,290
Mission Bay South	11,390	8,168	-3,222
Total	**16,440**	**11,928**	**-4,512**
Project			
Mission Bay North	6,585	5,454	-1,131
Mission Bay South	19,540	15,917	-3,623
Total	**26,125**	**21,371**	**-4,754**

Note:
a. Parking supply rates for Alternative 3 are those presented in 1990 FEIR, Volume Two, Table VI.E.29, p. VI.E.185.

Source: Wilbur Smith Associates.

than the project. This difference in level of development results in the difference in parking demand between Alternative 3 and the project. In essence, the difference in retail land use translates to short-term parking demand, and the presence of residential or R&D/office and institutional land uses translates to long-term parking demand. Alternative 3 would create a smaller demand for parking spaces for short-term parking but a slightly greater demand for long-term parking in Mission Bay North; in Mission Bay South parking demand would be substantially smaller than that from the project.

The parking supply for Alternative 3 is based on the same rates used for Alternative 1 and described in the 1990 FEIR, Table VI.E.29. The parking supply compared to the demand under Alternative 3 yields a parking deficit that is only 242 spaces (5%) less than the deficit described for the proposed project. Therefore, the effects of a parking deficit in Alternative 3 would be very similar to those described for the project.

On-street parking would be able to accommodate some of the excess demand of Alternative 3, similar to the project, but it would be limited enough to discourage some individuals from driving to the Project Area. However, some drivers to and from Mission Bay South may seek available parking in surrounding neighborhoods, including nearby commercial/industrial areas as well as residential areas in the Potrero Hill and Lower Potrero neighborhoods.

Pedestrians and Bicyclists

Table VIII.C.9 shows the non-motorized p.m. peak hour person trips generated by Alternative 3 compared to the proposed project. The most notable result shown in Table VIII.C.9 is the relatively small difference in pedestrian and bicycle trips in Mission Bay South. This is due to the greater amount of residential development included in Mission Bay South under Alternative 3 than in the project. The analysis assumes that trips generated by residential development have a substantially larger pedestrian and bicycle mode share than trips generated by other land uses, as for the project and all other alternatives. Because Mission Bay South under Alternative 3 includes about 3,200 more dwelling units than is proposed in the project, this area would generate a relatively large number of pedestrian and bicycle trips when compared to the project. Overall, Alternative 3 would generate about 13% fewer pedestrian and bicycle trips. In Mission Bay North, where crosswalks could be crowded near the MUNI MMX platform and the Caltrain terminal, Alternative 3 would generate about 28% fewer pedestrians and bicycle trips than would the project; therefore, pedestrian levels of service would remain at acceptable levels.

Air Quality

Regional Air Quality

In Alternative 3, vehicular emissions would be approximately 40% less than those from the proposed project. However, criteria pollutant emissions associated with daily peak vehicle trips would still exceed the significance thresholds established by the Bay Area Air Quality Management District (BAAQMD), and this alternative would not eliminate the significant regional air quality impact of the proposed project. Daily emissions from the Project Area traffic of reactive organic gases (ROG), nitrogen oxides (NO_x), carbon monoxide (CO), and particulate matter (PM_{10}) were calculated for this alternative. As indicated in Table VIII.C.10, vehicular emissions of ROG, NO_x, and PM_{10} would exceed the 80 lb/day significance threshold. Emissions of ROG were estimated to be 523 lb/day. NO_x emission was estimated at 800 lb/day, and PM_{10} emission was estimated at 1,189 lb/day. In addition, according to the modeling analysis, 7,387 lb/day of CO would be emitted from traffic associated with this alternative, exceeding the 550 lb/day screening threshold of the BAAQMD.

TABLE VIII.C.9
NON-MOTORIZED (Pedestrians and Bicycle) PERSON TRIP GENERATION IN 2015
COMPARISON OF ALTERNATIVE 3 AND PROJECT
(PM Peak Hour)

Subarea	Alternative 3	Project	Difference
Mission Bay North	1,474	2,040	-566
Mission Bay South	2,718	2,763	-45
Total	4,192	4,803	-611

Source: Wilbur Smith Associates.

Because CO emissions would be more than 550 lb/day, micro-scale analysis of CO concentrations at intersections is appropriate, as provided below.

As with the proposed project, all measures to decrease vehicle trips, as described for transportation, should be implemented. However, even with measures to reduce vehicle trips, the regional air quality impacts would remain significant, as they would under the proposed project.

Local CO Concentrations

Modeling results of local carbon monoxide concentrations at worst-case (maximally exposed) receptor locations were studied at four intersections. Figure VIII.A.4 shows the intersections selected for modeling for all three alternatives. Results indicated that no exceedances of federal or state one-hour or eight-hour standards (e.g., significant impacts) would occur as a result of traffic emissions associated with Alternative 3. Table VIII.C.11 provides the modeling results.

Four of the 13 intersections modeled in the proposed project were selected for analysis for Alternative 3, based on their relatively elevated CO concentrations for the proposed project. Figure VIII.A.4 shows the four intersections selected for comparison to the proposed project. Modeling results indicate that CO concentrations would be slightly less for Alternative 3 compared to the proposed project. Concentrations would be higher for Alternative 3 at the intersections of Fourth and Bryant and Eighth and Townsend. At the Eighth and Townsend Streets intersection, a one-hour exposure concentration of 10.3 parts per million (ppm) was estimated for the alternative. The concentration for this intersection in the proposed project was 9.9 ppm. For the remainder of the intersections modeled for both the project and the alternative, differences in modeling results for one-hour CO

TABLE VIII.C.10
ESTIMATED VEHICULAR EMISSIONS FROM ALTERNATIVE 3 TRAFFIC IN 2015

Pollutant	BAAQMD Threshold (lb/day)	Vehicular Emissions (lb/day)	
		Project	Alternative 3
Reactive Organic Gases (ROG)/a/	80	865	523
Nitrogen Oxides(NO_x)/a/	80	1,324	800
Particulate Matter (PM_{10})/a/	80	1,968	1,189
Carbon Monoxide (CO)/b/	550	12,228	7,387

Notes:
a. The BAAQMD regards this amount of emissions as a threshold of significance for a regional impact.
b. For carbon monoxide, the BAAQMD does not regard 550 lb/day as a threshold of significance, but rather, an indicator to perform microanalysis.

Source: EIP Associates. Based on modeling using the California Air Resources Board's URBEMIS version 5 model.

concentrations ranged from 0.4 to -1.6 ppm. For example, the highest one-hour CO concentrations were indicated at the intersection of Third and King Streets. Concentrations of 14.3 ppm and 12.0 ppm were estimated for the proposed project and Alternative 3, respectively. For eight-hour CO concentrations, differences between results ranged from 0.6 to -1.6 ppm. The greatest difference occurred at the intersection of Third and 16th Streets.

Toxic Air Contaminant Emissions

Alternative 3 has much more housing than the proposed project, Alternative 1, or Alternative 2. Alternative 3 has much less Service/Light Industrial/Research and Development than the corresponding Commercial Industrial and UCSF uses for the proposed project or the Service/Light Industrial/Research and Development/Office uses for Alternative 1 or Alternative 2. Therefore, Alternative 3, on the whole, has much less potential to emit toxic air contaminants from stationary sources than the proposed project or Alternatives 1 or 2. Since vehicle trips associated with Alternative 3 would be approximately 40% less than for the proposed project, toxic air contaminant emissions from vehicles would be correspondingly less for Alternative 3, compared to the project.

Whereas state law provides a mechanism to ensure that the school siting process considers potential exposure to toxic air contaminants, preschool and child care facilities would not be subject to

TABLE VIII.C.11
ESTIMATED LOCAL CARBON MONOXIDE CONCENTRATIONS AT SELECTED INTERSECTIONS FOR ALTERNATIVE 3 IN 2015

	CO Concentrations (ppm)			
	Proposed Project/a/		Alternative 3	
Intersection	One-Hour	Eight-Hour	One-Hour	Eight-Hour
3rd and 16th	11.0	6.3	9.9	4.7
3rd and King	13.6	7.6	12.0	6.8
4th and Bryant	8.3	5.3	8.6	5.3
8th and Townsend	9.9	5.4	10.3	6.0

Notes:
ppm = parts per million
a. Refer to Table V.F.5 and associated text in Section V.F, Air Quality.

Source: EIP Associates.

California's school siting process. These facilities could be operated near or among the Service/Light Industrial/Research and Development uses. A measure such as Mitigation Measure F.6 proposed for the project would be needed to ensure that preschool and child care facilities would consult with agencies regarding potential risks and that the BAAQMD would have the opportunity to request updated emissions inventories from facilities emitting toxic air contaminants if a preschool or child case center locates within 1,640 feet of such a facility.

