2.0 PROJECT DESCRIPTION

As discussed in Section 1.0, Introduction, this Environmental Impact Report (EIR) examines the potential environmental impacts associated with the Tesoro Avon Marine Oil Terminal Lease Consideration Project (Project). Section 2.0 provides a detailed description of the proposed Project, including Project overview, Project location, existing components, proposed renovations (e.g., rebuild, repair, demolition, and decommissioning in compliance with Marine Oil Terminal Engineering and Maintenance Standards [MOTEMS]),[1] continued Project operations, inspection and maintenance activities, and emergency response procedures. Alternative projects considered, factors used in the selection of those alternatives, and projects understood to have potential cumulative impacts are presented in Section 3.0, Alternatives and Cumulative Projects.

2.1 PROJECT OVERVIEW AND LEASE HISTORY

Tesoro Refining and Marketing Company, LLC (Tesoro or Applicant) has applied to the California State Lands Commission (CSLC) for a new 30-year lease of sovereign land to allow Tesoro to continue existing petroleum product export and import operations at the Avon Marine Oil Terminal (Avon Terminal). Product exports and imports currently represent approximately 90 and 10 percent of Avon Terminal operations, respectively.

- The Avon Terminal primarily operates as an export facility, transferring petroleum products (including premium fuel oil, gas oil, diesel, and cutter stock[2]) from designated product storage tanks at Tesoro's Golden Eagle Refinery (Refinery) via pipeline to tanker vessels berthed at the Avon Terminal.
- Infrequently and as needed, the Avon Terminal imports Refinery feedstocks, which are transferred via pipeline from tanker vessels to upland storage tanks, and later transferred to the Refinery process units.[3]

As noted in Section 1.0, Introduction, the Tesoro Amorco Marine Oil Terminal (Amorco Terminal; CSLC Lease No. PRC 3454) and Refinery are not part of the Avon Terminal lease. The vicinity and location of the Avon Terminal and the Refinery are shown on Figure 1-1 in Section 1.0, Introduction, and on Figure 2-1.

[1] MOTEMS are codified in the California Building Code, Chapter 31F – Marine Oil Terminals (Cal. Code Regs., tit. 24, § 3101F et seq.). The MOTEMS apply to all existing and new terminals in California, and include criteria for: audits; maintenance; inspection; structural and seismic analysis and design; mooring and berthing; geotechnical considerations (including site-specific assessment); and analysis and review of fire, piping, mechanical, and electrical systems. Since MOTEMS became effective, three updates to the California Building Code, in 2007, 2010, and 2013, have occurred.

[2] Cutter stock refers to lighter hydrocarbon products used to "thin" heavier oils for transport and marketing as fuels.

[3] The majority of imports and all crude oil imports occur at Tesoro's Amorco Marine Oil Terminal (Amorco Terminal).

Figure 2-1
Project Location
California State Lands Commission
Avon Marine Oil Terminal Lease Consideration Project

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Proposed CSLC Lease Boundary

N

0 1,000 2,000 Feet

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To consider authorization for a new 30-year lease, the CSLC must document the current and planned conditions at the Avon Terminal, including compliance with the MOTEMS. Based on MOTEMS audits (2008 and 2011) of the Avon Terminal completed by Tesoro, Tesoro has concluded that construction of a new berth (Berth 1A) next to the existing Berth 1 and renovation of the approachway is the most effective way to achieve MOTEMS compliance at the Avon Terminal. Tesoro would conduct these renovations in compliance with the 2013 MOTEMS, which became effective on January 1, 2014.

The scope of the proposed renovations would include: construction of a new berthing area, Berth 1A, and decommissioning of existing Berth 1; renovation of the existing approachway; and demolition and removal of existing Berth 5. The existing Berth 1 is located on the eastern end of the existing Avon Terminal, with Berth 1A to be installed immediately upstream (east), in what is currently open water. Existing Berth 5 is located on the western end of the Avon Terminal and is currently inactive.

As noted in Section 1.0, Introduction, the CSLC authorized the current Tesoro lease agreement for the Avon Terminal (Lease No. PRC 3454.1) in 1964. Since expiration of the lease in 2009, Tesoro has operated under the "holdover" provisions of the lease (i.e., the Avon Terminal continues to operate under the terms of Lease PRC 3454.1 until the CSLC terminates the current lease or authorizes the issuance of a new lease).

2.2 PROJECT LOCATION

2.2.1 Local Setting

The Avon Terminal is located in the lower Suisun Bay, approximately 1.75 miles east of the Benicia-Martinez Bridge, in unincorporated Contra Costa County (refer to Figure 2-1). The Avon Terminal operates on approximately 11.24 acres of sovereign land leased from the CSLC. The new 30-year lease would expand temporarily from the current 11.24-acre parcel to a 15.42~~36~~-acre parcel to allow additional lease area for renovation and demolition activities. When demolition of Berth 5 is complete and all of the Berth 5 structure is removed, the lease area would be reduced to a 13.33-acre parcel, removing the area that had encompassed Berth 5 (refer to Section 1.0, Introduction). The new lease area would reflect an extension waterward from the current boundary to accommodate the footprint of the largest vessel that can call on the Avon Terminal, and the removal from the lease of the area formerly occupied by Berth 5. Vehicular access to the facility is via Solano Way, which connects to Waterfront Road to the north, and Arnold Industrial Way to the south.

Tesoro's Golden Eagle Refinery is located approximately 0.5 mile south of the Avon Terminal on approximately 2,000 acres of Tesoro-owned property. A trackway and pipelines traverse the approachway over open bay and wetland areas, and connect the Avon Terminal to the Refinery. The Refinery contains petroleum-refining operating units,

storage tanks, associated pumps and pipelines, rail spurs, loading racks, and administration and warehousing buildings. The Refinery typically transports an amount of petroleum products equivalent to the daily crude intake from waterborne and land-based systems, or approximately 150,000 barrels per day (bpd).[4]

2.2.2 Regional Setting

Five of California's 13 gasoline-producing refineries are located in the San Francisco Bay Area (Bay Area) (California Air Resources Board 2013). In addition to the Golden Eagle Refinery, these refineries include:

- Shell Oil Products U.S. Martinez Refinery (Shell) in Martinez;
- Valero Benicia Refinery (Valero) in Benicia;
- Phillips 66 San Francisco Refinery (Phillips 66) in Rodeo; and
- Chevron U.S.A. Inc. Richmond Refinery (Chevron) in Richmond.

These refineries generally run combinations of foreign, Alaskan North Slope, and some San Joaquin Valley (SJV) crudes, and all have associated marine oil terminals. In addition to receipt and shipment via tankers, oils are transported to Bay Area refineries via pipelines, including the following:

- The Tesoro, Shell, Valero, and Phillips 66 refineries have pipeline connections to the Plains Product Terminals, LLC (formerly Shore) marine oil terminal and petroleum bulk storage facility in Martinez;
- The heated, proprietary Shell-owned pipeline from the SJV supplies San Joaquin Valley Heavy (SJVH) crude to the Phillips 66, Valero, and Shell refineries;
- The Phillips 66 Oleum Pipeline connects Phillips 66's facility in Santa Maria, which processes local heavy crude, including oil from the outer continental shelf and SJVH crude, to the Phillips 66 refinery in Rodeo; and
- Chevron Pipeline Company operates a common-carrier line importing SJV crude to the Bay Area, with pipeline connections serving the Tesoro, Phillips 66, Shell, and Chevron refineries.

In addition to these five refineries, there are eight ports, 14 marine oil terminals, and numerous other terminal facilities in the Bay Area. For discussion purposes, the marine oil terminals are grouped into five geographic areas, as described below. For more information regarding regional characteristics of crude oil and other hydrocarbon products in the San Francisco Bay and along coastal shipping lanes off northern California, including inbound and outbound vessel traffic, see Section 3.4.3.

[4] This approximation does not consider: (1) amounts of crude oil that are converted to Refinery fuel gas and burned in process furnaces; (2) impurities such as sulfur and nitrogen compounds that are removed; or (3) hydrogen that is added to displace impurities.

Carquinez Strait and Further Inland

Two terminals, Phillips 66 Rodeo Marine Terminal and NuStar Marine Terminal, lie west of the Carquinez Bridge in San Pablo Bay. In addition to the Avon Terminal, marine oil terminals that lie inland, east of the Carquinez Bridge, include: Shell Martinez, Plains Product Terminals, Tesoro Amorco Terminal in Martinez, and Valero Benicia Terminal in Benicia.

Port of Richmond Area

Facilities in the Port of Richmond area are located in two areas: Richmond Inner Harbor (including the 38-foot-deep Harbor Channel and the Santa Fe Channel), and the Richmond area northwest of the port. The Port of Richmond encompasses five city-owned terminals and 10 privately owned terminals for handling bulk liquids, dry bulk materials, metals, vehicles, and break-bulk[5] cargoes (City of Richmond 2010). The private marine oil terminals include the following:

- Richmond Harbor Channel: Phillips 66 Richmond, Kinder Morgan Richmond, and BP West Coast Products Richmond marine terminals; and
- Santa Fe Channel: Plains Richmond Terminal, International-Matex Tank Terminals, and BP Lubricants Terminal.

In addition, at Point Richmond, just south of the Richmond-San Rafael Bridge but north of the Port of Richmond, is the Chevron Long Wharf Marine Oil Terminal, which serves the Chevron Refinery in Richmond.

Port of San Francisco

The Port of San Francisco's marine facilities typically handle cargo,[6] rolling stock,[7] and break-bulk commodities; there are no marine oil terminals in the port. The port operates six deep-water berths, five gantry cranes, and has on-dock rail service capabilities (Port of San Francisco 2014).

Port of Oakland/Oakland Area

The Port of Oakland, the fifth busiest seaport in the nation, was established in 1927. There are no marine oil terminals in the Port of Oakland. The port occupies waterfront on the eastern shore of San Francisco Bay, with 665 acres devoted to maritime activities and 3,000 acres devoted to aviation activities. Since 1962, 1,210 acres of maritime terminals, an intermodal rail facility, and maritime support areas have been

[5] General cargo that must be loaded individually (i.e., not in intermodal containers or in bulk).
[6] Large shipments of varied cargo destined for one location and/or one specific project.
[7] Vehicles that move on a railway (e.g., railroad cars, coaches, and locomotives).

constructed. Activities launched through the port's Vision 2000 Program have included the development of two new maritime terminals, a new intermodal rail facility, deepening channels and berths (dredging) from -42 feet to -50 feet, a new public park, and wildlife habitat. Oakland's 20 deep-water berths and 35 container cranes are supported by a network of local roads and interstate freeways, warehouses, and intermodal rail yards. The Oakland area also supports numerous other terminal facilities that are not strictly within the Port of Oakland. These include additional container terminals and a variety of large and small recreational craft harbors. In 2011, the city of Oakland led a joint planning effort with the port for a master-planned development of the former 368-acre Oakland Army Base located in the Oakland Harbor area. The plans include a new intermodal rail terminal, new bulk marine terminal, truck parking and service areas, new warehousing space, and new recycling center (Port of Oakland 2014).

Port of Redwood City

The Port of Redwood City has no marine oil terminals and primarily handles general cargo, liquid bulk, and dry bulk commodities for firms located near the port. The port is also a U.S. Coast Guard (USCG)-certified oily waste reception facility. Facilities include five wharves (Port of Redwood City 2013).

2.3 PROJECT COMPONENTS

The Avon Terminal operates as an import and export facility for petroleum products. The facility allows vessels to berth and moor, and supports the equipment required to transfer product to and from vessels, onshore storage tanks, and the Refinery. The following information summarizes both the existing condition of Avon Terminal components and the proposed condition of post-renovation components (see Figure 2-2), as intended to correct the MOTEMS deficiencies reported in Tesoro's 2008 and 2011 MOTEMS audits. Renovation practices for each component are described in Section 2.5.

2.3.1 Marine Oil Terminal Engineering and Maintenance Standards

The MOTEMS are reviewed and updated at least every 3 years in accordance with the California Building Standards Commission's triennial code cycle. The Avon Terminal is currently required to comply with the most recent update to these minimum engineering, inspection, and maintenance standards, or the 2013 MOTEMS, which became effective on January 1, 2014. MOTEMS improvements are categorically exempt from the California Environmental Quality Act (CEQA), as specified in State CEQA Guidelines section 15301, subdivision (d), for repairs to existing facilities. Actions to comply with MOTEMS audit and inspection findings may include physical changes to the Avon Terminal and associated lease area. Depending on the nature and extent of any such changes, discretionary review by the CSLC Marine Facilities Division and/or Land Management Division may be required.

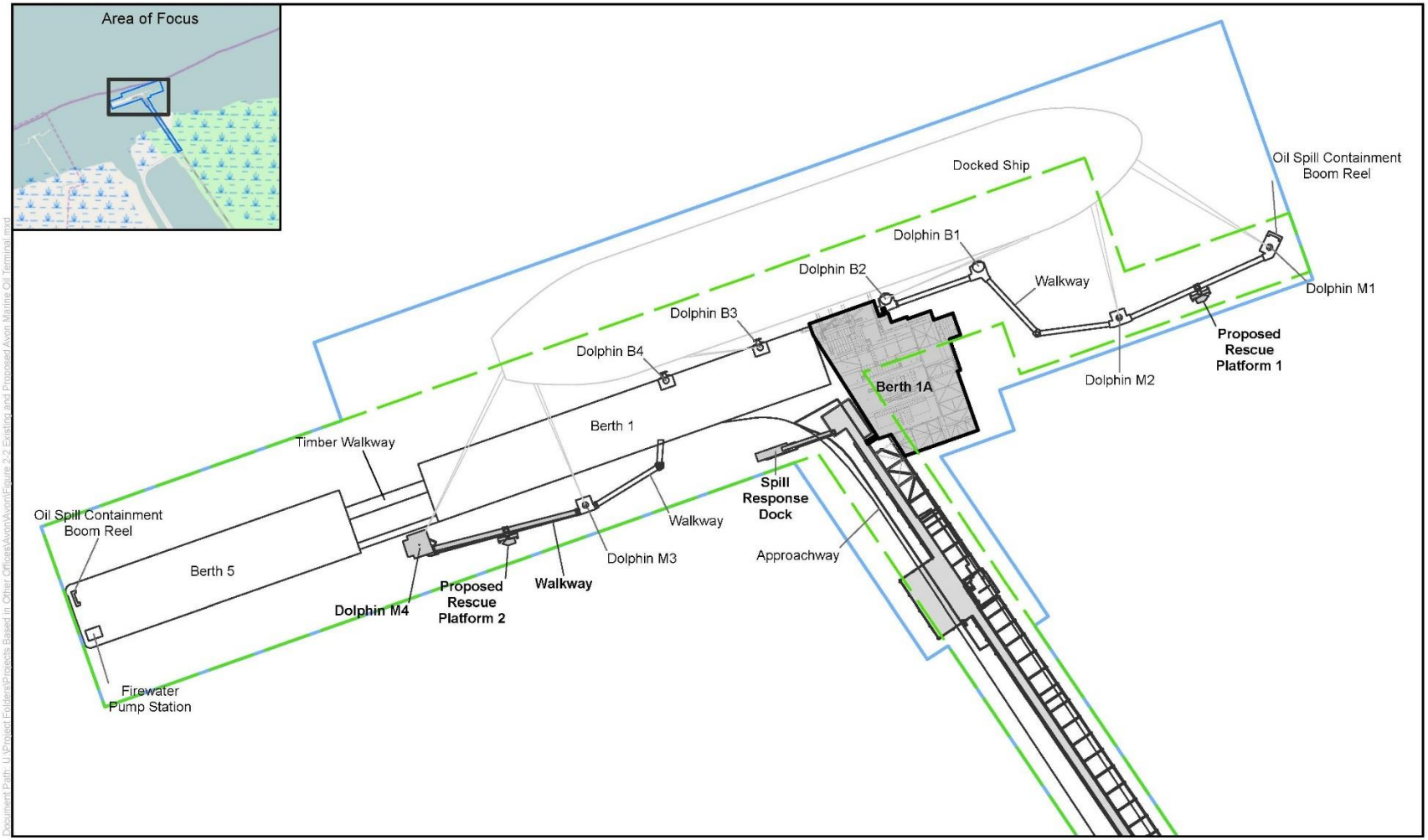

Figure 2-2
Existing and Proposed Avon Marine Oil Terminal
California State Lands Commission
Avon Marine Oil Terminal Lease Consideration Project

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Tesoro completed its initial MOTEMS audit of the Avon Terminal in March 2008, including comprehensive inspections and evaluations of the existing structural and non-structural facilities. The Avon Terminal was evaluated for compliance with MOTEMS again in March 2011. Based on Tesoro's findings, some seismic structural strengthening, fire system retrofits, and structural and non-structural improvements were completed at the Avon Terminal between 2008 and 2014 (see 2013 MOTEMS Interim Update, Revision 5A, dated November 2013). The repairs were performed after the appropriate permits had been obtained, and with the review and concurrence of the CSLC. The following primary modifications, among many other minor changes, were completed as a result of findings in the March 2008 and March 2011 MOTEMS audits:

- Two fendering/mooring dolphins were installed in 2011 to prevent vessel berthing loads from transmitting to the existing Berth 1 wood structure.
- Overall structural strengthening repair work was completed to address deficiencies caused by deteriorated structures. These repairs were intended to maintain the capability of the structures to handle operational loads. Two separate structural repair projects were completed that strengthened hundreds of piles, pile caps, and other related structures. Repairs included installation of grout-filled, fiberglass pile repair sleeves and reinforcement of existing pile caps.

Additional maintenance repairs, generated as a result of MOTEMS structural inspections performed in 2012, are scheduled for completion in 2014 and are independent of the Project under consideration by this EIR.

- Approximately four new steel piles and 23 timber pile repair sleeves will be installed within the footprint of the existing Berth 1 structure. At approximately five locations existing structures will be repaired by bolting up new wood or steel reinforcement beams.
- Two timber pile repair sleeves will be installed within the footprint of the existing approachway structure. At approximately 27 locations, existing structures will be repaired by bolting up new wood or steel reinforcement beams.

Maintenance dredging is not a MOTEMS activity; however, the Berth 1 area north of the Avon Terminal is dredged periodically to maintain required vessel underkeel clearance (UKC). A dredge event at Berth 1, anticipated to entail approximately 6,000 cubic yards (cy) of dredged material, will be conducted during 2014. See Section 2.4.15 for details.

