16.0 MARINE TRANSPORTATION AND MARINE TERMINAL OPERATIONS

This chapter describes the existing marine transportation system in San Francisco Bay and Suisun Bay, and analyzes the proposed project's potential effects on waterborne traffic, including safety and congestion. This chapter also describes potential impacts associated with proposed activities at the marine terminal following proposed upgrades, and includes an evaluation of upset (release) scenarios in waterways and at the marine terminal. Additional related discussion is presented in Chapter 3.0: Aesthetics; Chapter 6.0: Aquatic Resources; Chapter 7.0: Terrestrial Resources; Chapter 9.0: Geology, Soils, and Seismicity; Chapter 10: Hazards and Hazardous Materials; Chapter 11.0: Public Services and Utilities; Chapter 15.0: Land Transportation; and Chapter 17.0: Water Resources.

Guidelines and key sources of data used in the preparation of this chapter include the following:

- U.S. Coast Pilot, Volume 7, Pacific Coast, 43rd Edition (NOAA, 2011b)
- *San Francisco, San Pablo and Suisun Bays Harbor Safety Plan* (Harbor Safety Committee of the San Francisco Bay Region, 2011)
- Marine Oil Terminal Engineering and Maintenance Standards (MOTEMS) contained in Title 24, California Code of Regulations (CCR), Part 2, California Building Code (CBC), Chapter 31F - Marine Oil Terminals
- *Vessel Traffic Service San Francisco User's Manual* (U.S. Coast Guard, 2010)

16.1 ENVIRONMENTAL SETTING

16.1.1 Regulatory Context

16.1.1.1 International Regulations

The International Maritime Organization (IMO) is the major body governing the movement of goods at sea, through a series of international protocols. Individual countries must approve and adopt these protocols before they become effective.

The International Convention for the Prevention of Pollution from Ships, dated 1973 and modified in 1978, is known as MARPOL (marine pollution) 73/78. MARPOL 73/78 governs the movement of oil and specifies tanker construction standards and equipment requirements. The United States implemented MARPOL 73/78 with passage of the Act of 1980 to Prevent Pollution from Ships.

Regulation 26 of Annex I of MARPOL 73/78 requires that every tanker of 150 gross tons and above carries an IMO-approved Shipboard Oil Pollution Emergency Plan. In 1992, the IMO issued "Guidelines for the Development of Shipboard Oil Pollution Emergency Plans" to assist tanker owners in plan preparation, and to assist governments in developing and enacting domestic laws that give force to and implement IMO regulations. Plans that meet the Oil Pollution Act of 1990 (OPA) and the Lempert-Keene-Seastrand Oil Spill Prevention and Response Act (California Senate Bill [SB] 2040) requirements, discussed in Sections 16.1.1.2 and 16.1.1.3, respectively, also meet IMO requirements. Traffic Separation Schemes (TSS) must also be approved by the IMO such as the approved TSSs off the entrances to San Francisco Bay and the Santa Barbara Channel (NOAA, 2011b).

Regulations 20 and 21of Annex I of MARPOL 73/78 addresses the requirement for double-hull tankers. The regulations require that tankers of 5,000 deadweight tonnages or more, ordered after July 6, 1993, be fitted with double hulls or an alternative design approved by IMO. In addition, IMO adopted a phase-out schedule for single-hull tankers, on a strict timetable, which began on September 1, 2003.

The IMO adopted an amendment to the International Convention for Safety of Life at Sea with provisions entitled "Special Measures to Enhance Maritime Safety," which became effective in 1996. These provisions allow for operational testing during port state examinations to ensure that masters and crews are familiar with essential shipboard procedures relating to ship safety. The U.S. Coast Guard (USCG) Marine Safety Office conducts these examinations as part of their vessel inspection program.

16.1.1.2 Federal Regulations

A number of federal laws have been enacted to regulate marine vessels and marine terminals. These laws address, among other things, design and construction standards, operational standards, and spill prevention and cleanup. Regulations to implement these laws are contained primarily in Titles 33 (Navigation and Navigable Waters), 40 (Protection of Environment), and 46 (Shipping) of the Code of Federal Regulations (CFR). The most recent act to address spill prevention and response is the Oil Pollution Act of 1990.

OPA was enacted to expand prevention and preparedness activities, improve response capabilities, ensure that shippers and oil companies pay the costs of spills that do occur, and establish an expanded research and development program. It also established a $1 billion Oil Spill Liability Trust Fund, funded by a tax on crude oil received at refineries. A Memorandum of Understanding was established to divide areas of responsibility. The USCG was given responsibility for tank vessels and marine terminals, the U.S. Environmental Protection Agency (EPA) for tank farms, and the Research and Special Programs Administration for pipelines. Each of these agencies has developed regulations for their area of responsibility.

All facilities and vessels that have the potential to release oil into navigable waters are required by OPA to have up-to-date oil spill response plans and to have submitted them to the appropriate federal agency for review and approval. Of particular importance in OPA is the requirement for facilities and vessels to demonstrate that they have sufficient response equipment under contract to respond to and clean up a worst-case spill.

Other key acts addressing oil pollution include:

- Federal Water Pollution Control Act of 1972
- Clean Water Act of 1977
- Water Quality Act of 1987
- Act of 1980 to Prevent Pollution from Ships
- Resource Conservation and Recovery Act of 1978
- Hazardous and Solid Waste Act of 1984
- Refuse Act of 1899

Responsibilities for implementing and enforcing the federal regulations addressing marine terminals, vessels, and pollution control fall to a number of agencies, as described in the following sections.

<u>United States Coast Guard</u>

The USCG, through Title 33 (Navigation and Navigable Waters) and Title 46 (Shipping) of the CFR, is the federal agency responsible for vessel inspection, marine terminal operations safety, coordination of federal responses to marine emergencies, enforcement of marine pollution statutes, marine safety (e.g., navigation aids), and operation of the National Response Center for spill response, and is the lead agency for offshore spill response. The USCG has issued regulations under OPA addressing requirements for response plans for tank vessels, offshore facilities, and onshore facilities that could reasonably expect to spill oil into navigable waterways. Some of these regulations are discussed below.

Vessel Boarding Program

The USCG implemented a revised vessel boarding program in 1994 designed to identify and eliminate substandard ships from United States waters. The program pursues this goal by systematically targeting the relative risk of vessels and increasing the boarding frequency of USCG inspectors on high-risk (potentially substandard) vessels. Each vessel's relative risk is determined through the use of a matrix that factors the vessel's country of registration (flag), owner, operator, classification society, vessel particulars, and violation history. Vessels are assigned a boarding priority from I to IV, with priority I vessels being the potentially highest risk.

Marine Terminal Operations

The USCG is also responsible for reviewing marine terminal operations manuals, which must be prepared by any marine terminal that transfers crude oil or other petroleum product between a marine vessel and a marine terminal, and issuing Letters of Adequacy upon approval. At the present time, the USCG relies on the California State Lands Commission (CSLC) to review operations manuals and inspect marine terminals in the San Francisco Bay.

Vessel Double-hull Requirements

The USCG has issued regulations addressing double-hull requirements for tank vessels. The regulations establish a timeline for eliminating single-hull vessels from operating in inland waterways or in the Exclusive Economic Zone of the United States after January 1, 2010 (the Exclusive Economic Zone extends outward to a distance of 200 nautical miles from the shoreline), and eliminating double-bottom or double-sided vessels by January 1, 2015. Only vessels equipped with a double hull, or with an approved double-containment system, would be allowed to operate after those dates.

The phase-out timeline is a function of vessel size, age, and whether it is currently equipped with a single hull, double bottom, or double sides. All new tankers delivered after 1993 are required to be double hulled. The phase-out began in 1995 with: (1) 40-year-old or older vessels equipped with single hulls between 5,000 and 30,000 gross tons, (2) 28-year-old or older vessels equipped with single hulls over 30,000 gross tons, and (3) 33-year-old or older vessels equipped with double bottoms or sides over 30,000 gross tons. In essence, double-bottom or double-sided vessels can operate five years longer than single-hull vessels.

Inert Gas Systems

USCG regulations (46 CFR, Subpart 32.53) require that most crude oil tankers be equipped with and utilize inert gas systems (IGS) to ensure that the vapor space in the cargo tanks does not contain sufficient oxygen to allow combustion to occur. The regulations also specify design and operational requirements for the shipboard IGS systems. USCG regulations (33 CFR, Part 154) require that marine facilities that collect vapors from vessel cargo tanks during loading operations be equipped with vapor control systems. A new vapor control system installation must be certified as meeting the requirements of the regulations prior to operation.

United States Environmental Protection Agency

The EPA is responsible for the National Contingency Plan and acts as the lead agency in response to an onshore spill. The EPA also serves as co-chairman of the

Regional Response Team, which is a team of agencies established to provide assistance and guidance to the On-Scene Coordinator during the response to a spill. The EPA also regulates disposal of recovered oil and is responsible for developing regulations for Spill Prevention Control and Countermeasure (SPCC) Plans. SPCC Plans are required for onshore and offshore facilities that have the potential to spill oil into waters of the United States or adjoining shorelines.

National Oceanic and Atmospheric Administration

The National Oceanic and Atmospheric Administration (NOAA) provides scientific support to the USCG and other organizations for response and contingency planning, including assessments of the hazards that may be involved, predictions of movement and dispersion of oil and hazardous substances through trajectory modeling, and information on the sensitivity of coastal environments to oil and hazardous substances. It also provides expertise on living marine sources and their habitats, including endangered species; marine mammals and National Marine Sanctuary ecosystems; information on actual and predicted meteorological, hydrological, and oceanographic conditions for marine, coastal, and inland waters; and tide and circulation data for coastal waters.

The Coastal Zone Management Act (CZMA) of 1972 (United States Code Chapter 16, Sections 1451-1465) is administered by NOAA's Office of Ocean and Coastal Resource Management. The overall program objectives of CZMA are to preserve, protect, develop, and, where possible, restore or enhance the resources of the nation's coastal zone.

Department of Defense

The Department of Defense, through the U.S. Army Corps of Engineers (USACE), is responsible, on an as-needed basis, for reviewing aspects of a project and/or spill-response activities that could affect navigation. The USACE has specialized equipment and personnel for maintaining navigation channels, removing navigation obstructions, and accomplishing structural repairs.

U.S. Fish and Wildlife Service

The U.S. Fish and Wildlife Service (USFWS) is responsible for the protection of threatened and endangered species, migratory birds, and certain fish, marine mammals, and sea turtles. As such, the USFWS is also responsible for preparing for and responding to oil spills that may impact these species. The USFWS works proactively with the USCG, EPA, and State agencies to support efforts to contain a spill by providing response-related scientific and technical advice. Each USFWS region has a regional spill-response coordinator.

U.S. Geologic Survey

The U.S. Geologic Survey (USGS), through the Department of the Interior (DOI), is a member of the National Response Team. As required, the USGS mobilizes equipment and personnel to gather scientific data and information on the environmental impacts of an oil spill to affected coastal habitats. This includes collecting satellite imagery to assess the impact on wetlands and coasts, developing maps showing NOAA projections of spill trajectories, collecting samples to ascertain source and levels of toxicity to soils and water systems, conducting tests to determine cause of mortality of wildlife, developing models that depict how local tidal and current conditions would interact with seafloor bathymetry to carry oil over barrier islands, and providing decision support tools to help DOI land managers mitigate the effects of an oil spill and assist in restoration efforts.

16.1.1.3 State Regulations

Chapter 1248 of the Statutes of 1990 (SB 2040), the Lempert-Keene-Seastrand Oil Spill Prevention and Response Act, established a comprehensive approach to prevention of and response to oil spills. Regulations are carried out primarily by the CSLC Marine Facilities Division (MFD) with the Oil Spill Prevention and Response (OSPR), created within the California Department of Fish and Wildlife (CDFW), having some authority. These agencies and their responsibilities are discussed below.

CSLC Marine Facilities Division

The MFD is responsible for governing marine terminals under SB 2040. Through CCR Sections 2300 through 2571, the MFD has established a comprehensive program to prevent spills from occurring at marine terminals, and to minimize the spill impact, should one occur. These regulations established a comprehensive inspection and monitoring plan whereby CSLC inspectors monitor most transfer operations sometime during the operation. A comprehensive inspection of the marine terminal is performed annually. Regulations and programs under the MFD are discussed below.

Marine Terminal Regulations

The CSLC's marine terminal regulations are similar to, but more comprehensive than, federal regulations in the areas of establishing: (1) exchange of information between the marine terminal and vessels prior to and during transfer operations, (2) information that must be contained in the Declaration of Inspection, (3) requirements for transfer operations, and (4) information that must be contained in the operations manual. All marine terminals are required to submit updated operations manuals to the CSLC for review and approval whenever a change in procedure occurs. CSLC regulations also require that prior to the commencement of transfer of persistent oil (oil that does not dissipate quickly, including most crude oils) a boom must be deployed to contain any oil that might be released.

Marine terminals subject to high-velocity currents where it may be difficult or ineffective to pre-deploy a boom are required to provide sufficient boom, trained personnel, and equipment so that at least 600 feet of boom can be deployed for containment within 30 minutes. The proposed project area is subject to high-velocity currents and, therefore, pre-booming would not be required. However, the project would be required to meet the 30-minute, 600-foot booming capability, with the required personnel and equipment described above for high-velocity current areas.

Marine Terminal Security Program

A requirement that each marine oil terminal operator must implement a marine oil terminal security program is included in CCR Article 5, Section 2351. At a minimum, each security program must:

- provide for the safety and security of persons, property, and equipment on the marine terminal and along the dockside of vessels moored at the terminal;
- prevent and deter the carrying of any weapon, incendiary, or explosive on or about any person inside the marine terminal, including within his or her personal articles;
- prevent and deter the introduction of any weapon, incendiary, or explosive in stores or carried by persons onto the marine terminal or to the dockside of vessels moored at the marine terminal; and
- prevent or deter unauthorized access to the terminal and to the dockside of vessels moored at the marine terminal.