In sum, even though the toxic air contaminant emissions from stationary sources in Alternative 3 would likely be much less than for the proposed project, toxic air contaminant emissions from multiple facilities could combine to increase risks; therefore this SEIR conservatively characterizes toxic air contaminant emissions from Alternative 3 as a potentially significant impact. All of the mitigation measures for the project would be appropriate for Alternative 3, except Measure F.4 could be modified so that the meteorological station would be located near the potential Service/Light Industrial/Research and Development uses in the southern portion of the project area.

Demolition and Construction Air Pollutant Emissions

Criteria Pollutants

Criteria pollutants emissions, primarily in the form of PM_{10}, would be a less-than-significant impact after implementing BAAQMD-approved dust mitigation measures for demolition and construction activities as they would under the proposed project.

Contaminated Soils

As for the proposed project, excavation could result in the generation and release of dust containing toxic air contaminants to the air and adverse impacts on construction workers and the public. Potential impacts for Alternative 3 would be the same as for the project, and would be mitigated through implementation of risk management plans, as explained under "Contaminated Soils and Groundwater," below.

Noise and Vibration

A qualitative analysis of the traffic volumes for the noise study locations shows that Alternative 3 would have lower traffic volumes at most intersections compared to the proposed project with the exception of the intersection of Mariposa and DeHaro Streets. Therefore, this alternative would have correspondingly smaller traffic noise increases. Alternative 3 traffic volumes at the study locations of Potrero Avenue south of Sixteenth Street, and Pennsylvania Street south of Mariposa Street would be the same as those for the proposed project resulting in the same level of noise increase as shown for the project.

A slight increase in project traffic volume was projected for the intersection of Mariposa and De Haro Streets. Noise analysis of project traffic showed that traffic increases would contribute to an increase in peak hour and daily noise levels at existing sensitive receptor and residential locations, as well as at sites of potential future sensitive receptors, but that the contribution would not be noticeable to most individuals at most locations. To further assess the potential traffic noise impacts of Alternative 3, a quantitative analysis was performed at the sensitive receptor location at Mariposa and De Haro Streets.

Traffic volume data for the alternative were analyzed using the same SOUND 32 model that was used for the proposed project. This alternative's 24-hour L_{dn} would be 65.6 dBA, about 0.9 dBA greater than the traffic noise increase with the proposed project. Alternative 3 traffic plus cumulative traffic in 2015 would increase 24-hour L_{dn} noise levels by up to 2.2 dBA at the church on Mariposa Street at De Haro Street in contrast to the 1.3 dBA increase from traffic in the proposed project. The 1-hour L_{eq} for p.m. peak hour traffic noise under cumulative 2015 conditions with Alternative 3 would be 66.0 dBA, compared with 65.6 dBA under the proposed project traffic conditions. Alternative 3 traffic would contribute about 1.6 dBA to the overall 2.2 dBA 1-hour noise increase. This would be about 0.4 dBA greater than the 1-hour noise increase from the proposed project. As with the project, the change from 64.0 dBA L_{eq} existing traffic noise levels to 66.0 dBA L_{eq} under cumulative conditions with Alternative 3 would not be noticeable to most individuals and would not interrupt church activities.

As with the proposed project, this alternative's traffic noise impacts would be less than significant. Alternative 3 would have residential uses in most of the Project Area, including in upper stories along Third Street and 16th Street where light rail and heavy rail could cause vibration in Mission Bay South, and along Fourth Street and King Street in Mission Bay North adjacent to light rail tracks. The vibration effects along the Third Street light rail route and along the MUNI Metro Extension tracks in King Street would be the same as those described for the project in residential areas along Third and Fourth Streets. Assuming that the residential buildings would be concrete construction on pile foundations, similar to those expected in the project, vibration effects from light rail vehicles would not be significant.

Freight trains operating in 16th Street would cause greater vibration than would light rail vehicles and would be more noticeable to the residents in buildings facing this street. As described for the project, freight trains use these tracks late at night (generally between 1 a.m. and 4 a.m.) to travel from the main tracks to Port of San Francisco piers south of the Project Area. Because freight rail use is relatively infrequent, as explained for the project in "Vibration" in Section V.G, Noise and Vibration, vibration effects would not be considered to be significant impacts on residents in the area.

The residential buildings located west of Sixth Street and north of Berry Street in Mission Bay North would be adjacent to the Caltrain passenger train tracks and would experience the same vibration effects as for the project. The same mitigation measure, G.2, in Section VI.G, Mitigation Measures: Noise and Vibration, would apply to this block under Variant 3.

Seismicity

Effects of Groundshaking

The Project Area under Alternative 3 would be subject to the same seismic conditions described in the Subsection V.H, Seismicity: Setting: a 67% probability of at least one major earthquake within the 30-year period between 1990 and 2020; anticipated peak ground accelerations in excess of 0.5g; liquefaction and earthquake-induced settlement of some fill.

In this alternative, the entire Project Area would be built out and developed with new buildings to include about 67% more residential space, 80% less commercial/office space, and 80% less retail space than the proposed project. As would be required by the San Francisco Building Code in force at the time each building permit application was filed, site-specific modeling to establish design parameters for the seismic-restraint systems to be built into foundations and structures in the Project Area would be incorporated to prevent life-threatening damage from structural elements of buildings and utility lines (twisting, breakage, debris shedding) and from associated seismically induced ground failure, such as liquefaction (tilting or settlement). Therefore, the seismicity impact would be less than significant after the proposed project's mitigation measures were implemented, as it would be under the proposed project. If Fire Station No. 30 is re-used for a fire or fire and police station in this alternative, it would need seismic upgrades.

Seismic Hazard Zones

The Project Area is in a Liquefaction Hazard Zone. Because this alternative would develop all buildings within the Project Area according to San Francisco Building Code, the potential effects of liquefaction would be the same as the less-than-significant impacts of the proposed project. It is assumed in this alternative that, as in the proposed project, the Project Area would be developed with structures on appropriate foundations to accommodate the adverse effects of liquefaction (deformation, tilting, rapid settlement, or collapse). All new construction under San Francisco's jurisdiction throughout the Project Area would be required to meet the seismic safety provisions of the currently applicable San Francisco Building Code (1995 or future revisions).

Exposure of Concentrated Populations to Seismic Hazards

Because of its substantially lower retail and office development, this alternative would have about 60% of the population of the proposed project. In terms of exposure to seismic hazards, this population would be in the same circumstances as in the proposed project. About 40% fewer people would occupy the Project Area than would under the proposed project. Therefore, this alternative would expose fewer people to seismic risk than the proposed project. As with the proposed project, it is reasonable to assume that the same set of mitigation measures would apply, and that they would reduce the significant impacts of this alternative to less-than-significant levels.

Health and Safety

Like the proposed project, Alternative 3 would increase the use, storage, generation, and disposal of hazardous materials and waste. However, the increase would be substantially smaller with this alternative for two reasons. First, there would be a predominance of residential development under this alternative because the UCSF site would not be built. Second, there would be a much smaller amount of commercial space under this alternative that could use or generate hazardous materials or waste—approximately 90% less service/light industrial/research and development space (628,000 sq. ft. for this ernative and 5.6 million gross sq. ft. for the proposed project). The smaller amount of space under this alternative where substantial hazardous materials use and generation could occur could reduce the potential risk within the Project Area, but would not eliminate potentially significant impacts. Legal and regulatory requirements applicable to hazardous materials operations would reduce most of the common and potentially significant health and safety impacts to less than significant levels, as they would under the proposed project. However, the project's potentially significant impacts would also be significant under this alternative, and the mitigation measures proposed for the project would also apply to this alternative. Significant health and safety impacts are discussed below.

First, although the UCSF site would not be developed, it is possible that some occupants of the industrial space would conduct biomedical or related activities and generate biohazardous waste. In this case, the potential impact could be reduced to less-than-significant levels with mitigation measures identified for the project.

Second, development under this alternative would likely increase the generation of hazardous waste and contribute to existing impacts of hazardous waste disposal. However, the increase in hazardous waste generation would be substantially less than for the proposed project. As with the project, environmental impacts of hazardous waste disposal would be minimized, but not eliminated, by encouraging pollution prevention.

Contaminated Soils and Groundwater

Chemicals of various types and concentrations were found in the soil and groundwater throughout the Mission Bay Project Area. With the exception of petroleum hydrocarbon contamination in a free product area (see "Glossary and Acronyms" at end of Section V.J, Contaminated Soils and Groundwater, for definition) located in the southeast portion of the Project Area in the vicinity of Illinois and Third Streets, concentrations of contaminants in soil or groundwater do not present a human health or ecological risk under existing conditions. In the free product area, potential effects on near-shore aquatic organisms are being managed through additional investigation and any necessary remediation by oil companies responsible for the contamination. This remediation will be carried out regardless of whether the proposed project or this alternative is approved (see "Existing Human Health Risks," in Section V.J, Contaminated Soils and Groundwater: Setting).

Most of the Project Area would experience soil and groundwater construction-related effects similar to those described for the proposed project, although the locations and extent of activities would vary because of differences in land use compared to the proposed project. Potential construction-related effects on the aquatic environment would be similar to those identified for the proposed project.