The proposed Project, which would be performed as the result of the 2008 and 2011 MOTEMS audits, consists of renovations intended to bring the Avon Terminal into compliance with 2013 MOTEMS requirements. Renovations to the Avon Terminal vessel loading/unloading area and approachway are listed in Table 2-1 and described in Sections 2.3.2 and 2.3.3.

Table 2-1: Proposed MOTEMS Renovations at the Avon Terminal

Loading/ Unloading Area	• Construct a new Berth 1A vessel loading/unloading platform and mooring dolphin M4 • Construct associated facility structures and electrical, mechanical, and piping systems, including a new fire suppression system and east fire monitoring station • Decommission the existing Berth 1 • Demolish and remove the existing Berth 5
Approachway (see Figure 2-4 in Section 2.0, Project Description)	• Demolish and remove the existing trackway/walkway and pipeway from the vessel loading/unloading area to inland of the shoreline and rebuild roadway and pipeway (approximately 2,538 feet total – Areas C & D)* • Repair and retrofit the remainder of the inland walkway and pipeway (approximately 2,886 feet total – Areas A & B)* • Renovate associated facility structures, electrical, mechanical and piping systems, and west fire monitoring station, as necessary

* As discussed in more detail below, the approachway is divided for renovation purposes into four areas: Area D (at the north end of the approachway closest to Berth 1); Area C; Area B; and Area A (see Figure 2-4). Each area is denoted by specific bents (a section of piles and pile cap).

2.3.2 Avon Terminal Loading/Unloading Area

The Avon Terminal is an existing docking facility consisting of two berths: Berth 1 and Berth 5. While in the past the Avon Terminal has supported multiple active berths, the existing Avon Terminal presently supports only one active berth (Berth 1). The entire existing docking facility is approximately 1,520 feet long and ranges from 20 to 80 feet wide, and is primarily constructed of marine timber and concrete. Two oil spill containment boom reels are located at the far eastern and western ends of the wharf (refer to Figure 2-2). The Avon Terminal has been in use since the 1920s, and currently serves an average of 124 vessels per year.

Berth 1

Berth 1 is located on the east end of the Avon Terminal, and is currently the only berthing facility in active operation at the Avon Terminal. Berth 1 primarily operates as a product export facility (a small percentage of imports occurs on an as-needed basis as discussed in Section 2.1). Berth 1 supports associated loading and unloading equipment, including pumps, pipelines, electrical utilities, fire-protection equipment, spill-response equipment, and other mechanical equipment. Berth 1 can accommodate vessels up to 113,635 dead weight tons (DWT) with an arrival displacement of 102,600 long tons (LT). Berth 1 includes four breasting dolphins (B1, B2, B3, and B4) and four mooring dolphins (M1, M2, M3, and T), each consisting of a reinforced concrete or steel grated cap on steel piles; these dolphins were built in 1998 and 2011 to replace deteriorated timber dolphins and fender systems. The main Berth 1 docking area is approximately 980 feet long by 80 feet wide, and is primarily comprised of marine timber. Access to shore is via an approximately 1-mile-long marine timber

approachway. As part of the MOTEMS renovations, Berth 1 would be decommissioned and transfer operations would be relocated to Berth 1A.

Berth 1 is anticipated to operate as normal throughout renovation, except for approximately 6 weeks during which the Avon Terminal may not be operational as facilities are being transitioned from old infrastructure to the newly installed Berth 1A. Once Berth 1A becomes operational, Berth 1 would be decommissioned. Although there is limited open space available on Berth 1, after decommissioning the remainder of Berth 1 would be used for access to the west dolphins, to perform on-site spill response drills, and as a temporary material handling area for use during future repairs and maintenance activities.

Demolition and removal activities at Berth 1 would include:

- removal or relocation of appurtenant facilities from the new Berth 1A footprint, as required to accommodate the new Berth 1A platform, such as the hose-handling assemblies; recovered oil (slops) tank; miscellaneous pumps, pipelines, electrical utilities, fire-protection equipment, spill-response equipment, valves, and piping;
- removal of the timber piles and pile caps, and decking from the new Berth 1A footprint (considered to be in Area D of the approachway);
- removal of approximately 350 feet of piping on the approachway north of Isolation Station No. 1;
- removal of a portion of the wooden docking structure near the new construction of Berth 1A;
- removal of the T mooring dolphin; and
- removal of debris, if any.

Berth 1A

Berth 1A would be constructed approximately 60 feet east of the existing Berth 1, over open water (see Figure 2-3). Similar to Berth 1, Berth 1A would primarily accommodate export operations and, as needed, import operations. Berth 1A would use existing mooring dolphins (M1, M2, and M3) and breasting dolphins (B1, B2, B3, and B4) and one new mooring dolphin (M4). The installation of proposed Berth 1A and mooring dolphin M4 would not change the mooring and berthing capacity of the Avon Terminal. Berth 1A would be operationally equivalent to Berth 1 and would accommodate vessels up to 113,635 DWT with an arrival displacement of 102,600 LT.

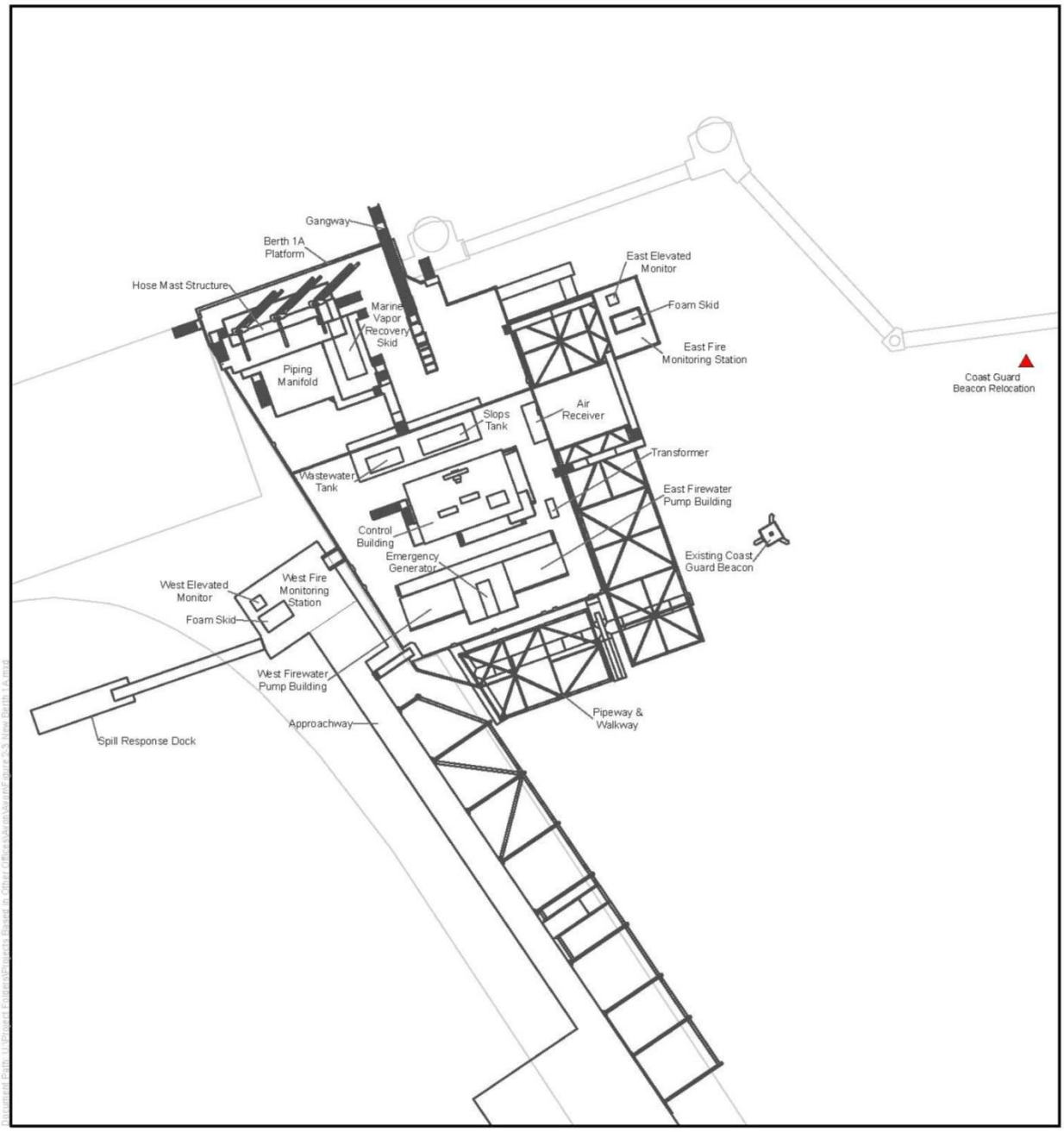

Figure 2-3
New Berth 1A
California State Lands Commission
Avon Marine Oil Terminal Lease Consideration Project

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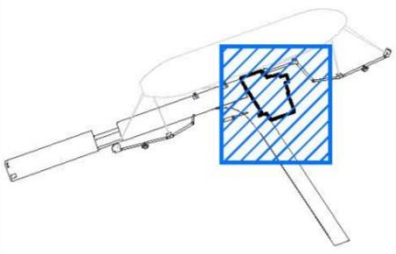
8/26/2014

Area of Focus



N

0 27.5 55 Feet

The new platform would be approximately 12,000 square feet in size, and approximately +19 feet in elevation relative to mean lower low water (MLLW), the average of the daily lowest tides over a specified time period. The new platform would be supported by approximately 12 corrosion-resistant, hollow steel piles, and would include a concrete surface to support the facility control building and other facility equipment and structures. An additional five pilings would be installed to support the new pipeway between the approachway piping structure and Berth 1A. Berth 1A would have similar instrumentation and controls to that of existing Berth 1, including:

- start and/or stop control for product loading pumps at the Refinery;
- Marine Vapor Recovery enables and controls;
- recovered oil (slops) tank alarm and indicators;
- Allision Avoidance System;
- current and wind monitoring systems; and
- mooring line tension monitoring.

Hoses and Dock Pipelines

Existing pipelines that serve Berth 1 are currently supported on the east side of the approachway, and a treated wastewater discharge pipeline is located on the west side of the approachway. Avon Terminal pipelines on the approachway traverse above open water and various marsh and upland areas. During exports (deliveries to ships), movement of product is accomplished using onshore Refinery pumping systems, USCG-approved hoses, block valves, and associated steel pipelines. Products remaining in transfer hoses are pumped back to the Refinery tankage before hoses are uncoupled from the ship. During imports (when the Refinery is receiving product), transfer pumps located on the berthing vessel assist with transferring product through similar hoses, block valves, and pipelines to onshore tanks. Products remaining in transfer hoses are drained back into ship compartments before hoses are uncoupled from the ship. The proposed renovation Project would not change these operations.

The Project would include renovation of the piping/pipelines and pipeway structures at Berth 1A and along the approachway. Existing and proposed Avon Terminal pipelines are summarized in Table 2-2. All new and existing piping/pipelines would conform to the provisions of American Petroleum Institute Standard 2610, American Society of Mechanical Engineers (ASME) Code B31.3, or Code B31.4 per MOTEMS. All new piping would also have welded connections over water and be installed above deck to allow for ease of inspection and maintenance. Tesoro would continue to periodically test and maintain all piping/pipelines in accordance with Article 5.5 Marine Terminal Oil Pipelines (Cal. Code Regs., tit. 2, §§ 2560-2571).

Table 2-2: Existing and Proposed Avon Terminal Dock Pipelines

Line Diameter (inches)	Purpose	Tesoro Operational Designation
Existing Pipelines		
6	Recovered oil	10 Line
3	Domestic water	Domestic Water Line
2	Plant air	Plant Air Line
8	Diesel fuel, cutter oil	14 Line
10	Vapor recovery	20 Line
12	Diesel fuel	16 Line
3	Propane	Propane Vapor
12	Gasoline	24 Line
12	Firewater	Fire Water Line
20	Fuel oil	26 Line
16	Gasoline	28 Line
28	Treated effluent	Diffusion Line
Proposed Pipeline		
2	Firefighting foam	Firefighting Foam Line

Approximately 350 feet of the 12 existing pipelines would be replaced between the existing loading/unloading host mast structure and Isolation Station No. 1, and the new piping would be rerouted along the new Berth 1A and approachway structures. On the north end of Berth 1A, a new loading/unloading hose mast structure with hoists, manifolds, and hoses would be built to accommodate terminal-to-vessel transfer connections. The new piping would then extend past the piping manifolds to the east side of the Berth 1A platform, and run along the east and south perimeters. The Berth 1A pipeway would be supported by two 72-inch-diameter, one 48-inch-diameter, and two 36-inch-diameter corrosion-resistant, hollow steel piles.

At the Berth 1A to approachway interface, the new piping would cross over to the new pile-supported pipeway in approachway Area D. Isolation Station No. 1 is located in Area D and marks the tie-in location of the new Berth 1A piping/pipelines and existing piping/pipelines for connection to onshore storage tanks and Refinery facilities.

Marine Terminal Buildings

Berth 1 currently has a control building that houses the Terminal Person-in-Charge (TPIC) during operations. This building contains communication equipment, an operations panel for monitoring and operating tank and pipeline valves (typically used during product transfer and remote pipeline valve operations), and a panel for monitoring wind and currents.

A new two-story control building would be constructed on the southern center of the Berth 1A platform. The new control building would have a footprint of approximately

1,500 square feet and include areas for storage, information technology control, and electrical equipment. This building would house an operations control area that would contain computer systems, locker rooms, restrooms, showers, and kitchen facilities for Avon Terminal personnel. In addition, two firewater pump buildings would be located on the southern end of the platform, each housing a diesel-driven firewater pump. For a depiction of proposed building locations on Berth 1A, refer to Figure 2-3.

Loading/Unloading Hose Mast Structure

The Berth 1A loading structure would support the main piping manifold and six cargo hoses that would be used during loading and offloading operations at Berth 1A. The loading structure would extend approximately 57 feet above the Berth 1A platform and have three elevated decks. The first deck would provide access to the main manifold piping and valves. The second deck would provide access to the electrical winches used to raise and lower the cargo hoses and the slewing mechanism controls that swing the hoses from a stowed to operating position. The third deck would provide access to the motors and gearboxes that make up the slewing mechanisms.

Marine Vapor Recovery System

Bay Area Air Quality Management District (BAAQMD) Regulation 8, Rule 44 limits emissions of organic compounds into the atmosphere from marine tank vessel operations. It applies to all loading operations greater than 1,000 barrels of all gasoline, gasoline blending stocks, aviation gas, JP-4 fuel, crude oil, and any other organic compound or mixture of organic compounds that exists as a liquid at actual conditions of use or storage that has a flash point less than 100 degrees Fahrenheit.

The Avon Terminal Marine Vapor Recovery (MVR) system, initially installed in 1987, complies with BAAQMD Regulation 8, Rule 44 and with 33 Code of Federal Regulations (CFR) Part 154 for MVR operations. In the absence of controls, hydrocarbon vapors escape from the cargo compartment when they are displaced during liquid product loading. The MVR system allows these vapors to be collected and combined with propane gas for safe blending into fuel gas at the Refinery’s No. 1 Gas Plant. Compressors at the Refinery's No. 1 Gas Plant create a vacuum on the MVR system. Hydrocarbons collected by this vacuum from the vessel's vapor space are routed back to the No. 1 Gas Plant via the 10-inch-diameter No. 20 Line, which connects the wharf to the onshore MVR Knockout Pot. An automatic control valve (PRC-4) maintains a specified pressure in the cargo tank. When an inerted tank is being loaded, the pressure is set at slightly above atmospheric. When a non-inerted vessel is being loaded, a slight vacuum is maintained. The MVR Knockout Pot is used to remove hydrocarbon condensate from the marine vapors.

Dual analyzers monitor the oxygen content of the mixture inside the system. The higher of the two signals from these analyzers is sent to the injection system. Propane gas is

injected into the MVR system whenever the oxygen level rises above permissible limits. The MVR system is also equipped, as required, with numerous arrestors and mixers for safety.

A new MVR skid to comply with BAAQMD Regulation 8, Rule 44 would be installed on Berth 1A, to the east of the loading/unloading hose mast structure (refer to Figure 2-3). The new MVR system would function the same as the existing system: hydrocarbon vapors would be analyzed, enriched as necessary to above the Upper Explosion Limit, and would be vacuumed through an existing line to the Refinery for processing.

Fire Prevention, Detection, and Suppression Systems

The Avon Terminal fire systems would be renovated to meet MOTEMS requirements. Two 4,000-gallon-per-minute (GPM) firewater pumps with diesel drivers, each with an approximately 1,000-gallon fuel tank and a backup emergency generator, would be installed on the south end of the Berth 1A platform. In addition, two 1,500-GPM elevated tower monitors with foam skids would be installed on the west and east sides of Berth 1A, at the west and east fire monitoring stations (refer to Figure 2-3). Other associated fire prevention, detection, and suppression equipment at the Avon Terminal would include:

- local and remote-actuated motor-operated emergency shutdown valves at the Berth 1A piping manifolds and at the existing valve station located 0.5 mile south of the Avon Terminal;
- automated fire detection system;
- automatic and manual fire alarms;
- vendor-supplied controls for new firewater pumps and elevated monitors; and
- Uninterruptible Power Supply system.

Dolphins

Dolphins are discrete marine structures that are typically supported by piles founded in soils. Dolphins are typically installed to provide working platforms or fixing points to attach fenders, mooring devices, and other equipment. The primary function of mooring dolphins is to support various mooring devices, such as quick-release hooks and bollards, that are used to secure vessel mooring lines. The primary function of breasting dolphins is to support fendering equipment that absorbs the energy from the berthing vessel and resists the breasting forces while the vessel is moored at a marine terminal. Breasting dolphins are often equipped with mooring hardware for spring lines.

As part of the proposed MOTEMS-related renovation work, a new mooring dolphin (M4) would be installed to support Berth 1A (refer to Figure 2-2). The dolphin would be

located approximately 575 feet west of Berth 1A, in an area that is currently open water. Access to the dolphin would be via a new walkway that would be attached to the westernmost existing mooring dolphin (M3).

