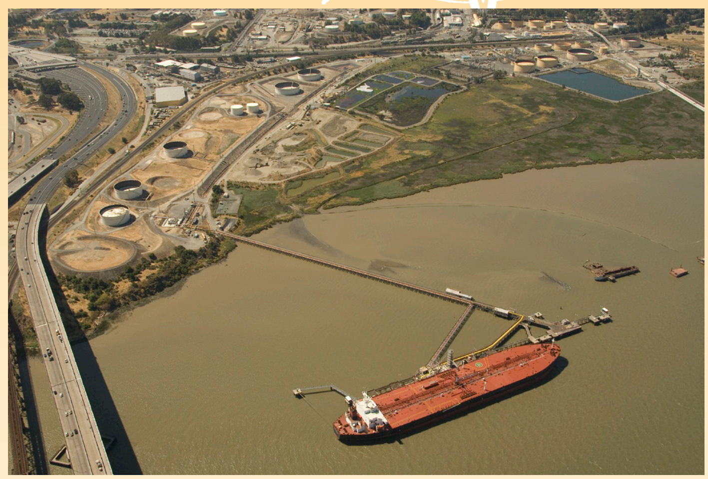
FINAL

ENVIRONMENTAL IMPACT REPORT

FOR THE

TESORO

TESORO AMORCO MARINE OIL TERMINAL LEASE CONSIDERATION



PREPARED BY

CALIFORNIA STATE LANDS COMMISSION

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FEBRUARY 2014

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Final Environmental Impact Report (EIR)
for the

Tesoro Amorco Marine Oil Terminal Lease Consideration

SCH Number: 2012052030
CSLC EIR Number: 760

Prepared for the California State Lands Commission

Prepared by TRC Solutions, Inc.

February 2014

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LIST OF ABBREVIATIONS AND ACRONYMS

UNITS OF MEASUREMENT

^{o}F	degrees Fahrenheit
bpd	barrels per day
bph	barrels per hour
bpy	barrels per year
cy	cubic yard
dB	decibel
dBA	decibel on A-weighted scale
dBRMS	decibel root mean square
DWT	dead-weight ton
kg	kilogram
km	kilometer
knots	nautical miles per hour
L_{dn}	day-night average noise level
L_{eq}	equivalent continuous sound level
L_{max}	maximum noise level
m^2	square meter
mcy	million cubic yards
mg/L	milligrams per liter
MMT	million metric tons
MT	metric ton
nm	nautical mile
pg/L	pictograms per liter
ppt	parts per thousand
µg/L	micrograms per liter
µPa	micro Pascal

OTHER ABBREVIATIONS AND ACRONYMS

AB	Assembly Bill
ADT	average daily traffic
ATCMs	Air Toxic Control Measures
BAAQMD	Bay Area Air Quality Management District
BCDC	San Francisco Bay Conservation and Development Commission
BMP	Best Management Practice
CAA	Clean Air Act
CAAA	Clean Air Act Amendments of 1990
CAAQS	California Ambient Air Quality Standards
cal. A.D.	calibrated Anno Domini
cal. B.P.	calibrated Before Present
Cal-EPA	California Environmental Protection Agency
CAP	Clean Air Plan
CARB	California Air Resources Board
CCAA	California Clean Air Act
CCC	California Coastal Commission
CDFW	California Department of Fish and Wildlife
CEQ	Council on Environmental Quality
CEQA	California Environmental Quality Act
CFCs	chlorofluorocarbons
CFR	Code of Federal Regulations

CO_{2e}	CO_2-equivalent
COL	Critical Operating Limits
CPUC	California Public Utilities Commission
CSLC	California State Lands Commission
CWA	Clean Water Act
DMMO	Dredged Material Management Office
DO	dissolved oxygen
DPS	Distinct Population Segment
DWR	California Department of Water Resources
ESA	Endangered Species Act
EEZ	exclusive economic zone
EFH	essential fish habitat
EIR	Environmental Impact Report
EIS	Environmental Impact Statement
ER-L	Effects Range-Low
ER-M	Effects Range-Medium
ERT	Emergency Response Team
FCMA	Fishery Conservation and Management Act
FEMA	Federal Emergency Management Agency
FMP	fishery management plan
FRP	Facility Response Plan
FSP	Facility Security Plan
GHG	greenhouse gas
HAP	Hazardous Air Pollutant
HAPC	Habitat Area of Particular Concern
HSC	Harbor Safety Committee
IGS	inert gas system
IMO	International Maritime Organization
LOS	level of service
LTMS	Long-term Management Strategy
MACT	maximum available control technology
MBTA	Migratory Bird Treaty Act
MHHW	mean higher high water
MHW	mean high water
MISA	Marine Invasive Species Act
MLLW	mean lower low water
MLW	mean low water
MM(s)	Mitigation Measure(s)

MOT	Marine Oil Terminal
MOTCO	Military Ocean Terminal Concord
MOTEMS	Marine Oil Terminal Engineering and Maintenance Standards
MOV	motor-operated valves
MSRC	Marine Spill Response Corporation
MTC	Metropolitan Transportation Commission
MTL	mean tide level
MVR	Marine Vapor Recovery
NAHC	Native American Heritage Commission
NESHAPs	National Emission Standards for Hazardous Air Pollutants
NHPA	National Historic Preservation Act
NMFS	National Marine Fisheries Service
NOAA	National Oceanic and Atmospheric Administration
NOP	Notice of Preparation
NPDES	National Pollutant Discharge Elimination System
OAB	Oakland Army Base
OGV	ocean-going vessel
OPA 90	Oil Pollution Act of 1990
OPR	State Governor’s Office of Planning and Research
OSPR	Office of Spill Prevention and Response
OSRO	Oil Spill Response Organization
PAHs	polycyclic aromatic hydrocarbons
PAWSA	USCG Ports and Waterways Safety Assessment
PCBs	polychlorinated biphenyls
PCEs	primary constituent elements
PED	Pre-construction, Engineering and Design Agreement
PFMC	Pacific Fisheries Management Council
PM_{10}	inhalable fine particulate matter
POL	Process Operating Limits
PORTS	Physical Oceanographic Real Time System
PSV	pressure safety valves
RMLPS	Richmond Marine-Link Pipeline System
RMP	Regional Monitoring Program
RNA(s)	Regulated Navigational Area(s)
RWQCB	Regional Water Quality Control Board
SB	Senate Bill
SIOSC	State Interagency Oil Spill Committee
SIP	State Implementation Plan

SJV	San Joaquin Valley
SJVH	San Joaquin Valley Heavy
SPL	Sound pressure level
SQO(s)	sediment quality objective(s)
SSC	suspended-sediment concentration
SWPPP	Storm Water Pollution Prevention Plan
SWRCB	State Water Resources Control Board
TACs	Toxic Air Contaminants
TBT	tributyltin
TMDL	Total Maximum Daily Load
TOLs	Terminal Operating Limits
TPIC	Terminal Person-in-Charge
TSS	Traffic Separation Scheme
UKC	under-keel clearance
USACE	United States Army Corps of Engineers
U.S.C.	United States Code
USCG	United States Coast Guard
USEPA	United States Environmental Protection Agency
USGS	United States Geological Survey
V/C	volume/capacity ratio
VGP	Vessel General Permit
VOC	volatile organic compound
VPIC	Vessel Person-in-Charge
VTS	Vessel Traffic Service
WCATWC	West Coast/Alaska Tsunami Warning Center
WCD	worst-case discharge
WETA	Water Emergency Transit Authority
WQO	water quality objective
WWTP	Wastewater Treatment Plant

FREQUENTLY USED TERMS

Ballast/ballast water – heavy material placed in the hold of a ship to provide stability.

Barge – any vessel that carries oil in commercial quantities as cargo, but is not equipped with a means of self-propulsion.

Dolphin – a fixed, manmade structure that is not connected to shore and is used to berth vessels against (a berthing dolphin) or moor vessels to (a mooring dolphin).

Marine terminal or Marine Oil Terminal – a facility, including a mobile transfer unit, other than a vessel, located on or adjacent to marine waters in California, used for transferring oil to or from tank vessels or barges. The term references all parts of the facility, including, but not limited to, structures, equipment and appurtenances thereto used or capable of being used to transfer oil to or from tank vessels or barges. A marine terminal includes all piping not integrally connected to a tank facility.

Oil – any kind of petroleum, liquid hydrocarbons, or petroleum products, or any fraction or residues there from, including, but not limited to, crude oil, bunker fuel, gasoline, diesel fuel, aviation fuel, oil sludge, oil refuse, oil mixed with waste, and liquid distillates from unprocessed natural gas.

Operator – when used in connection with vessels, marine terminals, pipelines, or facilities, means any person or entity which owns, has an ownership interest in, charters, leases, rents, operates, participates in the operation of or uses that vessel, terminal, pipeline, or facility. "Operator" does not include any entity that owns the land underlying the terminal or the terminal itself, where the entity is not involved in the operations of the terminal.

Spill or discharge – any release of oil into marine waters that is not authorized by any federal, State, or local government entity.

Terminal Person-in-Charge" or "TPIC" – an individual designated by the terminal operator as the person in charge of a particular oil transfer operation at a particular terminal.

Transfer – any movement of oil, including movements of bunker fuel, between the terminal and the vessel by means of pumping, gravitation, or displacement. The term "transfer" also includes those movements of oil to, from, or within any part of the terminal or vessel that are directly associated with the movement of oil or bunker fuel between the terminal and the vessel.

Vessel – every description of watercraft or other artificial contrivance used, or capable of being used, as a means of transportation on water, including, but not limited to, tank vessels and barges.

Vessel Person-in-Charge or "VPIC" – person in charge of a vessel's oil transfer operations.

California State Lands Commission

PART I – PREFACE

Final Environmental Impact Report for the Tesoro Amorco Marine Oil Terminal Lease Consideration, February 2014

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PART I. PREFACE TO THE FINAL ENVIRONMENTAL IMPACT REPORT

PURPOSE

This document is the Final Environmental Impact Report (EIR) for the Amorco Marine Oil Terminal Lease Consideration Project (Project). The Final EIR has been prepared for consideration by the California State Lands Commission (CSLC), as the Lead Agency for this project, pursuant to the California Environmental Quality Act (CEQA) and in accordance with the State CEQA Guidelines. (Pub. Resources Code § 21000 et seq. and Cal. Code of Regs., tit. 14, § 15000 et seq.)

ORGANIZATION OF THE FINAL EIR

The Final EIR, reproduced for convenience in one document, replaces the October 2013 Draft EIR. Consistent with State CEQA Guidelines section 15132, the Final EIR consists of the following elements:

- **Part I –** Preface
- **Part II –** Comments and Responses to Comments received on the Draft EIR during the 45-day public comment period, including a list of persons, organizations, and public agencies that provided comments on the Draft EIR.
- **Part III –** Revisions to the Draft EIR and any other information added to the EIR by the CSLC as Lead Agency. Part III includes the entire text of the Draft EIR, as revised, including revisions to the text of the Draft EIR in response to comments received or for reasons that include: to update information; to refine discussions and resolve internal inconsistencies; and to make minor format changes. Some changes have resulted in a shifting of text from one page to another. Except for minor format changes, all revisions to the Draft EIR are shown as follows:
    - Additions to the text of the Draft EIR are underlined; and
    - Deletions of the text of the Draft EIR are shown as ~~strikeout~~.