The area generally south of The Common in Mission Bay South has not been evaluated for residential uses in the assessment of chemicals in soil and groundwater for the project. A mitigation measure would be needed calling for further study of the potential for chemicals found in soil and groundwater to pose risks to residents prior to design and construction for proposed residential buildings in Mission Bay South for Alternative 3, in the area designated Commercial Industrial and Commercial Industrial/Residential for the project. If that study showed that risk would exceed the cancer risk criterion of 1×10^{-5} or a Hazard Index of 1, the RMP would need to be revised to include additional features such as remediation of the soil or groundwater by excavation and offsite disposal, soil vapor extraction, placement of an engineered clay cap, or other means appropriate to the chemicals exceeding the risk criteria. For example, special studies and potential additional RMP features may be needed in the area east of Third Street near 16th Street where a petroleum free product plume has been identified and residential uses are proposed in this alternative.

Another specific area of potential concern is in the block designated for community facilities in the southwest corner of Mission Bay South, south of 16th Street east of the freeway structure. Vinyl chloride was detected in groundwater in one monitoring well south of 16th Street immediately east of the I-280 freeway structure. If a child care center were proposed in this area, or in other locations south of the major park in Mission Bay South, Measure J.2 in Section VI.J, Mitigation Measures: Contaminated Soils and Groundwater, calling for a special study and either remediation or relocation of the child care center for the project would apply in this alternative.

To reduce potential hazards to human health and the environment during construction, Risk Management Plans are proposed to be prepared for development activities that would occur in Mission Bay North and Mission Bay South based on proposed land uses; the RMPs would be reviewed by the RWQCB. Measures identified in the RMPs, which would be modified to reflect the primarily residential land uses under this alternative, would reduce the risks that might result from construction and from use of locations that would be developed and occupied during construction under this alternative.

The amount of site development work resulting in impervious surfaces would be similar to the proposed project. To the extent that the creation of impermeable surfaces would reduce the amount of exposed soil and infiltration of rainwater that could affect contaminant concentrations in groundwater, this alternative could provide a similar reduction in potential releases of residual contaminants to the environment as would be provided by the project.

The wetlands proposed on the Bay shore east of Third Street in this alternative would probably require remediation of the petroleum free product. The wetlands could require excavation of the portion of soil in the free product area that is located where wetlands are proposed, as well as a cover of at least three feet of clean wetlands-quality soil that would be required by the RWQCB, in order to provide an appropriate substrate and aquatic environment. (See "China Basin Channel Vegetation and Wildlife," below.) If adequate removal of the free product could not be accomplished, some kind of containment divide or diversion structure could be necessary to divert groundwater and the floating petroleum product away from the wetlands area. These measures may be more extensive and more costly than those approved by the RWQCB for the free product are under the existing ongoing review process. If not included in the final remediation plans approved by the RWQCB, further remediation in the portion of the free product area proposed for wetlands in Alternative 3 could require excavation and removal of some soils contaminated with petroleum hydrocarbons, with off-site disposal. Off-site disposal, if deemed necessary, would include transport by an appropriately licensed hazardous waste transporter to an approved disposal facility, following state and federal requirements described in "Regulatory Framework," under Section V.J, Contaminated Soils and Groundwater: Setting. As noted there, under "Hazardous Waste Handling Requirements," soils can be removed from one area of the site and relocated on other areas of the site.

Hydrology and Water Quality

As with Alternative 1 and Alternative 2, it is assumed that development under Alternative 3 would be served by a combined sewer system. As with the project, land uses under this alternative would include businesses such as wet laboratories that could potentially release chemicals into the City's combined sewer system that could cause the City to exceed permit limits. This alternative would have less potential for development of research and development space. Mitigation Measure K.2 would apply to this alternative as it would for the project. Alternative 3 would be developed less intensively than under the proposed project and potentially could result in less pollutant loading.

As for the project, no new toxicological effects to aquatic organisms in San Francisco Bay and no new effects on sediment quality would result from changes in municipal wastewater effluent, treated CSOs, or direct stormwater discharges under this alternative. In addition, water-contact recreation would not be substantially impacted by increased treated CSOs, as with the project.

The cumulative impacts of this alternative would be similar to those of the proposed project, in that cumulative impacts would be less-than-significant, but as with the project, the SEIR conservatively finds that this alternative would contribute to a potentially significant cumulative impact on the near-shore waters of San Francisco Bay. Because no direct stormwater discharges would occur under this alternative, Mitigation Measure K.4 would not apply to this alternative. Only Mitigation Measure K.3 would apply to this alternative for this cumulative impact.

Alternative 3 would have about 20 acres more open space than the proposed project, and would have two wetland areas in the South of Channel area similar to those proposed in 1990 FEIR Alternative B. The retention of land for wetlands would provide an opportunity to implement some of the alternative wastewater treatment technologies discussed in "Alternative Wastewater Treatment Technologies" in Section V.K, Hydrology and Water Quality: Impacts, where the wetlands could be used to treat stormwater for the Project Area before discharge to the City's combined sewer system. Mitigation Measure K.4 does not apply to this alternative. A feasibility analysis would need to be performed before a decision is made regarding using the wetlands as an alternative treatment method.

Erosion and sedimentation impacts from construction would be similar to those of the proposed project. A construction Storm Water Pollution Prevention Plan would be required to be developed and implemented (as would be the case for the proposed project) to reduce significant impacts to less-than-significant levels. The plan would need to include measures specifically addressing potential erosion and sedimentation related to conservation of the wetlands. Other measures that must be included in the Storm Water Pollution Prevention Plan are specified in Mitigation Measure K.1. As with the proposed project, Mitigation Measure K.5 would reduce non-construction stormwater quality impacts prior to Project Area build-out to less-than-significant levels.

China Basin Channel Vegetation and Wildlife

Alternative 3 would have potentially significant, but mitigable, construction impacts (similar to those of the proposed project) from in-channel construction but would have a substantially beneficial biologic resources impact with the net creation of 19.77 acres of wetlands. The Channel edge treatments for Alternative 3 would be the same on the north edge of the Channel as those presented for Alternative B of the 1990 FEIR, with a hard edge composed of decking and gabions./57/ This treatment would result in the loss of existing salt marsh wetlands on the north side of the Channel (totaling 0.14 acre). The additional structures that would be placed in the Channel to support the decking and gabions would increase the impacts caused by resuspension of contaminated sediments and would increase mitigation requirements to contain and isolate work areas to keep suspended sediments from spreading.

Alternative 3 proposes creation of a total of 20 acres of wetlands in two sites: at the south edge of the Channel between Fourth and Sixth Street, and in the area east of Third Street. This would substantially compensate for the loss of 0.14 acre of wetland associated with Channel edge treatments.

Although some of these areas may be contaminated, and excavation for the wetlands would expose the contamination, the created wetlands would be of higher quality than the existing wetlands along the Channel edge (also on contaminated substrates), because the Regional Water Quality Control Board criterion requires wetland cover of at least 3 feet of clean wetland soils as backfill. This would ensure that the newly created wetland habitats would be free of contamination, at least initially. Quality would also be higher than existing wetlands because plantings over larger areas would increase habitat diversity. This alternative would, therefore, be a substantial beneficial impact for biological resource values, with adverse impacts far outweighed by benefits. Disposing of contaminated soils off site would be subject to applicable regulations intended, at least in part, to protect vegetation and wildlife. Proper disposal of contaminated soils is discussed in "Regulatory Framework," in Section V.J, Contaminated Soils and Groundwater: Setting.

Community Services and Utilities

Fire Protection

Alternative 3 assumes a level of development for the Project Area that has approximately 67% more residential development than the proposed project and about 80% fewer employees in 2015. There would be about 80% less retail development. The combined office and service/light industrial/R&D gross square footage for this alternative would be approximately 80% less than the proposed project (see Table VIII.1). The number of emergency, fire, and false alarm incidents generated by this alternative could reasonably be expected to be more than with the proposed project because residents would occupy the Project Area 24 hours a day as opposed to workers, who would generally leave the area at the end of the business day. This finding is consistent with Alternative B as analyzed in the 1990 FEIR./58/

Alternative B consisted of similar land uses and a similar number of employees and residents as this alternative. Alternative B was found to have the highest number of projected fire suppression incidents and, therefore, the greatest impact on the fire department of the three alternatives analyzed in the 1990 FEIR. Therefore, this alternative would be likely to require additional resources, similar to those needed for the 1990 FEIR Alternative B at full build-out. (Additional resources needed for Alternative B included an engine company and a truck company.)/59/ To satisfy demand created by Alternative 3, the alternative would include a mitigation measure to require a new engine company, truck company, and fire station. The impact of this alternative would, therefore, be the same as that of the proposed project. However, fewer hazardous materials incidents would be likely to occur because there would be about 80% less office, research and development, service, and light industrial space.