Table 2-3 includes a summary of existing and proposed dolphins at the Avon Terminal, including a description of piles and each dolphin's primary function (refer to Figure 2-2).

Table 2-3: Existing and Proposed Avon Terminal Dolphins

Dolphin Number(s)	Pile Description (No of Piles, Pile Diameter, and Material)	Primary Function
Existing Dolphins		
B1, B2, B3, B4	Single 7-foot-diameter steel pile	Breasting/mooring dolphins that support fender system components and quick-release hooks
M1, M2, M3	Single 7-foot-diameter steel pile	Mooring dolphins that support quick-release hooks
T (to be removed)	4 18-inch-diameter steel piles	Mooring dolphin that supports quick-release hooks
Proposed Dolphin		
M4	16 24-inch-diameter steel piles	Mooring dolphin that supports quick-release hooks

Mooring and Berthing Capacities

The Avon Terminal currently can only accommodate one vessel at a time. Berth 1 supports nine mooring points, using multi-hook assemblies; these mooring points include four breasting dolphins (B1, B2, B3, and B4), four mooring dolphins (M1, M2, M3, and T), and one mooring point on the northwestern corner of the Berth 1 platform. Mooring and berthing operations are conducted in accordance with the Berth 1 Terminal Operating Limits (TOLs) diagrams per MOTEMS.

The installation of proposed Berth 1A and mooring dolphin M4 would not change the mooring and berthing capacity of the Avon Terminal. Berth 1A would be operationally equivalent to Berth 1 and would accommodate vessels up to 113,635 DWT with an arrival displacement of 102,600 LT. Berth 1A would utilize seven existing mooring (M1, M2, and M3) and breasting (B1, B2, B3, and B4) dolphins, in addition to the new mooring dolphin M4. The existing T mooring dolphin between B2 and B3 and one mooring point on the northwestern corner of the Berth 1 platform would be demolished and decommissioned, respectively. Due to this change in dolphin layout and the relocation of the Berth 1A manifolds, Tesoro would update the TOLs and operate in accordance with new TOLs.

Stormwater Management, Drip, and Recovered Oil Collection

A drip pan provides stormwater and surface liquid containment at the unloading manifold area of Berth 1. Stormwater and surface drips are collected and drained into a 1,125-gallon, dock-mounted steel recovery tank, which is double-walled, internally coated, and protected from overflowing by level control instrumentation. Recovered drip-pan stormwater and oil collections are typically pumped onshore through a 6-inch-diameter recovered oil pipeline. Collections are treated onshore at the Refinery's Wastewater Treatment Plant (WWTP). A similar liquid-collection system would be installed at Berth 1A, with the entire concrete platform surface with a curbed perimeter serving as the collection area.

In addition, the Avon Terminal has the capability of receiving 'oily ballast water' (defined in Section 2.4.1) or 'bilge water' (water that collects in the bilge, which is the lowest compartment on a ship, below the waterline) for both emergency and non-emergency situations. Oily ballast water and/or bilge water are currently pumped onshore to segregated tankage at the Refinery for holding, treating, and isolation prior to treatment in the WWTP. Prior to treatment in the WWTP, oily ballast water is transferred to the Refinery recovered oil tank system, where water is pumped through the Refinery's oily water sewer and separator. (See Section 4.2, Biological Resources, for a discussion of provisions for dealing with invasive species in ballast water.) While this capability exists, ship operators and Tesoro typically cooperate to minimize the amount of oily ballast and/or bilge water sent to the Refinery WWTP.

Berth 5 (Demolition)

Demolition of Berth 5 is analyzed to the extent that information is available at the time of publication of this EIR. Should there be any major deviations from what is described in this EIR, an amendment or a supplemental EIR may be required.

Berth 5, built in 1954, is nonoperational. The structure is comprised of a steel-reinforced concrete deck supported on approximately 168 precast reinforced concrete piles and 60 gunite-encased steel piles. The structure also has 163 timber fender piles. Berth 5 is approximately 150 feet long by 80 feet wide, and is located immediately downstream and west of the existing Berth 1. Berth 5 is connected to the main platform and Berth 1 by a timber walkway (refer to Figure 2-2). Chemical cleaning and isolation of Berth 5 pipelines was completed in 2011 as part of decommissioning. Tesoro plans to remove Berth 5 as part of the proposed Project.

Demolition and removal activities would include:

- appurtenant facilities removal, such as the petroleum hydrocarbon vapor recovery system; hose-handling assemblies; recovered oil (slops) tank; diesel

generator set; miscellaneous pumps, valves, and piping; and equipment storage building;

- fixture removal, such as heavy metal fender springs, mooring bits, mooring cleats, and mooring posts;
- pipeline removal;
- concrete deck demolition;
- timber deck demolition (between Berth 5 and Berth 1);
- wood and concrete pile demolition; and
- removal of debris, if any.

Deconstruction would not take place until after Berth 1A becomes operational, as Berth 5 currently supports an operational firewater pump and oil containment boom reel that can be used in the case of a fire or spill.

2.3.3 Approachway

The existing approachway is approximately 1 mile long, and is comprised of approximately 1,500 timber piles, pile caps, and other structural components such as cross-bracing, handrails, and decking. The first 4,000 feet of the approachway (from the Refinery) crosses diked/disturbed marsh (3,000 feet) and intact tidal marsh (1,000 feet), with the remaining portion over open water. Timber decking supports an existing 3-foot-wide pedestrian walkway and a 4⅔-foot-wide trackway system (currently used for personnel and minor maintenance equipment movements). As discussed in Section 2.3.2, pipelines that serve the Avon Terminal are supported on the pipeway on the east side of the approachway, while a treated wastewater discharge pipeline is on the west side. The pipeway on the east side of the approachway varies in width up to approximately 30 feet. The approachway begins at Bent 328 near the Refinery and terminates on the east end of Berth 1 (see Figure 2-4).

The approachway is divided for the renovation Project into four areas: Area D, Area C, Area B, and Area A (see Figure 2-4). Each area is denoted by specific bents (a section of piles and pile cap). Starting from the north end of the approachway closest to Berth 1, areas include: Area D, spanning between Bent 4 and Bent 68; Area C, spanning between Bent 68 and Bent 163; Area B, spanning between Bent 163 and Bent 262; and Area A, spanning between Bent 262 and Bent 328.

To complete the MOTEMS-related renovation, each area would either be replaced, repaired, or taken out of service. The existing trackway/walkway would be removed, and associated sections of the approachway would be replaced with a roadway and/or walkway. The accompanying pipeways would either be replaced or repaired.

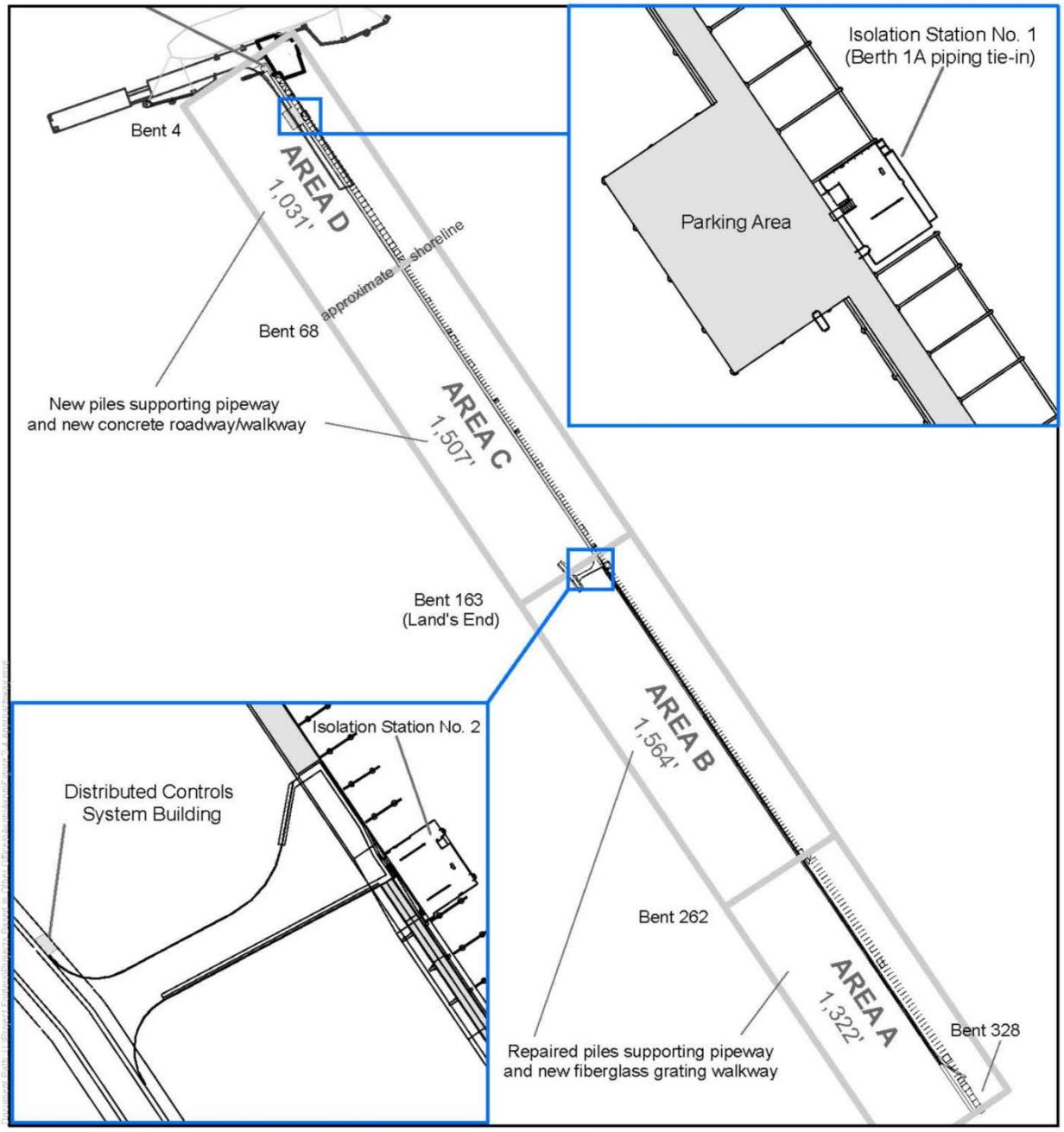


Figure 2-4
Approachway
California State Lands Commission
Avon Marine Oil Terminal Lease Consideration Project

N

0 325 650 Feet

TRC
Results you can rely on

8/29/2014

Service Layer Credits: © OpenStreetMap (and) contributors, CC-BY-SA

Area D

Area D extends from Bent 4 of the existing Berth 1 to Bent 68, which also approaches the approximate shoreline. First, all existing building structures and other appurtenances would be removed, including two existing buildings located on the approachway that serve primarily as break and lunchrooms for operators and maintenance personnel as well as contractors. All existing timber piles, pile caps, decking (including the trackway) would be removed.

Renovations would include installation of new corrosion-resistant, hollow steel piles to support the roadway/walkway and pipeway and construction of a new concrete driving surface to replace the trackway. The new roadway would also provide pedestrian access. Renovations on Area D of the approachway include installing 50 new support bents to support a new pipeway and a new concrete driving surface for access to Berth 1A. The bents would be supported by approximately 45 24-inch-diameter, 48 30-inch-diameter, and 67 36-inch-diameter corrosion-resistant, hollow steel piles. The roadway would be approximately 13 feet wide, with guardrails on both sides, at an elevation of approximately +20 feet MLLW. The pipeway would be approximately 29 feet wide, with an elevation of approximately +12.50 feet MLLW. Vehicular access would be prohibited on Berths 1 and 1A, and on the west fire monitoring station. At the far north end of Area D, the roadway surface would widen toward the west to provide a 14-foot by 26-foot concrete area that would accommodate the west fire suppression equipment (elevated fire monitor and foam tank). A row of bollards would separate the fire suppression equipment area from the roadway. Walkways would be installed at the north end of the roadway to provide pedestrian access to both berths.

Area C

Area C extends from Bent 68 to Bent 163. All existing building structures and other appurtenances, timber piles, pile caps, and decking would be removed. Renovations would include installation of new corrosion-resistant, hollow steel piles to support the roadway/walkway and pipeway and construction of a new concrete driving surface to replace the trackway. The new roadway would also provide pedestrian access. Renovations on Area C of the approachway include installing 62 new support bents to support a new pipeway and new concrete driving surface for access to Berth 1A. The bents would be supported by approximately 64 24-inch-diameter and 128 30-inch-diameter corrosion-resistant, hollow steel piles. The roadway would be approximately 13 feet wide, with guardrails on both sides, at an elevation of approximately +20 feet MLLW. The pipeway would be approximately 24 feet wide, with an elevation of approximately +12.50 feet MLLW.

Area B

Area B extends from Bent 163 to Bent 262. Renovations would include repairing or replacing existing piles with an embedment depth of approximately 40 feet, installing new pile caps, and constructing a new fiberglass grating pedestrian walkway.

Area A

Area A extends from Bent 262 to Bent 328, which terminates at the Refinery. Renovations would include repairing or replacing existing piles with an embedment depth of approximately 40 feet, installing new pile caps, and constructing a new fiberglass grating pedestrian walkway.

Isolation Stations and Distributed Controls System Building

Isolation Station No. 1 is located at Bent 20 next to the existing parking area. Manual gate valves are provided at Isolation Station No. 1 to allow for isolation of all pipelines. New piping from Berth 1A would be tied into the existing pipelines at Isolation Station No. 1. Refer to Table 2-2 for a summary of existing pipelines anticipated to be tied in.

Isolation Station No. 2 is located at Bent 166. Motor-operated valves are provided at Isolation Station No. 2 to allow for isolation of all hydrocarbon-containing pipelines.

A drip pan would be installed at both isolation stations to provide containment under all of the piping flange connections. The drip pans would have a built-in sump area that is pumped off as required by sump pumps that are under level control.

A new 10-foot by 12-foot building would be installed at Land's End[8] approximately 120 feet west of the approachway, just south of existing trailer facilities. Equipment associated with the Distributed Controls System would be housed in this building.

Pipeway

All existing piping from Isolation Station No. 1 inland would remain and be supported on the renovated pipeway. New piles and pile caps would be installed to support pipelines in Areas C and D, as described above; all existing timber piles, pile caps, decking, and other appurtenances would be removed in these areas. Existing piles, with an embedment depth of approximately 40 feet, would be repaired and new pile caps installed to support the pipelines in Areas A and B.

[8] Land's End is located at Bent 163, between Areas B and C, on the approachway (see Figure 2-4).

2.4 OPERATIONS

Present operations at the Avon Terminal involve the transfer of products between tanker vessels and storage tanks at Tesoro's Golden Eagle Refinery, typically approximately 90 percent export operations, and 10 percent import operations. Tesoro would continue to operate at Berth 1A in the equivalent manner as it has operated at Berth 1.

Equipment throughout the facility is controlled by both manual operators and automatic control systems. Avon Terminal operations are dictated by vessel schedule, as well as tide and current; therefore, unloading operations can occur at any time, day or night. Although actual operation depends on shipping demands, the Avon Terminal is capable of operating 365 days per year, 24 hours per day. Transfer operations are conducted in accordance with all applicable regulations and the Avon Marine Oil Terminal Operations Manual (Operations Manual) required by California Code of Regulations, Title 2, section 2385.

2.4.1 Ballast Water

Water confined in any hold of a vessel for the purposes of trim and stability is known as ballast water. A ship carrying little or no cargo rides high in the water, having less draft than a loaded ship. Ballast water intake is used to adjust the ship's position relative to surrounding water levels, thus increasing stability, making the vessel less vulnerable to waves and winds, and reducing the potential for the propeller to rise out of the water or for the bow to be slammed when riding over high waves. Ballast water normally enters a ship through intakes located below the waterline. Depending on the level of the tank relative to the water surface, water may be taken in or discharged, either by pumping or by gravitational flow, to adjust a ship's trim, improve maneuverability, increase propulsion efficiency, reduce hull stress, raise the ship to pass over shallow areas (reduce draft), and lower the ship to get under bridges or cranes (lower air draft). Tankers typically have specially constructed segregated water tanks that hold ballast water. Ships discharging ballast water from other geographic locations may introduce nonindigenous species that can invade, possibly harm ecosystems, and present risks to human health and the economy. For more detailed information, see Section 4.2, Biological Resources.

Ballast Water Regulations

Vessels are required to comply with all federal and State ballast water laws, regulations, and permits. Ballast water is regulated at the federal level by the USCG and U.S. Environmental Protection Agency (USEPA).

U.S. Coast Guard

The USCG regulates ballast water through regulations found in 33 CFR Part 151. USCG regulations, developed under authority of the Nonindigenous Aquatic Nuisance Prevention and Control Act of 1990 and later revised and reauthorized as the National Invasive Species Act of 1996, require the management of ballast water. These regulations are specific to vessels entering United States waters from outside the United States Exclusive Economic Zone.[9] In 2012, the USCG amended its regulations on ballast water management by establishing a standard for the allowable concentration of living organisms in ballast water discharged from ships in waters of the United States (77 Federal Register 17254). The USCG also amended its regulations for engineering equipment by establishing an approval process for ballast water management systems (77 Federal Register 17254). The final rule became effective on June 21, 2012.

Environmental Protection Agency

The USEPA regulates ballast water and other discharges incidental to normal vessel operations through the Clean Water Act, specifically the National Pollutant Discharge Elimination System (NPDES) Permit program. The USEPA released the NPDES Vessel General Permit (VGP) for Discharges Incidental to the Normal Operation of Commercial Vessels and Large Recreation Vessels in December 2008 and again in 2013. The 2013 final VGP (effective December 2013) continues to regulate 26 specific discharge categories that were contained in the 2008 VGP, and provides coverage for fish hold effluent in the event that a permitting moratorium for fishing vessels currently in effect expires in December 2014. For the first time, the 2013 VGP contains numeric ballast water discharge limits for most vessels. The ballast water discharge standards and the implementation schedule in the permit generally align with requirements contained within the 2012 USCG ballast water rulemaking. Additionally, the VGP contains requirements to ensure ballast water treatment systems are functioning correctly, more stringent effluent limits for oil-to-sea interfaces and exhaust gas scrubber washwater, additional administrative requirements, and numerous other additional environmental protections and ballast water management provisions.