The Final EIR may be viewed at the following repository locations and on the CSLC website (www.slc.ca.gov/Division_Pages/DEPM/DEPM_Home_Page.html)

Martinez Library 740 Court Street Martinez, CA 94553 (925) 646-2898	CSLC, Marine Facilities Division 750 Alfred Noble Drive, Suite 201 Hercules, CA 94547 (510) 741-4950	CSLC, Division of Environmental Planning and Management 100 Howe Avenue, Suite 100-South Sacramento, CA 95825 (916) 574-1889

PROJECT DESCRIPTION

The Amorco Terminal and its associated Golden Eagle Refinery (Refinery) have operated at their current locations, offshore and onshore within the city of Martinez, Contra Costa County, since 1923 and 1913, respectively (see Figure ES-1 in Part III of the Final EIR). The existing Amorco Terminal is located on an approximately 16.6-acre parcel of sovereign land in the Carquinez Strait, approximately 0.25 mile west of the Benicia-Martinez Bridge. The proposed Project is a 30-year lease for continued operation of the Amorco Terminal with a reduced parcel size, changing from approximately 16.6 acres to approximately 14.9 acres. The lease area was modified to exclude an area to the west of the Amorco Terminal that had never been used by Tesoro, and also to extend the lease area slightly waterward to account for the increase in ship size since the lease boundary was last established. The result was a net reduction in lease area. The Refinery is located approximately 2.5 miles east of the Amorco Terminal near Tesoro's Avon Marine Oil Terminal. Activities at these facilities include the transfer and processing of crude oil and various hydrocarbon fuels.

The western portion of the existing Amorco wharf, approach trestle, and five dolphins were constructed in 1925 (see Section 2.0, Project Description, in Part III of the Final EIR for component descriptions and illustrations). The Amorco Terminal was expanded in 1954 to include the eastern portion of the existing wharf, including the main transfer operations platform dolphin, seven additional dolphins, as well as a pipeway and roadway. Five dolphins were added in 1963, and three more dolphins were added in 2001. Seismic structural strengthening and comprehensive structural and non-structural improvements of the Amorco Terminal were completed between 2008 and 2013.

On March 1, 1966, the CSLC authorized the issuance of Lease No. PRC 3453.1, a General Lease-Industrial Use, to the Tidewater Oil Company for what is currently known as the Amorco Terminal. Subsequently, several amendments and lease assignments have been authorized to various operators. The CSLC issued the current lease in 1984 for a term of 25 years. In 2002, the CSLC authorized the assignment of this lease to Ultamar, Inc., which shortly thereafter sold the Amorco Terminal to Tesoro. In 2003, the CSLC authorized the assignment of the lease to Tesoro. The existing lease expired on December 31, 2008 and Tesoro is presently in a "holdover" month-to-month tenancy.[1]

In its lease application, Tesoro has requested a new 30-year lease from the CSLC to allow the Amorco Terminal to continue operations, which would enable the associated Refinery to continue to receive petroleum products from tankers that dock at the Amorco Terminal. With the exception of a reduced lease parcel size, no changes to the wharf or Amorco Terminal operations are proposed.

[1] Holdover status means that the Terminal is continuing to operate under the terms of its existing lease while a decision on a new lease is pending.

DECISION-MAKING PROCESS

The State CEQA Guidelines stipulate that an EIR must be prepared for any project carried out or approved by a state or local public agency that may have a significant impact on the environment. CSLC has determined that:

1) the Amorco Marine Oil Terminal Lease Consideration Project is a “project” as defined by the State CEQA Guidelines;
2) the Project may have a significant impact on the environment; and
3) an EIR is required.

The CSLC will use this Final EIR as part of its review process, including determining whether or not to approve the lease renewal. If the EIR is certified and the Project approved, mitigation measures will be adopted as part of the approval and incorporated as conditions of the lease for Project implementation. The CSLC must certify that:

- The Final EIR has been completed in compliance with CEQA;
- The Final EIR was presented to the CSLC in a public meeting and the CSLC reviewed and considered the information contained in the Final EIR prior to considering the proposed Project; and
- The Final EIR reflects the CSLC’s independent judgment and analysis.

(State CEQA Guidelines § 15090.)

If the CSLC decides to certify the Final EIR and approve the Project, the CSLC must make one or more written findings of fact for each significant environmental impact identified in the document. The possible findings are:

- The Project has been changed (including adoption of mitigation measures) to avoid or substantially reduce the magnitude of the impact.
- Changes to the Project are within another agency’s jurisdiction and have been or should be adopted by such other agency.
- Specific considerations make mitigation measures or alternatives infeasible.

(State CEQA Guidelines § 15091.)

If any impacts identified in the EIR cannot be reduced to a level that is less than significant, the CSLC may issue a Statement of Overriding Considerations for Project approval if specific social, economic, or other factors justify the Project’s unavoidable adverse environmental effects. If the CSLC approves a project for which a Final EIR has been prepared and certified, the CSLC will issue a Notice of Determination.

PROJECT CEQA CHRONOLOGY

The following is a brief chronology of the CEQA review process associated with the proposed Project (see also Part III, Section 1.3.2, Public Participation, of the Final EIR).

May 12, 2012. Notice of Preparation (NOP) and Notice of Public Scoping Meeting published. (The environmental setting existing at the time the NOP is published normally constitutes the baseline physical conditions by which a Lead Agency determines whether an impact is significant. State CEQA Guidelines, § 15125, subd. (a).)

May 31, 2012. Scoping meetings held at 2:00 and 6:00 p.m. in the city of Martinez. At these meetings, the public and interested agencies were informed about the proposed Project and had the opportunity to provide recommendations for the scope and content of the environmental analysis; however, no oral or written public comments were provided or received at the two meetings.

October 31, 2013 - December 20, 2013. Draft EIR released for 45-day public review with comments accepted by mail, email, facsimile transmission, and in person at two public meetings. One set of written comments was received during the public review period; one additional set of written comments was received after the close of the public review period.

December 5, 2013. Public meetings on Draft EIR held at 3:00 and 6:00 p.m. in the city of Martinez. At these meetings, attendees had the opportunity to ask questions about, and present oral and/or written testimony on, the Draft EIR and its contents; however, no oral or written public comments were provided or received at the two meetings.

December 20, 2013 – February 21, 2014. In preparing this Final EIR, CSLC staff responded to all comments received, obtained additional information as needed to respond to comments, and revised the Draft EIR (see Final EIR Parts II and III). The CSLC hearing on the Final EIR and action on the proposed Project are scheduled for February 21, 2014. (Date is subject to change; see www.slc.ca.gov for further information.)

California State Lands Commission

PART II – RESPONSES TO COMMENTS

Final Environmental Impact Report for the Tesoro Amorco Marine Oil Terminal Lease Consideration, February 2014

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PART II. RESPONSES TO COMMENTS

Pursuant to State California Environmental Quality Act (CEQA) Guidelines section 15088, the California State Lands Commission (CSLC), as CEQA Lead Agency, is required to evaluate comments on environmental issues received from persons who reviewed the Draft Environmental Impact Report (EIR) prepared for the Amorco Marine Oil Terminal Lease Consideration Project (Project) and to prepare a written response. The Lead Agency must respond to comments that it received during the noticed comment period and may respond to late comments. The State CEQA Guidelines further require the Lead Agency to describe in its written response the disposition of significant environmental issues raised (e.g., revisions to the proposed project to mitigate anticipated impacts or objections). If the Lead Agency's position varies from recommendations and objections raised in the comments, the agency must address the major environmental issues raised and give details why any specific comments and suggestions were not accepted.

Part II of this Final EIR contains copies of comment letters and CSLC staff's responses. Two written comment letters were submitted in response to the Draft EIR. No oral comments were received at two public meetings on the Draft EIR held by CSLC staff on December 5, 2013. Responses to comments are organized as follows:

- Each commenter is given a unique comment set and code that refers to the agency, organization, or person submitting the comments.
- Individual comments are numbered in the margins of each comment letter; correspondingly numbered responses follow each comment set.

Part III contains the complete EIR with revisions to the text of the Draft EIR shown in strikeout and underline that were made in response to comments that required changes or for the reasons stated on page I-1. The following conventions are used to indicate how the Draft EIR text was changed during EIR finalization in Part III of this Final EIR:

- <u>Underlined text</u> represents text added to the EIR (in some cases moved from another location in the document, in other cases new text).
- ~~Strikeout text~~ represents text removed from that location in the EIR (in some cases moved elsewhere, in other cases removed entirely).

Table II-1 Commenters on Draft EIR and Comment Identification Numbers Used in this Final EIR

Name of Commenter	Date	Comment	
		Set #	ID #
Agency			
Bay Area Air Quality Management District (BAAQMD)	1/9/14[2]	1	1-1 to 1-6
Applicant			
Tesoro Refining and Marketing Company LLC	12/19/13	2	2-1 to 2-3

[2] BAAQMD submitted a comment letter 3 weeks after the end of the comment period.

INDIVIDUAL COMMENT RESPONSES

COMMENT SET 1: BAY AREA AIR QUALITY MANAGEMENT DISTRICT (BAAQMD)

BAY AREA
AIR QUALITY
MANAGEMENT
DISTRICT

January 9, 2014

Sarah Mongano, Senior Environmental Scientist
California State Lands Commission
Division of Environmental Planning & Management
100 Howe Avenue, Suite 100-South
Sacramento, CA 95825

Subject: Tesoro Amorco Marine Oil Terminal DEIR

Dear Ms. Mongano,

Bay Area Air Quality Management District (Air District) staff has reviewed the State Land Commission's Draft Environmental Impact Report (DEIR) prepared for the Amorco Marine Oil Terminal Project (Project) operated by Tesoro Petroleum Corporation located in the Carquinez Straight near the City of Martinez. Tesoro proposes entering into a new 30-year lease agreement with the Commission in order to continue operating the Amorco Oil Terminal.

Air Quality Analysis

The Amorco Oil Terminal already has all required Air District permits. If the Project includes any new equipment or modifications/alterations of existing equipment that may affect air pollution, Tesoro must submit a permit application to the Air District.

The analysis in the DEIR only estimated emissions of volatile organic compounds (VOCs), sulfur dioxide (SO_2), nitrous oxides (NOx), carbon monoxide (CO), and particulate matter (PM_{10}) from ocean-going vessels (i.e. tankers and tug boats). These estimates were then compared to the Air District's 1999 thresholds of significance and determined to be less than significant. However, the DEIR did not provide the necessary information to evaluate the methodologies and emission factors used to estimate the Project's impacts. Therefore, Air District staff recommends that the Final EIR (FEIR) include the following:

1-1
- Specify the terminal's maximum allowed throughput based on the current Air District's Title V permit of 70,080,000 barrels per year. Page ES-5 of the DEIR states the terminal's maximum capacity is 63,875 million barrels per year.

1-2
- Specify the terminal's emissions estimates are included in the "Environmental Management Plan" as specified in the Air District's Permit Condition 8077. Pages 4.1-11 and 4.1-12 of the DEIR state that estimates are included in the "Refinery Emissions Clean Air Plan" as specified in Permit Condition 8077. To clarify, Condition 8077 does not mention a "Refinery Emissions Clean Air Plan".

1-3
- An estimate of all air pollutants, including fine particulate matter (see below), that includes any proposed increase in throughput.

1-4
- Emission estimates from fugitive components and ancillary equipment (e.g. pipelines, loading hoses, pumps, valves, flanges, etc.).

1-5
- A technical appendix that provides all methodologies, assumptions, emission factors, and calculations used for estimating emissions.

939 ELLIS STREET • SAN FRANCISCO CALIFORNIA 94109 • 415.771.6000 • WWW.BAAQMD.GOV

Ms. Mongano January 9, 2014

Fine Particulate Matter

1-6 The air quality analysis in the DEIR did not include fine particulate matter ($PM_{2.5}$) emissions by reasoning that the Air District's 1999 CEQA Guidelines had no $PM_{2.5}$ threshold. However, the absence of a threshold does not relieve a lead agency's obligation to evaluate all potentially significant environmental impacts. The public's exposure to $PM_{2.5}$ can result in substantial health effects, and ocean-going vessels are a major source of $PM_{2.5}$ in the Bay Area. See *Understanding Particulate Matter: Protecting Public Health in the San Francisco Bay Area*, available at http://www.baaqmd.gov/Divisions/Planning-and-Research/Plans/PM-Planning.aspx.