Expansion of the high-pressure water system (also known as the Auxiliary Water Supply System, or AWSS) and installation of cisterns or suction inlets would be necessary to provide adequate fire-fighting capability to the interior of the Project Area in this alternative. The AWSS is used exclusively for fire-fighting, and expansion of this high-pressure system into the interior of the Project Area is part of the proposed project. Cisterns and suction inlets are used for fire-fighting as a backup supply of water to the AWSS. Suction inlets are included in the proposed project. Expansion of the AWSS and installation of cisterns or suction inlets in the Interior of the Project Area are not, however, included as part of this alternative. To reduce the potential impacts caused by insufficient fire-fighting water supply, AWSS and cistern or suction inlet systems should be included as described in Mitigation Measures D.4 and D.5 of the 1990 FEIR./60/

This alternative would include 5.6 acres in the South of Channel area for community facilities, which could include a police and/or fire station. Fire Station No. 30 could be rehabilitated for use or a new station could be constructed. This is 1.9 acres more than would be included for the proposed project.

Police Protection

This alternative's demands for police personnel and resources would be similar to those for the proposed project. The resident population would be considerably larger (about 18,600 total, or approximately 67% more) with this alternative. There would, however, be about 6,550 employees (approximately 80% fewer than the proposed project). The total resident and employee population would be approximately 25,200. Using the same ratio of police personnel per number of residents and employees that was used for analysis of the proposed project, an estimated 38 police personnel, or approximately 40% less than the estimated 62 police personnel needed for the proposed project, would be needed under this alternative to provide a level of police service comparable to the citywide level./61/ As with the proposed project, interior building space would be needed for these additional personnel, either in an existing or new police station in or near the Project Area. The amount of space would be about 40% less (about 4,560 gross sq. ft. compared to 7,440 gross sq. ft.), as would the number of squad cars (about eight) and parking spaces.

This alternative, although smaller in the number of gross square feet of commercial use, would have a greater residential population, and would add substantial new development to an underdeveloped area, increasing demand on citywide police services. It is likely that with a larger residential population in the Project Area, demand on the San Francisco Police Department would range from a minimum of 38 additional personnel as calculated above to approximately the same, or slightly more, demand as generated by the proposed project. This is because the mix of land uses for this alternative (less commercial and more residential development) would generate different types and quantities of incidents. Residential development would involve 24-hour-a-day occupancy and use, as opposed to many commercial uses, such as offices and retail, which would generally be inactive during the night hours. Residential development would also tend to generate additional types of incidents that would require police involvement, such as domestic violence. In addition, this alternative would have more parks and open space than the proposed project, and would include the development of wetlands, which, as discussed in the 1990 FEIR, could increase the potential for issues involving transients in the area who may gather in such places./62/

It is unlikely that additional police personnel needed could be accommodated at existing police stations. This alternative would include 5.6 acres in Mission Bay South for community facilities, which could include a police and/or fire station. An approximately 1.5-acre site adjacent to and including the site of the Fire Station No. 30 at Third and Mission Rock Streets may be considered among those potentially available for a relocated Southern Station. If the Southern Station were to be expanded and/or relocated, it could accommodate some of the additional demand for space.

Public Health Services

This alternative would be likely to generate more demand for some public health services, and less demand for other services, than the proposed project would. The residential population of the Project Area would be about 67% larger under this alternative than under the proposed project. Demand could be more for personal health care services and mental health services because these services would probably be used more by residents than employees in the area.

In this alternative, there would be approximately 80% less retail development and 80% less office and R&D space than in the proposed project (see Table VIII.1). Demand on the Bureau of Environmental Health Management for inspection and oversight service would be less than under the proposed project because there may be fewer retail establishments serving food and fewer firms that would be likely to use hazardous materials.

Recreation and Parks

Residential demand for open space would be greater for Alternative 3 than for the proposed project because this alternative would have 67% more residents than the proposed project. Employee demand would be about 80% less. An estimated 68 acres of open space would be provided through 2015 with this alternative (see Figure VIII.C.1)/63/, compared with approximately 47 acres for the proposed project. Of the 68 acres, about 20 would be wetlands; the remaining acreage would be parkland.

The 68 acres of open space that are part of this alternative would need to meet residential demand of approximately 18,600 residents, a ratio of approximately 3.7 acres per 1,000 residents, with an employee demand of about 1 acre./64/ The proposed project's 47 acres of open space would provide a ratio of approximately 4.3 acres per 1,000 residents, with an employee demand of 4.2 acres. Although the total amount of open space provided by this alternative would be more than the amount proposed by the project, it would be less than the proposed project when measured in acres per 1,000 residents.

Comparison of open space impacts based on the service area analysis done for the proposed project is not possible, since there is no plan at this time for the location of types of recreational facilities that would be provided in Alternative 3 open space. This information would be necessary to determine whether open space planned for this alternative would be more or less likely to satisfy the needs of Project Area employees and residents than open space provided by the proposed project.

Schools

Alternative 3 projects a resident population of approximately 18,600, or about 67% more than that of the proposed project, by the year 2015. Therefore, this alternative would be expected to generate 67% more school-age students than the proposed project (2,760 compared with 1,615). The estimated number of students at each school level would be as follows: approximately 1,250 elementary-school-age students, 670 middle-school-age students, and 840 high-school-age students./65/

Like the proposed project, this alternative would include a site for a public school. If an elementary school were developed, it is unlikely that all new elementary-school-age students with this alternative could be accommodated on-site. Middle school and high school students would not be accommodated on-site. Therefore, as with the proposed project, the City and County of San Francisco would need to develop additional classroom space to accommodate students generated by the proposed project. Demand would be greater with this alternative than with the proposed project because there would be more new students and a greater number of the elementary school students residing in the Project Area would need to be accommodated at school facilities off-site.

Options that could be considered by the SFUSD to increase the capacity of the school district include implementing year-round schools, using portable classrooms, or building new permanent classrooms at an existing or new school site. If new schools were constructed, Alternative 3 could potentially require the construction of two to three elementary schools, one middle school, and one high school, whereas the proposed project would require only one entire elementary school with some additional facilities for other elementary, middle, and high school students. The additional numbers of middle- and high-school students in this alternative would be enough to warrant their own school facilities; the additional elementary school students would require another one or two schools more than the proposed project. While constructing new schools might cause significant impacts at those locations, it is too speculative to identify impacts at this time from construction of additional school facilities without knowing what action or actions the SFUSD would take to accommodate the additional students, whether SFUSD would choose to accommodate the additional students in a manner that would result in physical changes to the environment, or exactly where those actions would occur. Any new facilities proposed by SFUSD would undergo appropriate environmental review for site-specific physical environmental impacts.

Development that would occur with Alternative 3 would be subject to the same one-time development impact fee as the proposed project. As discussed in "Schools: Impacts" in Section V.M, Community Services and Utilities, this fee is collected for the school district at the time building permits are issued. It is $1.72/sq. ft. for residential development, and varies from $0.08/sq. ft. to $0.24/sq. ft. for different types of commercial development./66/ The development impact fees were set by the state legislature and are reviewed every two years by the state Allocation Board. The San Francisco Board of Education then must set the fees within the State's constraints. The fees do not necessarily increase annually./67/ Total fees would be more than those collected for the proposed project despite less commercial development, because there would be more residential development, which would generate a higher fee than commercial space./68/ Alternative 3 would generate about $16.3 million in school fees, whereas the project would generate approximately $11.2 million./69/ If a 500-student elementary school costs about $12.6 million in 1998 dollars /70/, fees generated from this alternative would cover the cost of one elementary school and a fraction of another school.

Solid Waste

Alternative 3 would generate approximately 12,000 tons of solid waste per year through 2015, which is about 60% of the projected solid waste generation for the proposed project at build-out (19,000 tons/year). At San Francisco's current diversion rate (35%), this alternative would contribute about 7,000 tons of solid per year to the Altamont Landfill. With a diversion rate of 50%, as required by state law in the year 2000,/71/ this alternative would contribute approximately 6,000 tons of waste to the landfill annually. As with the proposed project, development under this alternative is assumed in the Altamont Landfill Capacity Projections and would not affect the expected lifespan of San Francisco's landfill contract with Waste Management of Alameda County, due to expire between 2012 and 2016. Under this alternative, the disposal companies could potentially require additional staff and collection equipment to serve the Project Area, as they would under the proposed project.

Water Supply

Alternative 3 would use an estimated 2.2 million gallons per day (mgd) of water in 2015, which would represent approximately 75% of the water demand for the proposed project (2.9 mgd). The reclaimed water demand for this alternative would be approximately 0.42 mgd, or about 40% of the reclaimed water demand as for the proposed project (0.98 mgd).

As with the proposed project, the low-pressure and high-pressure water systems would require expansion in order to provide adequate service to the central portion of the Project Area. The City's proposed reclaimed water system would require a new system of pipelines throughout the Project Area, as would be the case under the proposed project.