State Requirements

Avon Terminal-bound vessels must comply with the California Ballast Water Management for Control of Nonindigenous Species Act of 1999 as amended by the Marine Invasive Species Act of 2003 that specify ballast water management practices (Pub. Resources Code, §§ 71200-71217). Ballast water management requirements vary

[9] An Exclusive Economic Zone is a sea zone prescribed by the United Nations Convention on the Law of the Sea over which a state has special rights over the exploration and use of marine resources, including energy production from water and wind. It stretches from the seaward edge of the state's territorial sea out to 200 nautical miles (nm) from its coast.

depending on whether the vessel arrives from inside or outside of the Pacific Coast Region.[10] Ballast water management practices for vessels arriving from places outside the Pacific Coast Region (Pub. Resources Code, § 71204.3) include:

- exchanging the vessel's ballast water in mid-ocean waters (waters that are more than 200 nm from land and at least 2,000 meters deep), before entering the coastal waters of the State;
- retaining all ballast water onboard the vessel;
- discharging the ballast water at the same location where the ballast water originated, provided that the master, operator, or person in charge of the vessel can demonstrate that the ballast water to be discharged was not mixed with ballast water taken on in an area other than mid-ocean waters;
- using an alternative, environmentally sound method of ballast water management that, before the vessel begins the voyage, has been approved by the CSLC or the USCG as being at least as effective as exchange, using mid-ocean waters, in removing or killing nonindigenous species;
- discharging ballast water to a CSLC-approved reception facility; and
- under extraordinary conditions, conducting a ballast water exchange within an area agreed to by the CSLC in consultation with the USCG at or before the time of the request.

Ballast water management practices for vessels arriving from places within the Pacific Coast Region (Pub. Resources Code, §§ 71201.7 and 71204.5; Cal. Code Regs., tit. 2, § 2280 et seq.) include:

- exchanging the vessel's ballast water in near-coastal waters (waters that are more than 50 nm from land and at least 200 meters deep), before entering the waters of the State, if that ballast water has been taken on in a port or place within the Pacific Coast Region;
- retaining all ballast water onboard the vessel;
- using an alternative, environmentally sound method of ballast water management that has been approved by the CSLC or the USCG before the vessel begins the voyage, and that is at least as effective as ballast water exchange in removing or killing nonindigenous species;
- discharging ballast water to a CSLC-approved reception facility; and

[10] The Pacific Coast Region refers to all coastal waters (within 200 nm of land) on the Pacific Coast of North America east of 154 degrees West longitude and north of 25 degrees North latitude (Pub. Resources Code, § 71200, subd. (k)), exclusive of the Gulf of California.

- under extraordinary conditions, conducting a ballast water exchange within an area agreed to by the CSLC in consultation with the USCG at or before the time of the request.

In 2006, the CSLC was tasked with the preparation of regulations under Public Resources Code section 71205.3 that require vessels operating in waters of the State to meet performance standards for ballast water discharge. These regulations were adopted in 2007 (Cal. Code Regs., tit. 2, § 2291 et seq.) and will be applied to vessels in a phased approach between 2016 and 2018 (Pub. Resources Code, § 71205.3). The interim performance standards for ballast water discharges are outlined in California Code of Regulations, Title 2, section 2293. A final discharge standard of zero detectable living organisms for all organism size classes in ballast water discharge shall be implemented on January 1, 2020, for all vessel size classes.

Vessels are also required to minimize the uptake and the release of nonindigenous aquatic species as follows:

- avoid the discharge or uptake of ballast water in areas within, or that may directly affect, marine sanctuaries, marine preserves, marine parks, or coral reefs;
- minimize or avoid uptake of ballast water in all of the following areas and circumstances:
    - areas known to have infestations or populations of harmful organisms and pathogens;
    - areas near a sewage outfall;
    - areas near dredging operations;
    - areas where tidal flushing is known to be poor, or times when a tidal stream is known to be more turbid;
    - in darkness when bottom-dwelling organisms may rise up in the water column; and
    - where propellers may stir up the sediment;
- remove vessel biofouling organisms from hull, piping, propellers, sea chests, and other wetted portions of a vessel on a regular basis, and dispose of removed substances in accordance with local, State, and federal laws, regulations, and permits; prior to and until the date that the regulations described in Public Resources Code section 71204.6 are adopted, “regular basis” means any of the following:
    - no longer than by the date of expiration on the vessel’s full-term Safety Construction Certificate or an extension of that expiration date;
    - no longer than by the date of expiration of the vessel’s full-term USCG Certificate of Inspection or an extension of that expiration date by the USCG; or

- no longer than 60 months since the time of the vessel's last out-of-water dry docking. The commission may approve a time extension to this period;

- in-water cleaning of submerged portions of a vessel shall be conducted using best available technologies economically achievable, and designed to minimize the release of coating and biological materials, cleaning agents, and byproducts of the cleaning process into the surrounding waters. The cleaning shall be performed in accordance with local, State, and federal laws, regulations, and permits, including the California State Water Resources Control Board's Section 401 Certification of the USEPA VGP.

Avon Terminal Requirements

As outlined in Tesoro's Avon Terminal Operations Manual, the Avon Terminal has various requirements regarding the handling of oily wastes from tank ships and barges. These operation requirements are established upon the following standards:

- USCG regulations (33 CFR 158) concerning the availability and adequacy of oily water and residue and solid waste reception facilities at marine terminals. These regulations are the basis for issuing Certificates of Adequacy to marine terminals. These documents qualify a terminal as having adequate facilities to receive and properly dispose of oily waste water from ocean-going ships' recovered oil tanks without causing undue delay to these ships;

- USEPA regulations concerning the storage, treatment, and disposal of hazardous and non-hazardous wastes; and

- Tesoro corporate and Martinez refinery policies and procedures regarding wastewater treatment plant operations.

Oil in ballast water is considered a hazardous discharge and is, therefore, subject to the VGP under the Clean Water Act.

The Operations Manual describes ship ballast water and waste-handling facilities at the Refinery and how these facilities are typically used. USCG regulations require vessels to provide 24 hours' advance notice to a marine terminal regarding any potential needs for discharging oily water. Notice, including a description of the material to be discharged, must be provided to Tesoro for all potential oily ballast or nonsegregated waters. The TPIC completes required sampling prior to and following the ship to wastewater treatment plant ballast transfer. The TPIC is responsible for taking custody of the samples for retention and completing the required documentation forms.

2.4.2 Personnel and Communications

A minimum of two personnel are required to be on duty during marine transfer operations, the TPIC and a second crew member, and they typically work a 12-hour

shift. Therefore, a minimum of approximately four employees (two employees per 12-hour shift) make trips to and from the facility each day. The TPIC supervises all vessel docking and transfer operations from the transfer manifold location. The second crew member provides relief for the TPIC and generally assists operations at other times. Both personnel have responsibilities for observing operations and reporting security and emergency issues such as oil spills. In addition, other personnel may be on the wharf for maintenance or additional assistance with operations, as required.

Communications are maintained by various means, including:

- portable radios, carried by both the TPIC and the Vessel Person-In-Charge (VPIC), provided by the Avon Terminal to the vessel. The same radio can be used by the TPIC to contact Refinery personnel on other channels;
- VHF radio, available for use by the TPIC;
- two direct telephone lines to the Refinery and outside lines; and
- a cell phone, carried by the TPIC, which is linked to the two land lines.

For information on communication practices during emergencies or unexpected conditions, see Section 2.4.16.

2.4.3 Security and Lighting

The Refinery is required to comply with State and federal security and lighting regulations. This is accomplished by operating in compliance with the Refinery Facility Security Plan (FSP), which includes the Avon Terminal. The FSP is subject to approval at 5-year intervals by the USCG. The current agency-approved FSP expired in August 2014. The USCG performs one annual deliberate inspection, as well as three to four random inspections per year, to ensure FSP compliance. Current copies of the FSP are kept on-site.

As described in the FSP, access to the Avon Terminal is limited to authorized personnel and vehicles. Unescorted personnel who have been granted access must have a valid Tesoro access badge and must be enrolled in the Transportation Worker Identification Credential Program, as administered by the U.S. Department of Homeland Security, Transportation Security Administration. Third-party security system providers are contracted to manage security personnel and vehicles at the Refinery. The main security gate locations are manned and have automated lift gates. Upon entering the facility, Tesoro personnel are required to check in at the Avon Terminal security building. The only current access to the Avon Terminal is via the small trackway installed to transport personnel and minor maintenance equipment that is operated by Tesoro personnel. Over-water access ladders at the Avon Terminal are secured with locked metal gates that must be manually unlocked for access. The Avon Terminal cannot be accessed from adjacent public shore areas.

Exterior lighting is provided along the approachway and at the Avon Terminal to allow for night operations and provide safety for employees. During each MOTEMS audit, Tesoro reviews the facility's lighting to verify that it satisfies the minimum requirements for illumination of operational areas.

2.4.4 Preliminary Avon Terminal Inspection and Testing

The TPIC supervises all ship mooring and transfer operations, including inspection and testing of the Avon Terminal's condition prior to any ship's arrival. Information on operating procedures is detailed in the Operations Manual. Items that are required to be checked prior to the arrival of every vessel include the following:

- confirm low liquid level in recovered oil tank;
- inspect the firewater supply pump and the condition of portable fire extinguishers and water supply monitors;
- check that all equipment, including life vests, hard hats, tools, gaskets, gauging equipment, and sampling equipment, are accessible and in good condition;
- check that the boom is in its proper location and in good condition;
- check to ensure electrical power is in working order;
- test capstans and winches, and both check and test sump piping and controls;
- inspect all hoses, pumps, and valves for proper positioning, operation, and damage;
- check to ensure all required documents are accessible;
- shut down any hot work such as work involving cutting or burning;
- confirm with onshore technician(s) that tanks, pumps, and valves are aligned and that the Avon Terminal is ready to transfer cargo;
- select and verify set points of pressure switches and valves;
- ensure that any other traffic at the Avon Terminal is stopped; and
- notify the ship that the Avon Terminal is ready for docking.

2.4.5 Berthing

Ships are required to berth in compliance with applicable USCG and MOTEMS requirements, including restrictions on vessel velocity (speed and angle), size (both DWT and displacement) and draft of ships. Specific berthing procedures for the Avon Terminal are detailed in the *San Francisco Bar Pilots Operations Guidelines for the Movement of Vessels on San Francisco Bay and Tributaries, Addendum 3* (dated August 29, 2013) and the Avon Terminal Operations Manual. As indicated in these

guidelines and the San Francisco Harbor Safety Plan, all berthing vessels must maintain 3 feet of UKC when underway. Tesoro requires that vessels maintain 2 feet of UKC through any stage of the tide while alongside the Avon Terminal. All vessels must have 3 feet of UKC when passing Pinole Shoal. Tesoro would continue to operate at Berth 1A in the equivalent manner as it has operated at Berth 1.

2.4.6 Mooring

Tesoro is required to maintain mooring configurations in accordance with MOTEMS, as stated in the TOLs diagrams in the Avon Terminal Operations Manual. Ships are moored to minimize drift, with the center of a ship's manifold directly opposite the cargo hoses. In general, a minimum of seven to nine mooring lines for barges and 12 to 14 mooring lines for tankers are required at the Avon Terminal. Mooring limits also include operational restrictions based on wind, current, and passing-ship conditions. Ship crews are responsible for positioning the vessel, tensioning mooring lines, and maintaining proper tension; however, Avon Terminal staff are responsible for ensuring that the Avon TOLs are enforced. Due to high currents and passing-vessel effects at the Avon Terminal, vessels are required to be tightly moored against the breasting dolphins. Tensioning is monitored by both vessel and Avon Terminal personnel throughout the time the vessel is moored.

Even though the ship is required to be moored to minimize drift, the Avon Terminal hoses can tolerate up to 10-foot drifts from the base centerline of the hose/manifold in either direction or parallel to the wharf. Tesoro would continue to operate at Berth 1A in the equivalent manner as it has operated at Berth 1.

2.4.7 Hoses

Loading hoses are used for the transfer of petroleum products between the Avon Terminal piping manifold and the delivering or receiving tanker or barge. Hoses vary between 4 and 10 inches in diameter and are furnished by the Avon Terminal. The hoses are connected at the Avon Terminal piping manifold prior to arrival of the vessel.

Once the loading-hose connections are on the ship, vessel personnel are required to pull the plastic bag and blind flange off (used to block off the loading-hose connections when not in use). This is completed only over an approved secondary containment or drip pan. Vessel personnel then bolt the hose flange to the ship's manifold, using a new gasket for each connection.

2.4.8 Pre-transfers

Once moored, a portable radio is provided to the ship's VPIC and tested to assure it is in working order. The TPIC tests and verifies operation of the shutdown system, as needed. Next, a pre-transfer conference with the ship's VPIC, often the vessel's Captain

or First Officer, is held and the Declaration of Inspection is completed per California Code of Regulations, Title 2, sections 2330 and 2335. The TPIC reviews the cargo transfer orders, including quantity and product type, and transfer rates, to obtain a clear understanding of the cargo transfer.

2.4.9 Transfers

Petroleum products are transferred onto calling vessels at the Avon Terminal by Refinery pumps. Products are unloaded by pumps onboard the calling vessels. Once the TPIC and the onshore operator have confirmed that the pipelines, valves, pumps, and tanks are properly aligned, the transfer procedure can commence. The TPIC and VPIC agree when to start transfers via the portable radios.

Pumping begins at a low rate, and once proper operations are confirmed, the loading rates are gradually increased. The TPIC and VPIC are required to observe pump discharge and line pressures. Uninterrupted radio communication between the TPIC, VPIC, and the onshore operator is required to be maintained during transfers. The TPIC and VPIC closely observe the equipment for any unanticipated changes in pressure that could result from leaks or improper valve or pump operation. If unanticipated changes are observed, the TPIC or VPIC would shut down the transfer. In addition, the TPIC is required to check for drips, leaks, and spills at least once per hour; check office controls and circuit breakers for any abnormal conditions; and check mooring conditions. As the transfer nears completion, the loading rate is reduced. At completion, the pumps are shut down, and the onshore operator or VPIC secures the pumps with a shutdown switch. Finally, the dock valves are closed and secured by the TPIC.

Next, the cargo hose vent valve is opened and allowed to drain to the ship. The onboard end of the hoses are emptied to the recovered oil tank system or pumped to the transfer line. Vessel personnel disconnect the transfer hoses, install a blind flange on the end of the hose, and install a plastic bag over the end while it is still on the vessel and over the vessel's drip pan. The blind is bolted and the VPIC confirms that the gasket and plastic bag are in place. Confirmation between the TPIC and land-side operator is conducted to assure that all shore valves and tanks are correctly positioned. The hoses are returned to stored positions on the dock and secured.

Final paperwork and copies of the Declaration of Inspection are then completed per California Code of Regulations, Title 2, section 2335. The radio is retrieved from the vessel and the vessel can be unmoored. Final duties of the TPIC include: checking to assure that the sump is properly pumped out; putting away tools; taking samples to the sample storage building at the Avon Terminal; and delivering completed logs, forms, and paperwork to the main office.

Should an emergency occur while a vessel is discharging, transfer operations at the Avon Terminal are immediately suspended, including suspension of transfer pumps and

closing of valves onboard the vessel. For more information regarding emergency response during product transfer, see Section 2.4.16.

2.4.10 Vessel Calls

Table 2-4 shows the annual vessel calls for the Avon Terminal for the years 2004 through 2013. (For more information regarding vessel calls, see Section 4.1, Operational Safety/Risk of Accidents.) With an average of 124 vessel calls per year between 2004 and 2013, the Avon Terminal has averaged approximately two calls per week. The level of shipment activity is not expected to change substantially during the proposed 30-year lease agreement period. Tesoro predicts that the total number of vessel calls will continue to remain lower than the previous decade because ships have steadily increased in size. Larger vessels allow shipment of the same throughput with fewer vessel trips. However, as previously stated, Berth 1A would be operationally equivalent to Berth 1 and would accommodate vessels up to 113,635 DWT with an arrival displacement of 102,600 LT. Therefore, the anticipated maximum annual ship and barge traffic is approximately 70 to 120 vessels. The average number of vessel calls of 124 serves as the basis for the impact analysis in Section 4.0, Environmental Impact Analysis.

Table 2-4: Avon Terminal Vessel Calls

Year	Total Vessel Calls (Berth 1 and Berth 5)	Total Vessel Calls (Berth 1 Only)
2004	152	125
2005	181	143
2006	170	144
2007	154	115
2008	136	114
2009[1]	140	134
2010	95	95
2011[2]	38	38
2012	88	88
2013	82	82
Average	**124**	**108**

[1] In June 2009, Berth 5 ceased all operations.

[2] A fendering system retrofit to Berth 1 and MOTEMS initial audit repairs to Berth 1 and the approachway were completed between August and November 2011. Tesoro also made substantial changes to the Refinery in 2011. These activities substantially limited ship traffic at the Avon Terminal during that year.

2.4.11 Throughput Volumes

Table 2-5 shows the annual throughput for the Avon Terminal for the years 2009 through 2013 in barrels per year (bpy). (For more information regarding vessel calls and throughput volumes, see Section 4.1, Operational Safety/Risk of Accidents.)

Table 2-5: Avon Terminal Throughput

Year	Avon Terminal Receipts (barrels per year)	Avon Terminal Deliveries (barrels per year)	Total Annual Throughput (barrels per year)
2009	240,999	9,267,640	9,508,639
2010	936,500	9,968,885	10,905,385
2011	501,856	4,598,600	5,100,456
2012	1,135,700	11,392,873	12,528,573
2013	1,025,425	11,823,360	12,848,785
Average	**768,096**	**9,410,272**	**10,178,368**

As presented, over the last 5 years, Avon Terminal exports have ranged from approximately 4.6 million bpy to 11.8 million bpy, and imports have ranged from approximately 241,000 bpy to 1.1 million bpy. Overall yearly throughput has ranged from approximately 5.1 million bpy to 12.8 million bpy. Mooring time varies with vessel volume and type of cargo; however, loading and unloading rates generally range from 1,000 to 8,000 barrels per hour. Typically, ships dock for approximately 20 to 30 hours. The level of throughput is not expected to change substantially during the proposed 30-year lease agreement period. Anticipated Avon Terminal use for operations in the immediate future ranges from approximately 10 million bpy to 15 million bpy of transferred products. The maximum amount of throughput that the Refinery is currently permitted to process by the BAAQMD is 183,000 bpd annual average or 63,875,000 barrels annually. The Avon Terminal is limited by the BAAQMD to a throughput of 45,000,000 barrels per 12 consecutive months.