Additional discussion is provided in Chapter 10.0: Hazards and Hazardous Materials.

Marine Oil Terminal Engineering and Maintenance Standards

The CSLC MFD initiated MOTEMS, which are designed to develop comprehensive engineering standards for performing analysis, design, inspection, and maintenance of marine oil terminals. MOTEMS are codified in CCR Title 24, Part 2, CBC, Chapter 31F. These standards apply to all existing and new marine oil terminals in California, and include criteria for the following:

- audit and inspection;
- structural loading;
- seismic analysis and performance-based structural design;
- mooring and berthing analysis and design;
- geotechnical hazards and foundations;
- structural analysis and design of components;
- fire prevention, detection, and suppression;

- piping and pipelines; and
- electrical and mechanical equipment.

Marine Invasive Species Program

The Marine Invasive Species Program is charged with preventing or minimizing the introduction of non-indigenous species to California waters from vessels over 300 gross registered tons capable of carrying ballast water. The program began in 1999 with the passage of California's Ballast Water Management for Control of Non-indigenous Species Act, which addressed the threat of species introductions through ships' ballast water during a time when federal regulations were not mandatory. In 2003, the Marine Invasive Species Act (MISA) was passed, reauthorizing and expanding the 1999 Act. Subsequent amendments to MISA and additional legislation has further expanded the scope of the program to include research, management, and policy development related to vessel fouling and ballast water treatment technologies.

Requirements vary depending on whether the vessel arrives from inside or outside the Pacific Coast Region (coastal waters within 200 nautical miles of the west coast of the United States), and whether ballast water is from inside or outside the Pacific Coast Region. In general, regulations prohibit the discharge or exchange of ballast water from occurring within the Pacific Coast Region, unless the ballast water is treated or is discharged/exchanged at the same port/place that it originated.

Vessels must develop and maintain ballast water management plans and ballast water logs. Vessels must submit a ballast water reporting form to the CSLC upon departure from each port of call. The logs and reporting forms must be maintained onboard the vessels for two years.

Other Regulations

The CSLC MFD has issued the following additional regulations:

- Marine Terminal Personnel Training and Certification,
- Structural Requirements for Vapor Control Systems at Marine Terminals, and
- Marine Oil Terminal Pipelines.

<u>CDFW Office of Oil Spill Prevention and Response</u>

The OSPR was created within the CDFW to adopt and implement regulations and guidelines for spill prevention, response planning, and response capability. Final regulations regarding oil spill contingency plans for vessels and marine facilities were issued in November 1993 and most recently updated in 2011. These regulations are similar to, but more comprehensive than, federal regulations. The regulations require that tank vessels, tank barges, and marine facilities develop and submit their comprehensive oil spill response plans to the OSPR for review and approval. OSPR regulations apply to all transfer operations between vessels, and between vessels and terminals, including bunkering (refueling), lightering, and small marine fueling facilities.

The OSPR's regulations require that vessels and marine facilities, including refueling facilities, be able to demonstrate that they have the necessary response capability on hand or under contract to respond to specified spill sizes, including a worst-case spill. The regulations also require that a risk and hazard analysis be conducted on each facility. This analysis must be conducted in accordance with procedures identified by the American Institute of Chemical Engineers.

SB 2040 established financial responsibility requirements for all marine facilities handling petroleum products and required that Applications for Certificate of Financial Responsibility be submitted to the OSPR. These requirements were recently updated and became effective August 13, 2011. California's requirement for financial responsibility is in excess of the federal requirements.

SB 2040 also requires the OSPR to develop a State Oil Spill Contingency Plan. In addition, each major harbor was directed to develop a Harbor Safety Plan addressing navigational safety, including tug escort for tankers. The Harbor Safety Committee of the San Francisco Bay Region issued its initial Harbor Safety Plan in 1992 and its latest updated plan in 2011. The plan contains several recommendations to improve safety.

The OSPR is also discussed in Chapter 10.0: Hazards and Hazardous Materials.

<u>California Coastal Commission and San Francisco Bay Conservation and Development Commission</u>

The California Coastal Commission (CCC) and the San Francisco Bay Conservation and Development Commission (BCDC) have oil spill statutory authority under the following two statutes: the California Coastal Act of 1976 (Public Resources Code, division 20) and the Lempert-Keene-Seastrand Oil Spill Prevention and Response Act of 1990. The CCC responsibilities include all of California's coastal shoreline, including ports and harbors, except for the San Francisco Bay, which falls under the jurisdiction of the BCDC. Responsibilities include review of coastal development projects related to energy and oil infrastructure for compliance with the California Coastal Act and consistency with the CZMA; attendance at statewide and regional Harbor Safety Committee Area committee meetings; review of regulations for oil spill prevention and response; review of oil spill contingency plans for marine facilities located in the coastal zone/San Francisco Bay Area (Bay Area) and on the outer continental shelf; participation in the State Interagency Oil Spill Committee; participation in studies to improve oil spill prevention, response, and habitat restoration; participation in oil spill drills; and participation in the development of planning materials for oiled wildlife rehabilitation facilities.

16.1.1.4 Local Regulations

Public Trust Lands

Senate Bill 551, passed by the State of California on October 2, 2011, granted certain tidelands and submerged lands known as California Public Trust Lands (Trust Lands) to the City of Pittsburg. As a grantee of these Trust Lands, the City of Pittsburg is obligated to execute leases with entities who intend to use these granted Trust Lands for a purpose consistent with the Public Trust Doctrine. As such, WesPac Energy–Pittsburg LLC (WesPac) is required to execute a lease with the City of Pittsburg for its use of the Trust Lands as a marine oil terminal.

Section 16.1.2.4 describes the role of the Marine Exchange of the San Francisco Bay Region in managing marine vessel traffic in the San Francisco Bay Area.

16.1.2 Existing Conditions

This section describes the existing environment that may affect the operational safety of the marine terminal, or that may be affected by an accident associated with construction and/or operation of the marine terminal, including transportation of crude oil and partially refined crude oil. This section also presents information on existing vessel traffic within the San Francisco Bay Area, including tank vessel traffic to other marine terminals. A summary of the historical casualties involving tank vessels and marine terminals within the Bay Area is also presented, along with a description of measures that are in place to allow the safe movement of marine vessels within the San Francisco Bay, and the ability to respond to emergency situations.

16.1.2.1 Meteorological Conditions

Winds

San Francisco Bay Area weather is seasonably variable, with three discernible seasons for marine purposes. Winter is the season with the most significant seas, both in terms of locally driven wind waves and open ocean swells that are generated by long fetches of strong winds over the eastern Pacific Ocean. Winter winds from November to February shift frequently and have a wide range of speeds depending on the procession of offshore high- and low-pressure systems. Spring tends to be the windiest season, with average speeds in the San Francisco Bay (Bay) of 6 to 12 knots, and speeds of 17 to 28 knots up to 40 percent of the time. Summer winds are the most constant and predictable.

Fog

Fog is a well-known problem in the San Francisco Bay Area, particularly around the entrance to the San Francisco Bay (known as the Golden Gate). It is most common during the summer, occasional during fall and winter, and infrequent during spring. The long-term fluctuations are not predictable, but daily and seasonal cycles generally come at expected intervals. The foggiest months are usually July and August while June is the least foggy. Under normal summer conditions, a sheet of fog appears in the early forenoon and becomes more formidable as the day wears on. This type of fog is normally referred to as sea fog. Fog signals in the Golden Gate operate 15 to 25 percent of the time during August.

Another type of fog, referred to as Tule fog, forms in low, damp places such as the Sacramento/San Joaquin Delta and is most prevalent in late December and January. This type of fog tends to drift seaward through the Carquinez Strait and other gaps in the Berkeley Hills. Fog signals tend to operate 10 to 20 percent of the time during these months.

Currents

The currents at the entrance to San Francisco Bay are variable and uncertain, and at times attain considerable velocity. The ebb current has been observed to reach a velocity of over 6.5 knots. Immediately outside the San Francisco Bar (which is a horseshoe-shaped area of shallow water that begins north of the Golden Gate in Marin County, runs out approximately 5 miles, and curves back to shore just south of the Golden Gate) is a slight current to the north and west known as the Coast Eddy Current. The currents that have the greatest effect on navigation in the Bay and out through the Golden Gate are tidal in nature, due to the tide rushing in and out of the Bay.

Tides

Tides in the San Francisco Bay Area are mixed. Usually two cycles of high and low tides, each cycle characterized by a different height, occur daily. Occasionally, the tidal cycle will become diurnal (only one cycle of tide in a day). Depths in the Bay are based on mean lower low water level (MLLW), which is the average height of the lower of the two daily low tides. The mean range of the tide at the Golden Gate is approximately 4.1 feet, with a diurnal range of approximately 5.8 feet. During the periodic maximum tidal variations, the range may be as much as 9 feet and have lowest low waters 2.4 feet below MLLW datum. The mean range of tide in Suisun Bay is approximately 4 feet.

Water Depths

Water depths in the Bay are generally shallow and subject to silting from river runoff and dredge spoil recirculation. Therefore, channel depths must be regularly maintained, and shoaling (the deposition of silt and sand that decreases water depth) must be prevented to accommodate deeper-draft vessels. The USACE attempts to maintain the depth of the main ship channel from the Pacific Ocean into the Bay at 55 feet; however, the continual siltation results in actual main channel depths ranging between 49 and 55 feet. Deep-draft vessels in the Bay must carefully navigate many of the main shipping channels because channel depths in some areas are barely sufficient for navigation by some modern larger vessels, depending upon how deeply laden the vessel is. While the USACE surveys specific areas of concern on a frequent basis, recent survey charts may not show all seabed obstructions or shallow areas due to highly mobile bottoms (due to localized shoaling). An ongoing federal project provides for a main channel 35 feet deep through Suisun Bay to the San Joaquin River. This is the limiting depth for travel to the Pittsburg area.

16.1.2.2 Marine Description and Facilities

Bridges

The San Francisco Bay Area is crossed by a number of bridges that carry automotive and rail traffic. Most shipping traffic transits through moveable or fixed bridges with adequate vertical clearance for normal passage. The following bridge complexes are located between the Bay entrance and Pittsburg: Golden Gate, Richmond-San Rafael, Carquinez, and Benicia-Martinez. All the bridge complexes are equipped with racons, which are radar sensors (beacons) that send out a radar emission that shows up as a distinctive mark on a ship's radarscope.

Suisun Bay Description and Facilities

Suisun Bay (see Figure 16-1: Suisun Bay and Facilities) is a broad, shallow body of water with marshy shores and numerous marshy islands. It is essentially the delta of the Sacramento and San Joaquin rivers, which empty into the east part of Suisun Bay. Two narrow, winding channels lead to the mouths of the rivers. These are marked by lights. Suisun Bay is used by many light-draft vessels having local knowledge.

Specific Suisun Bay facilities noted by NOAA (2011b) include:

- A restricted berthing area for Maritime Administration Reserve Fleet vessels is along the west side of Suisun Bay.
- The Concord U.S. Naval Weapons Station is on the south side of Suisun Bay. A restricted area has been established along the waterfront of the Naval Station. A security zone has also been established around the piers of the Naval Station.
- The Diablo Service Corporation Wharf, about 0.6 mile east of New York Point, is an offshore wharf with 1,154 feet of berthing space with dolphins. It is owned by Tosco Corporation and is used for the receipt of petroleum coke.

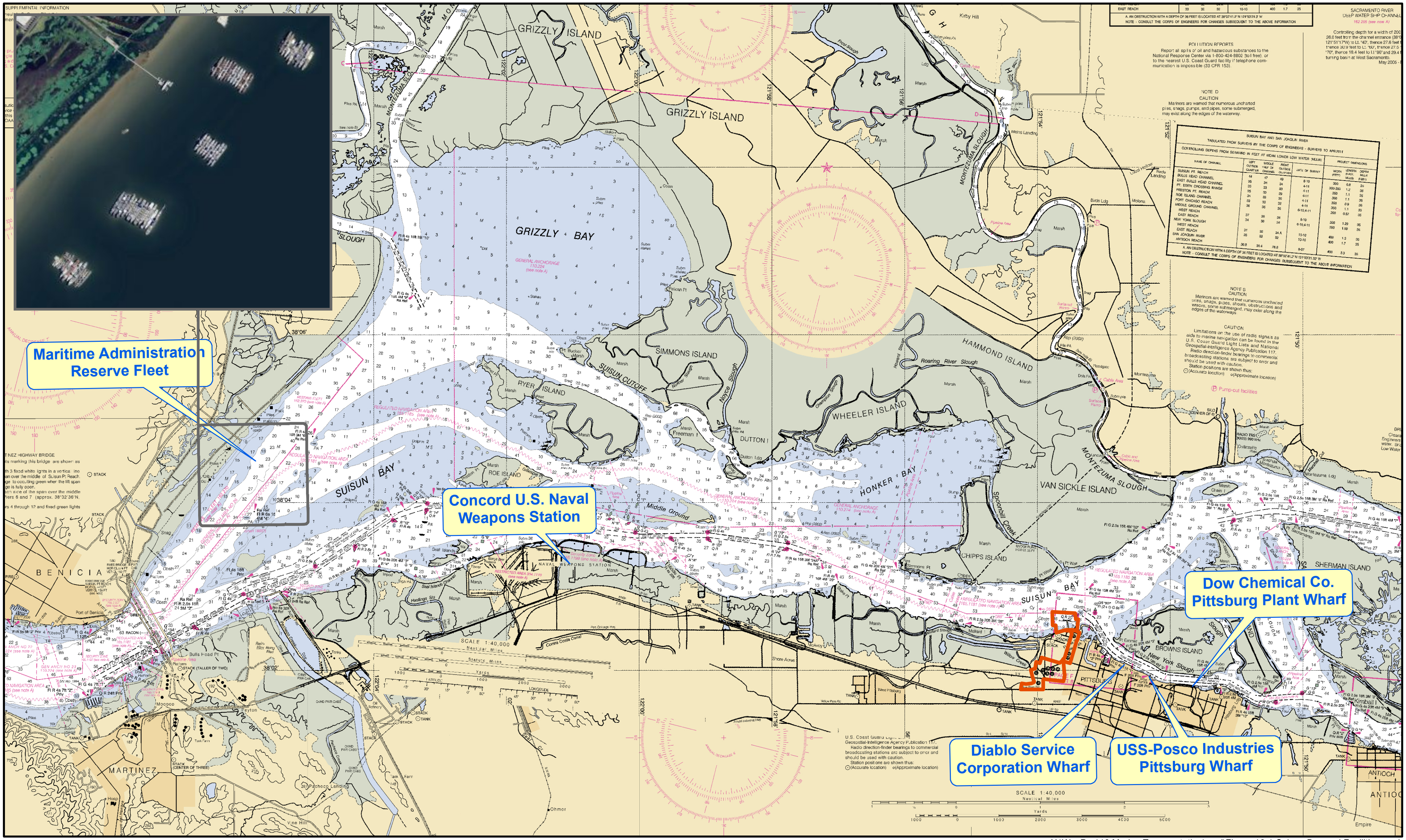

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Figure 16-1
Suisun Bay and Facilities
City of Pittsburg
WesPac Pittsburg Energy Infrastructure Project