Sewers and Wastewater

Alternative 3 would generate approximately 1.9 mgd of sewage through 2015, which is about 75% of the estimated daily sewage generation for the proposed project (2.5 mgd). Under this alternative, unlike the proposed project, the Central Bay Basin would continue to use the City's combined sewer system (see Figure V.K.2, in Section V.K, Hydrology and Water Quality). Analysis by the San Francisco Public Utilities Commission staff indicates that the City's combined sewer system probably has adequate capacity to accommodate the increased stormwater volumes created by development from the proposed project in Mission Bay without additional storage sewer capacity. Further analysis of detailed, project-level, drainage plans of the combined sewer system for the Project Area, once they were developed, would be needed for confirmation./72/ Therefore, it is unlikely that this alternative would not require the construction of additional storage sewer capacity. Expansion and upgrades to the existing combined sewer system in the Central/Bay Basin would be required to serve new development in that area. Growth in the North Basin and Mariposa Basin (Figure V.K.2) would require the same extensions of the existing combined sewer system to previously unserviced areas as would occur under the project. Construction of new sewer lines would have impacts related to contaminated soils similar to those described for project construction in Section V.J, Contaminated Soils and Groundwater: Impacts.

This alternative proposes to construct approximately 20 acres of wetlands in the South of Channel area, including a 13.2-acre wetland on the southern edge of the Channel (see Figure VIII.C.1)./73/ Construction of the 13.2-acre wetland would require the removal of the existing Channel Street storage sewer and a portion of the Fourth Street sewer line. A new storage sewer would need to be constructed south of the wetland to replace the stormwater storage capacity; some temporary construction effects may result from the replacement of the storage sewer.

Energy Capacity and Infrastructure

Energy demand would be less under this alternative than under the proposed project despite the greater number of dwelling units, because there would be significantly less commercial development. North of the Channel, there would be about 23% more residential development, but 88% less retail development. South of the Channel, there would be more than twice the number of dwelling units, but almost five times less commercial development.

Because the Mission Bay Project Area is an underdeveloped area, any substantial amount of new development would require some amount of new infrastructure or upgrades to existing infrastructure. Therefore, although energy demand would be less than for the proposed project, it could be possible that some upgrades would be necessary.

Telecommunications

This alternative would likely generate less demand for telecommunications services because, despite more residential development, there would be less commercial development by the year 2015, as discussed in "Energy Capacity and Infrastructure." Because the Project Area is an underdeveloped area, any substantial amount of new development may still require new infrastructure or infrastructure upgrades.

SUMMARY OF MITIGATION MEASURES

The significant impacts of Alternative 3 for visual quality and urban design; air quality including toxic air contaminants; seismicity; health and safety; contaminated soils and groundwater; and hydrology and water quality would be similar to or the same as those of the proposed project. Therefore, mitigation measures for these environmental issues under Alternative 3 would be the same as those described in Chapter VI for the project. Mitigation to replace wetland habitat identified for the project would not be necessary under this alternative.

Hydrology and water quality mitigation measures for Alternative 3 would be the same as for the project, but Mitigation Measure K.4 would not apply. This is because no direct stormwater discharges to near-shore waters would occur that could cumulatively impact near-shore water quality. Potential cumulative impacts to near-shore water quality would only occur from treated combined sewer overflows.

Traffic impacts for this alternative would be somewhat reduced, and fewer intersections would degrade to LOS E or F than with the project. Most mitigation measures described for the project would also be applicable to the alternative, although Fourth and King Streets would not need mitigation, and only one of the two measures identified for the Third and King Streets intersection would be needed to improve the intersection to LOS D or better. Impacts on regional transit service would be somewhat less than those of the project; as with the project, mitigation would be needed for cumulative effects on AC Transit. Impacts on MUNI service would be similar to those of the project because demand would be nearly the same, but with more transit users traveling inbound to the Project Area than with the proposed project. Therefore, MUNI mitigation measures described for the project would be applicable to this alternative.

Regarding toxic air contaminants, Mitigation Measure F.4 would be modified so the meteorological station would be located near the potential Service/Light Industrial/Research and Development/Office uses, since UCSF is not assumed as part of the alternative.

This alternative's significant unavoidable project and cumulative impacts would be the same as those of the proposed project (see Chapter IX, Other Statutory Sections, e.g., intersection, bridge/ramp, vehicular air pollutant emissions, toxic air contaminants, hazardous waste generation and disposal, water quality), although their magnitude may vary.

D. OTHER ALTERNATIVES CONSIDERED

Over the last 15 years, several development proposals have been presented to the City and public for Mission Bay. This section briefly describes the history of project proposals for the Project Area, including the range of variants and alternatives examined during prior CEQA environmental review and this SEIR process. The proposed project has evolved from this history of project proposals and represents a proposal that project sponsors believe best achieves their objectives, including marketability (see "Project Sponsors and Their Objectives" in Chapter III, Project Description). The various reasons for project sponsors' rejection of past project proposals, variants, and alternatives are still current today./74/ However, two of the past proposals that are reasonable today have been carried forward into this SEIR's analysis of alternatives to the proposed project. Alternative 1 in its entirety is based on the zoning from the Mission Bay Specific Plan and Article 9 of the Planning Code. The Project Area's current zoning is also part of Alternative 2 for Mission Bay South. This SEIR's Alternative 3 is the 1990 FEIR's Alternative B. In this manner, prior proposals have played a role in formulating the current proposed project and the range of reasonable alternatives assessed in this SEIR.

In July 1981, Southern Pacific (then-owner of most land in Mission Bay) presented a preliminary development program to the City for 6,000 residential units; 1,600 hotel rooms; 5 million gross square feet (gross sq. ft.) of office space; 2.5 million gross sq. ft. of commercial use, warehouse, secondary office, and showroom space; 400,000 gross sq. ft. of retail space; and 310,000 gross sq. ft. of recreational space. The project was to be known as Mission Bay, after the bay that formerly existed on the site. That plan elicited substantial debate. In April 1983, Southern Pacific submitted a revised proposal that included 7,000 housing units, 11.7 million gross sq. ft. of office space, 4.3 million gross sq. ft. of research and development space, 500,000 gross sq. ft. of retail and hotel space (with building heights up to 42 stories), and 40 acres of parks, waterways, and plazas. Both proposals were identified by the Planning Department as inconsistent with the City's General Plan Elements that called for housing, local employment, and maritime use in the Project Area.

In August 1984, the City announced a tentative understanding with Santa Fe Pacific Realty Corporation (then-title holder to most land in Mission Bay) on land use guidelines for Mission Bay. Those guidelines included: no buildings over eight stories; at least 7,577 residential units, of which at least 30% would be affordable; up to 2.6 million gross sq. ft. of research and development space; up to 4.1 million gross sq. ft. of office space; up to 200,000 gross sq. ft. of retail space; parks, lagoons, canals, waterways, and public open spaces; no impairment of rail access for businesses and port use; relocation of the Caltrain commute station to Seventh and Channel Streets, while retaining a right-of-way to downtown; MUNI Metro extension to 16th Street; and a 19-acre park on port property. In May 1986, the City added a ballpark at Seventh and Townsend Streets, a 500-room hotel, and 124 additional housing units to the guidelines for Mission Bay development.

In May 1985, the San Francisco Planning Department began preparing an "implementable development plan for a mixed-use Mission Bay community." The Department and its consultants began working with community representatives, other government agencies, and Santa Fe Pacific Realty Corporation to develop objectives and policies and a preferred plan for Mission Bay.

The resulting report, *The Mission Bay Plan, Proposal for Citizen Review*, published in January 1987, provided a land use program and a plan, social and economic programs, design guidelines, and land use controls. The *Mission Bay Plan* area encompassed 294 to 309 acres, depending on whether port land east of Third Street near Piers 50 to 54 would have been included.

Santa Fe Pacific Realty Corporation (renamed Catellus Development Corporation in June 1990) submitted an application for Environmental Evaluation on September 22, 1986 (City Planning File No. 86.505E). An Environmental Impact Report for the Mission Bay project was prepared. A Draft

EIR was published in August 1988, and a Draft EIR Supplement was published in March 1989. The Mission Bay Final EIR was certified in August 1990./75/

The 1990 Mission Bay EIR analyzed three development alternatives for the project area at an equal level of detail, and twelve variants on those alternatives. Alternatives A and B were integrated mixed-use development programs. Alternative A consisted of 4.1 million gross sq. ft. of office space; 3.6 million gross sq. ft. of service, light industrial, and research and development (S/LI/RD) space; a 500-room hotel; 7,700 dwelling units; 250,000 gross sq. ft. of retail space; and 125,000 gross sq. ft. of community facilities. A variant of Alternative A, Variant 12, which included about 500 more residential units, more office and retail space, less S/LI/RD space, and 10.8 acres of reclaimed wetlands, was ultimately approved. Alternative 1 for this SEIR assumes the land use districts that were codified in the City Planning Code, Article 9, Mission Bay Districts, and that most resemble Variant 12.