2.4.12 Shipping Routes

In 1992, the Western States Petroleum Association, in agreement with the California Department of Fish and Wildlife (CDFW, formerly California Department of Fish and Game) and 10 oil shipping companies, adopted a voluntary agreement to maintain a minimum distance of 50 nm offshore from the mainland for loaded crude oil tankers transiting between Alaska and California, except when approaching from offshore into the main (west) directed-traffic area south of the Farallon Islands. Vessel traffic lanes are established for north, south, and west approaches to San Francisco Bay. Each approach consists of a 1-mile-wide inbound lane, a 1-mile-wide outbound lane, and a 1-mile-wide separation zone. Approximately 16 miles west of the Golden Gate, these lanes enter a “Precautionary Area” where traffic is merged with eastbound traffic lanes through the Bar Channel toward San Francisco Bay (see Figure 2-5).

Once inside the Precautionary Area, vessels use the USCG Vessel Traffic Service on Yerba Buena Island. Vessels pass through Regulated Navigational Areas (RNAs) on their way to the Avon Terminal (see Figure 2-6).

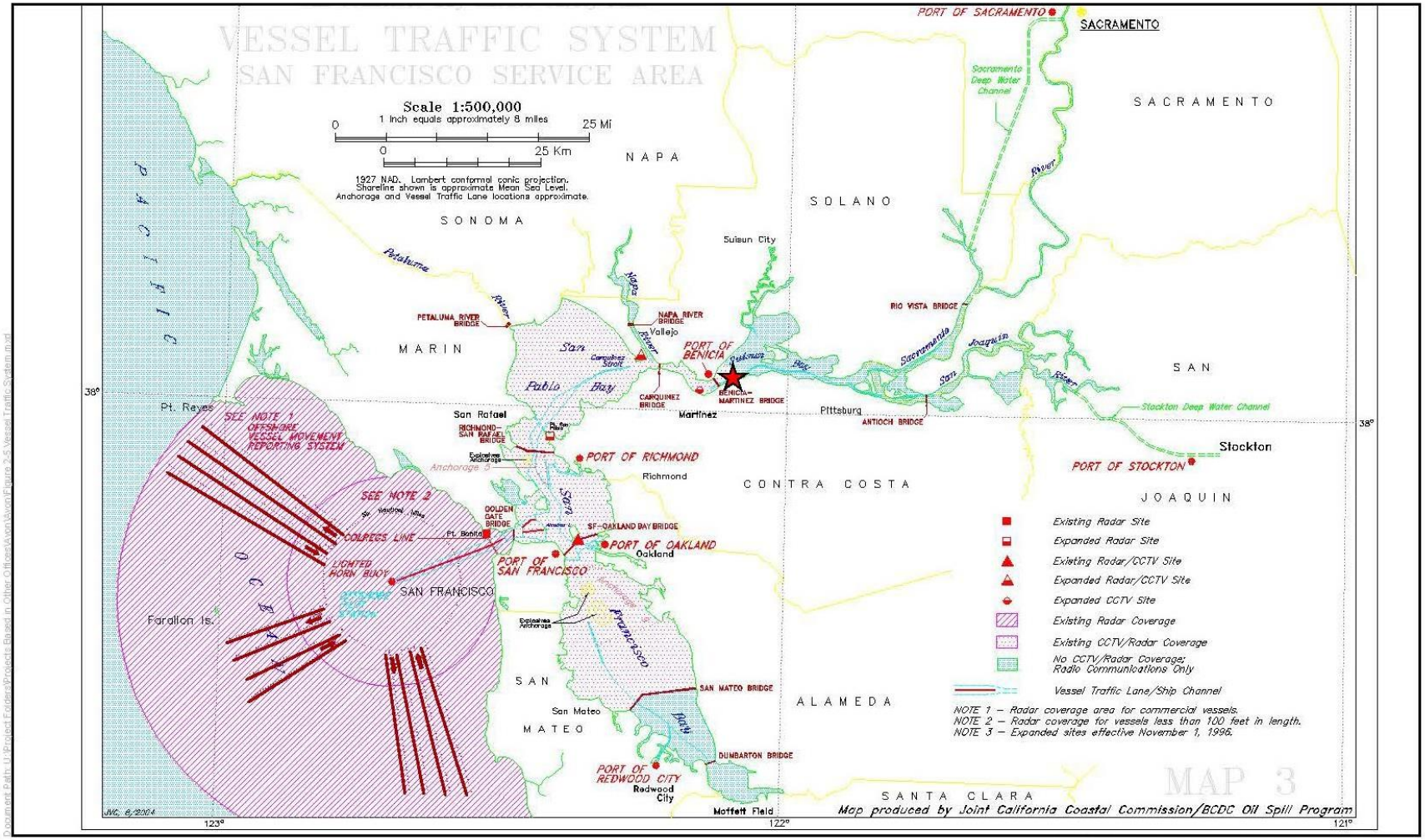


Figure 2-5
Vessel Traffic System
California State Lands Commission
Avon Marine Oil Terminal Lease Consideration Project

TRC Results you can rely on

8/26/2014

★ Approximate Terminal Location

N

Source: Marine Exchange of the San Francisco Bay Region

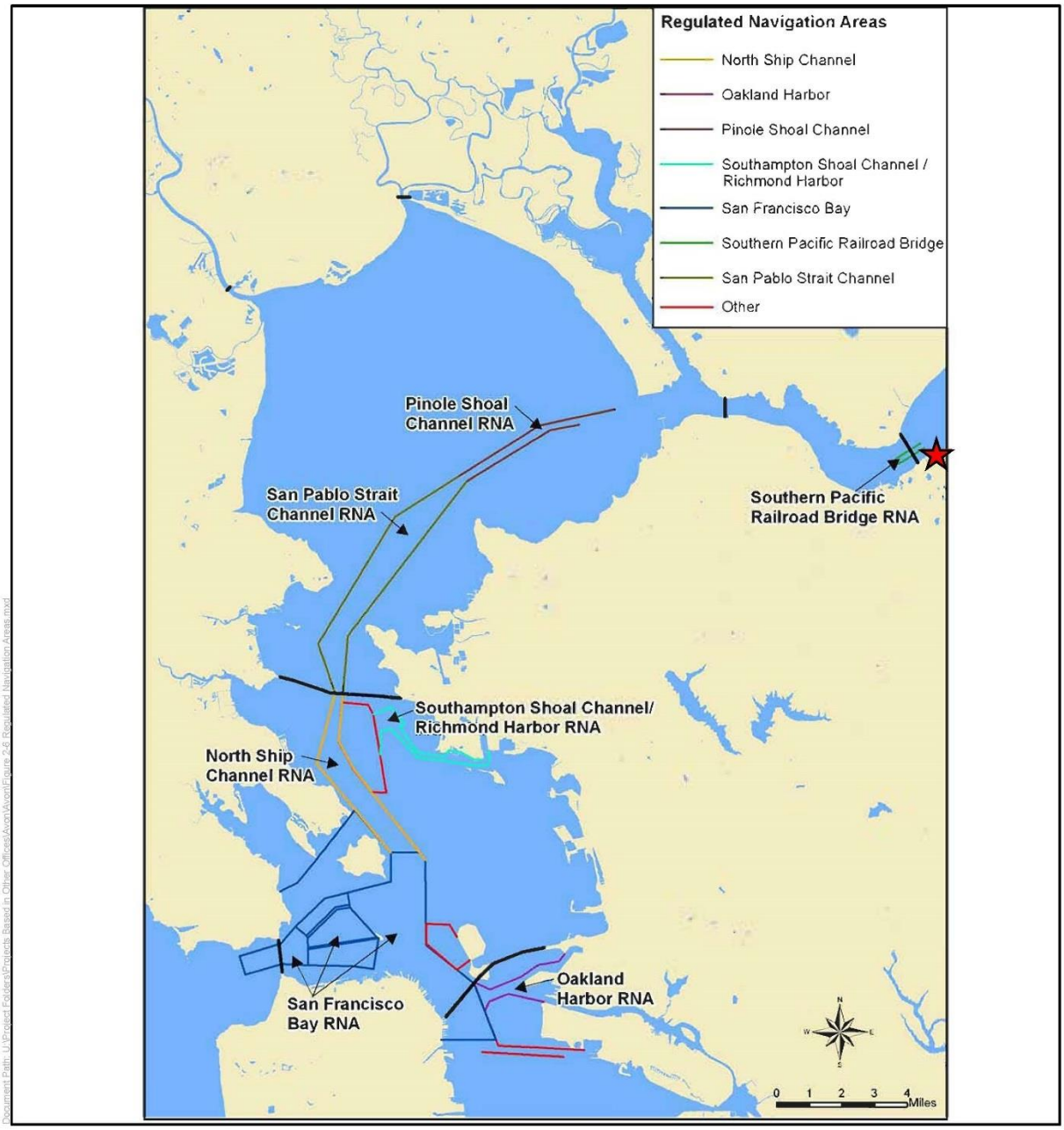


Figure 2-6
Regulated Navigation Areas
California State Lands Commission
Avon Marine Oil Terminal Lease Consideration Project

★ Approximate Terminal Location

TRC Results you can rely on

8/26/2014

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. Vessels proceed through San Francisco Bay, San Pablo Bay, and the Carquinez Strait and enter Bulls Head Channel along the south side of Suisun Bay (see Figure 2-7). Vessels calling at the Avon Terminal typically pass through the San Francisco Bay RNA, North Ship Channel RNA, San Pablo Strait Channel RNA, and Pinole Shoal Channel RNA before entering the Carquinez Strait and the Southern Pacific Railroad RNA in Carquinez Strait.

Vessels transit San Francisco Bay along one of several traffic lanes depending on draft. These include the Deep Water Traffic Lane north of Harding Rock or the westbound/eastbound traffic lanes north/south of Alcatraz. Some vessels must “lighter” cargo (transfer products from a large ship to a smaller vessel) to reduce draft prior to traveling through the shallower shipping channels that reach the Avon Terminal. Lightering of crude oil is restricted to the Anchorage 9 area that is located south of the San Francisco Bay Bridge (see Figure 2-8).

Circumstances that require lightering operations are varied and not necessarily related to specific vessels or cargo. Lightering operations are conducted using vapor recovery to meet emission limits specified under BAAQMD Regulation 8, Rule 46, Marine Tank Vessel to Marine Tank Vessel Loading. Tesoro has no control over, ownership of, or authority to direct vessels on alternative methods that would be implemented to partially load and unload or lighter cargos prior to berthing at the Avon Terminal dock. Between 2009 and 2010, approximately 19 vessels related to Avon Terminal operations lightered at Anchorage 9. No lightering events occurred between 2011 and 2013. However in summary, during the proposed lease period, Avon Terminal-bound vessels may lighter.

The distance from the Golden Gate to the Avon Terminal is approximately 31 miles. Vessels stop to pick up a San Francisco Bay pilot at the sea buoy, which is 11 miles outside the Golden Gate. This local pilot assists the ships in maintaining safe maneuvering upstream. At an average speed of 10 nautical miles per hour (knots), it takes approximately three hours to reach the Avon Terminal.

2.4.13 Waste Management

Waste generated during operations is minimal and of a household/commercial nature. Containerization and removal of solid municipal waste is currently accommodated by the vendor Republic Services/Allied Waste.

2.4.14 Operations Schedule

Avon Terminal operations are dictated by vessel schedule, as well as tide and current; therefore, unloading operations can occur at any time, day or night. Avon Terminal operations would continue to operate as normal until renovation activities commence.

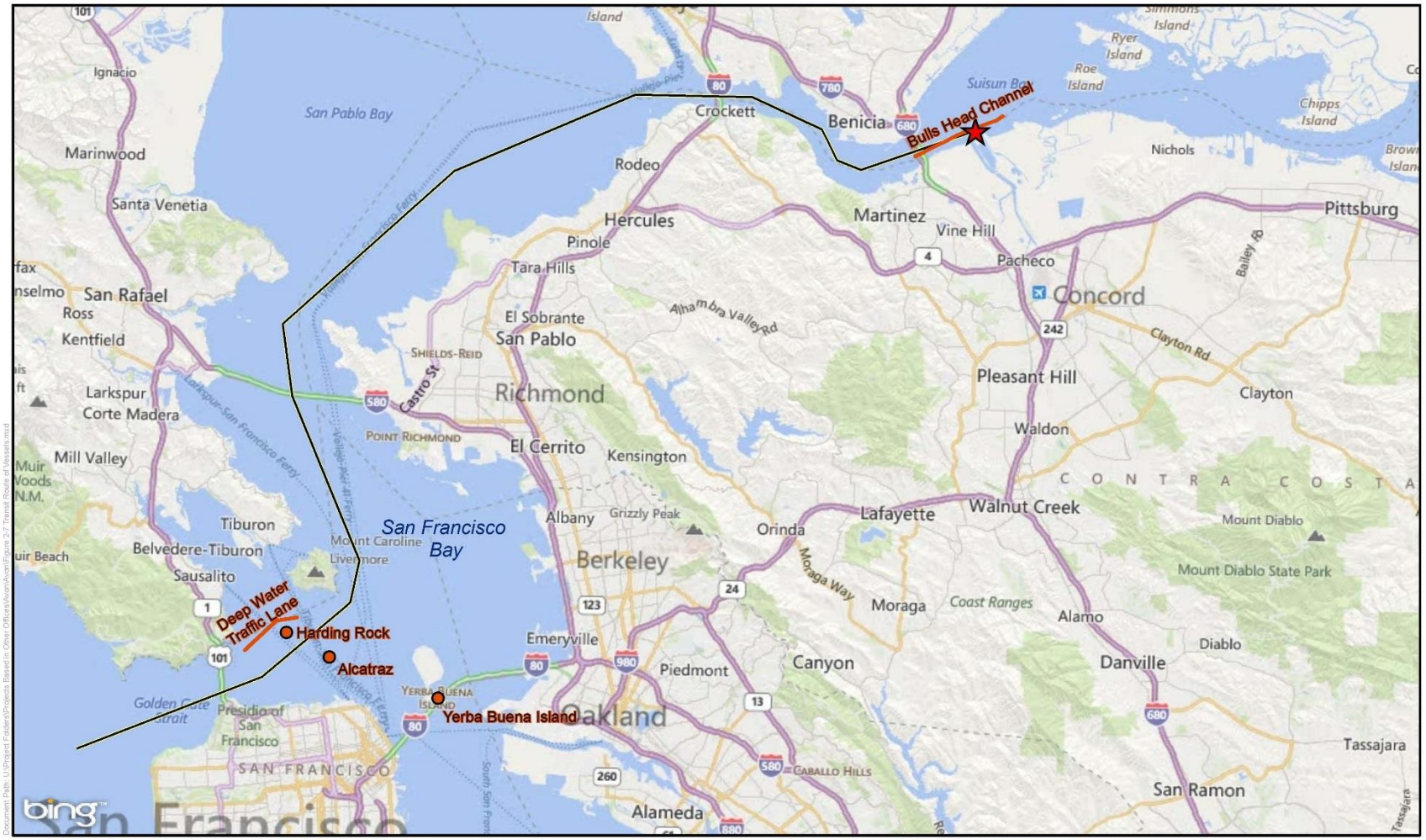


Figure 2-7
Transit Route of Vessels
California State Lands Commission
Avon Marine Oil Terminal Lease Consideration Project

TRC Results you can rely on

8/26/2014

Approximate Terminal Location

Typical Transit Route

N

0 2 4 Miles

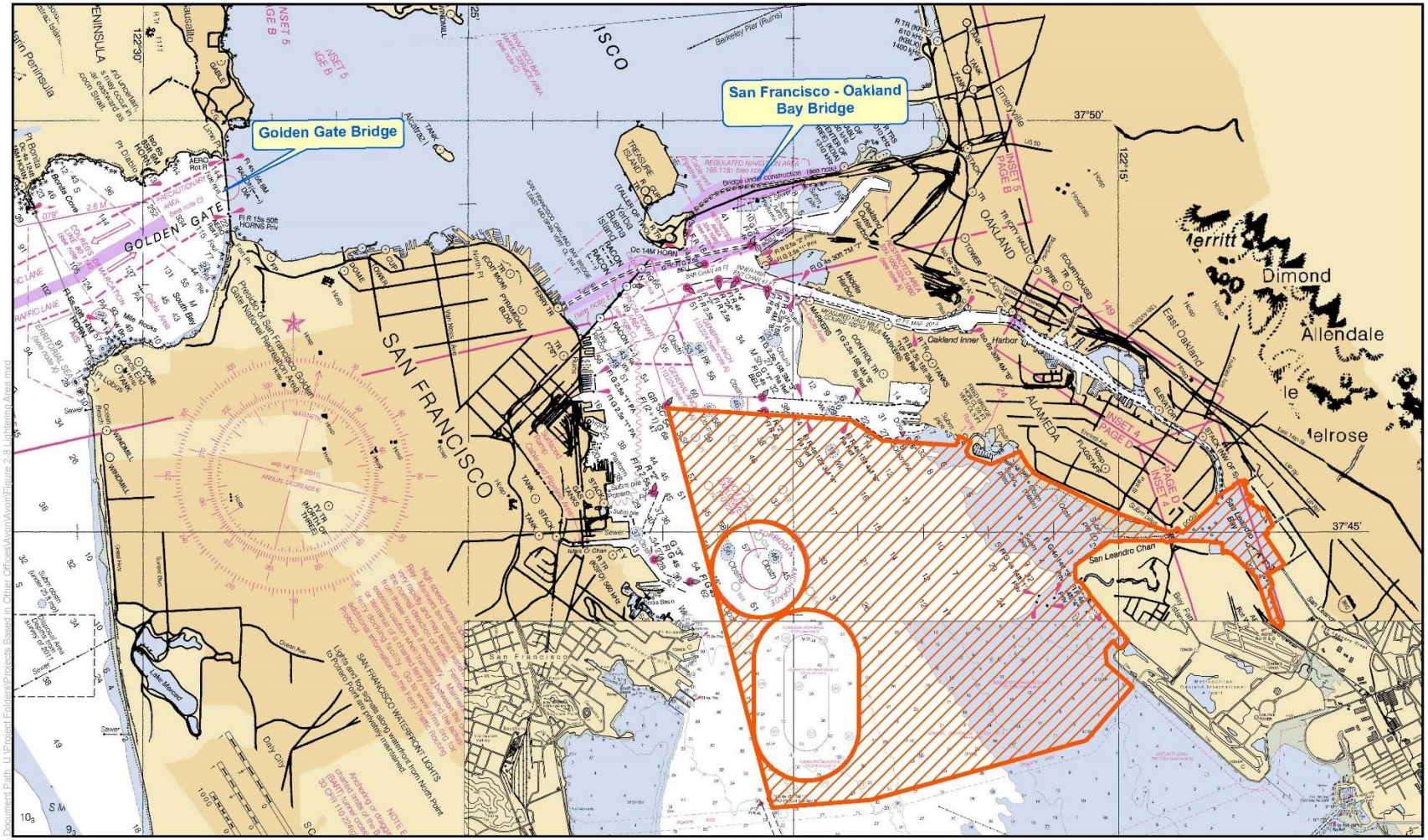


Figure 2-8
Lightering Area
California State Lands Commission
Avon Marine Oil Terminal Lease Consideration Project

TRC Results you can rely on

8/26/2014

Operation is anticipated to continue as normal throughout the renovation, although a window of approximately 6 weeks may occur where the Avon Terminal is not operational as facilities are being transitioned from old infrastructure to newly installed infrastructure.