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Terminal Boundary

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1 inch = 2 miles

0 2 4 mi

- USS-Posco Industries, Pittsburg Wharf, approximately 1.3 miles east of New York Point, is a 891-foot marginal wharf with depths of 33 feet alongside. It is used for receipt of semi-finished steel.

- Dow Chemical Company, Pittsburg Plant Wharf, about 2 miles east of New York Point, is an offshore wharf with 672 feet of berthing space with dolphins. It is used for shipment and receipt of caustic soda.

Navigational Description

A TSS has been established off the entrance of San Francisco Bay (see Figure 16-2: Vessel Traffic System). It includes three directed-traffic areas, each with one-way inbound and outbound traffic lanes separated by defined separation zones; a Precautionary Area (an area within defined limits where vessels must navigate with particular caution, and within which the direction of traffic flow may be prescribed); and a pilot boat cruising area. The TSS is recommended for use by vessels approaching or departing the Bay, but is not necessarily intended for tugs, tows, or other small vessels that traditionally operate outside the usual steamer lanes or close inshore. The TSS has been adopted by the IMO.

The USCG established the Vessel Traffic Service (VTS) in San Francisco Bay in 1972. The USCG operates the VTS and monitors nearly 400 vessel movements per day. The region is considered a difficult navigation area because of its high-traffic density, frequent episodes of fog, and challenging navigational hazards.

The VTS for the San Francisco Bay region has six components: (1) automatic identification system, (2) radar and visual surveillance, (3) very-high-frequency communications network, (4) position reporting system, (5) traffic schemes within the Bay, and (6) a 24-hour center that is staffed with specially trained vessel traffic control specialists.

The VTS area is divided into two sectors: offshore and inshore. The offshore sector consists of the ocean waters within a 38-nautical-mile radius of Mount Tamalpais, excluding the offshore Precautionary Area. The inshore sector consists of the waters of the offshore Precautionary Area eastward to San Francisco Bay and its tributaries extending inland to the ports of Stockton, Sacramento, and Redwood City. In sum, the geographic area served by VTS includes San Francisco Bay, its seaward approaches, and its tributaries as far as Stockton and Sacramento.

There are seven Regulated Navigation Areas (RNAs) in San Francisco Bay. These RNAs were established in 1993 by the USCG, with input from the Harbor Safety Committee, and are based on the voluntary traffic routing measures that were previously in existence. The RNAs are codified in 46 CFR 165.1116. RNAs organize traffic-flow patterns to reduce vessel congestion where maneuvering room is limited; reduce meeting, crossing, and overtaking situations between large vessels in constricted channels; and limit vessel speed. The seven RNAs are shown on Figure 16-3: Regulated Navigation Areas. All vessels 1,600 gross tons or more and tugs with a tow of 1,600 gross tons or more (referred to here as large vessels) navigating in the RNAs are required by the regulations to: (1) not exceed a speed of 15 knots through the water; and (2) have engine(s) ready for immediate maneuver, and operate engine(s) in a control mode and on fuel that will allow for an immediate response to any engine order by the Captain.

16.1.2.3 Vessel Traffic and Operations

Commercial Vessel Traffic

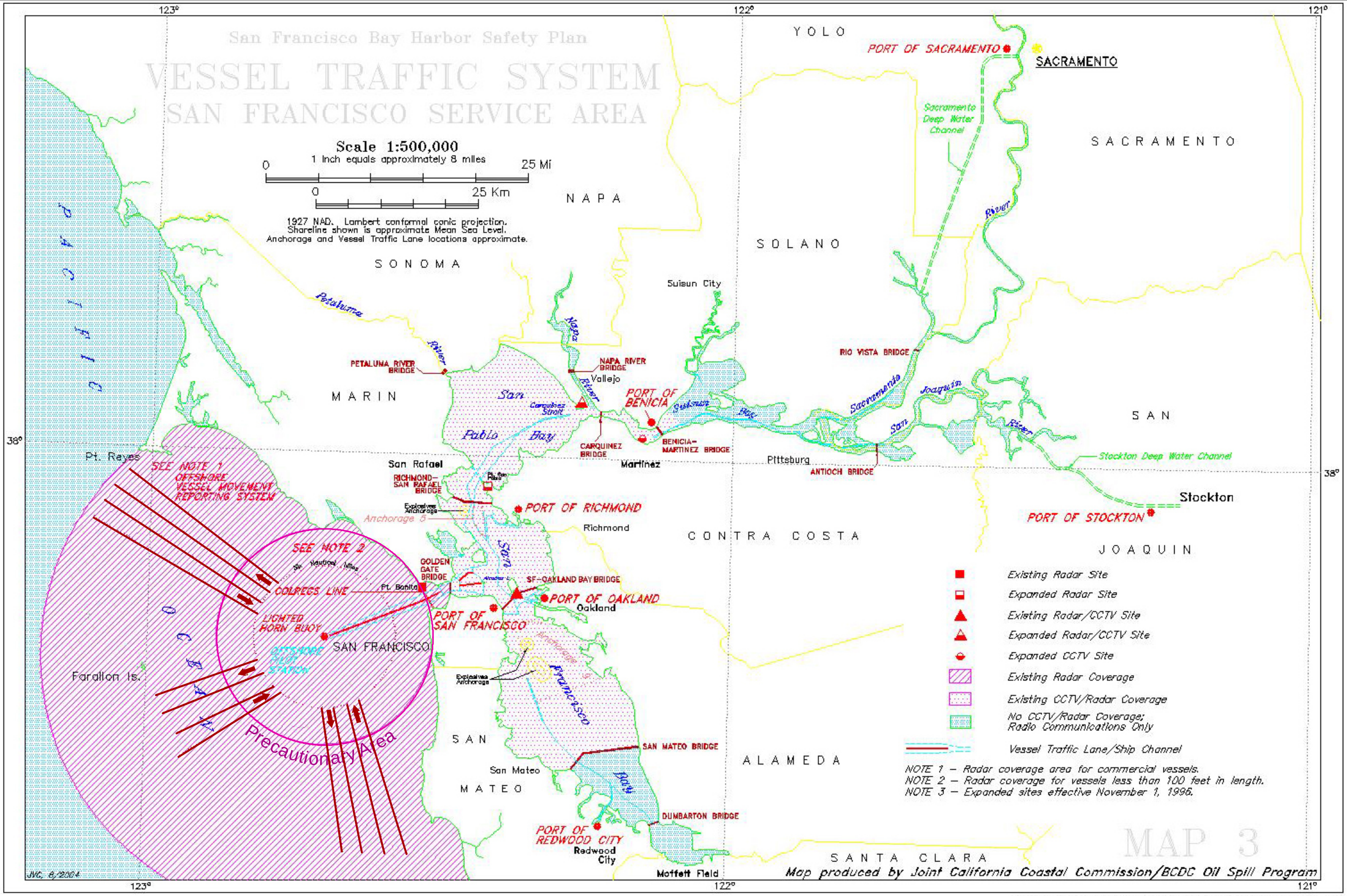
Many types of marine vessels call at terminals in the Bay Area, including dry-cargo vessels, tankers, tow/tug vessels, dry-cargo barges, and tank barges. Table 16-1 presents information on vessel visits to the Bay Area during 2010, which is the most recent year of available data and is generally representative of the baseline conditions for the proposed project. The numbers in the table represent inbound transits; numbers for outbound transits are approximately the same. A vessel that visits multiple terminals is counted at each terminal.

Table 16-2 presents information on tank vessel traffic in the Bay Area for 2010 and 2011. Tank vessel traffic remained fairly constant over the two years. Table 16-3 summarizes the volume of the various petroleum products that were loaded and discharged at marine terminals in the Bay Area in 2011. Approximately 200 million barrels of crude oil/petroleum products were offloaded at marine terminals in the Bay Area in 2011.

Ferries

High-speed commuter ferries frequently operate in central/south San Francisco Bay and San Pablo Bay. Concentrations of these ferries are highest around the San Francisco Ferry Building on San Francisco's north shore, where most central Bay routes terminate. Ferry routes in the San Francisco Bay and San Pablo Bay are shown on Figure 16-4: Ferry Routes. Many ferries also operate between San Francisco's north shore, Alcatraz, and Sausalito/Tiburon. These ferries do not run along charted routes.

The San Francisco Harbor Safety Committee, in conjunction with the USCG, has established a Ferry Traffic Routing Protocol for: (1) the area surrounding the Ferry Building terminal along the waterfront of San Francisco, (2) the waters of central San Francisco Bay, and (3) the waters of San Pablo Bay. The protocol is intended to increase safety in the area by reducing traffic conflicts and, while not compulsory, the guidelines set forth in the protocol are strongly recommended.



Base Map Source: Map of the North Half of California, Scale 1:500,000, USGS, 1970

X:\WesPac\16 Marine Transportation\mxd\Figure 16-2 Vessel Traffic System.mxd

Figure 16-2
Vessel Traffic System
City of Pittsburg
WesPac Pittsburg Energy Infrastructure Project

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Source: Marine Exchange of the San Francisco Bay Region

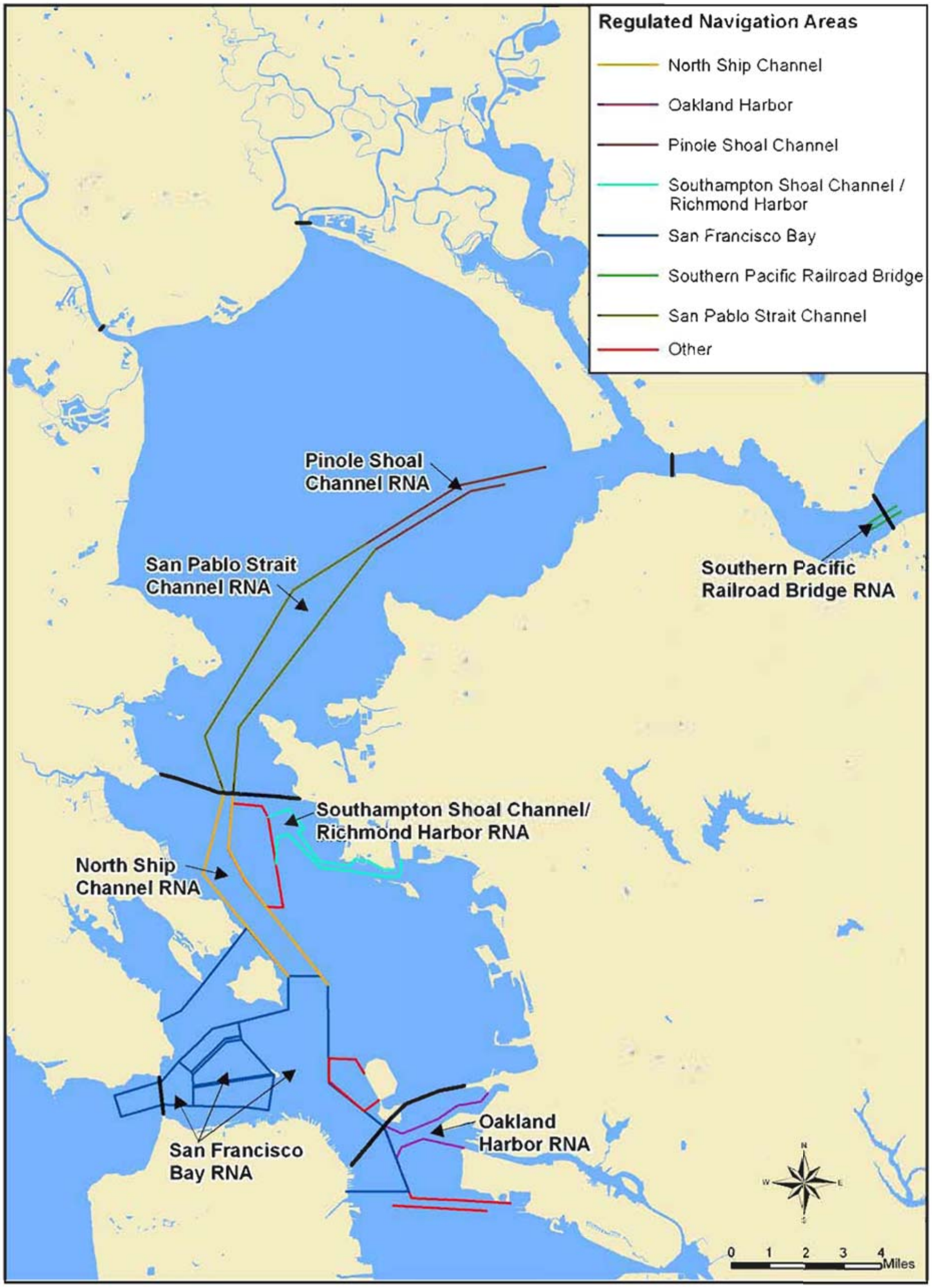

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Figure 16-3
Regulated Navigation Areas
City of Pittsburg
WesPac Pittsburg Energy Infrastructure Project