The San Francisco Bay Area is currently in nonattainment for state and federal $PM_{2.5}$ standards, and therefore, projects that increase $PM_{2.5}$ emissions in the air basin warrant careful consideration. The Air District has dedicated significant resources to assist lead agencies with identifying, assessing, and mitigating $PM_{2.5}$ emissions. This includes the Air District's 2012 CEQA Guidelines available at http://www.baaqmd.gov/Divisions/Planning-and-Research/CEQA-GUIDELINES/Updated-CEQA-Guidelines.aspx. Air District staff recommends that the FEIR evaluate the Project's $PM_{2.5}$ emissions and propose mitigation measures if appropriate.

Air District staff is available to assist the Commission in addressing these comments. If you have any questions, please do not hesitate to contact Ian Peterson, Environmental Planner II, at (415) 749-4783 or ipeterson@baaqmd.gov.

Sincerely,

Jean Roggenkamp
Deputy Air Pollution Control Officer

cc: BAAQMD Director John Gioia
BAAQMD Director David Hudson
BAAQMD Director Mary Piepho
BAAQMD Director Mark Ross

RESPONSES TO COMMENT SET 1: BAAQMD

1-1 Page ES-5 of the Draft Environmental Impact Report (EIR) states: "The maximum capacity that the Amorco Terminal could handle is 63,875 million [barrels per year] bpy." (Refer to Part III of the Final EIR, Executive Summary.) This is a typographical error. Page ES-5 has been revised to indicate that the maximum throughput of the Amorco Terminal is 70,080 million bpy, as permitted under Tesoro's Bay Area Air Quality Management District (BAAQMD) Title V Permit to Operate for the Golden Eagle Refinery (June 28, 2011).

1-2 Pages 4.1-11 and 4.1-12 of the Draft EIR do not reference the "Refinery Emissions Clean Air Plan" as stated by the commenter. The California State Lands Commission (CSLC) staff believes this to be a typographical error in the commenter's letter, which should have referenced text on pages 4.4-11 and 4.4-12. This text states:

> "The Amorco Terminal emissions are regulated as part of the BAAQMD Title V Operating Permit for the Refinery. The Amorco Terminal emissions are included in the Refinery Emissions Clean Air Plan (CAP), as specified in Permit Condition Number 8077."

The Project emissions inclusion in the CAP is not specified in Permit Condition Number 8077; therefore the language "as specified in Permit Condition Number 8077" has been removed in the Final EIR.

1-3 Particulate matter ($PM_{2.5}$) emissions have been calculated and added to the Project emissions impact estimation in Section 4.4.3, Emissions Estimation (see Part III of the Final EIR). Emissions estimation methodology is included as Appendix H in Part III of the Final EIR. No impact, significant or otherwise, was identified in the EIR because emissions will not be increased above baseline conditions. (Please also refer to the response to comment 1-5 below.)

1-4 An emissions estimate from fugitive components and ancillary equipment has been added to the Project emissions estimation in Section 4.4.3, Emissions Estimation (see Part III of the Final EIR). Fugitive emissions have been estimated using the Project's most recent 2013 fugitive volatile organic compounds inventory pursuant to their Leak Detection and Repair Database (LDAR) for BAAQMD Regulation 8 Rule 18 compliance. The Database estimates fugitive emissions using the Correlation Equation Method from the California Implementation Guidelines for Estimating Mass Emissions of Fugitive Hydrocarbon Leaks at Petroleum Facilities issued by the California Air Pollution Control Officers Association and California Air Resources Board. Further details regarding fugitive emissions estimation methodology is also included in Appendix H of Part III of the Final EIR. No impact, significant or otherwise, was identified in the EIR because emissions will not be increased above baseline conditions. (Please also refer to the response to comment 1-5 below.)

1-5 A technical appendix providing methodologies, assumptions, emission factors, and calculations used for estimating emissions has been included as Appendix H in Part III of the Final EIR, as suggested. This technical appendix has been revised to include $PM_{2.5}$ and fugitive emissions, as specified in response to Comments 1-3 and 1-4.

1-6 As stated in the response to comment 1-3, $PM_{2.5}$ emissions have been calculated and added to the Project emissions impact estimation (No Impact, no mitigation required) in Section 4.4.3, Emissions Estimation (see Part III of the Final EIR).

COMMENT SET 2: TESORO REFINING AND MARKETING COMPANY LLC (TESORO)

TESORO

Tesoro Refining & Marketing Company LL(
Golden Eagle Refinery
150 Solano Way
Martinez, CA 94553-1487
925 228 1220

December 19, 2013

USPS CERTIFIED MAIL: 7012 1010 0002 1361 2371

Sarah Mongano, Senior Environmental Scientist
California State Lands Commission
Division of Environmental Planning and Management
California State Lands Commission
100 Howe Avenue, Suite 100-South
Sacramento, CA 95825

SUBJECT: Tesoro Amorco DEIR Comments

2-1 Tesoro Golden Eagle Refinery (Tesoro) staff have reviewed the Draft Environmental Impact Report (DEIR) covering the "Tesoro Amorco Marine Oil Terminal Lease Consideration Project" dated October 31, 2013.

During this review our staff contacted representatives from California State Lands Commission (CSLC) and TRC Solutions to discuss minor errors and regulatory authorities for certain proposed mitigation measures. From these discussions Tesoro believes there are no substantive factual errors in the DEIR. Two minor errors are as follows:

2-2

1. On page ES-15 the term "Increased Crude Supplies from Non-Marine Sources Alternative" is used on lines 3, 13, and 15. Consistent with the rest of the DEIR, this term should be "Restricted Lease Taking Amorco Terminal Out of Service for Oil Transport".
2. On page 1-10 footnote 3 ("3") should be changed to read, "This marine oil terminal is currently known as the Plains Products Terminals, LLC.

2-3 With regard to regulatory authorities for proposed mitigation measures MM-OS-1a (Mooring Line Quick Release Devices), MM-OS-1b (Tension Monitoring Systems) and MM-OS-1c (Allision Avoidance Systems), Tesoro is concerned that these measures exceed requirements of the State's Marine Oil Terminal Engineering and Maintenance Standards (MOTEMS). Accordingly, Tesoro requests that CSLC staff propose additions or modifications to MOTEMS that would provide language specifying these measures. These proposals could then be appropriately

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2-3 cont. adopted under prevailing statutes that govern new or modified building codes and be commonly referenced by marine oil terminal owners/operators.

We continue to appreciate the cooperation extended to Tesoro by staffs of CSLC and TRC Solutions that contributed to the timely preparation of this DEIR.

Sincerely,

Christina H. McDowell
Lead Engineer, Air Permitting

CHM/kds

RESPONSES TO COMMENT SET 2: TESORO

2-1 The California State Lands Commission (CSLC) staff acknowledges the commenter's concurrence with the factual accuracy of the Environmental Impact Report (EIR).

2-2 Text in the Final EIR has been revised as suggested. These revisions do not fundamentally change the Project description or associated environmental analysis as presented in the EIR.

2-3 The purpose of the Marine Oil Terminal Engineering and Maintenance Standards (MOTEMS) (Cal. Code Regs., tit. 24, § 3101F et seq.) is:

> *"to establish minimum engineering, inspection, and maintenance criteria for Marine Oil Terminals (MOTs) in order to prevent oil spills and protect public health, safety, and the environment. This code does not, in general, address operational requirements."* (Cal. Code Regs., tit. 24, § 3101F.2.)

MOTEMS establishes minimum standards for marine oil terminals (MOTs) to meet. MOTEMS is a part of the California Building Code and applies to all MOTs in California, both on and off lands leased from the State. MOTEMS regulates engineering standards for the equipment that is installed at MOTs; it does not, in general, regulate operational requirements such as ensuring that the equipment is always in use, properly maintained, or that personnel using it have had adequate training.

In contrast, the purpose of mitigation measures under CEQA is to mitigate significant impacts from a specific project. As the CEQA Lead Agency, the CSLC is required to identify potential impacts to the environment, propose feasible mitigation measures to reduce significant impacts, and, if the project is approved, to adopt a Mitigation Monitoring Program (MMP) for reporting or monitoring to ensure that the mitigation measures are implemented. This Lead Agency responsibility originates in Public Resources Code section 21081.6, subdivision (a) (Findings), and the State CEQA Guidelines sections 15091, subdivision (d) (Findings) and 15097 (Mitigation Monitoring or Reporting). Therefore, it is not appropriate for CSLC to propose additions or modifications to MOTEMS in lieu of mitigation measures. Doing so would not meet the requirements of CEQA to propose specific mitigation measures to reduce significant impacts identified in this EIR for the proposed Project. Although both MOTEMS and the MMP for the proposed Project address the goal of oil spill prevention, they fulfill fundamentally different purposes.

California State Lands Commission

PART III – REVISIONS TO DRAFT EIR

Final Environmental Impact Report for the Tesoro Amorco Marine Oil Terminal Lease Consideration, February 2014

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INTRODUCTION

Tesoro Refining and Marketing Company, LLC (Tesoro) is the owner and operator of the Amorco Marine Oil Terminal (Amorco Terminal), a tanker and barge petroleum unloading facility, and associated Golden Eagle Refinery (Refinery), located in Contra Costa County (see Figure ES-1). The Amorco Terminal and Refinery have operated at their current locations since approximately 1923 and 1913, respectively. The Amorco Terminal is on sovereign public land leased from the California State Lands Commission (CSLC), with upland storage facilities located on private land. The CSLC is considering an application for a new 30-year lease of sovereign lands to Tesoro for the Amorco Terminal, otherwise known as the Amorco Marine Oil Terminal Lease Consideration Project (Project). Since 2008, the CSLC has considered the current lease agreement, Lease PRC 3453.1, to be in a “holdover” status (i.e., the Amorco Terminal continues to operate under the terms of its existing lease while a decision on a new lease is pending). The issuance of a new 30-year lease, if granted, would allow Tesoro to continue to operate its Amorco Terminal through 2043.

The CSLC is serving as the lead agency responsible for preparing this Environmental Impact Report (EIR) in compliance with the California Environmental Quality Act (CEQA) to analyze the environmental impacts associated with operation of the Amorco Terminal. Particular emphasis will be placed on oil transfer operations at the Amorco Terminal, and vessel transit along shipping routes within Carquinez Strait, San Pablo and San Francisco Bays, and along the outer coast. This EIR will provide the CSLC the information required to exercise its jurisdictional responsibilities for the proposed new lease.

PROJECT OBJECTIVE

The Applicant has identified the following basic objective for the Project:

> *To obtain a CSLC lease to continue operations at, and maintain the level of crude oil feedstock imported through, the existing Amorco Terminal, thereby maintaining the operation and viability of Tesoro’s associated Golden Eagle Refinery.*

ORGANIZATION OF THE EIR

The EIR contains the following sections:

- **Section 1.0 – Introduction** includes a general overview of the proposed project, the environmental review process, and purpose and scope of the EIR;

- **Section 2.0 – Project Description** describes the proposed Project, its location and facilities, an overview of its operation, and schedule;
- **Section 3.0 – Alternatives and Cumulative Projects** describes the alternatives to the Project carried forward for analysis, the alternatives that were considered but eliminated from detailed evaluation, and those projects considered during the evaluation of cumulative impacts to the Project;
- **Section 4.0 – Environmental Impact Analysis** describes existing environmental conditions within issue areas, Project-specific impacts and associated mitigation measures, and includes impact analysis of Project alternatives and cumulative impacts;
- **Section 5.0 – Other Required CEQA Sections** addresses other required CEQA elements, including evaluation of growth-inducing impacts of the Project;
- **Section 6.0 – Commercial and Sport Fisheries** addresses impacts to these resources;
- **Section 7.0 – Socioeconomics and Environmental Justice** describes existing conditions and Project-related effects related to socioeconomics and environmental justice;
- **Section 8.0 – Mitigation Monitoring and Reporting Program** summarizes all Applicant-proposed measures and recommended mitigation measures identified to avoid or reduce significant impacts, the party(ies) responsible for tracking each mitigation measure, and how compliance with the measure will be reported; and
- **Section 9.0 – List of Preparers and References** presents information on the individuals who prepared the EIR and their qualifications and list of reference materials used to prepare the report.