2.4.15 Inspection and Maintenance

Tesoro performs routine inspection and maintenance on the Avon Terminal to ensure proper operation and to meet regulatory obligations. These inspection and maintenance activities include the following.

- The Avon Terminal is staffed 24 hours per day and visual inspections to confirm pipeline integrity are performed at least once per 12-hour shift.
- CSLC-mandated pipeline hydrotests are performed every 3 years per California Code of Regulations, Title 2, section 2564.
- External ultrasonic thickness surveys are performed every 3 years per California Code of Regulations, Title 2, section 2570.
- USCG-mandated hydrotests are performed as required.
- MOTEMS audits and inspections and MOTEMS-required maintenance are performed as described in Section 2.3.1.
- Visual inspections of piping are performed at least once per year by Tesoro's American Society for Testing and Materials-certified inspectors.
- New hoses are visually inspected and hydrotested upon installation, and annually thereafter, in accordance with California Code of Regulations, Title 2, section 2380 incorporating by reference standard IP-11-4 Oil Suction and Discharge Hose: Manual for Maintenance, Testing and Inspection issued by the Rubber Manufacturers Association. Pressure relief valves are inspected, serviced, tested to confirm the set pressure, and retagged on an interval that is determined for each relief valve. The typical interval for inspection and maintenance is 1 year.
- Fabrication and inspection requirements of ASME B31.3 are met for process piping. After installation of new piping, all butt welds are inspected using a combination of visual, radiographic, and hydrostatic testing techniques. All socket welds are inspected using a combination of visual, radiographic, dye penetrant, magnetic particle, and hydrostatic inspection techniques. Baseline ultrasonic thickness measurements are taken upon installation.
- Routine maintenance of lighting, bollards, life rings, etc. occurs as needed.

Inspection Programs

Facility inspections are performed by the USCG, BAAQMD, and CSLC. The BAAQMD has the authority to issue Notices of Violation as well as take more severe enforcement, if warranted. The USCG and CSLC have jurisdiction over Avon Terminal operations. The CSLC Marine Facilities Division conducts quarterly and annual facility inspections and verifies instrument charts and gauge readings that must meet State and federal standards. In addition to agency inspections, the Refinery self-certifies its maintenance and inspections of the facility. The Avon Terminal equipment inspection program consists of annual component inspections and structural inspections of the wharf, approachway, and associated pipelines. Structural and pipeline inspections are routine components of facility operation. The Refinery also contracts third-party inspectors, as needed, to complete additional inspections for operational safety, facility integrity, and regulatory compliance purposes.

Comprehensive inspections of all Avon Terminal mechanical, electrical, piping/pipelines, and structural systems are performed in accordance with MOTEMS requirements. Inspection reports are transmitted to the CSLC Marine Facilities Division upon completion. MOTEMS audits and above-water inspections are completed and transmitted to the CSLC Marine Facilities Division on a maximum 4-year interval; underwater structural inspections are completed on a cycle interval dependent upon the condition of the facility, construction material type, and/or environment at the mudline. Audit findings can result in additional rehabilitation, maintenance, or monitoring, as needed. In accordance with MOTEMS, post-event inspections are also performed after significant, potentially damage-causing events.

Maintenance Dredging

The Berth 1 area north of the Avon Terminal is dredged periodically to maintain required vessel UKC. A depth of 44 feet below MLLW for dredging episodes at Berth 1 has currently been specified by Tesoro marine transportation managers. Bathymetric surveys are conducted quarterly and maintenance dredging is only conducted as required to maintain minimum required depths. The last Avon Terminal dredging event, conducted in 2012, entailed removal of 3,827 cy of dredged material. Dredged material removed in 2012 was disposed at Winter Island, located approximately 15 miles east of the Avon Terminal. A dredge event at Berth 1, which is not part of the MOTEMS-related renovations, will be conducted during 2014 and is anticipated to entail approximately 6,000 cy of dredged material. Scheduled maintenance dredging is known sufficiently in advance and Tesoro would continue to comply with applicable permits to ensure appropriate assessments are conducted prior to conducting maintenance-related dredging. Dredged material is tested and managed according to permits issued by jurisdictional agencies, including the CSLC, U.S. Army Corps of Engineers (USACE),

San Francisco Bay Conservation and Development Commission (BCDC), and San Francisco Bay Regional Water Quality Control Board.

Historic depth surveys indicate that maintenance dredging may not be required after Berth 1A is placed into service.

2.4.16 Emergency Response

Emergency Shutdown

Transfer operations at the Avon Terminal may be suspended when any of the following conditions has occurred:

- breakdown or loss of communication between operator and vessel;
- oil spillage on deck or to surrounding waters;
- fire/explosion (on vessels or on Avon Terminal);
- excessive wind, current, or passing-vessel conditions that compromise safe mooring management of vessels (including consideration of the TOLs);
- marine incidents such as allision, collision or impending collision, close-passing vessels that create surge off the dock, and/or personnel incidents on board that threaten the safe transfer of oil;
- slack in mooring lines;
- significant earthquake or other natural events (e.g., tsunami) that may compromise the safe transfer of oil; or
- vessel drifting off-spot, affecting safe use and operation of the transfer hoses.

Should an emergency occur while a vessel is discharging, the TPIC would use radio, voice communication, or air horn to notify the tank vessel to immediately shut down transfer operations, per California Code of Regulations, Title 2, section 2340, including the shutdown of pumps and closing of valves onboard the vessel. Shut-off valves, both manual and motor operated, are located on the Avon Terminal to close off the transfer hoses and the product lines connected to the shore pumps and tankage. Isolation valves for all transfer lines are located onshore at the end of the approachway. If the ship loading-hose connection breaks loose while pumping oil offshore, block valves, located on the wharf, stop flow of oil from the shore facility into the water. In addition, the pipeline is equipped with pressure sensors that should detect any large releases very quickly because of the pressure drop. In accordance with regulations, the pipeline is equipped with motor-operated valves, which can be activated remotely and closed within 30 seconds with activation of the emergency shutdown system.

The TPIC would notify on-site security staff immediately, and if needed, Tesoro's Emergency Medical Technicians would be dispatched from the Refinery and the city of Martinez Fire Department would be notified. Subsequently, the USCG and the ship's agent would be notified. In the event of an oil spill, agencies would be notified in accordance with Tesoro's Avon Terminal Operations Manual and the Oil Spill Contingency Plan.

MOTEMS Tsunami Considerations

The National Oceanic and Atmospheric Administration (NOAA) operates two tsunami warning centers in the United States: The West Coast/Alaska Tsunami Warning Center (WCATWC) and the Pacific Tsunami Warning Center. The two tsunami warning centers collaborate to provide tsunami warning service and mutual backup to coastal regions in the United States and in other countries worldwide. The WCATWC Area of Responsibility includes the U.S. West Coast where the Avon Terminal is located. The WCATWC operates 24 hours every day and records data from approximately 600 seismic stations that are funded and operated by different agencies, including the U.S. Geological Survey, Global Seismic Network, and NOAA. An earthquake that activates an alarm initiates an earthquake and tsunami investigation that includes automatic locating and characterization of the earthquake, earthquake analysis and review, sea-level data analysis and tsunami forecasting, and dissemination of information to the appropriate emergency management officials and systems. Notifications issued by the WCATWC are communicated directly via cell phone to Tesoro personnel responsible for marine operations. Tesoro personnel take appropriate action as required to insure personnel safety and to minimize potential impact to the environment and equipment. These actions may include stopping oil transfer, disconnecting hoses, and calling for tugs to hold the vessel securely to the Avon Terminal or assist in setting sail. Per MOTEMS, Tesoro maintains a Tsunami Response Plan that considers the possible effect of tsunamis on the Avon Terminal.

MOTEMS Sea-level Rise Considerations

MOTEMS (Cal. Code Regs., tit. 24, § 3103F.5.3.4) requires that each terminal consider the predicted sea-level rise over the remaining life of a terminal. Sea-level rise over the 50-year life of the facility has been evaluated and incorporated into the design. Tesoro has and will continue to consider sea-level rise in Avon Terminal assessments. Tesoro conducts hydrographic surveys at the Avon Terminal on a quarterly basis and conducts underwater and above-water structural MOTEMS inspections. These surveys and inspections would over time detect increased water depth and potential corrosion at higher-elevation splash zones. The Avon TOL diagrams will be re-evaluated when subsequent MOTEMS audits deem the sea-level rise to be significant enough to impact operations.

Avon Terminal Oil Spill Response Capability

The Oil Pollution Act of 1990 was enacted, in part, to ensure that shippers and oil companies pay the costs of spills that occur. It also established a $1 billion Oil Spill Liability Trust Fund, funded by a tax on crude oil received at refineries. The State of California also requires businesses that handle a petroleum product to file for a Certificate of Financial Responsibility, in which they must demonstrate to the State in some manner, such as insurance, letter of credit, etc., that they have the financial wherewithal to respond to and cleanup a worst-case spill.

Table 2-6 lists available oil spill response equipment, as identified in Tesoro's Avon Marine Oil Terminal Oil Spill Response Plan (2008). Should an oil spill occur, equipment listed in the table would be used during an initial response to the spill.

Table 2-6: Avon Terminal Oil Spill Response Equipment

Type/Model	Quantity	Size[1]	Deployment Time (hours)	Location
Boom trailer	1	7 ft by 15 ft	1	Boat house
Containment boom with universal connectors	1,000 ft	8 ft by 24 ft	1	Boat house
Misc. hand tools	Various	Various	1	Boat house
Personal Protective Equipment (PPE) Trailer (Model No. C122)	1	8 ft by 12 ft	1	Boat house
Portable generator (Model No. EX-1000)	1	1000 W, 4 cycles, 3600 rpm	1	Boat house
Jon boat (Vessel No. CF 4344 JY)	1	12 ft	1	Boat house
Johnson outboard motor with gas tank	1	15 hp	1	Boat house
	1	9.9 hp	1	Boat house
Misc. PPE	Various	Various	1	Boat house
Misc. equipment and absorbents	Various	Various	Various	Various
Misc. hand tools	Various	Various	1 to 4	Boat house
Boat, V-hull with trailer	2	12 ft	1 to 4	Boat house
Jon boat	3	10 ft, 12 ft	1 to 4	Boat house
Boat motors	4	15 hp	1 to 4	Boat house
	1	9.9 hp	1 to 4	Boat house
	1	20 hp	1 to 4	Boat house
Containment boom with universal connections	1,200 ft 1,000 ft	8 by 24 9 by 9	2 to 4	Avon Terminal
	2,400 ft	8 by 24	--	
	1,000 ft	4 by 8	1 to 4	Boat house
PetroMesh with oil snares (cases) "pom-poms"	10	3 ft	1 to 4	Boat house

Type/Model	Quantity	Size[1]	Deployment Time (hours)	Location
Type 270 sorbent sausage	105	8 in by 40 ft bag	1 to 4	Boat house
	16	8 in by 40 ft bag	1 to 4	Avon Terminal
	13	8 in by 40 ft bag	--	
Type 151 sorbent sheets	100	100 per package	1 to 4	Boat house
	46	100 per package	1 to 4	Avon Terminal
	14	100 per package	--	
Type 126 sorbent sweeps	80	100 ft per package	1 to 4	Boat house
	48	100 ft per package	1 to 4	Avon Terminal
	25	100 ft per package	--	
Type 100 absorbent rolls	35	100 ft per package	1 to 4	Boat house
	5	100 ft per package	--	Avon Terminal
	5	100 ft per package	--	
"Avon I" Munson Hammerhead Serial No. ALF with Volvo/Penta AQAD 42/290 single prop motors. • Motor Serial No. 2204132960, Stern Drive Serial No. 3102051898 • Motor Serial No. 2204132936, Stern Drive Serial No. 3102051897	1	30 ft 200 hp 200 hp	1	Martinez Marina
Avon II, Make: Kvichak work boat	1	24 ft	1	Martinez Marina
Pacific Trailer, Serial No. 40R1A2LJ49A028795. License No. 4KR3764	1	6 ft by 24 ft	1	Boat house
Yamaha 150 TXRX, Serial Nos. 6G4X-050267 & 6 KOX-297780 Motor Serial Nos. G03110184 & G03110162 (1999)	2	150 hp	1	Martinez Marina
Whaler III, Make: Boston Whaler (1979), Model: BWCC 7220. Vessel No. C9091 GK. Work Order No. 88482 (backup for Avon I, II or IV when out for service)	1	17 ft	2	Boat house
Brough Trailer. Model No. 72, Serial No. 251198	1	12 ft	2	Boat house
Pacific Trailer. Model No. 72, Serial No. 251198	1	12 ft	2	Boat house
Johnson 50 (1990)	2	50 hp	2	Avon Terminal
SV I, Make: Avon (1992), Model S4. 65 RIBS, Vessel No. CF4908 JZ. Work Order No. 86649	1	13 ft	2	Boat house

Type/Model	Quantity	Size[1]	Deployment Time (hours)	Location
Calkins Trailer, License No. 1DW9210	1	13 ft	2	Boat house
SV II, Make: Avon (1992), Model S4. 65 RIBS, Vessel No. CF5089 ND. Work Order No. 86647	1	13 ft	2	Boat house
E-Z Loader Trailer, Model EZ14-16, License No. 1DX5714	1	13 ft	2	Boat house

Source: Tesoro's Avon Marine Oil Terminal Oil Spill Response Plan 2008
[1] Units of Size: ft = feet; hp = horsepower; rpm = revolutions per minute; W = watts; in = inch
[2] Discontinued, remaining inventory on hand

Tesoro has contracted with Bay Area Ship Services to assist with initial oil spill response services, including the immediate execution of approximately 600 feet of harbor boom in approximately 30 minutes. In addition, Tesoro contracts with Marine Spill Response Corporation (MSRC) to serve as the primary Oil Spill Response Organization contractor in its Oil Spill Response Plan for offshore, onshore, and shallow-water response services. MSRC maintains an extensive inventory of privately owned spill response equipment. This equipment is solely dedicated to spill response, and is stored and maintained at MSRC's 51 equipment pre-position sites across the United States. MSRC's capabilities are augmented by a network of over 90 participants in the Spill Team Area Responders program, an affiliation of environmental response contractors located throughout the country.

The CDFW Office of Spill Prevention and Response and USCG issue the Area Contingency Plan, which provides guidance on sensitive sites; initial response techniques; and response requirements for the type of boom, skimmers, and number of personnel. Should a spill occur, Tesoro would comply with all federal and State response plans.

Tesoro's Avon Marine Oil Terminal Oil Spill Response Plan specifies that the following response equipment and testing procedures must be implemented:

- Containment boom: During semi-annual boom deployment exercises, boom shall be inspected for signs of wear or structural deficiencies. If tears in fabric or rotting of fabric are observed, the boom shall be repaired or replaced. In addition, end connectors shall be inspected for evidence of corrosion. If severe corrosion is detected, equipment shall be repaired or replaced.
- Response boats: Response boats shall be put in the water and engines shall be started at least quarterly. If any mechanical problems are detected, they shall be addressed or repaired in a timely manner.
- Other equipment: Other response equipment shall be inventoried and inspected to ensure that the stated quantities are in inventory and in proper working order.

Documentation of equipment inspection and deployment exercises are maintained at the facility.

Process Safety Controls

The objective of the Avon Terminal control systems is to provide controls to transfer products between the Refinery and/or onshore tankage and a ship docked at the Avon Terminal both reliably and safely while minimizing environmental concerns. The controls to meet these objectives consist of the following systems and subsystems, each of which are described below.

- isolation valve monitoring and control system;
- mooring line tension monitors;
- process safety equipment; and
- fire protection system.

Isolation Valve Monitoring and Control System

Avon Terminal emergency shutdown valves located at the Berth 1 manifold and shore isolation valves located at Isolation Station No. 2 are motor-operated valves (MOV) equipped with actuators, push-button controls, and status lights. Valves are controlled via local control panels. Remote switches are also located at each MOV so that valves can be manually opened or closed if required. MOVs located at Berth 1 and at Isolation Station No. 2 can close within 30 seconds, per CSLC requirements. These valves are intended to be used to quickly provide isolation points should a fire, leak, or other emergency event occur.

As discussed in Section 2.4.7, products are pumped between the Avon Terminal and onshore tankage and Refinery equipment via pumps with over-pressurization protection. Thermal relief to the recovered oil system is provided via relief valves located on discharge lines. Pressure transmitters on the product line display pressure in the control room and alert operators to abnormal conditions. Under emergency conditions, Avon Terminal operators would alert the ship and shut down the transfer.