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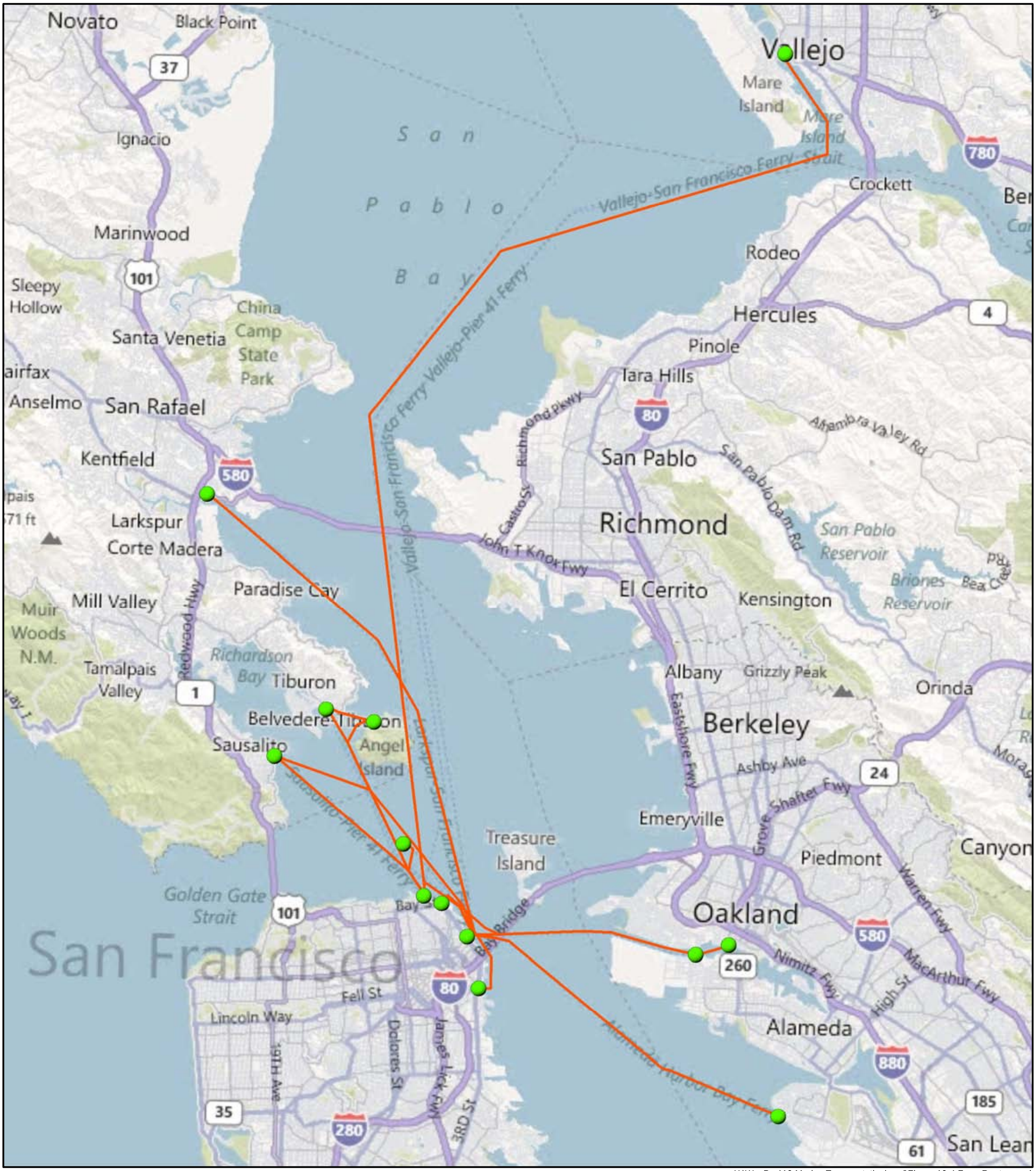

X:\WesPac\16 Marine Transportation\mxd\Figure 16-4 Ferry Routes.mxd

Figure 16-4
Ferry Routes
City of Pittsburg
WesPac Pittsburg Energy Infrastructure Project

Ferry Terminals
Ferry Routes

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Table 16-1: Inbound Vessel Traffic in San Francisco Bay (2010)

Location	Type of Vessel					Total Number of Vessels
	Dry Cargo	Tanker	Tow or Tug	Dry-cargo Barge	Tank Barge	
San Francisco Bay Entrance	2,434	722	248	7	322	3,733
San Francisco Harbor	38,723	0	692	90	42	39,574
Oakland Harbor	10,974	13	1,548	141	594	13,270
Richmond Harbor	65	393	4,374	107	1,061	6,000
San Pablo Bay and Mare Island Strait	10,508	357	991	405	279	12,540
Carquinez Strait	1,362	329	1,061	165	278	3,195
Suisun Bay Channel	124	91	365	181	69	830
Sacramento River	19	2	0	0	0	21
San Joaquin River	103	34	102	47	15	301

Source: U.S. Army Corps of Engineers, 2010

Table 16-2: Tank Vessel Traffic in San Francisco Bay

Movement Type	2011	2010
Tanker arrivals to San Francisco Bay	776	699
Barge arrivals to San Francisco Bay	327	371
Total tanker and barge arrivals	1,103	1,070
Tank ship movements and escorted barge movements	3,571	3,528
Tank ship movements	2,313	2,070
Escorted tank ship movements	1,186	925
Unescorted tank ship movements	1,127	1,145
Tank barge movements	1,258	1,458

Movement Type	2011	2010
Escorted tank barge movements	500	683
Unescorted tank barge movements	758	775

Source: Harbor Safety Committee, 2011

Table 16-3: Petroleum Product Transfers in San Francisco Bay (2011)

Product	Load (in barrels)	Discharge (in barrels)
Additives - Alkylate	814,000	1,776,255
Additives - Naphtha	1,378,600	189,400
Additives - other	424,212	497,650
Additives - Ethanol	2,066,500	459,500
Additives - PenHex	0	0
Additives – Reformate	662,000	160,000
Additives – Toulene	0	30,000
Crude – Alaskan North Slope	0	26,753,000
Crude – import	558,000	116,989,182
Crude – other	503,000	1,234,000
Cutter stock	298,975	222,000
Diesel	17,008,614	3,924,500
Fuel oil	17,126,996	10,410,348
Gasoline	28,161,376	11,307,800
Jet fuel	10,576,300	3,617,017
Light cycle oil	3,379,000	22,170,870
Lube oil	4,354,665	267,889
Marine diesel oil	2,800	0
Other	716,425	250,590
Totals:	**88,031,463**	**200,260,001**

Source: Harbor Safety Committee, 2011

Recreational Boating

There are a number of small boat marinas in the Bay Area that offer a wide variety of recreational boating opportunities, including sailing, power boating, and fishing. Power boat, sailboat, and sailboard races are commonplace on the Bay. Most large regattas or marine events are published in the Coast Guard Local Notice to Mariners. The number of recreational boats transiting the Bay Area is not monitored.

In addition, there are other commonplace water activities that occur within the Suisun Bay such as kayaking, kiteboarding, paddleboarding and similar watersport activities using small, non-motorized watercrafts. These types of watercrafts typically launch from a ramp, shoreline, dock, or marina, and traverse through the open waters, sometimes crossing the shipping channel.

Under Rule 9 of the International and Inland Rules of the Road published by the USCG, all vessels less than 20 meters (66 feet), vessels engaged in fishing, and all sailboats cannot impede the passage of a vessel that can only operate safely in a narrow channel or fairway. The Captain of the Port has designated all major deep-draft ship channels in San Francisco Bay as narrow channels or fairways, thus making Rule 9 applicable in these areas. In addition, some channels have been designated as RNAs to organize traffic flow patterns. Rule 9 is also applicable in these areas. Rule 9 places the obligation on the small vessel operator to avoid impeding the large vessel while operating in a deep-draft channel. Non-motorized watercrafts are highly maneuverable by their individual users, which make them capable of complying with these regulations. Rule 9 is intended to protect the recreational boater.

Tug Escorts

All tank vessels carrying more than 5,000 tons of oil in bulk as cargo must have a standby tug available, or be escorted by one or more tugs, when transiting through the zones shown on Figure 16-5: Tug Escort Zones. This requirement does not apply to tankers with double hulls when the tanker has fully redundant steering and propulsion systems, as described in the regulations (14 CCR, Section 851.10.1). The tug escorts must be certified and must meet specific requirements based on the size of the tanker. Tug escorts are required while tankers are transiting the Carquinez Strait and Suisun Bay.

Pilotage

Pilotage in and out of San Francisco Bay is compulsory for all vessels of foreign registry and for United States vessels not having a federal licensed pilot on board. The San Francisco Bar Pilots provide pilotage to ports in San Francisco Bay and to ports on all tributaries to the Bay, including Stockton and Sacramento. Pilots board inbound tank vessels under escort in the pilot boarding area, located approximately 12 miles west of the Golden Gate Bridge.

Lightering

Sometimes, large tank vessels delivering oil to the Bay Area are not able to travel to some of the marine terminals because they draw more water than the depth of the channel. In these cases, the tank vessels transfer some of their oil to a smaller vessel, which then delivers the crude oil. This transfer is referred to as lightering. After enough of the oil has been transferred, the large vessel is able to travel to the marine terminals because it sits higher in the water.

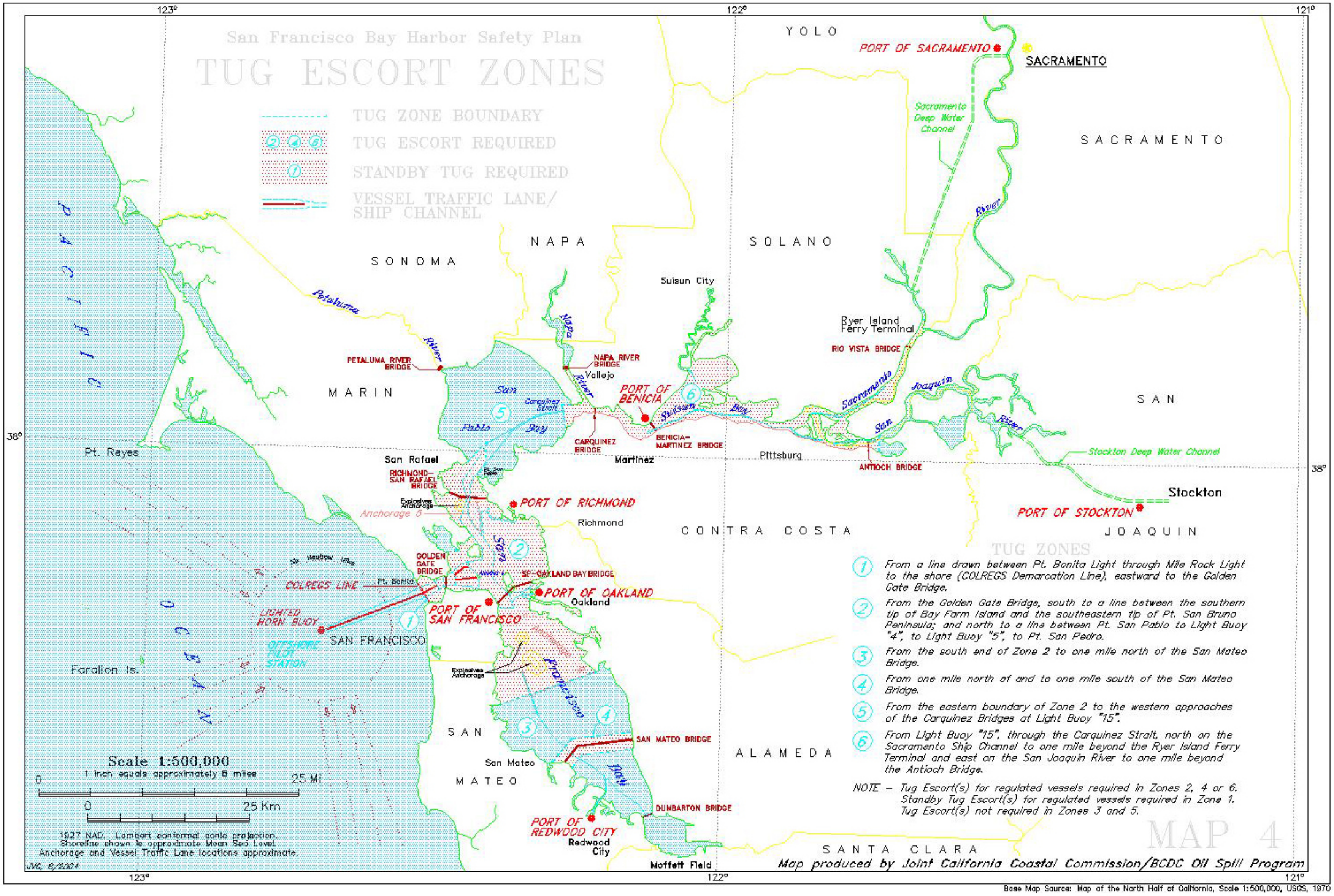
Due to numerous environmentally sensitive areas, lightering within San Francisco Bay is permitted only in Anchorage 9 (see Figure 16-6: Lightering Area – Anchorage 9). Because of its size and location, Anchorage 9 affords the best opportunity for containment and recovery in the event of an oil spill during oil transfer. Lightering regulations (14 CCR, Sections 840-845.2) require that written procedures, specific equipment, inspections, oil spill response standby capabilities, and other measures be in place prior to the commencement of transfer operations. In particular, the regulations require that prior to beginning each transfer operation, the transfer unit shall provide either: (1) boom deployment so as to enclose the water surface area adjacent to the receiving unit; or (2) sufficient boom, trained personnel, and equipment maintained in a stand-by condition at the point of transfer, such that at least 600 feet of boom, or an amount sufficient to meet the containment requirements described in the regulations, can be deployed in 30 minutes or less after discovery of a spill. In addition, the owner or operator of a transfer unit must also identify the equipment, personnel, and procedures such that at least an additional 600 feet of boom can be deployed within one hour following an oil spill.