PROPOSED PROJECT

The Amorco Terminal operates as an import-only facility for crude oil and currently consists of approximately 16.6 acres of State-owned sovereign land leased from the CSLC, which will be reduced to 14.9 acres under the new 30-year lease proposed as part of the Project. The Amorco Terminal supports the Refinery, located 2.5 miles east, and is capable of operating 365 days a year, 24 hours a day, although actual operation depends on shipping demands.

The Amorco Terminal is a single-berth docking facility, consisting of marine timbers and concrete. The main wharf, approximately 1,130 feet long by 150 feet wide, supports associated unloading equipment, including pumps, pipelines, electrical utilities, fire protection equipment, spill response equipment, and other ancillary mechanical equipment. Access to the Amorco Terminal from the onshore Amorco Tank Farm is provided by an approximately 28-foot-wide by 1,500-foot-long approach trestle.

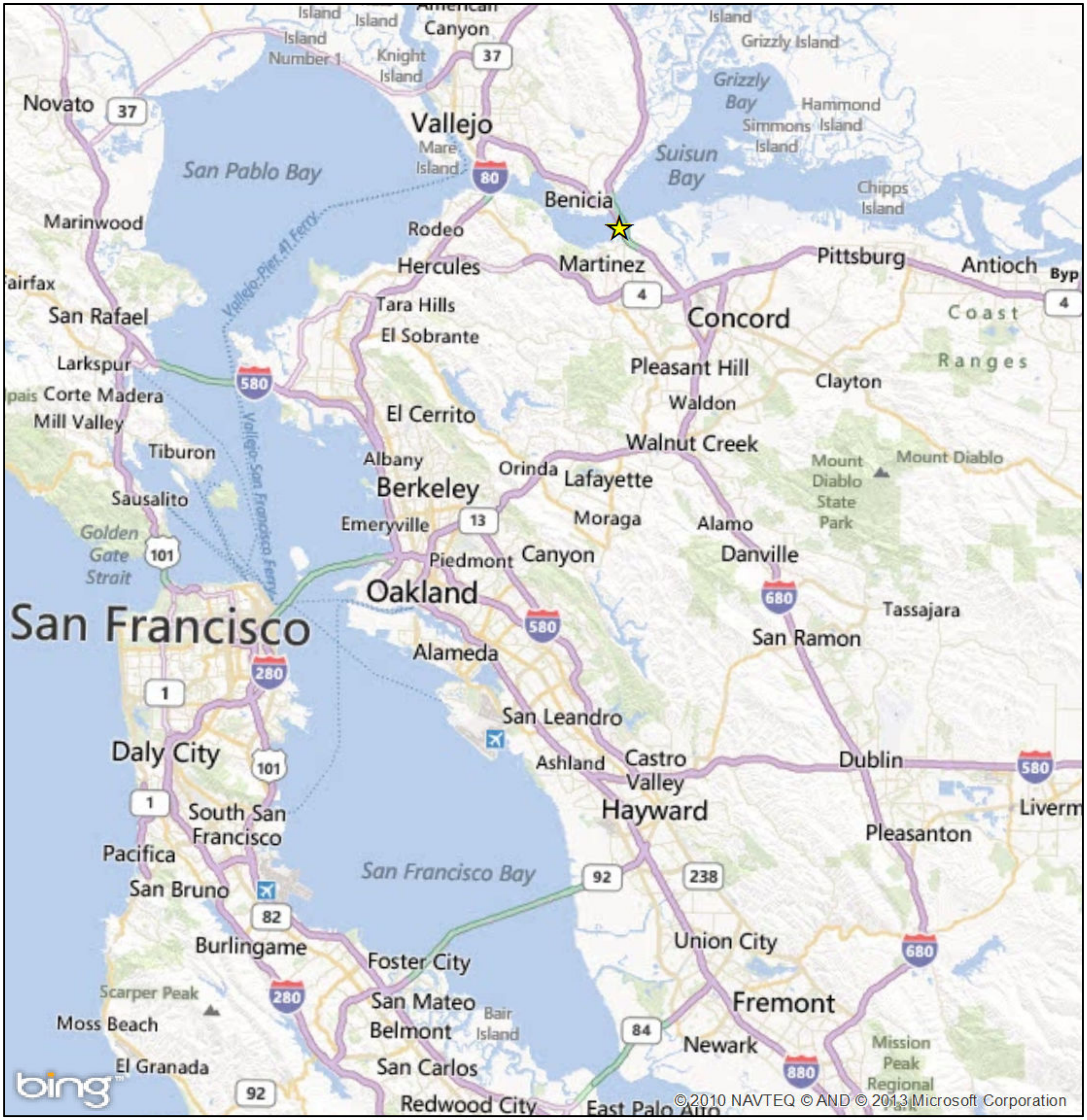

Figure ES-1 Project Vicinity
California State Lands Commission
Amorco Marine Oil Terminal
Lease Consideration Project

N

☆ Amorco Terminal Location

1 inch = 6 miles

1:400,000

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The Amorco Terminal is currently authorized to accommodate up to 190,000 deadweight ton (DWT) vessels with displacements up to 200,000 DWTs. Vessel traffic and throughput volumes at the Amorco Terminal are summarized below.

- Annual ship and barge traffic currently averages 69 vessels per year (between 2008 and 2012). Amorco Terminal throughput ranges from 16,900,000 barrels per year (bpy) to an anticipated maximum of 26,800,000 bpy.
- Future estimates are 60 to 90 vessels per year. Future Amorco Terminal throughput estimates range from 20 million bpy to an anticipated maximum of 30 million bpy.
- The maximum capacity that the Amorco Terminal could handle is ~~63,875~~ 70,080 million bpy. Maximum throughput is based on Tesoro's Bay Area Air Quality Management District Title V Permit to Operate for the Refinery.

Therefore, Section 4.0, Environmental Impact Analysis is based on the anticipated future estimates provided above. Other than reducing the acreage of land leased from approximately 16.6 acres to 14.9 acres, Tesoro has no existing plans to modify the Amorco Terminal over the 30-year term of the proposed lease.

ALTERNATIVES TO THE PROPOSED PROJECT

The CEQA requires consideration of a range of reasonable alternatives to the project or project location that: (1) could feasibly attain most of the basic project objectives; and (2) would avoid or substantially lessen any of the significant impacts of the proposed project. The following is a summary of alternatives analyzed in this EIR. For more detail, see Section 3.0, Alternatives and Cumulative Projects.

No Project

Under the No Project Alternative, the Amorco Terminal lease would not be renewed, and the existing Amorco Terminal would be subsequently decommissioned. Tesoro may choose to pursue transitioning the Avon Marine Oil Terminal (currently an export-only marine oil terminal located in Martinez, California) to absorb all import operations from the Amorco Terminal, thereby increasing the throughput at the Avon Marine Oil Terminal to the Golden Eagle Refinery to meet regional refining demands.[1]

In addition, Tesoro may consider alternative means of traditional crude oil transportation to absorb import operations from the Amorco Terminal. Sources may include land-

[1] While currently an export-only marine oil terminal, Tesoro's Avon Marine Oil Terminal is capable of operating as both an import and export facility, provided that the wharf is upgraded and expanded to meet the current throughput capacities for the Avon and Amorco Terminals. The Avon Marine Oil Terminal is currently subject to CEQA evaluation by the CSLC for a new 30-year lease of sovereign land to continue the Refinery's exporting operations through the Avon Terminal.

based transportation such as rail cars and trucks, and/or pipeline connections to other Bay Area terminals, or a combination thereof. Pipeline delivery may require construction of new pipelines and/or the purchase of existing pipeline capacity from other local petroleum refinery competitors. While the CSLC may have no jurisdiction over any of these land-based forms of transportation (except for pipeline or road and railway construction underneath and/or across waterbodies under CSLC jurisdiction), construction and operation of facilities would be subject to substantial environmental review and permitting by other local and state agencies.

Restricted Lease Taking Amorco Terminal Out of Service for Oil Transport

Under this alternative, Tesoro's Amorco Terminal lease would be renewed with modification to restrict its allowed use such that the existing Terminal would be: left in place, taken out of service and placed into caretaker status for any petroleum product transfer, and not decommissioned or demolished. No environmental impacts would be associated with these activities. Because the structure of the Amorco Terminal would remain in place, Tesoro would retain the option to apply to bring it back into service for oil transport at some time in the future, should the need arise. Any future change in use of the Amorco Terminal would require a lease action and potential separate CEQA review by the CSLC. Alternative uses for the Amorco Terminal could include:

- use of the Amorco Terminal as a staging area for dredging operations, maintenance and upgrades to other terminals, or training exercises;
- the option for Tesoro to bring the Amorco Terminal back into service as a fully operational petroleum product transfer facility; or
- sale of the Amorco Terminal to another entity for the above, or for other uses.

As with the No Project Alternative, Tesoro might absorb import operations from the Amorco Terminal by transitioning the Avon Marine Oil Terminal to import and export operations or consider alternative means of traditional crude oil transportation such as a pipeline and/or rail transportation, or use some combination of the these sources

ENVIRONMENTAL IMPACTS AND MITIGATION

This EIR includes a detailed evaluation of the potentially significant environmental effects that could result from implementation of the Project on a variety of resource topics, including: operational safety/risk of accidents; biological resources, air quality and greenhouse gas emissions; geology, soils, and seismicity; cultural resources; land-based transportation; land use and recreation; noise; and visual resources, light, and glare. Table ES-1 presents a summary of potential impacts and mitigation measures for the proposed Project.

Table ES-1: Summary of Environmental Impacts and Mitigation Measures for the Proposed Project

Impact	Impact Class[1]	Recommended Mitigation Measures (MMs)
Section 4.1 Operational Safety/Risk of Accidents (OS)		
OS-1: Potential for spills and response capability for containment of oil spills from the Amorco Terminal during transfer operations	SU	• **MM OS-1a:** Remote Release Systems. • **MM OS-1b:** Tension Monitoring Systems. • **MM OS-1c**: Allision Avoidance Systems.
OS-2: Amorco Terminal spills from pipelines during non-transfer periods	SU	No additional mitigation measures available. (Refer to **MMs OS-1a, OS-1b, OS1c, OS4a, and OS-4b.**)
OS-3: Potential for fires and explosions and response capability	SU	• **MM OS-3a:** Remote Release Systems. (Refer to **MM OS-1a**.) • **MM OS-3b:** Fire Protection Assessment.
OS-4: Response capability for accidents in the San Francisco Bay, and outer coast	SU	• **MM OS-4a:** USCG Ports and Waterways Safety Assessment workshops. • **MM OS-4b:** Spill response to vessel spills.
CUM-OS-1: Upset Conditions	SU	• No additional mitigation measures available (refer to **MMs OS-1a, OS-1b, OS1c, OS4a, and OS-4b**.)
Section 4.2 Biological Resources (BIO)		
BIO-1: Increase deposition or erosion of sensitive habitats along the vessel path, including marshlands within and adjacent to the lease area, resulting from the resuspension of sediments by calling vessels	LTS	No mitigation required.
BIO-2: Cause substantial impact to special-status wildlife species, including impact to behavior and the composition of biotic communities, in the vicinity of the Amorco Terminal as a result of the use of bright lights during nighttime Amorco Terminal operations	LTS	No mitigation required.
BIO-3: Cause substantial direct and/or indirect impacts on aquatic biota through the changing of physical and chemical environmental factors as a result of maintenance dredging	LTS	No mitigation required.