Mooring Line Tension Monitors

This system is designed to continuously monitor the tension of a vessel's mooring lines while moored at the Avon Terminal. Low and high settings are manually set at each hook (current settings are 1 ton and 25 tons). An alarm at the mooring hook will sound if either one of the parameters are exceeded. A foghorn is also provided that activates manually using an on/off switch. Sensors for wind direction and speed, as well as water current direction and speed, are displayed, as required by the USCG and CSLC.

Process Safety Equipment

Process safety equipment is provided as a function of the process design. Relief valves protect vessels and pipelines from over-pressuring. Fail-safe valves assume their designed positions (closed/open) in case of incorrect pressure or loss of electrical power, or instrument air. These features provide protection against over-pressuring of vessels or lines and potential loss of containment.

Alarms are installed at specific points in the process to monitor parameters critical to the proper operation of the unit. Exceeding a set point, altering a particular process, or shutting down equipment can cause an alarm. These alarms also provide the operator with a forewarning of the conditions that, if left uncorrected, may activate specific automatic process responses such as relief valve opening, automatic shutdowns (interlocks), etc. Some alarms are connected to an interlock as part of the safety design. When activated, these interlocks perform specific automatic actions such as closing or opening valves, de-energizing pumps or other equipment, or preventing startup of equipment.

Equipment and vessels are protected from over-pressuring by pressure safety valves (PSVs) and by locking open valves to ensure an open relief path. At the Avon Terminal, PSVs relieve into low-pressure piping systems that have an open path back to tankage. Over-pressure conditions are avoided when PSVs automatically open in response to process pressures reaching the PSVs' set points. The PSVs automatically close when process pressures drop back below the PSV set points. PSVs associated with pipelines and the Avon Terminal are replaced yearly per CSLC and USCG regulations to ensure correct operation.

Fire Protection System

The Avon Terminal is equipped with firewater and foam systems that can be activated in the event of a fire. Fire protection at the Avon Terminal is provided by the following equipment:

- booster pump for the Avon Terminal adjacent to the approachway at Land's End;
- offshore firewater pump that takes suction from Suisun Bay;
- firewater supplied by the Refinery;
- multiple hose reels, monitors (portable and fixed), hydrants, and foam drums located at the Avon Terminal;
- monitors located along the approachway, spaced at a maximum of 150-foot intervals; and
- multiple portable and wheeled dry chemical extinguishers at the Avon Terminal.

Currently, a 6-inch-diameter firewater line supplies firewater in approachway Area A from the onshore firewater system. The firewater line increases in size to 8 inches in diameter in Area B until it reaches the firewater booster pump located across the trackway at Land's End. At the end of the booster pump manifold, the line size increases to 12 inches in diameter and continues all the way to the north side of the Avon Terminal. The line then turns 90 degrees west and travels to Berth 5, where the firewater line necks down to an 8-inch-diameter line. The firewater line terminates at the west end of the Avon Terminal, near the offshore fire pump. Monitors and hose reels are installed at reasonable intervals. Dry hydro-chem carts are placed along the Avon Terminal near monitors.

Sections of the firewater line in Areas A and B may be replaced in-kind. Two 30-foot-tall elevated monitors would be located at the west and east fire monitoring stations for Berth 1A and would have automatic and remote start-up capabilities. These monitors would be capable of vertical and horizontal sweeps with foam water mixers and adjustable-nozzle water patterns.

The Avon Marine Oil Terminal Fire Protection Plan would be updated after installation of new facilities is complete to reflect the new/retrofitted fire protection equipment and procedures, including newly installed fire equipment function, features, operation, and arrangement. This plan includes photos and maps documenting the locations of fire-protection equipment for Avon Terminal personnel. Fire response is performed by Tesoro's Emergency Response Team (ERT) on-site at the Refinery. Back-up support may be provided under mutual aid from other nearby refineries. ERT firefighters receive an initial 40-hour basic fire-response training taught at the Refinery, as well as annual 32-hour live-fire training at an off-site fire school. Monthly refresher and enhancement trainings are provided for ERT day workers and twice per quarter for ERT shift workers.

Tesoro's personnel and ERT are not responsible for shipboard fire management, as that is the responsibility of the vessel's crew. In the event of a shipboard fire, Tesoro would provide shore-side assistance from the Avon Terminal, in accordance with Tesoro's Operations Manual and Fire Response Plan. All other onshore or offshore fires at the Avon Terminal would be managed by Avon Terminal personnel and the ERT, in accordance with Tesoro's Operations Manual and Fire Response Plan.

2.5 MOTEMS-RELATED RENOVATION

The proposed Project scope was developed to comply with the most current MOTEMS requirements and address MOTEMS audits completed since 2008. The following description provides a summary of the associated renovation work (e.g., repair, replacement, demolition, or decommissioning) and renovation practices anticipated for the Project.

2.5.1 General Renovation Sequence

Avon Terminal MOTEMS renovation activities would generally occur in the following order. While this sequence provides a general idea of the Avon Terminal vessel loading/unloading area renovation, some structures would be built concurrently. Detailed sequencing of the approachway is further discussed in Section 2.5.14. See Section 2.5.3 for details regarding renovation scheduling.

1. Install piles to support replacement structures, or retrofit or repair existing structures (pile installation may require partial deconstruction of some existing structures).
2. Install prefabricated cap beams and deck elements.
3. Install the control building, equipment, and piping supported by platforms.
4. Install other associated dock piping, including main loading/unloading product lines, marine vapor recovery line, stormwater line, and various other utilities (such as firewater and plumbing).
5. Install all instrumentation and electrical gear, conduit runs, wiring.
6. Install other marine terminal structures (not included on the Berth 1A platform).
7. Shut down Berth 1 and cut over pipelines and systems to Berth 1A.
8. Test, troubleshoot, and satisfy regulatory requirements to commence operations of new facilities, including training and certification of personnel and Operations Manual approval.
9. Remove all temporary facilities/staging areas, equipment, and materials used during renovation.
10. Commission the Avon Terminal to operations.
11. Decommission Berth 1.
12. Demolish and remove Berth 5.

2.5.2 Typical Renovation Equipment

Typical renovation, demolition, and removal equipment and anticipated duration of use required for renovation activities and for the demolition of Berth 5 is provided in Table 2-7. Barges would be used for various purposes during renovation of the Avon Terminal. The estimated duration of barges to be used during renovation is 19 months. Renovation activities would generally occur between the hours of 7 a.m. and 7 p.m., Monday through Friday; however, some work may be completed on weekends and/or outside of typical work hours, as necessary.

Table 2-7: Typical Renovation (Construction and Demolition) Equipment

Equipment with Number Required		Use	Operation Timeframe			
			Days per Week	Hours per day	Duration (weeks)	Peak Use hours per day
Vibratory hammer	4	Pile driving	6	0 to 8	36	8
Impact hammer	4	Pile driving	6	0 to 8	36	8
Small derrick barge	1	Pile driving/service crane	4 to 6	8 to 10	63	10
Large derrick barge	1	Pile driving/service crane	4 to 6	8 to 10	16	10
Flat-deck barges	4	Material/equipment/ access storage	4 to 6	10	30	10
Medium crawler crane (165-ton range)	1	Pile driving/steel erection/material handling	4 to 6	8 to 20	56	20
Tug boats	2	Demolition debris barge transport	4 to 6	0 to 8	24	8
Anchor boats	1	Personnel and equipment logistics during demolition	4 to 6	0 to 8	24	8
Small crane (20-ton range)	1	Demolition debris handling	4 to 6	8	24	8
Large crane (200-ton range)	1	Demolition debris handling	4 to 6	0 to 8	24	8
Derrick crane	1	Demolition debris handling/removal	4 to 6	8	24	8
Medium crawler crane (165-ton range)	1	Pile driving/steel erection/material handling	4 to 6	8 to 20	56	20
Large crawler crane (230- to 250-ton range)	2	Pile driving/steel erection/material handling	4 to 6	8 to 20	56	20
Knuckle boom truck	1	Service mechanical work during turnaround	6	6 to 10	6	10
Pickups	14	Transportation	4 to 6	2 to 14	87	14
Passenger vans	2	Transportation	4 to 6	2 to 14	87	14
Telehandlers	4	Material handling	4 to 6	2 to 20	65	20
Hydraulic RT cranes (55-ton range)	2	Service cranes	4 to 6	6 to 10	45	10
Large air compressors	2	Pile driving/support	4 to 6	2 to 20	7	20
Concrete drill	2	Concrete demolition	4 to 6	0 to 8	24	8
Diamond wire saw	1	Metals/infrastructure	4 to 6	0 to 8	24	8

Equipment with Number Required		Use	Operation Timeframe			
			Days per Week	Hours per day	Duration (weeks)	Peak Use hours per day
		deconstruction				
Excavator with shear	1	Demolition	4 to 6	8	24	8
Vibratory pile extractor	1	Pile removal	4 to 6	8	24	8
Excavator with pile extractor	1	Pile removal	4 to 6	8	24	8
Excavator with pulverizer	1	Demolition	4 to 6	8	24	8
Excavator	1	Demolition	4 to 6	8	24	8
Generator	1	Remote power generation	4 to 6	8	24	8
Dump truck	2	Debris removal	4 to 6	8	24	8

2.5.3 Renovation Schedule

The MOTEMS-related renovation at the Avon Terminal would consist of two major components: (1) renovation of facilities associated with the Avon Terminal vessel loading/unloading area; and (2) renovation of facilities associated with the approachway. Work on these two components would, for the most part, occur concurrently.

Loading/unloading area renovation activities would include: construction of Berth 1A, with associated structures, buildings, piping and appurtenances; decommissioning of Berth 1, involving minor deconstruction; and the eventual demolition and removal of Berth 5. The loading/unloading area renovation is estimated to take approximately 9 months to complete, commencing in 2015 and completing in 2016.

Renovation of the various sections of the approachway is estimated to take approximately 19 months to complete; commencing in 2015 and completing in 2016.

Berth 1 is anticipated to operate as normal throughout renovation, except for approximately 6 weeks during which the Avon Terminal may not be operational as facilities are being transitioned from old infrastructure to newly installed infrastructure. After the transition, the Avon Terminal would operate using Berth 1A, and Berth 1 would be decommissioned.

Renovation activities would generally occur between the hours of 7 a.m. and 7 p.m., Monday through Friday; however, some work may be completed on weekends and/or outside of typical work hours, as necessary. To complete the Project by the end of 2016, all pile driving in Area C, Area D, and Berth 1A must be completed within the first in-water work window of August 1 through November 30, 2015. To accomplish this,

approximately 15 workers would be employed on a night shift for 4 months (August through November 2015). Work at night would be limited to welding, material handling, and construction of temporary access for the pile-driving equipment. No pile driving would occur at night. See Sections 4.2, Biological Resources; 4.10, Noise; and 4.11, Visual Resources, Light and Glare for details about night work. The anticipated renovation schedule is provided in Table 2-8.

Table 2-8: Renovation Schedule (Approximate)

Renovation Area	Renovation Duration	Start Date	Completion Date
Vessel loading/ unloading area	9 months	August 2015	May 2016
Areas A and B	17 months	July 2015	December 2016
Area C	11 months	May 2015	April 2016
Area D	9 months	August 2015	May 2016
Berth 5 demolition*	5 months	August 2018	December 2018

*The schedule for the Berth 5 demolition is approximate and subject to BCDC permit requirements.

2.5.4 Access and Staging Areas

Heavy equipment required for renovation at the offshore portion of the Avon Terminal would generally be floating equipment, and as such, would access the site from Suisun Bay. Once floating equipment has been mobilized to the site, crews would access this equipment either from boats or from land. Larger, heavier materials such as piles, precast decks, and fender piles would be delivered to the site via barges. Equipment required for onshore renovation and privately owned vehicles transporting renovation personnel would generally access the Avon Terminal via Marina Vista Road/Waterfront Road as described in Section 4.8, Land Transportation.

The renovation work crew would park their privately owned vehicles in an existing parking lot near an office complex established just south of Area A on the east side of the Refinery. From there, buses would take the crews to their respective work locations.

For Areas A, B, and C, temporary fill areas for staging and crane pads would be necessary where ground improvements are required to support the necessary equipment and work operations. For each temporary work area, the vegetation would first be cleared and geotech fabric would be placed on the unvegetated area. The temporary work area would then be backfilled with 1-foot lifts of clean rock to create a stable, level surface. Following project completion, all rock and geotechnical fabric would be carefully removed and the temporary work areas would be restored.

The temporary work areas for the staging areas would be approximately 100 feet by 60 feet in size; these areas would be used to store boxes/containers for equipment and roll-off containers for renovation debris. The temporary work areas for the crane pads would be approximately 100 feet by 100 feet in size. Areas A and B would each have a

temporary fill area for staging purposes and a temporary fill area for the crane pad. Area C would only require a temporary fill area for staging purposes.

An off-site staging area at Mare Island and a receiving area and laydown yard along the eastern edge of the Refinery would also be used for staging. In addition, small areas on Ox Pond Road or adjacent crane pads would be used to support additional short-term staging of supplies closer to the work on a day-to-day basis. Staging and stockpile areas would be designed and constructed as required by permits.

2.5.5 Renovation Workforce

The size and composition of the workforce would vary depending on the activities in progress and the particular phase of renovation. During renovation activities, the number of workers on-site would vary from approximately 50 to 180, with the majority of workers for the day shift (it is expected that approximately 15 workers would work a night shift from August through November 2015). As phases of the work are completed, the workforce at the Avon Terminal would gradually decline.

The renovation work crew would park their privately owned vehicles in an existing parking lot just south of Area A on the east side of the Refinery. From there, buses would take the crews to their respective work locations at the beginning of each shift. The buses would travel on Refinery roads to Land's End where the crews would disperse to their work locations. The reverse procedure would occur at the end of shift taking workers from the job site to the parking area. The quantity of bus trips would depend on the number of contractors used. Approximately 25 round trips per day are anticipated. Most of the workforce would be local skilled workers supplemented by outside contractor labor, as required. Tesoro intends to engage in a Project Labor Agreement with the Contra Costa Building and Construction Trades Council to use union workers in the completion of construction and renovation efforts required for the Project. Given the presence of multiple union halls in the local and regional area, workers would most likely reside within 20 to 30 miles of the Project site.

2.5.6 Renovation Waste Management

Procedures for the management of waste generated during renovation would be developed as Project details are quantified. However, based on presently available information, waste would include metal (e.g., piping, old equipment), concrete, waste oil, equipment (pumps, motors, and electrical equipment), wood, and other industrial waste. To the extent practicable, these wastes would be recycled. Recovered oils, such as residuals in existing facility equipment, would likely be returned to the Refinery for processing, or alternatively, would be recycled off-site by a licensed waste oil recycling firm, as appropriate. Tesoro maintains a hazardous waste generator number in accordance with regulatory requirements. A Waste Management Group in the Environmental Department has responsibility for all recycling, waste management, and

disposal within the Refinery, including construction projects. Best management practices, including specified material storage and housekeeping requirements with frequent auditing, would be implemented on-site to meet the requirements of the project-specific Storm Water Pollution Prevention Plan. For more information regarding hazardous wastes, see Section 4.1, Operational Safety/Risk of Accidents.

2.5.7 Renovation Power and Electricity

Avon Terminal renovation machinery would run on diesel-powered engines. Electricity would only be used for welding equipment, temporary lighting, and temporary contractor trailers. These electrical requirements would be provided by portable diesel generators located near work areas, as necessary.

2.5.8 Vegetation Clearance and Clean Up

Vegetation clearance, including marsh vegetation, shrub, and brush removal in some areas, would continue to be necessary along either side and below the approachway to allow for required piping and structural inspections. No trimming or removal of trees is anticipated as part of the Project. Mitigation for any wetland vegetation impacts caused by renovation or future Avon Terminal operations would be specified by jurisdictional permitting agencies. For more information see Section 4.2, Biological Resources.

2.5.9 Equipment Refueling

Refueling of derrick barges and tug boats would be conducted either at nearby fuel docks or on-site. If conducted on-site, fuel trucks or tug boats would transfer fuel directly to the derrick barges, or derrick barges would be refueled using smaller fuel cells (500 to 1,000 gallons each), which would require bringing the fuel cell to the site on a barge and then pumping the fuel from the fuel cell to the equipment tank. Smaller equipment, such as welding machines, generators, and light plants, would be refueled using fuel cells. Power tools such as chop saws and chain saws would be refueled using fuel cans, approximately 5 gallons each. Derrick barges typically have the capacity to hold approximately 5,000 to 10,000 gallons of diesel fuel.

2.5.10 Rights-of-Way

All offshore renovation work within submerged tidelands would be located within leased portions of the Avon Terminal boundary. All onshore renovation, staging, and laydown areas and access areas would be within Tesoro-owned properties. No additional rights-of-way would need to be acquired for the Project.

2.5.11 Pile Removal

Pile removal would occur using one of three methods: vibratory hammer, barge-mounted crane, or tug boat pull. The material type, quantity, and diameter of pilings to be removed for Project renovation are provided in Table 2-9.

Table 2-9: Proposed Piling Removals

Location/Type	Quantity	Diameter (inches)	Embedment Depth (approximate feet)
Mooring Dolphin T	4	18	70
Area C/Timber	378	15	Unknown
Area D/Timber	417	15	Unknown
Area D/Steel[1]	8	18	55
Berth 5/Concrete	168	18	40 to 55
Berth 5/Steel[2]	60	14	Unknown
Berth 5/Timber	163	15	35 to 45
Berth 5 to Berth 1 transition/Timber	36 25	15 18	35 to 45 35 to 45
USCG Aid to Navigation Range Marker	3	18	25
Total	**1,262**		

[1] Described as 0.5-inch wall steel pilings; [2] Described as gunite-encased HP 14 x 73 steel pilings.

Timber Pile Removal

The National Marine Fisheries Service-preferred method of timber pile removal uses a vibratory hammer that first dislodges the pile, and then slowly lifts the entire timber pile from the bay sediments. Because of the embedded depth and age of the timber piles, which have a high probability of breaking during removal attempts, it may not be feasible to completely remove them. The alternative method would use either a barge-mounted crane to grab the timber pile and break it off, or a tug boat to pull on the timber pile until it breaks. Based upon past experience of several marine contractors in the Bay Area, the timber piles generally break off at least 3 feet below the mudline. If timber pile breakage occurs using either method, the actual breakage depth for each timber pile would be verified by measuring the length between the mudline and the bottom of the broken segment of timber pile that is brought to the surface. If the timber pile breaks higher than 3 feet below the mudline, the stub would be removed using a hydraulic shear or by divers with a hydraulic chain saw to cut the stub a minimum of 3 feet below the bay sediment and a crane or other equipment to cleanly pull out the sheared stub section. To prevent introduction of creosote to the water column, the timber stub would not be “chewed off” using a clam shell dredge or other equipment.