16.1.2.4 Accidents, Spills, and Response Measures

Historical Accidents and Spills within the San Francisco Bay

The CSLC has been tracking spills from marine terminals since 1992. As discussed in detail under Impact MT-7 in Section 16.2.3.1, approximately 54 percent of spills have been less than 1 gallon, and 95 percent have been less than 1,000 gallons. Terminals were responsible for approximately 59 percent of the spills, and vessels were responsible for the remaining 41 percent. In addition, several major vessel incidents have occurred over the past 30 years. EPA rules require that terminals maintain a historical record of oil spills from their terminal.

In 1971, a collision of the Oregon Standard and the Arizona Standard occurred in heavy fog under the Golden Gate Bridge, resulting in a spill of approximately 27,600 barrels of heavy fuel oil. Spilled oil impacted the outer coast as far north as Point Reyes and to the south near San Gregorio Beach in San Mateo County.



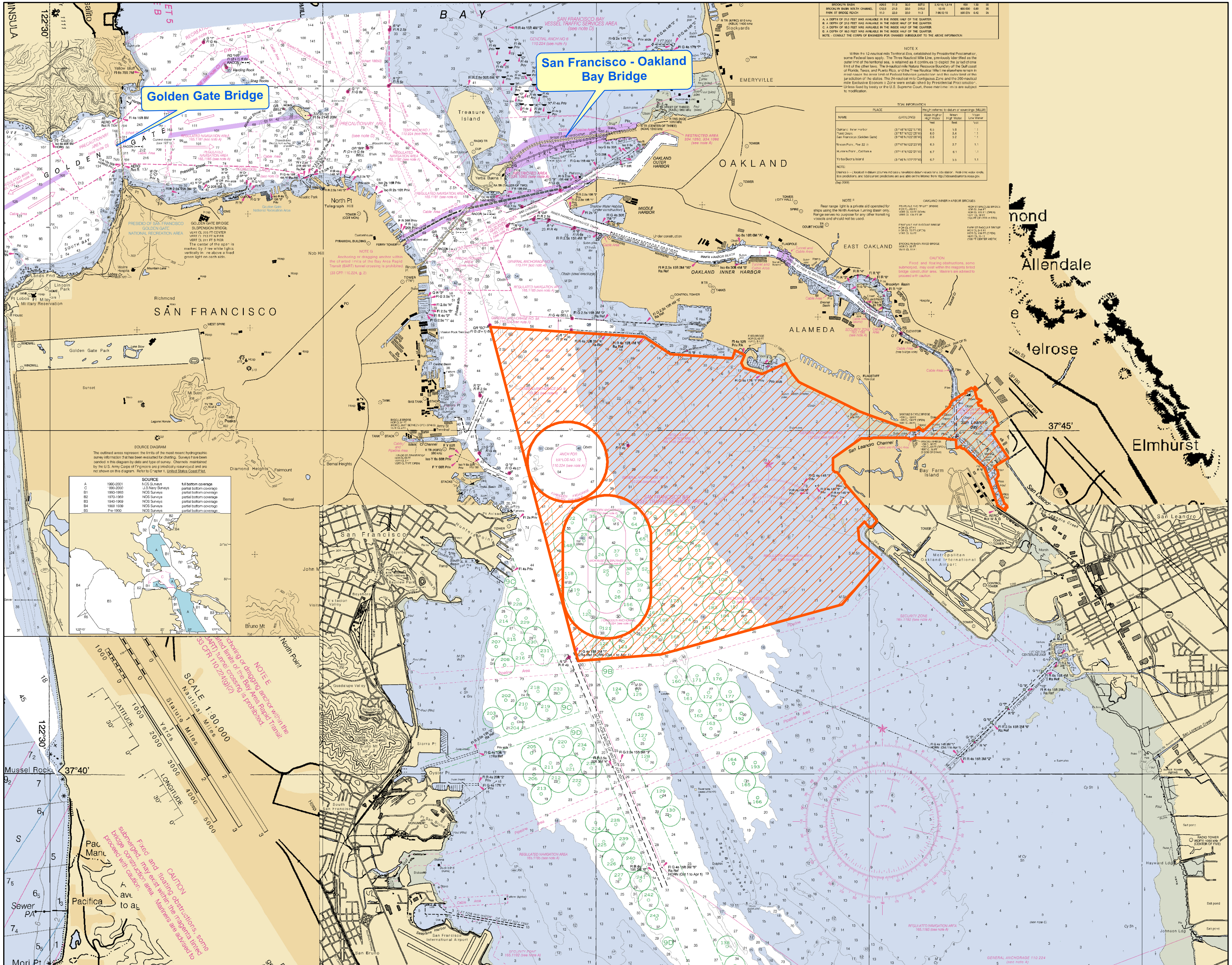
X:\WesPac\16 Marine Transportation\mxd\Figure 16-5 Tug Escort Zones.mxd

Figure 16-5
Tug Escort Zones
City of Pittsburg
WesPac Pittsburg Energy Infrastructure Project

12/20/2011

Source: Marine Exchange of the San Francisco Bay Region

Figure 16-6
Lightering Area - Anchorage 9
City of Pittsburg
WesPac Pittsburg Energy Infrastructure Project



Anchorage 9

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CH X:\WesPac\16 Marine Transportation\mxd\Figure 16-6 Lightering Area - Anchorage 9.mxd

In 1984, the chemical tanker Puerto Rican experienced an explosion in a void space surrounding a cargo tank. The explosion occurred while the vessel was in open waters about 8 miles west of the Golden Gate Bridge. The accident resulted in injury to crew members and the release of over 30,000 barrels of lubricating oil and fuel oil, impacting the Farallon Islands, Point Reyes, and Bodega Bay.

In November 2007, a container ship, the Cosco Busan, struck the Bay Bridge and released almost 1,400 barrels of fuel oil into the water. Oil contamination occurred on the waterfront in the San Francisco Bay, and several beaches in San Francisco and in Marin County were closed because of oil contamination. On-water and shoreline cleanup activities were undertaken. Many oiled and closed beaches have since been cleaned up, and all of these appear to have been re-opened (Cosco Busan Oil Spill Trustees, 2012).

As a result of the 2007 spill, California legislation was passed in September 2008 that is geared to improve oil spill preparedness and to improve response measures. Some of the legislation deals with preparedness, and other legislation assigns responsibility for cleanup in the event of a spill.

The Harbor Safety Committee of the San Francisco Bay Region (2011) summarizes safety statistics for the Bay Area. There were 42 reported marine casualties involving tank vessels for the five-year period from 2006 through 2010, for an average of about 8 per year. These casualties included all causes, including collisions, ramming, groundings, fire, propulsion and steering failures, and personnel errors. The tank vessel collision and ramming incidents could involve any other type of vessel, including but not limited to ferries, fishing vessels, pleasure craft, and military vessels.

Physical Oceanographic Real Time System

The Physical Oceanographic Real Time System (PORTS) is designed to provide crucial information in real time to mariners, oil spill response teams, managers of coastal resources, and others about the San Francisco Bay's water levels, currents, salinity, and winds. In partnership with NOAA's National Ocean Service, OSPR, the USGS, and the local community, the Marine Exchange of the San Francisco Bay Region operates PORTS as a service to those who must make operational decisions based on oceanographic and meteorological conditions in the Bay.

The number, type, and mix of instruments that collect this information are deployed at strategic locations in the Bay, both to provide data at critical locations and to allow nowcasting and forecasting using a mathematical model of the Bay's oceanographic processes. Data from these sensors are fed to a central data-collection point; raw data from the sensors are integrated and synthesized into information and analysis products, including graphical displays of PORTS data. These displays are available over the Internet and through a voice-response system. Station 9415115 is located near Pittsburg (NOAA, 2011b).

Spill Response Capability

Marine terminals and all vessels calling at marine terminals are required to have spill response plans and a certain level of initial response capability. Some of the response resources must be available at the WesPac Energy–Pittsburg Terminal (Terminal), while others can be available from off-site resources. The requirements for the response capability are detailed in the federal and state regulations. The Terminal, being non-operational, currently does not have and is not required to have spill response capabilities. However, the proposed project is required to develop a detailed oil spill response plan that must include, among other things, a description of how the response capability requirements would be met. This plan must be approved by the USCG and OSPR before the Terminal can begin operations.

Marine Firefighting

Marine firefighting capabilities and associated equipment in the San Francisco Bay Area are summarized in the Marine Firefighting Contingency Plan (USCG, 2008). The purpose of this plan is to provide guidance to the USCG and local fire agencies to ensure coordinated responses to marine fires. The USCG considers marine firefighting to be a local responsibility, usually assumed by the local fire department. Where a local agency assumes responsibility as lead agency for response to a fire and is capable of ensuring an adequate response, the USCG would support this response as its resources allow, but would not assume responsibility for firefighting. The proposed Terminal is located within the Contra Costa County Fire Protection District. In addition, the proposed project is intended to be involved in the local Petro-Chemical Mutual Aid Organization, an agreement between large industries in the San Francisco Bay Area to provide aid in the form of spill/hygiene/fire response equipment and assistance. The proposed project is similar to many of the existing Petro-Chemical Mutual Aid Organization members, and it is not expected that the proposed project would require additional assets beyond those listed above.

Very few dedicated fireboats are available in the Bay Area. The availability of vessels varies according to jurisdictional coverage requirements, mutual aid agreements, and maintenance or repair conditions. According to the *Sector San Francisco Marine Firefighting Plan* (USCG, 2008) two firetugs are stationed in Benicia, and the Suisun Bay Reserve Fleet has three firetugs.

16.2 IMPACT ANALYSIS

16.2.1 Methodology for Impact Analysis

The impacts section addresses potential injury or death to members of the public as a result of marine transportation and marine terminal construction and operation. The effects of a spill, fire, or explosion on other aspects of the environment (e.g., visual, biological, and geological resources) are discussed in Chapter 3.0: Aesthetics; Chapter 6.0: Aquatic Resources; Chapter 7.0: Terrestrial Resources; Chapter 9.0: Geology, Soils, and Seismicity; Chapter 10.0: Hazards and Hazardous Materials; Chapter 11.0: Public Services and Utilities; Chapter 15.0: Land Transportation; and Chapter 17.0: Water Resources.

Risks to the public were assessed by estimating the probabilities of oil releases from vessels, both transiting and berthed; probabilities are based on published data from various sources, discussed in detail in Section 16.1.2. To estimate where oil could flow and how large an area could be impacted, spill trajectory modeling was conducted. The impacts of potential spills on the public were assessed based on the likelihood of people coming into contact with the spilled oil, considering geographic setting and also the intervening effects of spill contingency plans that would be in place. Impacts to vessel traffic in Suisun Bay were assessed by comparing anticipated traffic resulting from system construction and operations with historical commercial vessel traffic data.

16.2.2 Significance Criteria

For the purposes of this analysis, an impact to marine transportation or marine terminal operations was considered to be significant and to require mitigation if it would result in any of the following:

- Adversely affect safe navigation resulting in substantial increases in the number of incidents in the San Francisco Bay Area
- Substantially increase vessel congestion in the San Francisco Bay Area
- Substantially affect emergency response capabilities to effectively mitigate spills and other accident conditions
- Create a potential for fires, explosions, releases of flammable or toxic materials, or other accidents from the Terminal or from vessels calling at the Terminal that could cause injury or death to members of the public

16.2.3 Impacts and Mitigation Measures

16.2.3.1 Proposed Project

Construction-related Impacts

Impact Marine Transportation (MT)-1: Substantially increase vessel congestion in Suisun Bay resulting from marine construction vessels and associated vessel traffic. (Less than significant.) The marine terminal construction and dredging process and equipment is described in Chapter 2.0: Proposed Project and Alternatives. Typical marine vessel construction equipment would consist of a dredge derrick, derrick, and tugboat used for moving barges. The anticipated average and peak number of barges is 6 and 12, respectively. Some construction materials such as steel and concrete piles would be delivered to the site by barge. Dredging would be accomplished using a clamshell-type bucket. If the dredged material is disposed of offshore, it would be transported by barge. It is estimated that approximately 75 round trips by barge would be required to dispose of dredged material, dispose of demolished material, supply new materials, and provide equipment for the project. There is limited commercial vessel traffic in the construction area. Annually, approximately 1,660 (830 inbound and 830 outbound) commercial vessels transit into Suisun Bay, 42 (21 inbound and 21 outbound) into the Sacramento River, and 600 (300 inbound and 300 outbound) into the San Joaquin River (refer to Table 16-1). In addition, there is some recreational boat traffic, although the exact amount is not known. The Pittsburg Marina, with its 575 berths, is located just east of the proposed Terminal.