Impact	Impact Class[1]	Recommended Mitigation Measures (MMs)
BIO-4: Cause injury or behavioral interruptions to aquatic species as a result of noise from vessels	**LTS**	No mitigation required.
BIO-5: Cause impacts to the San Francisco Bay Estuary and associated aquatic biota as a result of minor fuel, lubricant, and/or boat-related spills	**LTS**	No mitigation required.
BIO-6: Cause impacts to the San Francisco Bay Estuary and associated aquatic biota as a result of major fuel, lubricant, and/or boat-related spills	**SU**	• **MM BIO-6a:** Bird rescue personnel and rehabilitators. • **MM BIO- 6b:** Cleanup of oil from biological area. • **MM BIO-6c:** Natural Resource Damage Assessment Team.
BIO-7: Introduce invasive nonindigenous species to the San Francisco Bay Estuary	**SU**	• **MM BIO-7a:** Marine Invasive Species Act Reporting Forms. • **MM BIO-7b:** Invasive species action funding.
CUM-BIO-1: Cause cumulative adverse impacts to special status species, biotic communities, and habitat through vessel resuspension of sediment, use of bright night time lights, routine dredging, shipping noise, and potential minor oil spills as a result of Amorco Terminal operations	**LTS**	No mitigation required.
CUM-BIO-2: Cause cumulative impacts to San Francisco Bay Estuary and associated biota from oil spills from all marine oil terminals combined, or from all tankering combined	**SU**	• **MM CUM-BIO-2a:** Tesoro shall implement **MM BIO-6a through BIO-6c.**
CUM-BIO-3: Cause cumulative impacts by increasing the risk of introduction of nonindigenous aquatic species from vessel traffic to San Francisco Bay	**SU**	• **MM CUM-BIO-3a:** Tesoro shall implement **MM BIO-7a and BIO-7b.**
CUM-BIO-4: Cause cumulative impacts to the biota of the San Francisco Bay Estuary resulting from degradation of water quality from vessels visiting the Amorco Terminal that are coated with antifouling paints	**LTS**	No mitigation required.

Impact	Impact Class[1]	Recommended Mitigation Measures (MMs)
Section 4.3 Water Quality (WQ)		
WQ-1: Degrade water quality as a result of maintenance dredging	LTS	No mitigation required.
WQ-2: Degrade water quality as a result of sediment disturbance from vessel maneuvers	LTS	No mitigation required.
WQ-3: Degrade water quality by the discharge of ballast water	SU	• **MM WQ-3:** Advise vessels of applicable regulations and standards.
WQ-4: Degrade water quality as a result of discharge of cooling water, sanitary wastewater, bilge water, or other liquid wastes	LTS	No mitigation required.
WQ-5: Degrade water quality as a result of vessel biofouling	SU	• **MM WQ-5:** Advise vessels of applicable regulations and standards. (Also refer to MM BIO-7a).
WQ-6: Degrade water quality due to anti-fouling paints used on vessel hulls	SU	• **MM WQ-6:** Inform Vessels calling at the Amorco Terminal of the ban on TBT.
WQ-7: Degrade water quality as a result of cathodic protection on vessels	LTS	No mitigation required.
WQ-8: Degrade water quality as a result of stormwater runoff from the wharf	PS	• **MM WQ-8:** Amend existing SWPPP.
WQ-9: Degrade water quality as a result of oil leaks and spills during unloading	SU	No additional mitigation measures available. (Refer to **MMs OS-1a, 1b, and 1c**.)
WQ-10: Degrade water quality due to releases from vessels in transit in the San Francisco Bay or along the outer coast	SU	No additional mitigation measures available. (Refer to **MMs OS-4a and OS-4b.**)
CUM WQ-1: Cause contaminant impacts on San Francisco Bay water quality	SU	No additional mitigation measures available. (Refer to **MMs WQ-3, WQ-5 and WQ-6.**)
CUM WQ-2: Cause re-suspension of sediment	LTS	No mitigation required.
CUM WQ-3: Degrade water quality due to oil releases from vessels in transit in the San Francisco Bay or along the outer coast	SU	No mitigation measures available. (**Refer to MMs OS-1a, 1b, and 1c**.)

Impact	Impact Class[1]	Recommended Mitigation Measures (MMs)
Section 4.4 Air Quality and Greenhouse Gas Emissions (AQ)		
AQ-1: Conflict with or obstruct implementation of an applicable air quality plan, permit, or standard, or create an air quality violation.	**LTS**	No mitigation required.
AQ-2: Result in a considerable net increase of any criteria pollutant for which the Project region is non-attainment under an applicable federal or State ambient air quality standard, including releasing emissions that exceed quantitative thresholds for ozone precursors.	**LTS**	No mitigation required.
AQ-3: Expose sensitive receptors to substantial pollutant concentrations.	**LTS**	No mitigation required.
AQ-4: Create objectionable odors affecting a substantial number of people.	**LTS**	No mitigation required.
GHG-1: Generate GHG emissions, either directly or indirectly, that conflict with an applicable plan, policy, or regulation adopted for the purposes of GHG reduction.	**LTS**	No mitigation required.
Section 4.5 Geology, Sediments, and Seismicity (GSS)		
GSS-1: Expose people or structures to surface faulting and ground rupture, resulting in substantial structural damage and risk of injury or loss of life.	**LTS**	No mitigation required.
GSS-2: Expose people or structures to strong ground shaking, slope instability, and/or seismically induced landslides causing substantial structural damage and risk of injury or loss of life.	**LTS**	No mitigation required.

Impact	Impact Class[1]	Recommended Mitigation Measures (MMs)
GSS-3: Expose people or structures to liquefaction and seismically induced settlement causing substantial structural damage and risk of injury or loss of life.	**LTS**	No mitigation required.
GSS-4: Expose people or structures to the risk of loss, injury, or death as a result of tsunamis and/or seiches.	**LTS**	No mitigation required.
GSS-5: Cause Structural damage to the Amorco Terminal due to an Increase in Loading Conditions, Vessel Size, or Number of Vessels Calling.	**LTS**	No mitigation required.
Section 4.6 Cultural Resources (CR)		
CR-1: Have the potential to disturb previously unrecorded historical, archaeological, or paleontological resources, and human remains.	**NI**	No mitigation required.
Section 4.7 Land-based Transportation (LT)		
LT-1: Generate project-related traffic that would cause LOS to drop below standards established by local jurisdictions; increase risk of accidents due to design elements of the project; generate significant parking demand; conflict with adopted policies, plans, or programs regarding land-based transportation; or substantially affect emergency response capabilities.	**NI**	No mitigation required.
Section 4.8 Land Use and Recreation (LUR)		
LUR-1: Conflict with any applicable land use plan, policy, or regulation of an agency with jurisdiction over the Project adopted for the purpose of avoiding or mitigating an environmental effect	**LTS**	No mitigation required.

Impact	Impact Class[1]	Recommended Mitigation Measures (MMs)
LUR-2: Cause residual impacts on sensitive shoreline lands and/or water and non-water recreation due to an accidental release of oil at or near the Amorco Terminal	**SU**	No additional mitigation measures available. (Refer to **MMs OS-1a, OS-1b, OS-1c, OS-4a, and OS-4b.**)
LUR-3: Cause residual impacts on sensitive shoreline lands and/or water and non-water recreation due to an accidental release of oil from vessels in transit	**SU**	No additional mitigation measures available. (Refer **to MMs OS-1a, OS-1b, OS-1c, OS-4a, and OS-4b.**)
LUR-4: Conflict with established or proposed land uses, including potentially sensitive land uses	**LTS**	No mitigation required.
Section 4.9 Noise (NO)		
NO-1: Cause a violation of local noise ordinances or any other exceedance of applicable noise standards in regulations promulgated at the county, State, or federal level	**LTS**	No mitigation required.
Section 4.10 Visual Resources, Light and Glare (VR)		
VR-1: Cause adverse impacts on a scenic vista or scenic highway	**LTS**	No mitigation required.
VR-2: Create a new source of substantial light or glare, which would adversely affect day or nighttime views in the area (including views from land or water)	**LTS**	No mitigation required.
VR-3: Create visual effects from routine operations over the 30-year lease period	**LTS**	No mitigation required.
VR-4: Create visual effects from accidental releases of oil at or near the Amorco Terminal	**SU**	No additional mitigation measures available. (Refer **to MMs OS-1a, OS-1b, OS-1c, OS-4a, and OS-4b.**)
VR-5: Create visual effects from oil spills from vessels in transit	**SU**	No additional mitigation measures available. (Refer to **MMs OS-1a, OS-1b, OS-1c, OS-4a, and OS-4b.**)

[1]Impact Classes: SU = Significant and unavoidable; PS = Potentially significant that is reduced to less than significant with mitigation; LTS = Less than significant; NI = No impact; B = Beneficial impact

Summary of Major Potential Impacts of the Project

Potential impacts associated with small oil leaks and spills at the Amorco Terminal are addressed in part through compliance with the CSLC's Marine Oil Terminal Engineering and Maintenance Standards (MOTEMS), which became effective on February 6, 2006.[2] The standards apply to all existing and new marine oil terminals in California, and include criteria for inspection, structural analysis and design, mooring and berthing, geotechnical considerations (a seismic and structural assessment, based on current seismic criteria), and analysis and review of the fire, piping, mechanical, and electrical systems. MOTEMS require each terminal operator (such as Tesoro) to conduct audits and inspections to determine level of compliance and evaluate continuing fitness-for purpose of the facility, and submit the results to the CSLC's Marine Facilities Division for review and concurrence. Depending on the results, operators must then determine what actions are required, and provide a schedule for implementation of deficiency corrections and/or rehabilitation. The schedule must be mutually agreeable between the CSLC and the terminal operator.

The Amorco Terminal is subject to MOTEMS, and Tesoro commenced its initial MOTEMS Audit in November 2007 (completed in March 2008). Subsequently, in December 2008, a Revision 1 Update of the initial MOTEMS Audit was commenced, and completed in February 2009. In June 2013, seismic upgrades to concrete breasting dolphins, the timber loading platform, and timber fire pump platform were completed. The MOTEMS Audit process includes inspections and condition assessments of the capacities of the existing wharf structure, fenders, and mooring devices. Future actions to comply with MOTEMS Audit findings may include physical changes to the Amorco Terminal and associated lease area. Depending on the nature and extent of any such changes, additional discretionary review by the CSLC Marine Facilities Division and/or Land Management Division may be required. MOTEMS are reviewed and updated every 3 years and all marine oil terminals must comply with the most recent version. Above-water inspections are due every 3 years, and underwater inspections are required every 3 to 6 years, depending on the results of the previous audit. For more information regarding MOTEMS requirements and Amorco Terminal compliance, see Section 2.0, Project Description.

Even with compliance with MOTEMS, moderate or large spills may originate from the Amorco Terminal due to natural factors (e.g., earthquake and/or tsunami), human error (e.g., berth collision and/or bad hose connection), or from a vessel moored at the Amorco Terminal or transiting the tanker lanes in the San Francisco Bay or along the outer coast. While the risk of moderate to large spills is small, the potential for impacts is significant for many environmental areas. The fate of spilled oil in the marine

[2] MOTEMS are codified in California Code of Regulations, Title 24, California Building Code, Chapter 31F—Marine Oil Terminals (Cal. Code Regs., tit. 24, § 3101F et seq.).

environment is determined by a variety of complex and interrelated physical, chemical, and biological transformations. Moderate to severe oil spills can result in impacts to water quality, biological resources, commercial and sport fisheries, shoreline land uses, shoreline and water recreational uses, and visual quality of surface water and shorelines. Project impacts and associated proposed mitigation measures are presented in Table ES-1.