Concrete and Steel Pile Removal

Steel-reinforced concrete piles would be removed after the timber piles are removed, and would be cut off a minimum of 3 feet below the mudline with a hydraulic shear or another suitable device only for piles that cannot be extracted completely. Sediment around the base of the piles may be jetted away to provide access for the cutting tool. Divers are generally recommended for these operations to assure the proper positioning of the cutting tool, but are not essential. An alternative to cutting the concrete piles off below the mudline is to extract them using a barge-mounted crane and a vibratory extractor. Visual inspections indicate that most of the piles are in reasonably good condition. However, given the embedment length of the concrete piles the concrete piles may break during extraction. This may require concrete stubs to be sheared off to a depth of 3 feet below the mudline using barge-mounted equipment, or recovery of piles or portions of piles to the surface via rigging.

The Berth 1 steel piles, including mooring dolphin T, would be removed concurrently with the Berth 1 timber pile removal and would be removed using a vibratory extractor. The Berth 5 steel batter piles are coated with steel mesh reinforcing and gunite down to the mudline or below. They are anchored into the face beam and beams that support the deck. These piles are placed at a relatively flat 5-inch to 12-inch batter. These piles would be removed concurrently with the concrete plumb piles to provide derrick barge access to all the piles. These piles are to be extracted completely, or cut off a minimum of 3 feet below the mudline for piles that cannot be extracted completely.

An alternative to cutting the steel batter piles off below the mudline is to extract them using a barge-mounted crane and a vibratory extractor. Visual inspections indicate that most of the piles are in reasonably good condition. Confirmation of whether pile stubs or debris are present on or above the bay floor would be made with a post-demolition bathymetric survey using the same methods that were used for the pre-demolition bathymetric survey for the Project. The steel piles would be lifted by crane onto barges and transported to the onshore staging area for recycling or landfill disposal.

Removal of piles at least 3 feet below the mudline is appropriate in areas where scour is not expected to occur and is sufficient to ensure that the pile stubs do not have the potential to protrude above the seafloor, posing a potential hazard to navigation. The new Berth 1A and existing Berth 1 provide an impediment to flow through Berth 5, resulting in a slight depositional environment, and without maintenance dredging, it is anticipated that pile stubs would remain buried under at least 2 feet of sediment. See Impact Biology-8 in Section 4.2, Biological Resources, for details regarding monitoring in the event that piles cannot be completely removed.

2.5.12 Pile Installation

Depending on soil conditions, new steel piles would be installed using a vibratory hammer or impact hammer. If soil conditions are such that it is not possible to install piles with a vibratory hammer, an impact hammer would be used. The quantity and diameter of pilings to be installed for construction of Berth 1A and other new Avon Terminal operational structures are provided in Table 2-10.

Table 2-10: Proposed Piling Installations

Location	Quantity	Diameter (inches)	Embedment Depth (approximate feet)
Berth 1A platform	10	72	100
	2	48	65
Approachway to Berth 1A pipeway	2	72	75 to 100
	1	48	75 to 100
	2	36	75 to 100
Floating boat dock	2	24	100
Emergency egress boat lifts (two)	2	36	100
	8	24	100
Approachway Areas C and D	67	36	95
	176	30	80
	109	24	85
Mooring dolphin M4 (with gangway to Berth 1A)	1	48	85
	16	24	100
USCG Aid to Navigation Range Marker	3	18	25
Total	**401**		

The average number of strikes per pile can vary depending on soil conditions, final depth of pile, and depth to which the pile is able to be driven with the vibratory hammer. A pile test program and/or pile driving analysis used during driving would be required to more accurately determine the number of strikes necessary to achieve the design capacity. An average of 1,200 to 1,600 impact strikes per pile would likely be required for large-diameter piles (48 inches and larger). For smaller-diameter piles (36 inches and smaller), an average of 800 to 1,400 strikes per pile would likely be required.

The particular sound attenuation and sound reduction system to be employed during pile driving, as appropriate, would be developed as part of permitting conditions specified for the Project (e.g., Endangered Species Act Section 7 consultations required for USACE permitting). Piles would be hammered until design tip elevations (e.g., elevations for compression, tension, lateral, scour, liquefaction, or a combination of these loads) are met. These elevations express the “intent” of the design and help the field engineer to resolve constructability and quality issues. The embedment depth of the piles would vary greatly depending on location along the approachway or vessel

loading/unloading area, but in general pile embedment would be between approximately 60 feet and 100 feet. In general, pile tip elevations would likely be between 55 feet and 110 feet below MLLW.

2.5.13 Avon Terminal Loading/Unloading Area Renovation

Berth 1 is anticipated to operate as normal throughout renovation, except for approximately 6 weeks during which the Avon Terminal may not be operational as facilities are being transitioned from old infrastructure to newly installed infrastructure. After the transition, the Avon Terminal would operate using Berth 1A, and Berth 1 would be decommissioned (refer to Section 2.5.1).

Most of the major operational components would be prefabricated off-site to minimize the amount of renovation activity done over water. Actual over-water renovation activities would be generally limited to installation of these components and providing any required piping, electrical, instrumentation, and piping connections. These components include:

- Marine Vapor Recovery skid
- Elevated fire monitors and foam skids
- Wastewater tank
- Slops (recovered oil) tank
- Air receiver
- Control building
- Firewater pump buildings
- Emergency generator
- Transformer structure

Berth 1 and Berth 1A Structures

Avon Terminal renovation would begin with the minimal demolition, or partial deconstruction, of existing structures only as required to construct the new facilities. After operations have been transitioned to Berth 1A, the Berth 1 recovered oil (slops) tank and above-deck mechanical equipment, including piping, hose masts, and air winches, would be demolished. A portion of the Berth 1 structure from Bent 3 heading south, and mooring dolphin T, would be demolished to provide room for installation of the new facilities. The lighting and firewater piping systems at Berth 1 would remain in service.

Minimal demolition would be followed by the installation of new piles to support new structures at the Avon Terminal, including new piles for the Berth 1A platform (currently open water), new mooring dolphin (M4), a new floating boat dock, and emergency egress boat lifts. Piles and pile installation equipment would be hoisted using a derrick

barge. The quantity and diameter of pilings to be installed for construction of Berth 1A and other new structures are provided in Table 2-10.

New platforms and decks would consist of a combination of steel and concrete. Following the installation of piles, prefabricated cap beams and deck elements would be installed. Concrete that is precast in modules would come from a batch plant located near the precasting site (the precasting site would not be located at the Avon Terminal). In small quantities, cast-in-place concrete would be delivered in bags; in larger quantities, concrete would be delivered via local ready-mix trucks and pumped or bucketed to the appropriate location. Cast-in-place concrete could also be delivered by truck, loaded onto barges, and then taken to the Project site.

A liquid collection system for stormwater management, drips, and recovered oil would be integrated into the Berth 1A platform, with the entire concrete platform surface having a curbed perimeter serving as a collection area.

A surge protection system consisting of surge-relief valves and a common surge collection tank would be installed on the Berth 1A platform to keep pipeline pressures within safe, Code-prescribed limits in the event motor-operated valves on a vessel are inadvertently closed while products are being loaded.

Product Piping/Pipelines

Following construction of necessary platforms and walkways, new Avon Terminal piping would be installed. New piping would be fabricated off-site, and would be delivered to the Project site by barges and/or trucks. A bolted set of flanges would connect the existing piping to new piping at Isolation Station No. 1. All flanges would be located over a spill containment sump as required by MOTEMS.

A percentage of the butt welds performed to fabricate the piping systems would be required to undergo Radiographic Testing (RT) where radiographs are taken and examined for fabrication flaws by qualified inspectors. Any unacceptable flaws that are discovered must undergo removal, repair, and RT before acceptance. The hydrocarbon transfer pipelines have a 100 percent RT requirement.

All piping would also undergo hydrostatic testing before being placed into service. The hydrostatic testing of hydrocarbon-containing pipelines is the most stringent and requires that a Static Liquid Pressure Test be performed in accordance with Article 5.5 Marine Terminal Oil Pipelines (Cal. Code Regs., tit. 2, §§ 2560-2571).

Fire Prevention, Detection, and Suppression Systems

Following construction of necessary platforms and walkways, new components of the fire system would be installed. Two 4,000-GPM firewater pumps with diesel drivers,

each with an approximately 1,000-gallon fuel tank and a backup emergency generator, would be installed on the south end of the Berth 1A platform. In addition, two 1,500-GPM elevated fire monitors with foam skids would also be installed on the west and east sides of Berth 1A, at the west and east fire monitoring stations (refer to Figure 2-3). New fire system components would be fabricated off-site, and the east foam skid would be pre-loaded onto the pipeway module at the off-site facility. The fire system components would be delivered to the site by barges and/or trucks. At the Project site, the east elevated fire monitoring station would be installed onto pipeway module 3, and the west elevated fire monitoring station and the west foam skid would be installed onto the rebuilt approachway. The fire pump hoses would be installed onto the deck modules on-site, and the interconnecting mechanical and electrical connections would be installed, including: motor-operated emergency shutdown valves at the Berth 1A piping manifolds and at the existing valve station located 0.5 mile south of the Avon Terminal, automated fire detection system, automatic and manual fire alarms, vendor-supplied controls for new firewater pumps and elevated monitors, and an Uninterruptible Power Supply system.

Marine Terminal Buildings

A new 1,500-square-foot control building would be located on the south center of the Berth 1A platform and would be two stories high to provide visibility of the Avon Terminal. Components for the control building would be fabricated off-site by a contractor, delivered by barge, and set on the deck modules for final installation on the pile-supported platform. In addition, two firewater pump buildings would be located on the southern end of the platform, each housing a diesel-driven firewater pump.

Loading/Unloading Hose Mast Structure

The new Berth 1A loading/unloading hose mast structure would be constructed of steel components that would be assembled and welded off-site. After fabrication is complete, the structure would be test fit on Deck Modules 1 and 2, then staged on a flat barge with temporary supports in preparation for transport. The loading/unloading hose mast structure would be installed after Deck Modules 1 and 2 are in place at the Berth 1A site. Installation of the structure would be performed during a single lift using a large derrick barge.

Mooring Dolphin M4

New mooring dolphin (M4) would consist of a concrete platform installed on 16 new 24-inch-diameter steel piles. Refer to Section 2.5.12 for details. The topside of M4 would be of similar design to existing mooring dolphins, would be equipped with a triple quick-release hook and motorized capstan, and would tie into the tension monitoring system. M4 would be designed to work in conjunction with all existing mooring equipment to accommodate the full range of vessels that may call at the Avon Terminal.

U.S. Coast Guard Aid to Navigation Range Marker

An existing USCG Aid to Navigation range marker (Point Edith Crossing South Range Front Light structure) is located east of the proposed Berth 1A platform and pipeway. This range marker would be relocated approximately 120 feet east of the current location to ensure that it would not be damaged by construction and renovation activities. The existing structure is supported by three 18-inch-diameter steel piles that would be removed completely and replaced in-kind with three 18-inch-diameter steel piles at the new location. Approval to execute the relocation of this range marker was granted in a letter dated December 17, 2012, from the USCG Chief of Waterways Management Branch.

Berth 5 (Demolition)

Demolition of Berth 5 is not planned until the new Berth 1A is commissioned and the new firewater pumps and spill containment boom reel are operational. Demolition of Berth 5 and the transition area between Berth 5 and Berth 1 is scheduled to start in 2018.

The Berth 5 concrete deck structure measures 350 feet by 80 feet and is of beam and slab construction. The spans are 16 feet in the east-west direction and generally 11 inches thick. The beams vary in width and depth throughout the structure. There is a 26-foot-wide pipeway extending 257 feet into the east portion of the deck, which has concrete beams to support the piping. The portion of the deck south of this pipeway is 13 feet wide.

Prior to implementing the concrete deck demolition process, provisions would be made to contain debris and cutting fluids associated with the concrete demolition process. It is anticipated that a temporary timber substructure, or another appropriate system, would be erected beneath the work areas to contain falling debris from the demolition process. If cutting fluids are used during the drilling or concrete sawing process, temporary containment sumps would be erected around the work area. Debris and cutting fluid containment details would be provided by the selected contractor in a Project-specific work execution plan to be prepared for review and approval by Tesoro prior to implementing the demolition work.

It is anticipated that the concrete deck structure would be cut into smaller pieces using a diamond wire saw. Prior to initiating sawing activities, a hole pattern would be laid out on the surface of the deck, holes would be drilled through the deck, and the diamond wire saw blade would be fed through two holes between which a cut would be made. Rigging would be secured to each piece prior to it being cut free from the pile caps.

The Berth 5 facility includes a total of 391 piles. Of the piles, 168 are precast, steel-reinforced concrete piles that provide the primary support for the deck, 60 are gunite-

encased steel "H" piles that provide lateral support for the wharf, and 163 are creosote-treated timber fender piles. The concrete piles are 18 inches square in section and the steel batter piles are HP 14 x 73. There are approximately 70 timber tiles supporting the transition structure between Berth 1 and Berth 5.

The Avon Terminal plans as approved for renovation suggest that the length of concrete piles varies between 85 feet and 97 feet. The length of the steel batter piles varies between 93 feet and 100 feet. The Avon Terminal plans suggest that the embedment length of the concrete piles is on the order of 40 to 55 feet into the bay sediment, and the embedment length of the timber piles is on the order of 35 to 45 feet into the bay sediment. Refer to Section 2.5.11.

After Berth 5 demolition and removal is completed, a post-bathymetric survey would be conducted of the lease area, including the work area. The survey would document the condition of the bay floor and identify debris resulting from previous Avon Terminal operations and/or from the demolition activities. Debris items are defined as those objects located on the seafloor or less than 3 feet below the seafloor, and identified as debris associated with the Berth 5 demolition process. Identified debris would be removed from the bay floor to the surface and disposed or recycled, as appropriate, using the Sea Floor Debris Removal Plan. A post-demolition bathymetric survey would then be conducted 2 years after completion of demolition activities to document that scour is not occurring in the Avon Terminal footprint and the piles embedded in the bay floor have not become exposed by erosion.

2.5.14 Approachway Renovation

The specific renovation sequences for Areas A to D would be determined by Tesoro Project managers and construction contractors consistent with any conditions specified by jurisdictional permitting agencies. The pipeway would support product pipelines and fire suppression pipelines leading up to the vessel loading/unloading area to support Berth 1A. Refer to Section 2.5.13 for piping details.

Areas C and D

Renovation activities for Areas C and D would include installation of new piles and support bents, construction of a new concrete driving surface, and removal of the existing timber approachway. First, all existing buildings and related appurtenances would be demolished, including three small buildings in Area D that house electrical equipment and operations personnel. Construction would generally occur by driving piles in two headings linearly from Land’s End to the north and from Area D to the south until the two headings meet in the middle. Then, construction of the superstructure and deck would proceed from the middle in two directions back toward Land’s End and Area D. Work activities would occur in the following order:

1. Drive permanent pile at the first bent.
2. Set temporary cap, stringers, and timber mats on top of permanent pile for equipment access.
3. Advance the crane forward and drive the next bent of permanent piles.
4. Repeat Steps 2 and 3 until all permanent piles are driven and the two headings meet in the middle.
5. Remove temporary cap, stringers, and timber mats, and demolish existing approachway at middle spans.
6. Set permanent cap at last bent.
7. Set precast deck panels and pour topping slab.
8. Advance crane rearward.
9. Repeat Steps 5 through 8 until the existing approachway has been completely demolished and construction of the new deck is finished.

Upon completion of construction of the new pipeway, the existing trackway, timber decking, and other structures would be lifted off of the existing timber pile caps in large sections, using crawler cranes in Area C and a derrick barge in Area D. A derrick barge or a flatbed trailer would then remove trackway materials off-site or to the laydown area for processing and disposal in the Tesoro-provided dumpsters.

The piles and pile caps for the support bents would be fabricated off-site at each supplier's facility. The material would be delivered to the site via truck (Area C) and barge (Area D) and then assembled on-site. Refer to Section 2.5.12 for a discussion of pile installation methods.

Concrete for the new sections of roadway would be precast to the extent possible. Concrete that is precast would come from a batch plant located near the precasting site. In small quantities, cast-in-place concrete would be delivered in bags; in larger quantities, concrete would be delivered via local ready-mix trucks and pumped or bucketed to the appropriate location. Cast-in-place concrete could also be delivered by truck, loaded onto barges, and then taken to the Project site.

The roadway would be constructed with precast panels and a 4-inch topping slab, which would be poured in place on top of the precast panels. The topping slab would consist of approximately 470 cy of concrete.

Areas A and B

Renovation activities for the pedestrian walkway (Areas A and B) would include pile repair and installation of new caps, and installation of a new fiberglass pedestrian walkway. Renovation activities would generally occur in the following order:

1. Remove abandoned pipe.
2. Remove track and timber from trackway.
3. Lift pipes to remove old pipeway beams.
4. Perform pile repairs.
5. Install the new pipeway beam.
6. Lower the active process pipe onto the new pipeway beam.
7. Install the pedestrian walkway.

Delivery of timber and fiberglass elements would be made by a combination of barges and trucks. Timber piles would be repaired using fiberglass jackets and reinforced grout (sleeves and braces). The timber pipeway and pedestrian walkway pile caps would be replaced with 10-inch by 6-inch structural tubing. Approximately 2 feet would be excavated around the existing timber piles prior to installing the repairs, and approximately 150 cy of soil would be removed.

The existing trackway and timber decking would be lifted off of the existing timber pile caps in large sections, using crawler cranes. A marine barge or a flatbed trailer would remove trackway materials off-site or to the laydown area for processing and disposal in the Tesoro-provided dumpsters. After the existing trackway is removed, a new 5-foot-wide, open-grated fiberglass pedestrian walkway would be installed in its place. The pedestrian walkway would be fabricated off-site in 40-foot lengths by a contractor and installed on-site.

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