The marine terminal extends approximately 750 feet into the water. The width of Suisun Bay at the Terminal is approximately 3,000 feet (NOAA, 2010). The construction vessels would generally be stationed at or near the Terminal, leaving adequate room for passing vessels. Environmental Commitment MT-1, described in Chapter 2.0: Proposed Project and Alternatives, commits the construction/dredging company to informing the USCG of the type and placement of vessels, and the schedule before the project begins. The USCG would disseminate this information to mariners using the Local Notice to Mariners (LNM) process. The LNM is the primary means for disseminating information concerning aids to navigation, hazards to navigation, and other items of marine information of interest to mariners. These notices are published weekly and are also available on the Internet. In addition, Suisun Bay and the proposed Terminal are located in an RNA, which puts additional constraints on commercial traffic. All construction vessels are required to be marked and have lighting in accordance with USCG regulations (refer to Environmental Commitment MT-2, described in Chapter 2.0: Proposed Project and Alternatives). Thus, it is expected that vessel traffic in the area would be fully aware of the construction activity and have adequate room to avoid it, and as a result, congestion would not occur.

Boating traffic in and out of the Pittsburg Marina occurs at the far eastern end of the marina and is not anticipated to be impacted for the same reason given above.

Mitigation Measure: No mitigation required.

Impact MT-2: Substantially increase the number of incidents in the San Francisco Bay arising from unsafe navigation conditions related to marine construction vessels and project-related vessel traffic. (Less than significant.) As presented under Impact MT-1, construction activities would be well publicized and would not be expected to increase congestion in the area. Barge deliveries of construction materials would not substantially increase vessel traffic in the Bay. Such barge traffic would be required to follow the navigation rules enacted in the Bay, including those in the RNA. Thus, the construction-related vessel traffic would not substantially increase the number of incidents in the Bay.

Mitigation Measure: No mitigation required.

Impact MT-3: Risk of injury or death to the public from fire, explosion, release of flammable or toxic materials, or other accident caused by marine construction vessels and associated vessel traffic. (Less than significant.) Marine vessels would be used to assist with construction of the Terminal; however, these vessels would be significantly smaller than the tankers that would be unloading there after operations begin. The construction vessels would adhere to the San Francisco Bay VTS and navigation rules, and construction would be a temporary activity. The only hazardous materials that would be located on construction-related vessels would be fuels, lubricants, and solvents, some of which may be flammable or combustible. Environmental Commitment MT-3, described in Chapter 2.0: Proposed Project and Alternatives, commits the project to storing lubricants and solvents in approved containers. There would be a potential for small fuel spills, but the potential for fires and/or explosions is extremely small because most of the materials (e.g., diesel, lubricants) would have low volatility. The potential for fuel spills would be minimized because refueling would typically take place at approved dockside facilities, which are regulated by OSPR (refer to Environmental Commitment MT-4, described in Chapter 2.0: Proposed Project and Alternatives).

Because any spill or fire would be offshore and away from the public, accidents are not expected to cause injury or death to members of the public located onshore. Because of the process in place (refer to Impact MT-1) to provide notification of the construction activity, it is expected that pleasure craft and other non-construction vessel traffic would avoid the construction activity, and, therefore, the chance that such vessels would be impacted by a fire is very low. Because of this low chance, and because of the temporary nature of the construction activity, the potential impact to members of the public on marine vessels would not be significant. Hence, impacts to human health associated with potential fire, explosion, release of flammable or toxic materials, or other related accident caused by marine construction vessels or vessel traffic would be less than significant.

Mitigation Measure: No mitigation required.

Operational Impacts

Impact MT-4: Substantially increase vessel congestion in the San Francisco Bay Area arising from the calling of marine vessels at the Terminal. (Less than significant.) It is estimated that 18 tank vessels per month (216 per year) would call at the Terminal (refer to Chapter 2.0: Proposed Project and Alternatives). Assuming these are additional tank vessel trips (as opposed to tank vessels being rerouted from existing terminals to the proposed Terminal), this would result in a 0.5 percent increase in the total number of commercial vessels in San Francisco Harbor, a 6.8 percent increase in commercial vessel traffic in the Carquinez Strait, and a 26.0 percent increase in Suisun Bay over 2010 traffic levels (refer to Table 16-1). However, commercial vessel traffic in Suisun Bay has historically been much higher; in 2005, the number of upbound trips was 2,365, almost triple what it was in 2010. In the recommendations sections of the San Francisco Bay Harbor Safety Plans from 1995 through 2012, no vessel traffic problems were noted for the proposed project area and no recommendations for improvements were proposed. (The Harbor Safety Plans present information on vessel traffic and marine casualties in the Bay, but the data are not broken down by casualty location.) Hence, the VTS in Suisun Bay should be able to safely manage the relatively minor increase in vessel traffic expected from the proposed project. Impacts on vessel congestion would be less than significant.

Mitigation Measure: No mitigation required.

Impact MT-5: Substantially increase the number of incidents in the San Francisco Bay Area arising from unsafe navigation conditions caused by tank vessels transiting to and/or from the marine terminal. (Less than significant.) As discussed in Impact MT-4, the increase in overall traffic due to the tank vessels that would call at the marine terminal would not substantially increase overall vessel traffic in the Bay, nor would it substantially increase congestion. As described in Section 16.1, there are numerous safety regulations in place in the Bay Area to minimize the potential for accidents. These include use of pilots, tug escorts, VTS, and RNAs.

Tank vessels calling at the marine terminal would pass under the Carquinez and Benicia-Martinez bridge complexes. Both bridge complexes are equipped with racons, which are radar sensors (beacons) that send out a radar emission that shows up as a distinctive mark on a ship's radarscope. The Carquinez Bridge complex consists of three separate bridges: one suspension bridge (named the Alfred Zampa Memorial Bridge), completed in 2003, carrying southbound traffic; one bridge, completed in 1958, carrying northbound traffic; and one bridge, completed in 1927, that is no longer being used for vehicular traffic. Because the newest bridge is a suspension bridge, the channel opening and height restrictions are governed by the two older bridges. The channel on each side of the center pier is 998 feet wide. The minimum vertical clearances are 146 feet through the north span and 134 feet through the south span. The *Carquinez Bridges Replacement Project, Marine Operations and Risk Analysis Study* conducted on the proposed new bridge design (Reese-Chambers, 1996) concluded that the Carquinez Bridge complex does not present a significant risk to vessels transiting past the bridge complex.

The Benicia-Martinez Bridge complex requires tank vessels to navigate through three bridges—two road bridges and a railroad drawbridge. The bridge with the narrowest opening and lowest height is the railroad drawbridge. Its clearance when closed is about 70 feet and when open about 135 feet. The horizontal clearance is 291 feet. A comprehensive marine operations impact study (Reese-Chambers, 1991) was conducted to analyze the potential impact of the bridge complex on vessel traffic that must pass through the complex. The analysis concluded that the bridge complex does not present a safety hazard to marine vessel traffic. According to USACE Waterborne Commerce data, the level of traffic transiting the Carquinez Strait was greater during the time of the bridge analysis than in 2010, and there has been no increase in the size of vessels transiting the Carquinez Strait since that time.

Mitigation Measure: No mitigation required.

Impact MT-6: Risk of injury or death to the public from fire, explosion, release of flammable or toxic materials, or other accidents caused by tank vessels at or transiting to and/or from the Terminal within the San Francisco Bay Area. (Less than significant.) As discussed under Impacts MT-4 and MT-5, the traffic due to the tank vessels that would call at the Terminal would not substantially increase overall vessel traffic in the Bay, nor would it be expected to substantially increase congestion or the number of incidents in the Bay Area. A discussion of the probability of a release from tankers and barges in the Bay, followed by a discussion of the expected extent and impacts of such a release, follows.

Release Probabilities

Probability estimates for tanker and barge spills from vessel traffic accidents are based primarily on data obtained from the Unocal San Francisco Refinery Marine Terminal Environmental Impact Report (EIR) (Chambers Group, 1994), Gaviota Terminal Company EIR (Aspen, 1992), the *Port Needs Study* (John A. Volpe National Transportation Center, 1991), ship transit risk project (Massachusetts Institute of Technology (MIT, 1998), the Shell Martinez Marine Lease Consideration Final EIR (CSLC, 2011a), and the San Francisco Harbor Safety Plan (Harbor Safety Committee, 2011). Table 16-4 presents oil spill probabilities from barges and tankers from three causes: (1) collisions, which are impacts between two or more moving vessels; (2) rammings (or allisions), for which moving vessels run into stationary objects; and (3) groundings. These probabilities were calculated from the individual probabilities of small, medium, and large vessels, considering the volume of traffic in each category (derived from data in John A. Volpe National Transportation Center, 1991). In accordance with the methodology in Aspen (1992), a 0.10 reduction factor has been applied to tanker and barge groundings for double-bottom and double-hull vessels, and a 0.71 reduction factor has been applied to tanker and barge collisions for double-hull vessels. The estimated probabilities of spills from the various types of tankers and barges, after applying the reduction factors, are presented in Table 16-5.

The CSLC (2011a) assumed that approximately 95 percent of the tankers and 20 percent of the barges that currently call at the Shell Martinez Terminal are double hull; a discussion of regulations requiring the phase out of single-hull tank vessels is provided in Section 16.1.1.2. This same mix has been assumed as an estimate for the proposed Terminal. Based on the mix of vessels expected to call at the marine terminal, as described in Chapter 2.0: Proposed Project and Alternatives, for analysis purposes it has been assumed that 198 tankers (188 double hull and 10 single hull) and 18 tank barges (3 double hull and 15 single hull) would call annually. Based on this mix of vessels, Table 16-6 presents the annual probabilities of a spill greater than 100 gallons inside the San Francisco Bay resulting from a tank vessel transiting to the marine terminal. The overall probability of a release over 100 gallons of 2.9×10^{-4} equates to approximately one spill every 3,450 years.

Table 16-4: Spill Probabilities by Vessel Type

Vessel Type	Probability of Spill Greater than 100 Gallons, per Vessel			
	Collision	Ramming	Grounding	Total
Tanker	9.12×10^{-7}	1.42×10^{-7}	5.58×10^{-7}	1.61×10^{-6}
Barge	4.86×10^{-6}	1.50×10^{-6}	6.02×10^{-7}	6.96×10^{-6}

Source: Derived from John A. Volpe National Transportation Center, 1991

Table 16-5: Spill Probabilities per Vessel Type per Vessel Calling

Vessel Type	Probability of Spill Greater than 100 Gallons, per Vessel		
	Single Hull	Double Bottom	Double Hull
Tanker	1.6×10^{-6}	1.1×10^{-6}	8.4×10^{-7}
Barge	7.0×10^{-6}	Not applicable	5.0×10^{-6}

Table 16-6: Annual Probabilities of Spills Resulting from Vessels Calling at the Terminal While Transiting the San Francisco Bay

Vessel Type		Annual Probability of Spills Greater than 100 Gallons*		
		Single Hull	Double Hull	All
Tankers	Number of vessels calling	10	188	198
	Annual probability of release	1.6×10^{-5}	1.6×10^{-4}	1.7×10^{-4}
Barges	Number of barges calling	15	3	18
	Annual probability of release	1.1×10^{-4}	1.5×10^{-5}	1.2×10^{-4}
Tankers and Barges	Total number of vessels calling	25	191	216
	Annual probability of release	1.2×10^{-4}	1.7×10^{-4}	2.9×10^{-4}

* Probabilities reflect rounding error to one significant digit.

Release Extent and Impacts

A spill of crude oil from tank vessels at or transiting to/from the marine terminal would not normally present a safety hazard to members of the public. This is because releases out on the Bay would be relatively remote from the public, and even on the water a release would not present a public safety hazard unless it became ignited. A large spill could shut down vessel traffic in portions of the San Francisco Bay while responders attempt to mitigate the spill. Impacts to water quality, biology, aesthetics, and other resources are discussed in applicable chapters of this EIR.

Because of the relatively low transit speeds in the Bay, the worst-case release from a tanker would consist of the contents of a single cargo tank, which is assumed to be 20,000 barrels (BBLs), the approximate size of the largest cargo tank on a tanker. Results from a 20,000-BBL tanker spill scenario near the Carquinez Bridge complex, conducted using the NOAA Trajectory Analysis Planner II (TAPII) software for the Shell Crude Tank Replacement Project Final EIR (Contra Costa County, 2011) are summarized here and presented in detail in Appendix N: Oil Spill Analysis, Shell Crude Tank Replacement Project EIR, Martinez, California. Both a summer spill and winter spill were modeled. These spill scenarios are presented here to demonstrate how large an area could be impacted by a release, and are not representative of the location where a release would be most likely. In actuality, a release could occur anywhere along the transit route.

In accordance with TAPII, the level of concern for the oil spill impact analysis was based on crude oil sheen thickness for a “silvery sheen,” which equates to approximately 50 gallons present in 1 square nautical mile, or 0.6 BBL per “shoreline zone” as pre-defined in the TAPII model system. Modeling results indicate that probabilities of exceeding the levels of concern range from 75 to 100 percent along the shoreline east and west of the Carquinez Bridge in both summer and winter, with higher probabilities of exeedance extending into San Pablo Bay and Suisun Bay for the winter scenario. Results are presented graphically in Appendix N.