Alternative B contained more housing and open space, and less commercial space, than Alternative A. Alternative B consisted of 1.0 million gross sq. ft. of office space, 420,000 gross sq. ft. of S/LI/RD space, 10,000 dwelling units, 300,000 gross sq. ft. of retail space, and 293,000 gross sq. ft. of community facilities. Alternative B also included three wetlands. Alternative 3 for this SEIR assumes build-out of the land use program of Alternative B within the current Project Area.

Alternative N, the no project alternative, presented a development scenario likely to occur in the future under then-existing M-2 (Heavy Industrial) zoning with no master development program for the area. Alternative N consisted of 5.0 million gross sq. ft. of industrial uses, 1.05 million gross sq. ft. of port-related industrial uses, 1.0 million gross sq. ft. of office, 100,000 gross sq. ft. of retail, and 42,000 gross sq. ft. of community facilities. Alternative 1 for this SEIR is based on recent projections reflecting current zoning and is different than Alternative N's land use program.

In addition to the three alternatives (A, B, and N), 12 variants of the alternatives were evaluated in the 1990 FEIR. Each variant was based on one or more of the alternatives, with certain changes, as summarized below.

Six variants involved changes in land use and density. Those variants would have:

- Added 1,000 housing units to Alternative N;
- Replaced residential, open space, and S/LI/RD uses east of Third Street in Alternative B with port-related/M-2 uses;

- Reduced housing in Alternative B from 10,000 units to 7,700 units;
- R d some S/LI/RD in Alternative A with retail, personal service, and community facility uses;
- Replaced some S/LI/RD in Alternative A with offices; and
- Increased height limits from 110 feet to 220 feet for some residential structures along Fifth Street in Alternative B.

Four variants involved changes in other aspects of development. They would have:

- Allowed offices as a primary S/LI/RD use in Alternatives A and B;
- Varied the amount and size of affordable housing units in Alternatives A and B;
- Kept the Caltrain terminal in its present location in Alternatives A and B; and
- Reduced seismic hazards in all alternatives.

Two variants were alternative land use programs. They were based on:

- A proposal submitted by a coalition of community groups at one of the public hearings on the 1990 Mission Bay FEIR; and
- An application for a development agreement submitted by the project sponsors in May 1989.

The San Francisco City Planning Commission certified the 1990 FEIR on August 23, 1990. In September 1990, the Planning Commission adopted California Environmental Quality Act (CEQA) findings, including an explanation of reasons for rejection of various alternatives, and a mitigation monitoring program, approved the *Mission Bay Plan* (a specific plan) as part of the San Francisco Master Plan, and adopted conforming amendments to other elements and area plans of the Master Plan. In September 1990 and February 1991, the Commission adopted resolutions recommending to the Board of Supervisors that it 1) adopt amendments to the City Planning Code and Zoning Map to add Article 9 to the City Planning Code and Mission Bay districts to the Zoning Map, and 2) approve a development agreement with Catellus Development Corporation. In February 1991, the Planning Commission amended the *Mission Bay Plan* and the San Francisco Board of Supervisors adopted CEQA findings and a mitigation monitoring program, approved the Mission Bay development proposal, executed a development agreement, and adopted amendments to the San Francisco City Planning Code and Zoning Map implementing the *Mission Bay Plan*. On January 10, 1992, the Planning Commission adopted the Master Tentative Map and Public Improvement Report.

Although approved, the Mission Bay project analyzed in the 1990 FEIR was never built. The City's office market slowed down during the recession of the early 1990's, and construction was never started. On April 14, 1996, Catellus formally terminated its Development Agreement with the City and County of San Francisco, pursuant to the Agreement's termination clause.

E. ENVIRONMENTALLY SUPERIOR ALTERNATIVE

CEQA Sections 21002 and 21081 require lead agencies to adopt feasible mitigation measures or feasible environmentally superior alternatives in order to substantially lessen or avoid otherwise significant adverse environmental effects of proposed projects. A project may be approved in spite of its significant effects if specific social, economic, or other conditions make such mitigation measures or alternatives infeasible. When the environmentally superior alternative is the No Project Alternative, CEQA Guidelines Section 15126(d)(4) requires the EIR to identify an environmentally superior alternative among the other alternatives. The California Courts of Appeal have upheld the requirement to examine an environmentally superior alternative when the adoption of all feasible mitigation measures would leave an unmitigated significant impact of the project./76/

This EIR evaluates a No Project/Expected Growth Alternative, a Redevelopment North/Expected Growth South Alternative, and an Residential/Open Space Development Alternative. All of the alternatives would result in the same project and cumulative significant unavoidable adverse impacts identified for the project (traffic, vehicular air pollution emissions, potential combined toxic air contaminants, cumulative hazardous waste generation and disposal, cumulative water quality, possible off-site school facility impacts). However, there are differences among the alternatives and the project with respect to these impacts. In general, the alternatives would reduce these identified impacts (because of reduced intensity of development) but not to a level of insignificance.

The alternatives would involve some impacts that are different from project impacts. Some of those impacts could be mitigated, and mitigation measures are suggested. The applicable mitigation measures would vary among the alternatives, as described in the Alternatives section. Certain of the impacts caused by the project would be avoided in one or more of the alternatives. Accordingly, mitigation measures would not be required for those alternatives.

Alternative 3 is identified as the environmentally superior alternative. While it would not avoid the unavoidable significant impacts associated with the project, it would reduce most of them. Additional mitigation would be required to avoid impacts from existing hazardous wastes on wetlands and residential uses associated with Alternative 3. Alternative 3 also was evaluated at full buildout, as with the project analysis, while Alternatives 1 and 2 were evaluated at partial buildout in 2015.

Alternatives 1 and 2 at full buildout would generate greater impacts than identified for the analysis year of 2015.

NOTES: A· ·rnatives to the Proposed Project

1. Ca. .nia Public Resources Code, Section 21000 *et seq.*

2. California Code of Regulations, Title 14, Section 15000 *et seq.*, known as the State CEQA Guidelines.

3. State CEQA Guidelines Section 15126(d).

4. Public Resources Code Section 21002, State CEQA Guidelines Section 15091(a)(3).

5. State CEQA Guidelines Section 15126(d)(2).

6. "Service/Light Industrial/Research and Development" is a land use term developed for the 1990 FEIR that expresses the type of Mission Bay Commercial Industrial development anticipated at the time of that document's preparation. Office uses were added to the Service/Light Industrial/Research and Development designation to provide more flexibility in the eventual location of office uses for the approved project.

7. Service enterprises would be businesses supporting Mission Bay, downtown, and nearby business areas. Service enterprises generally would occupy lower-floor space and would include vehicle/equipment leasing and rental; building maintenance and protection/security; and data processing, communications, delivery, and reproduction services.

   Light industrial/research and development/office enterprises would occupy higher-density development space, with more emphasis on amenities and design. A mix of functions would be possible in a single building. Such enterprises would include technology-oriented manufacturing companies; research and development facilities for communications, biotechnology, computer and other electronics products companies; and support offices for manufacturing, distribution, or research and development functions.

8. San Francisco Planning Department, *Mission Bay Final Environmental Impact Report*, Planning Department File No. 86.505E, State Clearinghouse No. 86070113, certified August 23, 1990, Table VI.E.29, p. VI.E.185.*

9. City and County of San Francisco, Planning Department, *Mission Bay Plan: Proposal for Adoption*, January 1990, as amended September 1990 and February 1991, Chapter 4, Implementation, P. 11. In general, the open space assumed under this alternative follows from the Mission Bay Plan (housing/ open space linkage of 1 acre per 150 constructed residential units). However, the Mission Bay Plan does not precisely indicate the timing and location of open space development. Since development would occur in both Mission Bay North and South, under this alternative, opens space development would occur in both areas too.

10. Note that under the existing zoning, UCSF could potentially construct a few individual buildings to meet some of its space need.

11. City Planning Code Section 983 (e)(1) provides that most non-conforming uses and noncomplying structures may continue operations in the Project Area for a period of 10 years, plus possible extensions, from February 1991.

12. City and County of San Francisco, Planning Department, *Mission Bay Plan: Proposal for Adoption,* January 1990, as amended September 1991, p. 3-66 and Chapter 4, p. 25.

13. The *Mission Bay Plan* provided for a total of 8,500 housing units. Of this total, 7,600 were located south of the Channel and 900 were located north of the Channel. See City and County of San Francisco, Planning Department, *Mission Bay Plan: Proposal for Adoption*, January 1990, as amended September 1990 and February 1991, p. 3-11 and Figure 9, following p. 3-12.*

14. City and County of San Francisco, Planning Department, *Mission Bay Plan: Proposal for Adoption*, January 1990, amended September 1990 and February 1991, p. 3-11.*

15. City and County of San Francisco, Planning Department, *Mission Bay Plan: Proposal for Adoption*, January 1990, amended September 1990 and February 1991, p. 3-69. Also see City and County of San Francisco, Planning Department, *Mission Bay Final Environmental Impact Report*, Planning Department File No. 86.505E, State Clearinghouse. No. 86070113, August 23, 1990, Volume Four, pp. XV.P.29–XV.P.30.*

16. An updated jobs/housing analysis is used in this comparison, not the jobs/housing analysis incorporated in the 1990 FEIR and used to evaluate the development agreement variant and EIR alternatives at that time. Regional economic relationships and demographic conditions have changed since the mid-1980's when the original analysis was completed. The updated analysis puts both development outcomes on an equal footing for comparative purposes in this SEIR.