Significant adverse impacts can also occur from releases of toxic algae or other harmful microorganisms in a vessel's ballast water. The introduction of invasive, non-native species via ship's ballast water has severely disturbed the aquatic communities of San Francisco Bay.

COMPARISON OF PROPOSED PROJECT AND ALTERNATIVES

The State CEQA Guidelines (§ 15126.6, subd. (d)) require that an EIR include sufficient information about each alternative to allow meaningful evaluation, analysis, and comparison with the proposed Project. A matrix displaying the major characteristics and significant environmental effects of each alternative may be used to summarize the comparison. Table ES-2 provides a comparison of the proposed project with each of the alternatives evaluated in this document, including the No Project Alternative.

Environmentally Superior Alternative

State CEQA Guidelines section 15126.6, subdivision (e)(2) states:

> The "no project" analysis shall discuss the existing conditions at the time the notice of preparation is published, or if no notice of preparation is published, at the time environmental analysis is commenced, as well as what would be reasonably expected to occur in the foreseeable future if the project were not approved, based on current plans and consistent with available infrastructure and community services. *If the environmentally superior alternative is the "no project" alternative, the EIR shall also identify an environmentally superior alternative among the other alternatives.* (Emphasis added.)

While the No Project Alternative eliminates impacts from the Amorco Terminal, implementation of the No Project Alternative would shift similar levels of impact to other Bay Area marine oil terminals that would make up the differential for crude oil and product transport throughout the San Francisco Bay. By eliminating impacts of Amorco Terminal operations at the Refinery, the No Project Alternative appears to be environmentally superior, but actually has significant impacts to the operational viability of the Refinery without a method of crude oil and product transport, and to the remaining marine oil terminals that would have to accept the product that is currently being delivered to the Amorco Terminal. Hence, the No Project Alternative would not meet the Project objective of maintaining Refinery operational viability and would potentially transfer similar direct impacts to other Bay Area marine oil terminals.

The ~~Increased Crude Supplies from Non-marine Sources~~Restricted Lease Taking Amorco Terminal Out of Service for Oil Transport Alternative would eliminate operations and impacts at the Amorco Terminal. However, as described above, this Alternative results in the transfer of similar direct impacts of the proposed Project to other Bay Area marine oil terminals. Construction associated with new and existing pipelines and/or rail and roadway related infrastructure would have the potential for significant and unavoidable impacts associated with biological resources, water quality, land use, and noise.

Under this alternative, the capacity of other marine terminals may be taxed, potentially increasing vessel congestion and collisions (as well as the costs) while vessels wait to berth and offload/load.

Because the ~~Increased Crude Supplies from Non-marine Sources~~Restricted Lease Taking Amorco Terminal Out of Service for Oil Transport Alternative moves impacts from the Amorco Terminal to the locations of other marine oil terminals, and has the added potential for land-based transportation-related spills, it represents a greater potential adverse environmental impact than the proposed Project.

The ~~Increased Crude Supplies from Non-marine Sources~~Restricted Lease Taking Amorco Terminal Out of Service for Oil Transport Alternative is the only alternative that meets the Project objective of maintaining Refinery operational viability. This alternative does not represent a greater environmental benefit than that of the proposed Project. When only one alternative to the proposed Project is evaluated, identification of an environmentally superior alternative is not required.

The comparison between the proposed Project and alternatives is presented in Table ES-2.

KNOWN AREAS OF CONTROVERSY OR UNRESOLVED ISSUES

There are no known areas of controversy surrounding the Project. No objections to the Project were raised during public scoping and no correspondence has been received challenging the Project or its potential environmental effects.

Table ES-2: Summary of Environmental Impacts for Proposed Project and Alternatives

Impact	Impact Class[1]		
	Proposed Project	No Project	Restricted Lease Taking Amorco Out of Service for Oil Transport
Section 4.1 Operational Safety/Risk of Accidents			
OS-1: Potential for spills and response capability for containment of oil spills from the Amorco Terminal during transfer operations	**SU**	**N/A**	**N/A**
OS-2: Amorco Terminal spills from pipelines during non-transfer periods	**SU**	**N/A**	**N/A**
OS-3: Potential for fires and explosions and response capability	**SU**	**N/A**	**N/A**
OS-4: Response capability for accidents in the San Francisco Bay and outer coast	**SU**	**N/A**	**N/A**
OS-5/OS-6: Risk of spills, fire, or explosion from displaced product transit	**N/A**	**SU**	**SU**
CUM-OS-1: Upset Conditions	**SU**	**N/A**	**N/A**
Section 4.2 Biological Resources			
BIO-1: Increase deposition or erosion of sensitive habitats along the vessel path, including marshlands within and adjacent to the lease area, resulting from the resuspension of sediments by calling vessels	**LTS**	**N/A**	**N/A**
BIO-2: Cause substantial impact to special-status wildlife species, including impact to behavior and the composition of biotic communities, in the vicinity of the Amorco Terminal as a result of the use of bright lights during nighttime operations	**LTS**	**N/A**	**N/A**
BIO-3: Cause substantial direct and/or indirect impacts on aquatic biota through the changing of physical and chemical environmental factors as a result of maintenance dredging	**LTS**	**N/A**	**N/A**
BIO-4: Cause injury or behavioral interruptions to aquatic species as a result of noise from vessels	**LTS**	**N/A**	**N/A**
BIO-5: Cause impacts to the San Francisco Bay Estuary and associated aquatic biota as a result of minor fuel, lubricant, and/or boat-related spills	**LTS**	**N/A**	**N/A**

Impact	Impact Class[1]		
	Proposed Project	No Project	Restricted Lease Taking Amorco Out of Service for Oil Transport
BIO-6: Cause impacts to the San Francisco Bay Estuary and associated aquatic biota as a result of major fuel, lubricant, and/or boat-related spills	**SU**	**N/A**	**N/A**
BIO-7: Introduce invasive nonindigenous species to the San Francisco Bay Estuary	**SU**	**N/A**	**N/A**
BIO-8: Cause impacts to the San Francisco Bay Estuary and associated biota resulting from the decommissioning and abandoning in place of existing structures	**N/A**	**SU**	**SU**
BIO-9: Cause impacts to the San Francisco Bay Estuary and associated biota resulting from the partial or complete removal of Amorco Terminal structures	**N/A**	**PS**	**PS**
BIO-10: Cause impacts to the San Francisco Bay Region and associated biota by decommissioning and removing the Amorco Terminal and shifting crude oil imports to overland transport	**N/A**	**SU**	**SU**
BIO-11: Cause impacts to the San Francisco Bay Region and associated biota by shifting crude oil imports to overland transport	**N/A**	**SU**	**SU**
CUM-BIO-1: Cause cumulative adverse impacts to special-status species, biotic communities, and habitat through vessel resuspension of sediment, use of bright night time lights, routine dredging, shipping noise, and potential minor oil spills as a result of Amorco Terminal operations	**LTS**	**N/A**	**N/A**
CUM-BIO-2: Cause cumulative impacts to San Francisco Bay Estuary and associated biota from oil spills from all marine oil terminals combined, or from all tankering combined	**SU**	**N/A**	**N/A**
CUM-BIO-3: Cause cumulative impacts by increasing the risk of introduction of nonindigenous aquatic species from vessel traffic to San Francisco Bay	**SU**	**N/A**	**N/A**
CUM-BIO-4: Cause cumulative impacts to the biota of the San Francisco Bay Estuary resulting from degradation of water quality from vessels visiting the Amorco Terminal that are coated with antifouling paints	**LTS**	**N/A**	**N/A**

Impact	Impact Class[1]		
	Proposed Project	No Project	Restricted Lease Taking Amorco Out of Service for Oil Transport
Section 4.3 Water Quality			
WQ-1: Degrade water quality as a result of maintenance dredging	**LTS**	**N/A**	**N/A**
WQ-2: Degrade water quality as a result of sediment disturbance from vessel maneuvers	**LTS**	**N/A**	**N/A**
WQ-3: Degrade water quality by the discharge of ballast water	**SU**	**N/A**	**N/A**
WQ-4: Degrade water quality as a result of discharge of cooling water, sanitary wastewater, bilge water, or other liquid wastes	**LTS**	**N/A**	**N/A**
WQ-5: Degrade water quality as a result of vessel biofouling	**SU**	**N/A**	**N/A**
WQ-6: Degrade water quality due to anti-fouling paints used on vessel hulls	**SU**	**N/A**	**N/A**
WQ-7: Degrade water quality as a result of cathodic protection on vessels	**LTS**	**N/A**	**N/A**
WQ-8: Degrade water quality as a result of stormwater runoff from the wharf	**PS**	**N/A**	**N/A**
WQ-9: Degrade water quality as a result of oil leaks and spills during unloading	**SU**	**N/A**	**N/A**
WQ-10: Degrade water quality due to oil releases from vessels in transit in the San Francisco Bay or along the outer coast	**SU**	**N/A**	**N/A**
WQ-11: Degrade water quality during decommissioning of the Amorco Terminal	**N/A**	**LTS**	**LTS**
WQ-12/WQ-14: Degrade water quality due to accidental spills from rail cars, trucks, and/or pipelines	**N/A**	**SU**	**SU**
WQ-13/WQ-15: Degrade water quality due to stormwater runoff during construction	**N/A**	**LTS**	**LTS**
CUM WQ-1: Cause contaminant impacts on San Francisco Bay water quality	**SU**	**N/A**	**N/A**
CUM WQ-2: Cause re-suspension of sediment	**LTS**	**N/A**	**N/A**
CUM WQ-3: Degrade water quality due to oil releases from vessels in transit in the San Francisco Bay or along the outer coast	**SU**	**N/A**	**N/A**

Impact	Impact Class[1]		
	Proposed Project	No Project	Restricted Lease Taking Amorco Out of Service for Oil Transport
Section 4.4 Air Quality and Greenhouse Gases			
AQ-1: Conflict with or obstruct implementation of an applicable air quality plan, permit, or standard, or create an air quality violation	**LTS**	**N/A**	**N/A**
AQ-2: Result in a considerable net increase of any criteria pollutant for which the Project region is non-attainment under an applicable federal or State ambient air quality standard, including releasing emissions that exceed quantitative thresholds for ozone precursors	**LTS**	**N/A**	**N/A**
AQ-3: Expose sensitive receptors to substantial pollutant concentrations	**LTS**	**N/A**	**N/A**
AQ-4: Create objectionable odors affecting a substantial number of people	**LTS**	**N/A**	**N/A**
GHG-1: Generate GHG emissions, either directly or indirectly, that conflict with an applicable plan, policy, or regulation adopted for the purposes of GHG reduction	**LTS**	**N/A**	**N/A**
AQ-5: Create air quality impacts during decommissioning of the Amorco Terminal or by the transfer of operations to other Bay Area terminals	**N/A**	**LTS**	**LTS**
AQ-6/AQ-8: Impact air quality during construction or operation of rail facilities or additional trucking	**N/A**	**LTS**	**LTS**
AQ-7: Create air quality impacts by the transfer of operations to other Bay Area terminals.	**N/A**	**LTS**	**LTS**
Section 4.5 Geology, Sediments, and Seismicity			
GSS-1: Expose people or structures to surface faulting and ground rupture, resulting in substantial structural damage and risk of injury or loss of life	**LTS**	**N/A**	**N/A**
GSS-2: Expose people or structures to strong ground shaking, slope instability, and/or seismically induced landslides causing substantial structural damage and risk of injury or loss of life	**LTS**	**N/A**	**N/A**
GSS-3: Expose people or structures to liquefaction and seismically induced settlement causing substantial structural damage and risk of injury or loss of life	**LTS**	**N/A**	**N/A**