It is possible that a spill from tank vessels at or transiting to/from the Terminal could become ignited, although this is an unlikely scenario. If a fire were to occur, the potential for safety impacts to members of the public is low, because in most cases the spill would be offshore on the water, away from residential areas. In the case of a release, booming would be deployed to contain the oil and keep it from drifting toward the shoreline. Thus, the probability of a fire near the public shoreline or residential areas would be remote. Riverview Park is approximately 500 feet from the wharf, and the nearest homes are approximately 2,000 feet away. In the event of a fire, people located inside buildings would be protected from the radiant heat and would not be in danger. In addition, the radiant heat would not be sufficient to cause damage to the homes. Although harmful levels of thermal radiation could build up in outdoor areas at Riverview Park, people present there would have time to move to a safe location before the radiation could build to harmful levels (Essentia, 2008). The potential for a tank vessel explosion is remote, because tankers are required to be equipped with IGS that maintain an inert gas in the vapor space of the cargo tanks, preventing the formation of a flammable gas-oxygen mixture in the explosive range.

In the event of a release from a tank vessel, the primary responsibility of responding to the release lies with the tank vessel itself. As presented in Section 16.1.1, all tank vessels that enter the Bay are required to have oil spill response plans that meet federal requirements. These plans must identify the necessary resources to be able to respond to the reasonable worst-case release. This is normally done by demonstrating that the tank vessel has a contract with a USCG-approved oil spill response organization (OSRO). In the event that the USCG does not feel that the tank vessel is adequately responding to the release, the USCG can step in and manage the response effort and bring in whatever resources it deems appropriate. The California OSPR would also be involved in this effort. The marine terminal is also required to meet federal and State response capability requirements for responding to releases at the Terminal. These capabilities are discussed throughout Section 16.1.1 and under Impact MT-7.

Mitigation Measure: No mitigation required.

Impact MT-7: Risk of injury or death to the public arising from an oil spill at the marine terminal. (Less than significant.) Impact MT-7 addresses the potential for oil spill releases and potential impact areas resulting from the operation of the marine terminal. This impact assesses specifically potential injury or death to members of the public, and it also forms the basis for the evaluation of the impact of releases on other aspects of the environment such as water and biological resources. Additional discussion is presented in relevant chapters in this EIR.

Spills may originate from the marine terminal or from a vessel at the marine terminal as a result of natural factors (e.g., earthquake), human error (e.g., berth collision, faulty hose connection), or broad-spectrum equipment deterioration. Potential sources of a spill from the marine terminal include drip pans, deck drainage, hydraulic hoses, loading hoses and fittings, pipelines and fittings, and valves. The CSLC (2011a) estimated a probability of a spill per vessel call of 4.1 x 10^{-3}. The largest recorded spill between 1992 and 2008 was 1,383 BBLs (58,082 gallons). While the probability of a spill is presented in terms of spills per vessel transfer, the database includes spills that occur even when a vessel is not present. However, the vast majority of spills occur when vessels are present, and it is generally believed that including other spills in the calculations does not bias the results. Therefore, the probability actually reflects the probability of spills at the marine terminal from all causes, and not just those associated with transfer operations. The potential for spills from the onshore portion of the facility, including the storage tanks and pipelines, is addressed in Chapter 10: Hazards and Hazardous Materials.

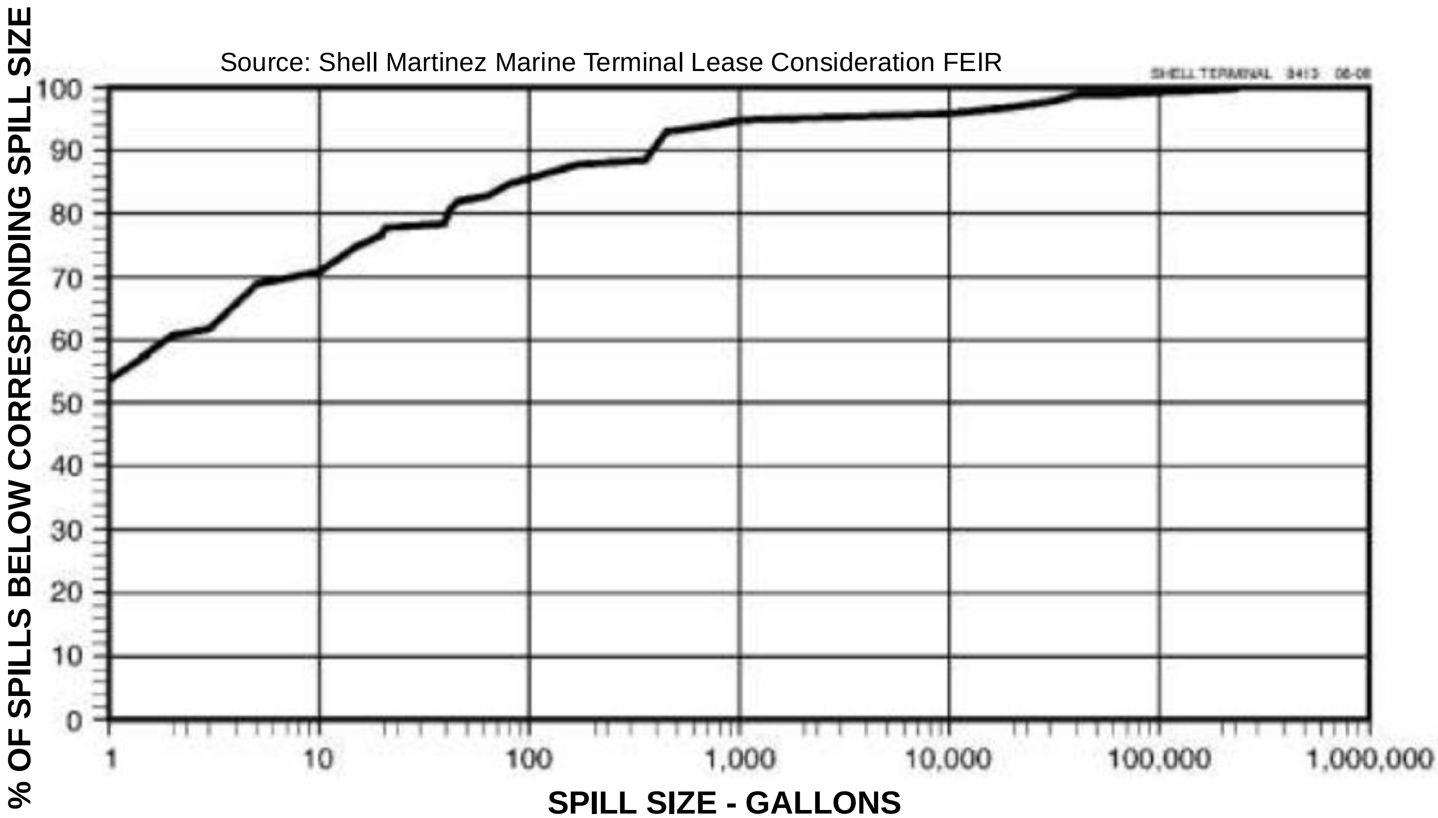
Because there have been very few large spills at terminals within the Bay, the CSLC (2011a) integrated worldwide data with the CSLC data to estimate the potential for large spills from the proposed Terminal. Figure 16-7: Worldwide Spill Size Cumulative Distribution at Large Marine Terminals presents a graph of the percent of spills as a function of size. Because the majority of spills are small, a logarithmic scale was used for the spill size axis. As the figure indicates, 54 percent of spills are less than 1 gallon, 70 percent are less than 10 gallons, 86 percent are less than 100 gallons, and 95 percent are less than 1,000 gallons.

The number of vessels projected to call annually at the Terminal is 216. Using the spill probability presented above, one spill approximately every 1.1 years (an annual probability of spill of 0.89) is anticipated. A spill larger than 1 gallon would be expected approximately every 2.4 years. The probability of a spill larger than 1,000 gallons from the Terminal is 0.04, or one spill every 23 years. These probabilities as applied to the marine terminal are very conservative because the spill data used are for all marine terminals, many of which are not or were not in compliance with MOTEMS. Should the proposed project proceed, marine terminal upgrades would be designed to fully comply with MOTEMS, further reducing the risk of spills.

The EPA, USCG, and CSLC have specified methods for calculating three levels of spill planning volumes for use in determining the minimum amount of spill response equipment/capability that must be available within specified timeframes to respond to a release. These are discussed below.

Reasonable Worst-case Discharge: The USCG and OSPR define worst-case discharge (WCD) as the contents of the pipeline plus pumping loss. This equates to 1,267 BBLs (53,214 gallons) for the 30-inch-diameter, 0.13-mile pipeline from the wharf to the tank farm (600 BBLs from draindown of the pipeline plus 667 BBLs from one minute of pumping loss). One minute for pumping loss is used because federal regulations (33 CFR 154.550) require that an emergency shutdown (ESD) system be in place that can shut off flow within 30 seconds, and that it can take no longer than 30 seconds to discover the release and activate the ESD. While other sources of leaks are possible such as drip pans and deck drainage, the USCG and OSPR have determined that pipelines have the potential to produce the largest releases. Although a release from a vessel at the Terminal is also possible, it is not required to be considered in the calculation of the WCD by either the USCG (33 CFR 154.1029) or OSPR (14 CCR 817.02(d)(1)). A release from a tanker is addressed under Impact MT-6.

Source: Shell Martinez Marine Terminal Lease Consideration FEIR



X:\WesPac\16 Marine Transportation\mxd\Figure 16-7 Worldwide Spill Size Cumulative Distribution at Large Marine Terminals.mxd

Figure 16-7
Worldwide Spill Size Cumulative Distribution at Large Marine Terminals
City of Pittsburg
WesPac Pittsburg Energy Infrastructure Project

TRC

12/22/2011

Maximum Most Probable (Medium) Discharge: The USCG defines this discharge as the lesser of 1,200 BBLs or 10 percent of the volume of the WCD. The WCD is 1,267 BBLs and thus, the maximum most probable discharge is 127 BBLs.

Average Most Probable (Small) Discharge: The EPA defines the average most probable discharge as 50 BBLs, not to exceed the WCD, while the USCG defines it to be the lesser of 50 BBLs or 1 percent of the WCD (13 BBLs in this case). Thus, the average most probable (small) discharge planning volume is 50 BBLs.

To estimate the potential impact from the above three spill sizes, oil spill trajectory modeling was conducted for two types of oil during both winter and summer conditions (a total of 12 scenarios). A detailed description of this modeling effort, together with the results, is contained in Appendix O: Oil Spill Analysis for WesPac Pittsburg Energy Infrastructure Project EIR, Pittsburg California. Modeling was conducted using the following design approach and assumptions:

- Two representative oil types were modeled: Alaskan North Slope (ANS) crude oil and Fuel No. 6. These two oil types were chosen to bound the possible types of oil that could be delivered to the Terminal, with ANS representing a light oil and Fuel Oil No. 6 representing a heavy persistent oil.
- The tidal/river hydrodynamics were calculated using a three-dimensional (3D) model of the entire Bay with delta and river extensions.
- The results of the 3D hydrodynamic model (i.e., surface currents) were used as input to the oil spill model.
- For each of the 12 scenarios, numerous modeling runs (spills) were conducted, spread throughout the season.
- A spill duration of 30 minutes was assumed. This release time was selected for two reasons: first, it represents a reasonable worst-case shortest time release; and second, it is consistent with previous modeling performed for marine terminals in the Bay Area (CSLC, 2011a).
- Modeling was conducted for a five-day time period.
- For each spill modeling run, the percent of simulations in which oil concentrations were above the “concentration/level of concern” was evaluated in each shoreline zone. Consistent with TAPII, the level of concern for the oil spill impact analysis was based on crude oil sheen thickness for a “silvery sheen,” which equates to approximately 50 gallons present in 1 square

nautical mile, or 0.6 BBL per "shoreline zone" as pre-defined in the TAPII model system (refer to Impact MT-6).

- All spill modeling runs for each scenario were combined to generate a probability (of exceeding the level of concern) map for each scenario.

The modeling indicates that there was very little difference in the oil spill trajectories for the two oil types. During the winter months, the released oil primarily flows downstream into Suisun Bay and the Carquinez Strait, and during the summer it flows approximately equally upstream and downstream. Figures 5 and 6 in Appendix O show the probability of the oil impacting the shoreline above the "concentration/level of concern." For Scenario 1, a spill of 1,267 BBLs of Fuel Oil No. 6 during the winter, it can be seen from Figure A1 that the probability of oil impacting the southern shore of Suisun Bay between the Terminal and Port Chicago is essentially 100 percent, dropping to approximately 60 percent between Port Chicago and the Benicia-Martinez Bridge. There is less than a 30 percent probability that the oil would reach San Pablo Bay. This is the worst-case winter scenario. The Scenario 7 trajectory, shown in Appendix O, (similar to Scenario 1 except for the use of ANS crude oil instead of Fuel Oil No. 6) is essentially the same as the Scenario 1 trajectory.

For Scenario 2, a spill of 1,267 BBLs of Fuel Oil No. 6 during the summer, it can be seen from Figure A2 in Appendix O that the probability of oil impacting the southern shore of Suisun Bay between the Terminal and Port Chicago is also essentially 100 percent, dropping to below 30 percent west of Port Chicago. There is very little chance that the oil would reach west of the Benicia-Martinez area. However, during the summer (when the river flow to the ocean is less than in the winter), there is over a 90 percent chance that the oil would reach the shoreline east of the Terminal, including Sherman Island. This, together with Scenario 8 (similar to Scenario 2 except for the use of ANS crude oil instead of Fuel Oil No. 6), is the worst-case summer scenario. Results of the other scenarios are shown in Appendix O.