17. Sally Nielsen, Hausrath Economics Group, Technical Memorandum to EIP Associates, August 7, 1997.

18. San Francisco Planning Department, *Guidelines for Environmental Review: Transportation Impacts*, July 1991.

19. Parking supply for the No Project/Expected Growth Alternative is calculated based on the 1990 FEIR, Volume Two, Table VI.E.29, p. VI.E.185, at 1 space for each 1,000 sq. ft. of office/research and development floor area; retail at 1 space per 1,000 sq. ft.; hotel at 0.4 spaces per room; warehouse at 1 space per 1,000 sq. ft. and residential at 1 space per dwelling unit.

20. In addition, to account for a possible shift in traffic patterns, CO concentrations at the intersections of Seventh and Townsend Streets and Potrero and 16th Streets were also analyzed, but not included in the comparison between the proposed project and this alternative because the analysis showed that there was no substantial differences in traffic increases at these intersections.

21. Federal Transit Administration, *Transit Noise and Vibration Impact Assessment*, DOT-T-95-16, April 1995, p. 8-3.

22. City and County of San Francisco, Planning Department, *Mission Bay Plan*, pp. 3-42 to 3-4.*

23. City and County of San Francisco, Planning Department, *Mission Bay Plan*, pp. 3-42 to 3-47.*

24. San Francisco City Planning Commission, Resolution No. 12040, adopted September 27, 1990, Attachment A, Mission Bay Findings, amended September 20, 1990, Exhibit A Mitigation Monitoring Program, p. A-4; *San Francisco General Plan*, Mission Bay Plan, Objective 26.

25. An approximate citywide level of service of 1 police officer per 657 people was estimated in "Police Protection: Impacts," in Section V.M, Community Services and Utilities. Using this ratio, Alternative 1, with a combined resident and worker population of 20,200, would generate demand for approximately 30 additional police personnel.

26. a.) Employee demand for open space in the 1990 FEIR was estimated based on the Downtown Plan's requirement that commercial developments provide 1 square foot of open space for every 50 gross sq. ft. of building space (1990 FEIR, p. VI.D.71, and *San Francisco General Plan,* Downtown Plan, p. II.1.15). An employee density factor of 1 employee per 290 gross sq. ft. was used to convert this to a standard of 0.14 acre of open space per 1,000 employees.

    b.) Employee demand for open space is not necessarily additive to residential demand, but instead could be satisfied by employees using the same parks that residents use, provided they were within a reasonable distance of business uses. Therefore, employees are not added to residents when calculating acres provided per 1,000 population.

27. These numbers were arrived at by subtracting 50% from the estimates of school age children calculated in "Schools," in Appendix L, Community Services and Utilities.

28. San Francisco Unified School District, Property Management Division, "School Facility Impact Fee Changes," August 30, 1994.

Residential Development	$1.72 per square foot
Non-Residential Development	
Office	$0.24 per square foot
Retail/Service	$0.13 per square foot
Light Industrial	$0.22 per square foot
Warehouse	$0.09 per square foot
Lodging	$0.08 per square foot

29. Artie Kelley, San Francisco Unified School District, Property Management Department, telephone conversation with EIP Associates, March 13, 1998.

30. Assumes residential units are 840 sq. ft.

31. Timothy Tronson, Director of Facility Planning, San Francisco Unified School District, telephone conversation with EIP Associates, February 13, 1998. A 500-student elementary school is about 56,000 sq. ft. at $225 per sq. ft. Calculation assumes elementary school size is proportional to the number of students.

32. California Assembly Bill 939 (Public Resources Code Section 40000 et seq.) requires cities to divert 50% of solid waste through recycling, composting, and source reduction activities by the year 2000.

33. City and County of San Francisco, San Francisco Public Utilities Commission, Clean Water Program, *Bayside Cumulative Impact Analysis*, March, 1998.

34. David G. Kearnan, Loop Planning Engineer, Pacific Bell, letter to EIP Associates, September 2, 1997.

35. 1990 FEIR, Table IV.E.29, p. VI.E.185.*

36. City and County of San Francisco, Planning Department, *Mission Bay Plan: Proposal for Adoption*, January 1990, as amended September 1990 and February 1991, Chapter 4, Implementation, p. 11. In general, the open space assumed under this alternative follows from the Mission Bay Plan (housing/

open space linkage of 1 acre per 150 constructed residential units). However, the Mission Bay Plan does not precisely indicate the timing and location of open space development. Since development would occur in both Mission Bay North and Mission Bay South under this alternative, it is assumed that open space development would occur in both areas too.

37. Of the total housing units provided for in the *Mission Bay Plan*, 900 were located north of the Channel and 7,600 were located south of the Channel. See City and County of San Francisco, Department of City Planning, *Mission Bay Plan: Proposal for Adoption*, January 1990, as amended September 1990 and February 1991, Figure 9, following p. 3-12.*

38. Of the total housing units provided for in the *Mission Bay Plan*, 900 were located north of the Channel and 7,600 were located south of the Channel. See City and County of San Francisco, Department of City Planning, *Mission Bay Plan: Proposal for Adoption*, January 1990, as amended September 1990 and February 1991, Figure 9, following p. 3-12.*

39. Sally Nielsen, Principal, Hausrath Economics Group, Technical Memorandum to EIP Associates, August 7, 1997.

40. Parking supply for the No Project/Expected Growth Alternative is calculated based on the 1990 FEIR, Volume Two, Table VI.E.29, p. VI.E.185, at 1 space for each 1,000 sq. ft. of office/research and development floor area; retail at 1 space per 1,000 sq. ft.; hotel at 0.4 space per room; warehouse at 1 space per 1,000 sq. ft.; and residential at 1 space per dwelling unit.

41. In addition, to account for a possible shift in traffic patterns, CO concentrations at the intersections of Seventh and Townsend Streets, and Potrero and 16th Streets were also analyzed, but not included in the comparison between the proposed project and this alternative, because the CO analysis showed that no difference in CO concentrations would be caused at these intersections.

42. Federal Transit Administration, *Transit Noise and Vibration Impact Assessment*, DOT-T-95-16, April 1995, page 8-3.

43. City and County of San Francisco, Planning Department, *Mission Bay Plan*, pp. 3-42 through 3-47.

44. San Francisco City Planning Commission Resolution No. 12040, adopted September 27, 1990, Attachment A, Mission Bay Findings, amended September 20, 1990, Exhibit A Mitigation Monitoring Program, p. A-4; *San Francisco General Plan*, Mission Bay Plan, Objective 26.

45. An approximate citywide level of service of 1 police officer per 657 people was estimated in "Police Protection: Impacts," in Section V.M, Community Services and Utilities. Using this ratio, Alternative 2, with a combined resident and worker population of approximately 16,600, would generate demand for approximately 25 additional police personnel.

46. See endnote 26, which discusses estimates of employee demand for open space.

47. These numbers were arrived at by subtracting 4% from the estimates of school-age children calculated in "Schools," in Appendix L, Community Services and Utilities.

48. San Francisco Unified School District, Property Management Division, "School Facility Impact Fee Changes," August 30, 1994.

Residential Development	$1.72 per square foot
Non-Residential Development	
Office	$0.24 per square foot

Retail/Service	$0.13 per square foot
Light Industrial	$0.22 per square foot
Warehouse	$0.09 per square foot
Lodging	$0.08 per square foot

49. Artie Kelley, Manager, Property Management and Permits, San Francisco Unified School District, telephone conversation with EIP Associates, March 13, 1998.

50. Assumes residential units are 840 sq. ft.

51. Timothy Tronson, Director of Facility Planning, San Francisco Unified School District, telephone conversation with EIP Associates, February 13, 1998. A 500-student elementary school is about 56,000 sq. ft. at $225 per sq. ft. Calculation assumes elementary school size is proportional to the number of students.

52. California Assembly Bill 939 (Public Resources Code Section 40000 *et seq.*) requires cities to divert 50% of solid waste through recycling, composting and source reduction activities by 2000.

53. City and County of San Francisco, San Francisco Public Utilities Commission, Clean Water Program, *Bayside Cumulative Impact Analysis*, March 1998.

54. See 1990 FEIR, Volume Two, Chapter V, pp. V.13-V.16. The 1990 FEIR assumed full build-out of Alternative B in the year 2020.*

55. The number of parking spaces is based on parking rates for the land uses proposed in Alternative 3 from the 1990 FEIR, Volume Two, Table VI.E.29, p. VI.E.185.*

56. An updated jobs/housing analysis is used in this comparison, not the jobs/housing analysis incorporated in the 1990 FEIR and used to evaluate this alternative (Alternative B) in the earlier EIR. Regional economic relationships and demographic conditions have progressed since the mid-1980's when the original analysis was completed. The updated analysis puts all development outcomes on an equal footing for comparative purposes in this SEIR.