Impact	Impact Class[1]		
	Proposed Project	No Project	Restricted Lease Taking Amorco Out of Service for Oil Transport
GSS-4: Expose people or structures to the risk of loss, injury, or death as a result of tsunamis and/or seiches	**LTS**	**N/A**	**N/A**
GSS-5: Cause structural damage to the Amorco Terminal due to an increase in loading conditions, vessel size, or number of vessels calling	**LTS**	**N/A**	**N/A**
GSS-6: Elimination of long-term potential for structural damage	**N/A**	**B**	**B**
GSS-7/GSS-9: Potential to cause substantial soil erosion, or to impact a known mineral resource	**N/A**	**LTS**	**LTS**
GSS-8/GSS-10: Potential to cause damage and/or failure to pipelines as a result of a seismic event	**N/A**	**LTS**	**LTS**
Section 4.6 Cultural Resources			
CR-1/CR-2/CR-3: Have the potential to disturb previously unrecorded historical, archaeological, or paleontological resources, and human remains	**NI**	**PS**	**NI**
Section 4.7 Land-based Transportation			
LT-1: Generate project-related traffic that would cause LOS to drop below standards established by local jurisdictions; increase risk of accidents due to design elements of the project; generate significant parking demand; conflict with adopted policies, plans, or programs regarding land-based transportation; or substantially affect emergency response capabilities	**NI**	**N/A**	**N/A**
LT-2: Generate project-related vehicular traffic resulting from the dismantling of existing structures	**N/A**	**LTS**	**PS**
LT-3/LT-4: Generate project-related traffic that would cause LOS to drop below standards established by local jurisdictions; increase risk of accidents due to design elements of the project; generate significant parking demand; conflict with adopted policies, plans, or programs regarding land-based transportation; or substantially affect emergency response capabilities	**N/A**	**PS**	**PS**

Impact	Impact Class[1]		
	Proposed Project	**No Project**	**Restricted Lease Taking Amorco Out of Service for Oil Transport**
Section 4.8 Land Use and Recreation			
LUR-1: Conflict with any applicable land use plan, policy, or regulation of an agency with jurisdiction over the Project adopted for the purpose of avoiding or mitigating an environmental effect	**LTS**	**N/A**	**N/A**
LUR-2: Cause residual impacts on sensitive shoreline lands and/or water and non-water recreation due to an accidental release of oil at or near the Amorco Terminal	**SU**	**N/A**	**N/A**
LUR-3: Cause residual impacts on sensitive shoreline lands and/or water and non-water recreation due to an accidental release of oil from vessels in transit	**SU**	**N/A**	**N/A**
LUR-4: Conflict with established or proposed land uses, including potentially sensitive land uses	**LTS**	**N/A**	**N/A**
LUR-5/LUR-7: Cause residual impacts on sensitive shoreline lands and/or water recreation due to an accidental release of oil from marine-based sources; or conflict with established or proposed land uses, including potentially sensitive land uses	**N/A**	**B**	**B**
LUR-6/LUR-8: Cause residual impacts on sensitive lands and/or recreation due to an accidental release of oil imported from non-marine sources; or conflict with established or proposed land uses, including potentially sensitive land uses	**N/A**	**SU**	**SU**
Section 4.9 Noise			
NO-1: Cause a violation of local noise ordinances or any other exceedance of applicable noise standards in regulations promulgated at the county, State, or federal level	**LTS**	**N/A**	**N/A**
NO-2: Effects on noise with no new Amorco Terminal lease	**N/A**	**LTS**	**LTS**
NO-3: Effects on noise by importing crude supplies from non-marine sources	**N/A**	**PS**	**PS**
NO-4: Effects on noise by taking Amorco Terminal out of service for oil transport	**N/A**	**N/A**	**B**

Impact	Impact Class[1]		
	Proposed Project	**No Project**	**Restricted Lease Taking Amorco Out of Service for Oil Transport**
Section 4.10 Visual Resources, Light, and Glare			
VR-1: Cause adverse impacts on a scenic vista or scenic highway	**LTS**	**N/A**	**N/A**
VR-2: Create a new source of substantial light or glare, which would adversely affect day or nighttime views in the area (including views from land or water)	**LTS**	**N/A**	**N/A**
VR-3: Create visual effects from routine operations over the 30-year lease period	**LTS**	**N/A**	**N/A**
VR-4: Create visual effects from accidental releases of oil at or near the Amorco Terminal	**SU**	**N/A**	**N/A**
VR-5: Create visual effects from oil spills from vessels in transit	**SU**	**N/A**	**N/A**
VR-6: Effects on visual resources with no new Amorco Terminal lease	**N/A**	**B**	**B**
VR-7: Effects on visual resources by taking Amorco Terminal out of service for oil transport	**N/A**	**N/A**	**LTS**

[1]Impact Classes:
SU = Significant and unavoidable
PS = Potentially significant that is reduced to less than significant with mitigation
LTS = Less than significant
NI = No impact
B= Beneficial Impact
N/A = Not Applicable; defined in this case as either lack of relevance to the defined alternative, or because a given impact would be evaluated as part of a separate CEQA evaluation, as applicable, as discussed in the EIR.

1.0 INTRODUCTION

The California State Lands Commission (CSLC) has prepared this Environmental Impact Report (EIR) pursuant to the California Environmental Quality Act (CEQA) and State CEQA Guidelines,[1] to provide the public, and responsible and trustee agencies, with information about the potential environmental effects of the proposed Amorco Marine Oil Terminal Lease Consideration Project (Project). The CSLC is the CEQA lead agency for the Project because Tesoro Refining and Marketing Company, LLC (Tesoro) has applied to the CSLC for a new 30-year lease of sovereign land to continue operations at the Amorco Marine Oil Terminal (Amorco Terminal), a tanker petroleum unloading facility.

Although the Amorco Terminal is currently operating and no changes to the facility or its operations are proposed, the CSLC has determined that the issuance of a 30-year lease requires the preparation of an EIR because, among other potentially significant impacts, there are inherent risks to the public health, and safety and the environment at any facility where crude oil is routinely transferred over water.

This section provides a brief introduction to the Amorco Terminal and Project study area, introduces the Applicant's Project objective, and summarizes the environmental review process for this Project. For a detailed description of the proposed Project, including existing conditions and operations, see Section 2.0, Project Description.

1.1 PROJECT LOCATION AND BACKGROUND

The Amorco Terminal and its associated Golden Eagle Refinery (Refinery) have operated at their current locations, offshore and onshore within the city of Martinez, Contra Costa County, since 1923 and 1913, respectively (see Figure ES-1). The existing Amorco Terminal is located on an approximately 16.6-acre parcel of sovereign land in the Carquinez Strait, approximately 0.25 mile west of the Benicia-Martinez Bridge. The proposed 30-year lease request for continued operation of the Amorco Terminal includes a reduced parcel size, changing from approximately 16.6 acres to approximately 14.9 acres. The Refinery is located approximately 2.5 miles east of the Amorco Terminal near Tesoro's Avon Marine Oil Terminal. Activities at these facilities include the transfer and processing of crude oil and various hydrocarbon fuels.

The western portion of the existing Amorco wharf, approach trestle, and five dolphins (Dolphins A-32, A-33, A-34, A-35, and A-36) was constructed in 1925 (see Section 2.0, Project Description, for component descriptions and illustrations). The Amorco Terminal was expanded in 1954 to include the eastern portion of the existing wharf, including the

[1] Public Resources Code section 21000 et seq. and California Code of Regulations, Title 14, section 15000 et seq., respectively.

main transfer operations platform dolphin (A-71), seven additional dolphins (A-68, A-69, A-70, A-72, A-73, A-74, and A-75), as well as a pipeway and roadway. Five dolphins (A-76, A-77, A-78, A-79, and A-80) were added in 1963, and three more dolphins (A-81, A-82, and A-83) were added in 2001. Seismic structural strengthening and comprehensive structural and non-structural improvements of the Amorco Terminal were completed between 2008 and 2013.

On March 1, 1966, the CSLC authorized the issuance of Lease No. PRC 3453.1, a General Lease-Industrial Use, to the Tidewater Oil Company for what is currently known as the Amorco Terminal. Subsequently, several amendments and lease assignments have been authorized to various operators. The CSLC issued the current lease in 1984 for a term of 25 years. In 2002, the CSLC authorized the assignment of this lease to Ultamar, Inc., which shortly thereafter sold the Amorco Terminal to Tesoro. In 2003, the CSLC authorized the assignment of the lease to Tesoro. The existing lease expired on December 31, 2008 and Tesoro is presently in a “holdover” month-to-month tenancy.[2]

In its lease application, Tesoro has requested a new 30-year lease from the CSLC to allow the Amorco Terminal to continue operations, which would enable the associated Refinery to continue to receive petroleum products from tankers that dock at the Amorco Terminal. With the exception of a reduced parcel size, no changes to the wharf or Amorco Terminal operations are proposed. Operations at the Amorco Tank Farm, located upland from the wharf, and Refinery are not under the CSLC’s jurisdiction, and are addressed in this EIR as they pertain to Amorco Terminal operations or as Project alternatives.

1.2 PROJECT OBJECTIVE

The Applicant has identified the following basic objective for the Project:

> *To obtain a CSLC lease to continue operations at, and maintain the level of crude oil feedstock imported through, the existing Amorco Terminal, thereby maintaining the operation and viability of Tesoro’s associated Golden Eagle Refinery.*

1.3 OVERVIEW OF THE ENVIRONMENTAL REVIEW PROCESS

CEQA’s primary objectives are to:

- ensure that the significant environmental effects of proposed activities are disclosed to decision makers and the public;
- identify ways to avoid or reduce environmental damage;

[2] Holdover status means that the Terminal is continuing to operate under the terms of its existing lease while a decision on a new lease is pending.

- prevent environmental damage by requiring implementation of feasible alternatives and/or mitigation measures;
- make public the reasons for agency approval of projects with significant environmental effects;
- foster interagency coordination in the review of projects; and
- enhance public participation in the planning process.

With certain limited exceptions, CEQA requires all State and local government agencies to consider the environmental consequences of projects over which they have discretionary authority before taking action on those projects. It establishes both procedural and substantive requirements that agencies must satisfy to meet CEQA's objectives. In accordance with these requirements, the CSLC, as the lead agency with decision-making authority over Tesoro's Project, must first assess whether it would result in significant environmental impacts. Because the CSLC determined, based on Tesoro's lease application, that the Project could result in significant environmental impacts, CEQA requires that the CSLC prepare an EIR analyzing both the proposed Project and a reasonable range of potentially feasible alternatives. Other key requirements include carrying out specific noticing and distribution steps to maximize public involvement in the environmental review process and developing a plan for implementing and monitoring the success of the identified mitigation measures.

The EIR is an informational document used in the planning and decision-making process. It is not the purpose of an EIR to recommend either approval or denial of a project. Consistent with CEQA requirements, the CSLC has engaged in a good-faith, reasonable effort toward full public disclosure of the potential effects of Tesoro's Project. Prior to a decision on whether and how to issue the lease requested by Tesoro, the CSLC must certify that (State CEQA Guidelines § 15090, subd. (a)):

- the final EIR has been completed in compliance with CEQA;
- the final EIR was presented to the CSLC and the CSLC reviewed and considered the information contained in the final EIR prior to approving the project; and
- the final EIR reflects the CSLC's independent judgment and analysis.

In addition to disclosing the environmental effects, CEQA requires that a lead agency (1) avoid or reduce significant effects to the extent feasible (Pub. Resources Code § 21002) and (2) prepare written findings of fact for each significant environmental impact identified in the document upon certification of the EIR and prior to approval of the Project (State CEQA Guidelines § 15121, subd. (b)). The possible findings are (State CEQA Guidelines § 15091, subd. (a)):

- changes or alterations have been required in, or incorporated into, the Project which avoid or substantially reduce the significant environmental effect as identified in the final EIR;
- such changes or alterations are within the responsibility and jurisdiction of another public agency and not the CSLC. Such changes have been adopted by such other agency or should be adopted by such other agency; or
- specific economic, legal, social, technological, or other considerations make infeasible the mitigation measures or project alternatives identified in the final EIR.