If a release were to occur at the marine terminal, WesPac would be responsible for the cleanup operations via an oil spill response plan, which would identify the equipment and services under contract to respond to the worst-case release. Likely initial steps following a spill would include: (1) activate the emergency shutdown system; (2) activate the spill-response team, including personnel on duty; and (3) deploy the boom that would be required to be stored on the wharf. The boom would be deployed on the down-current side of the spill in an attempt to prevent the oil from drifting away. Additional fast-response vessels, boom carrying/deploying vessels, boom, personnel, and other response equipment would be provided by the OSRO. Oil would be recovered with sorbent material and/or skimmers. Skimming vessels and additional sorbent material would be provided by the OSRO.

A release from the Terminal is not expected to result in injury or death to members of the public. A release could result in short-term impacts to commercial and recreational vessel traffic in the area by precluding these vessels from transiting through the area. Oil spill modeling demonstrates that, because of the high currents in the area, nearly all the oil would become beached or fall below the "concentration/level of concern" after five days (see Appendix O). Hence, the impacts on other vessel traffic in the area are not considered to be significant.

Mitigation Measure: No mitigation required.

Impact MT-8: Risk of injury or death to members of the public resulting from a fire or explosion at the marine terminal. (Less than significant.) The public areas nearest to the Terminal are Riverview Park located approximately 500 feet from the wharf, the Pittsburg Marina located approximately 800 feet from the wharf, and a residential area located approximately 2,000 feet from the wharf.

Tank vessels have the potential to be a source of fire or explosion. Tankers are required by CFR Chapter 46, Section 34 to have sophisticated firefighting systems, which include fire pumps, piping, hydrants, and foam systems. Tank barges are required to have portable fire extinguishers, and some are equipped with built-in systems. The tank vessel crews are trained in the use of the firefighting equipment, and the onboard firefighting equipment is sufficient to extinguish most fires.

The USCG prepared and issued a Marine Fire Fighting Contingency Plan (USCG, 2008). The plan addresses risk assessment, including damage potential, strategic planning, management of response efforts, and available response resources. The plan outlines the resources that the USCG provides to manage and coordinate response in the event of a tanker fire. In addition, the Contra Costa County Fire Protection District would respond to a marine fire and provide support. Finally, the proposed project is intended to be involved in the local Petro-Chemical Mutual Aid Organization, an agreement between large industries in the San Francisco Bay Area to provide aid in the form of spill/hygiene/fire-response equipment and assistance.

The potential for a tank vessel explosion at the Terminal is considered to be extremely small because of the USCG regulations requiring that tank vessels be equipped with IGS. The CSLC (2011a) calculated the potential hazard areas from a tanker fire and explosion. The radiant-heat footprint capable of causing second-degree burns to exposed skin after 30 seconds of exposure (1,600 British thermal units per square foot per hour) was calculated to be 300 feet around the vessels. The radiant-heat hazard footprint would not pose a significant hazard to the public because there are no public areas within 300 feet of the wharf area. An explosion involving one of the cargo tanks could send flying debris up to 1,500 feet from the ship. Riverview Park and the Pittsburg Marina could potentially be impacted by flying debris from a vessel explosion, as could the northernmost tank within the East Tank Farm. However, the CSLC (2011a) classifies this impact as less than significant because of the extremely low probability of occurrence. CSLC (2011a) classifies the probability of occurrence of a tanker explosion as “rare,” which is defined to be less than once in 10,000 years.

A second potential area for a fire or explosion is the vapor control system (VCS), which mitigates vapor releases during oil transfer operations. The VCS must be designed to provide fire and explosion protection. USCG regulations require that the design of the system, including a Safeguarding Analysis, be submitted to the USCG for review and approval. The regulations also require that a detonation arrester be installed in the vapor pipeline to prevent a flame from passing from the marine terminal to the ship. With the required safety measures, the potential risk from the VCS would be less than significant. Additionally, the facility would have fire protection equipment on the wharf. At a minimum, this would include a fire water line throughout the entire wharf, fire water connections at the berth, firefighting foam, and fire extinguishers.

There is also the possibility that a release of oil or product onto the water could become ignited. The crude oil and products that would be handled at the Terminal have a low volatility and would be difficult to ignite, especially when spread out on the water. If a fire were to occur, the potential for safety impacts to members of the public is low because of the isolated nature of spill locations on the water, away from populated areas.

Mitigation Measure: No mitigation required.

Impact MT-9: Risk of injury or death to members of the public arising from compromised operations of the marine terminal as a result of sea level rise, tsunamis, and/or seiches. (Less than significant.) The CSLC (2009) studied the impact of sea level rise in the San Francisco Bay Area. Two levels of rise were addressed—16 inches and 55 inches. Maps were produced showing the areas that could be impacted for both levels of sea rise. Such rises would not have a negative impact on vessel traffic, but might be beneficial in that water depths would increase. The potential impact on marine terminals has been addressed through a revision to MOTEMS (Section 3103 F.5.3.4), which requires all marine oil terminals to consider the effects of predicted sea level rise over the life of the Terminal. Per MOTEMS, the effects of sea level rise would be incorporated into the proposed project’s marine terminal design, and hence a less-than-significant impact is expected.

The potential impacts of tsunamis and/or seiches are addressed under Impact GSS-5 in Chapter 9: Geology, Soils, and Seismicity, and were found to be less than significant.

Mitigation Measure: No mitigation required.

16.2.3.2 Alternative 1: Reduced Onshore Capacity

Construction-related Impacts

Impact MT-10: Substantially increase vessel congestion in Suisun Bay resulting from marine construction vessels and project-related vessel traffic. (Less than significant.) Construction under Alternative 1 would be identical to the proposed project, and thus, the impacts would be identical. Refer to Impact MT-1.

Mitigation Measure: No mitigation required.

Impact MT-11: Substantially increase the number of incidents in the San Francisco Bay arising from unsafe navigation conditions related to marine construction vessels and project-related vessel traffic. (Less than significant.) Construction under Alternative 1 would be identical to the proposed project, and thus, the impacts would be identical. Refer to Impact MT-2.

Mitigation Measure: No mitigation required.

Impact MT-12: Risk of injury or death to the public from fire, explosion, release of flammable or toxic materials, or other accident caused by marine construction vessels and associated vessel traffic. (Less than significant.) Construction under Alternative 1 would be identical to the proposed project, and thus, the impacts would be identical. Refer to Impact MT-3.

Mitigation Measure: No mitigation required.

Operational Impacts

Impact MT-13: Substantially increase vessel congestion in the San Francisco Bay Area arising from the calling of marine vessels at the Terminal. (Less than significant.) Under Alternative 1, it is estimated that 15 tank vessels per month (180 per year) would call at the Terminal (refer to Chapter 2.0: Proposed Project and Alternatives). This is 83.3 percent of the vessel traffic assumed for the proposed project, and thus, the potential impact on vessel congestion would be slightly less. Assuming these are additional tank vessel trips (as opposed to tank vessels being rerouted from existing terminals to the proposed Terminal), this would result in a 0.5 percent increase in the total number of commercial vessels in San Francisco Harbor, a 5.6 percent increase in commercial vessel traffic in the Carquinez Strait, and a 21.6 percent increase in Suisun Bay over 2010 traffic levels (refer to Table 16-1). However, as discussed under Impact MT-4, commercial vessel traffic in Suisun Bay has historically been much higher; in 2005, the number of upbound trips was 2,365, almost triple what it was in 2009. As discussed under Impact MT-4, the VTS in Suisun Bay should be able to safely manage the relatively minor increase in vessel traffic expected under Alternative 1. Thus, impacts on vessel congestion would be less than significant.

Mitigation Measure: No mitigation required.

Impact MT-14: Substantially increases the number of incidents in the San Francisco Bay Area arising from unsafe navigation conditions cause by tank vessels transiting to and/or from the marine terminal. (Less than significant.) Because the number of tank vessels calling at the proposed marine terminal under Alternative 1 would be less than the number calling for the proposed project, the potential impact would be expected to be less. Refer to Impact MT-4.

Mitigation Measure: No mitigation required.

Impact MT-15: Risk of injury or death to the public from fire, explosion, release of flammable or toxic materials, or other accident caused by tank vessels transiting to and/or from the Terminal within the San Francisco Bay Area. (Less than significant.) Because the number of tank vessels calling at the Terminal under Alternative 1 would be less than the number calling for the proposed project, the potential impact would be expected to be less. As discussed in Impacts MT-4 and MT-5, the increase in overall traffic due to the tank vessels that would call at the marine terminal would not substantially increase overall vessel traffic in the Bay, nor would it substantially increase congestion or the number of incidents in the Bay Area.

The probability estimates for tanker and barge spills from vessel traffic accidents For Alternative 1 were calculated using the same database and methodology used for the proposed project. As with the proposed project, it was assumed that approximately 95 percent of the tankers and 20 percent of the barges that would call at the marine terminal would be double hulled. Table 16-7 presents the annual probabilities of a spill greater than 100 gallons inside the Bay from a tank vessel transiting to the marine terminal. The overall probability of a release over 100 gallons of 2.5×10^{-4} equates to approximately one release every 4,000 years.

A spill of crude oil would not normally present a safety hazard to members of the public. A large spill could shut down vessel traffic in portions of the Bay while responders attempt to mitigate the spill. Impacts to water quality, biology, aesthetics, and other resources are discussed in applicable chapters.

Modeling results describing where oil could flow and how large an area could be impacted would be the same as for the proposed project, and are discussed under Impact MT-6.

Mitigation Measure: No mitigation required.

Table 16-7: Annual Probabilities of Spills from Vessels Calling at the Terminal While Transiting the San Francisco Bay

Vessel Type		Annual Probability of Spills Greater than 100 Gallons*		
		Single Hull	Double Hull	All
Tankers	Number of vessels calling	8	157	165
	Annual probability of release	1.3×10^{-5}	1.3×10^{-4}	1.4×10^{-4}
Barges	Number of barges calling	12	3	15
	Annual probability of release	8.4×10^{-5}	1.5×10^{-5}	9.9×10^{-5}
Tankers and barges	Total number of vessels calling	20	160	180
	Annual probability of release	9.7×10^{-5}	1.5×10^{-4}	2.5×10^{-4}

* Probabilities reflect rounding error to one significant digit.

Impact MT-16: Risk of injury or death to the public arising from an oil spill. (Less than significant.) This section addresses the potential for oil spill releases from the Terminal and the areas that could potentially be impacted. While this section only assesses the potential impact on injury or death to members of the public, the information in this section also forms the basis for the evaluation of the impact of releases on other aspects of the environment such as water and biological resources.

Spills may originate from the marine terminal or from a vessel at the Terminal and may be due to natural factors (e.g., earthquake), human error (e.g., berth collision or bad hose connection), or deterioration. Potential sources of a spill from the Terminal include drip pans, hydraulic hoses, loading hoses and fittings, pipelines and fittings, and valves. The final design and approval of the Terminal upgrades is not complete at this time; however, the upgrades would be designed to fully comply with all of the MOTEMS requirements. The design would be submitted to the CSLC for review and approval and, therefore, it is assumed that the Terminal would meet all MOTEMS requirements. Hence, the estimated probability of spills from the Terminal presented here are conservative because they are based on CSLC spill data for all marine terminals in the Bay Area, many of which are or were not compliant with MOTEMS.

The same methodology used to estimate the probability of a spill from the Terminal for the proposed project has been used to calculate the probability of a spill from the Terminal for Alternative 1. The number of vessels projected to call annually at the Terminal under Alternative 1 is 180. Using the spill data presented under Impact MT-7, approximately one spill every 1.4 years (an annual probability of spill of 0.74) is anticipated. A spill larger than 1 gallon would be expected approximately every 2.9 years. The probability of a spill larger than 1,000 gallons from the Terminal is 0.038 or 1 spill every 27 years.

The impacts from a spill at the Terminal, should one occur, would be the same as that of the proposed project.

Mitigation Measure: No mitigation required.

Impact MT-17: Risk of injury or death to members of the public arising from a fire or explosion at the Terminal. (Less than significant.) The probability of a fire or explosion at the Terminal under Alternative 1 would be slightly less than that for the proposed project, because fewer tank vessels would call. The potential impacts, should an incident occur, would be the same as for the proposed project.

Mitigation Measure: No mitigation required.

16.2.3.3 Alternative 2: No Project

Impact MT-18: Risk of injury or death to the public arising from an oil spill, fire, or explosion, or substantially increase vessel congestion in the San Francisco Bay Area arising from the calling of marine vessels at the Terminal. (Less than significant.) Because the marine terminal would not be upgraded or operated, there would be no potential for accidents at the marine terminal or from tank vessels traveling to the Terminal. However, if the demand for foreign oil in the Bay Area increases, and the proposed project is not constructed, the additional oil would be delivered to existing terminals or to a terminal constructed in the future. The potential risk from tank vessels delivering this oil would be a function of the amount of oil delivered and the number of tank vessel trips required. If the increase in oil demand is the same as the proposed throughput of the proposed marine terminal, then the potential risk of a tank vessel spill would be approximately the same. If the amount of oil delivered is less, than the risk would be proportionally less. The potential impact from an oil spill would be a function of the location of the spill. This would be dependent on the location of the terminals to which the oil is delivered.

It is possible, depending on the increase in volume of oil delivered and the throughput capacity of the existing marine terminals, that vessel congestion in some locations of the Bay could increase. For example, a terminal’s increase in throughput may result in tank vessels having to wait to unload their oil because another tank vessel is at the berth. The waiting tank vessel may then have to proceed to an anchorage, increasing the number of vessels moving around the Bay and possibly increasing congestion.

Therefore, Alternative 2 would eliminate any potential vessel or risk impact at the proposed project location, but could, depending on the increased demand for oil in the Bay, transfer the potential impact to other locations within the Bay.

Mitigation Measure: No mitigation required.

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