57. 1990 FEIR, Volume Two, p. V.20.*

58. 1990 FEIR, Volume Two, p. VI.D.40.*

59. 1990 FEIR, Volume Two, p. VI.D.115.*

60. 1990 FEIR, Volume Two, pp.VI.D.115-VI.D.116.*

61. An approximate citywide level of service of 1 police officer per 657 people was estimated in "Police Protection: Impacts," in Section V.M, Community Services and Utilities. Using this ratio, Alternative 3, with a combined resident and worker population of approximately 25,200, would generate demand for approximately 38 additional police personnel.

62. 1990 FEIR, Volume Two, p. VI.D.48.*

63. For consistency with Project Area boundaries, acreage of open space does not include the China Basin Channel or port property, which were included in the 1990 FEIR.

64. See endnote 26, which discusses estimates of employee demand for open space.

65. These numbers were arrived at by increasing the estimates of school-age children calculated in "Schools,"in Appendix J, Community Services and Utilities, by 71% to account for the larger residential population in this alternative.

66. San Francisco Unified School District, Property Management Division, "School Facility Impact Fee Changes," August 30, 1994.

Residential Development	$1.72 per square foot
Non-Residential Development	
Office	$0.24 per square foot
Retail/Service	$0.13 per square foot
Light Industrial	$0.22 per square foot
Warehouse	$0.09 per square foot
Lodging	$0.08 per square foot

67. Artie Kelley, Manager, Property Management and Permits, San Francisco Unified School District, telephone conversation with EIP Associates, March 13, 1998.

68. The estimate that total fees would be more for this alternative than for the proposed project is based on a rough calculation of the total fees that could be collected for the proposed project compared to those for Alternative 3. This calculation is approximate, and was done for comparison purposes only.

69. Assumes residential units are 840 sq. ft.

70. Timothy Tronson, Director of Facility Planning, San Francisco Unified School District, telephone conversation with EIP Associates, February 13, 1998. A 500-student elementary school is about 56,000 sq. ft. at $225 per sq. ft.

71. San Francisco City Planning Commission, Resolution No. 12040, adopted September 27, 1990, Attachment A, Mission Bay Findings, amended September 20, 1990, Exhibit A Mitigation Monitoring Program, p. A-4; *San Francisco General Plan*, Mission Bay Plan, Objective 26.*

72. San Francisco City Planning Commission, Resolution No. 12040, adopted September 27, 1990, Attachment A, Mission Bay Findings, amended September 20, 1990, Exhibit A Mitigation Monitoring Program, p. A-4; *San Francisco General Plan*, Mission Bay Plan, Objective 26.*

73. 1990 FEIR, Volume Two, p. VI.D.120.*

74. San Francisco Planning Commission, Resolution No. 12040 Attachment A, Mission Bay Findings, adopted September 27, 1990. These findings discuss reasons for rejection of alternatives and variants.

75. The 1990 FEIR is incorporated by reference into this Subsequent EIR. Pertinent information from the 1990 FEIR is summarized throughout this document.

76. <u>Citizens for Quality Growth vs. City of Mount Shasta</u> (3d Dist. 1988) 198 Cal.App.3d 433 [243 Cal.Rptr. 727]

* A copy of this report is on file for public review at the Office of Environmental Review, Planning Department, 1660 Mission Street, San Francisco.

IX. OTHER STATUTORY SECTIONS

A. SIGNIFICANT ENVIRONMENTAL EFFECTS THAT CANNOT BE AVOIDED IF THE PROPOSED PROJECT IS IMPLEMENTED

This chapter identifies impacts that could not be eliminated or reduced to an insignificant level by mitigation measures included as part of the proposed project, or other mitigation measures that could be implemented, as described in Chapter VI, Mitigation Measures.

Significant unavoidable adverse effects can be classified into two categories. The first includes impacts that would be attributable to the project itself, and the second includes cumulative impacts to which the project would contribute an increment. Project-specific impacts have been projected with relative certainty, given the detailed information presented herein, regarding the environmental setting and the project proposal. Cumulative effects are by their nature less certain, because their analysis depends on a prediction of possible future environmental changes well beyond the scope of the current project. The following is a list of the significant unavoidable effects that have been identified in this analysis:

- project and cumulative traffic intersection impacts, primarily affecting intersections at or near I-280 and I-80 in the South of Market area.
- cumulative bridge/on-ramp impacts (lengthening of peak congestion)
- project and cumulative regional air quality impacts from increased vehicular emissions, e.g., exceedance of BAAQMD's significance thresholds for reactive organic gases and oxides of nitrogen, which are ozone precursors, and for particulate matter.
- potentially significant project impacts from toxic air contaminants from mobile sources, from individual stationary sources (because adequate buffers between potential stationary sources and sensitive receptors cannot be shown), from the combined risk due to emissions from multiple facilities, and from cumulative risks.
- cumulative hazardous waste generation and disposal impacts.
- cumulative water quality impacts (although the project's contribution to cumulative water quality impacts could be reduced to less-than-significant levels if mitigation measures are imposed).

B. IRREVERSIBLE ENVIRONMENTAL CHANGES WHICH WOULD BE INVOLVED IN THE PROPOSED ACTION SHOULD IT BE IMPLEMENTED

CEQA Guidelines (Sections 15126(f) and 15127) require that a Draft EIR must identify significant irreversible environmental changes if the following could occur:

- The project would involve a large commitment of non-renewable resources;
- The primary and secondary impacts of a project would generally commit future generations to similar uses (e.g., a highway provides access to a previously remote area);
- The project involves uses in which irreversible damage could result from any potential environmental accidents associated with the project; or
- The project would wastefully consume resources, such as energy.

As discussed in this SEIR, the redevelopment of the Mission Bay Project Area would intensify the development of a range of land uses in the Project Area consistent with an urban environment. Although not necessarily irreversible, the commitment would be difficult to change in the short-run. It would commit some future generations to the same land uses. Overall, the conclusions of this SEIR regarding irreversible impacts are not substantially different from those of the 1990 FEIR/1/, except that the loss of backland for nearby piers, discussed then as a potential impact, is no longer an issue or impact because the land exchange for property near Pier 70 has since occurred, providing backland in an area closer to the Port's intermodel container facilities at Pier 80.

Implementation of the project would result in an irreversible commitment of energy resources, primarily in the form of fossil fuels, including fuel oil, natural gas, and gasoline or diesel fuel for automobiles and construction equipment during construction and from on-going use of the site./2/ The consumption or destruction of other non-renewable and slowly renewable resources would also result during construction, occupancy, and use of the site. These resources include, but are not limited to: lumber, concrete, sand and gravel, asphalt, masonry, metals, and water. The project would also irreversibly use water and solid waste disposal resources during construction and operation.

Irreversible damage could occur in that the project would develop an area that is subject to substantial seismic hazard, similar to other areas in the City underlain by fill. Development of more business and residences in the area would increase the employee and resident population, resulting in exposure of larger numbers of people to death and injury in the event of a major earthquake in the Bay Area. However, because the 1995 San Francisco Building Code, along with the most stringent codes from either the San Francisco Building Code, the Uniform Building Code, or the California Building Code in effect at the time of building permit issuance would be followed for new construction, the project's structures would reduce seismic risks to a less-than-significant impact.

A risk exists that an accident involving hazardous materials could occur, with the possibility that irreversible damage could result. This risk is discussed in Section V.I, Health and Safety: Impacts. The required preparation of Risk Management Plans would minimize this risk.

NOTES: Other Statutory Sections

1. San Francisco Planning Department, *Mission Bay Final Environmental Impact Report*, Planning Department file 86.505E, State Clearinghouse No. 86070113, certified August 23, 1990, Volume Two, p. VIII.1-VIII.4.*

2. See the discussion of Energy in the Initial Study (Appendix A).

* A copy of this report is on file for public review at the Office of Environmental Review, Planning Department, 1660 Mission Street, San Francisco.

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Tenants and property owners in the Project Area, approximately 60 people, were sent notices of availability of the Draft SEIR and Draft SEIR public hearing. A complete copy of the distribution listing is available in the Planning Department office at 1660 Mission Street, as part of File No. 96.771E.

EIP
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MISSION BAY NORTH RETAIL	MISSION BAY OPEN SPACE	
MISSION BAY SOUTH RETAIL	UCSF (includes City school site)	NOTE: See Table III.A.2 for types and amounts of uses.

LAND USE PROGRAM ANALYZED AS THE PROJECT IN THE DRAFT EIR

SEE INSIDE FRONT COVER FOR THE COMBINATION OF PROJECT FEATURES AND VARIANTS AS ADOPTED