Under CEQA, if the CSLC finds that the above-specified considerations make identified mitigation measures or alternatives infeasible, and as a result, implementation of the Project would result in the occurrence of one or more significant effects, the CSLC would only be allowed to approve the lease if it prepares a written statement that the Project's environmental benefits (including economic, legal, social, technological, or other region-wide or statewide benefits) outweigh the unavoidable adverse environmental effects. This statement of "overriding considerations" must be supported by the specific reasons and evidence in the record for making such a determination.

The State CEQA Guidelines indicate that the EIR should identify the ways in which the lead and responsible agencies would use this document in the approval or permitting processes. In addition to the lease from the CSLC, Tesoro may need to obtain other permits or approvals to implement the Project. The following subsections summarize the roles of the agencies and the public participation process for this EIR.

1.3.1 Responsible and Coordinating Agencies/Permitting

As noted above, the CSLC will use this EIR when exercising its jurisdictional responsibilities on whether or how to approve Tesoro's lease application. In addition, the CSLC's Marine Facilities Division has regulatory responsibility for the Marine Oil Terminal Engineering and Maintenance Standards (MOTEMS), which became effective on February 6, 2006, and are codified in California Code of Regulations, Title 24, Part 2, California Building Code, Chapter 31F – Marine Oil Terminals (Cal. Code Regs., tit. 24, § 3101F et seq.). These standards apply to all existing and new marine oil terminals in California, and include criteria for inspection, structural analysis and design, mooring and berthing, geotechnical considerations (a seismic and structural assessment based on current seismic criteria), and analysis and review of the fire, piping, mechanical, and electrical systems. MOTEMS require each terminal to conduct periodic audits and inspections to determine its level of compliance and an evaluation of the continuing fitness-for-purpose of the facility. Depending on the results, operators (such as Tesoro) must then determine what actions are required, and provide Marine Facilities Division staff with a schedule for implementation of deficiency corrections and/or rehabilitation.

As these future actions may include physical changes to the wharf and associated lease area, depending on the nature and extent of any such changes, additional discretionary review by the CSLC may be required. Such discretionary review may also trigger CEQA review of future actions.

The Project may also require permits and approvals from other local, State, federal, and/or regional reviewing authorities and regulatory agencies that may have oversight over aspects of the Project activities, including the agencies listed in Table 1-1.

Table 1-1: Agencies with Potential Project Oversight

Local and Regional	City of Martinez
	Contra Costa County
	Bay Area Air Quality Management District (BAAQMD)
State	California Department of Fish and Wildlife (CDFW), including Office of Spill Prevention and Response (OSPR)
	California Coastal Commission (CCC)
	California State Fire Marshal (CSFM)
	San Francisco Bay Conservation and Development Commission (BCDC)
	San Francisco Bay Regional Water Quality Control Board (RWQCB)
	State Water Resources Control Board (SWRCB)
Federal	National Oceanic and Atmospheric Administration (NOAA) National Marine Fisheries Service (NMFS)
	U.S. Army Corps of Engineers (USACE)
	U.S. Coast Guard (USCG)
	U.S. Environmental Protection Agency (USEPA)
	U.S. Fish and Wildlife Service (USFWS)

While permits could vary, requirements likely to apply to the Project include compliance with the following:

- All regulations under the authority of the Public Resources Code section 8750, et seq., USCG, and/or CSFM inspection requirements and regulations for a marine oil terminal operations manual;
- 33 Code of Federal Regulations (CFR), section 158: USCG Certificate of Adequacy as an oily waste reception facility;
- Government Code section 8670.28: OSPR and USEPA regulations and guidelines for oil spill response plans, including spill prevention, response planning, and response capability;
- California Marine Invasive Species Act of 2003, including subsequent amendments; and

- Federal, State, and local regulations and standards regarding air pollutant emissions, including a BAAQMD Major Facility Review Permit.

Other requirements that might be triggered by dredging or other regulated Project activities may include compliance with the following:

- Provisions of the federal and State Endangered Species Acts, including USFWS and/or NMFS Section 7 Consultation;
- Federal and State protection of cultural, historical, and paleontological resources, including State Historic Preservation Office Section 106 Permit;
- Federal Clean Water Act (CWA) stipulations regarding placement of fill materials in jurisdictional waters of the United States, including USACE CWA Section 404 Permit and Rivers and Harbors Act Section 10 Permit;
- Compliance with SWRCB Section 401 Water Quality Certification and National Pollutant Discharge Elimination System Permit requirements; and
- Compliance with the Dredge Material Management Office and the CSLC lease agreement regarding dredging adjacent to the Project area.

Additional information on relevant regulations and likely compliance requirements for various types of resources is presented in Section 4.0, Environmental Impact Analysis.

1.3.2 Public Participation

Opportunities for public involvement in the EIR process are summarized below.

Scoping

On May 10, 2012, pursuant to CEQA section 21080.4 and State CEQA Guidelines section 15082, subdivision (a), the CSLC provided a Notice of Preparation (NOP) for the proposed Project to responsible and trustee agencies and to other interested parties. Through the NOP, the CSLC solicited both written and verbal comments on the EIR's scope during a 30-day comment period and provided information on a forthcoming public scoping meeting. On May 31, 2012, the CSLC staff held a public and agency scoping meeting in the city of Martinez, California, to solicit verbal comments on the scope of the EIR. No verbal comments were provided. Written comments were received in response to the NOP from the following:

- Linda Scourtis, Coastal Planner, BCDC
- Scott Wilson, Acting Regional Manager, CDFW, Bay Delta Region; and
- Shane McAffee, General Manager, Greater Vallejo Recreation District.

Appendix A contains a copy of the NOP, mailing list, comment letters received, and an index indicating where the scoping comments are addressed in the EIR.

Public Comment

This EIR is being circulated to local, regional, federal, and State agencies; property owners and occupants adjacent to the proposed Project; and to other interested parties. Written comments may be submitted to the CSLC during a 45-day public review period. Verbal and written comments on this EIR will be accepted at a noticed public meeting (either noticed in this document or under separate cover). All comments received will be addressed in a finalizing addendum, which, together with this EIR, will constitute the Final EIR for the Project.

EIR Information and Repository Sites

Placing CEQA documents in "repository" sites in or near the Project area can be an effective way to provide ongoing information about a project to the public. This EIR is available for public review at the locations listed below and is also posted on the CSLC website (www.slc.ca.gov, under the "Information" tab and "CEQA Updates" link).

Martinez Library 740 Court Street Martinez, CA 94553 (925) 646-2898	CSLC, Marine Facilities Division 750 Alfred Noble Drive, Ste. 201 Hercules, CA 94547 (510) 741-4950	CSLC, Division of Environmental Planning and Management 100 Howe Avenue, Ste.100-South Sacramento, CA 95825 (916) 574-1310

1.4 PURPOSE AND SCOPE OF THE EIR

1.4.1 Study Area Boundary

The scope of this EIR covers the environmental impacts associated with operation of the Amorco Terminal, with particular emphasis on oil transfer operations and vessel transit along shipping routes within San Francisco Bay and along the outer coast. This scope does not cover construction at, operation of, or maintenance to any associated Tesoro-owned upland facilities, including the Refinery and Amorco Tank Farm.

1.4.2 Baseline and Future Conditions

Baseline conditions are defined as the existing physical setting that may be affected by the Project (State CEQA Guidelines § 15125, subd. (a)). Specifically, baseline conditions are the local and regional physical environmental conditions in the Project vicinity, as they exist at the time the NOP was published (May 1, 2012), unless specified otherwise. This environmental setting will constitute the baseline physical conditions by which the CSLC will determine whether or not impacts from the proposed Project and alternatives are significant. The impacts of the Project are defined as changes to the environmental setting that are attributable to Project components or operations.

Future Conditions in the Project area include planned and approved projects. The CEQA requires an EIR to discuss the cumulative impacts of a project when the project's incremental effect is "cumulatively considerable" (State CEQA Guidelines § 15130). A cumulative impact is an impact that is created through a combination of the project being analyzed in the EIR and other projects in the area causing related impacts. Section 3.0, Alternatives and Cumulative Projects, defines the applicable geographic scope of the cumulative analysis ("Cumulative Projects Study Area"), and lists projects to be included in the cumulative environment.

Because the Amorco Terminal is currently existing and operating, this EIR examines the impact of continued Amorco Terminal operations on the environment during the proposed 30-year lease period. A description of the existing environmental setting within the Project area as it pertains to each physical resource analysis for potential impact is included in Section 4.0, Environmental Impact Analysis.

1.4.3 Impacts of Proposed Project and Summary of Alternatives Evaluated

This EIR identifies the potential environmental impacts of the Project on the existing environment and indicates if and how those impacts can be avoided or reduced by mitigation measures and/or Project alternatives. This document is intended to provide the CSLC with the information required to decide whether to issue the lease required to continue operations at the Amorco Terminal. As described in more detail in Section 4.0, Environmental Impact Analysis, and Section 6.0, Commercial and Sport Fisheries, potentially significant environmental impacts or no significant impacts are anticipated for the following resource areas.

Potentially Significant Impacts	***No Significant Impacts***
• Operational Safety/Risk of Accidents • Biological Resources • Water Quality • Land Use and Recreation • Visual Resources, Light and Glare • Commercial and Sport Fisheries	• Air Quality and Greenhouse Gas Emissions • Geology, Sediments, and Seismicity • Cultural Resources • Land-based Transportation • Noise

Pursuant to State CEQA Guidelines section 15126, subdivision (d), an EIR must also describe and evaluate a reasonable range of alternatives that would feasibly attain most of the Project's basic objectives, and, when feasible, would avoid or substantially lessen any of the significant impacts of the Project as proposed. The State CEQA Guidelines also state that the range of alternatives required to be evaluated in an EIR is governed by the "rule of reason"—that is, an EIR needs to describe and evaluate only those alternatives necessary to permit a reasoned choice and to foster informed decision making and public participation. This EIR will be used by the CSLC in determining whether to approve Tesoro's proposal for a new 30-year lease of State sovereign lands.

Following is a summary of the alternatives analyzed in this EIR. They are explained in greater detail in Section 3.0, Alternatives and Cumulative Projects.

- **No Project Alternative.** Under the No Project Alternative, Tesoro's Amorco lease would not be renewed and the existing Amorco Terminal would be subsequently decommissioned. Tesoro may choose to pursue transitioning the Avon Terminal (currently an export-only marine oil terminal) to absorb import operations from the Amorco Terminal. They may also choose to pursue various non-marine sources such as rail cars and trucks, and/or pipeline connections to other San Francisco Bay Area Marine Oil Terminals or a combination thereof, in order to meet regional refining demands. Pipeline delivery may require construction of new pipelines and/or the purchase of existing pipeline capacity from other local petroleum refinery competitors. The Refinery is part of the greater San Francisco Bay Area refining industry, and the future demand for crude oil at nearby refineries is not expected to decrease. This alternative assumes Refinery operations would be dependent on crude oil receipts through various other sources in order to meet regional refining demands.
- **Restricted Lease Taking Amorco Out of Service for Oil Transport.** Under Alternative 2, Tesoro's Amorco Terminal lease would be renewed with modification to restrict its allowed use. The existing Amorco Terminal would be left in place, but taken out of service for any petroleum produce transfer. This alternative also assumes Refinery operations would be dependent on crude oil receipts through various other sources in order to meet regional refining demands.

1.4.4 Organization of the EIR

In addition to this Introduction, the EIR contains the following sections:

- **Section 2.0 – Project Description** describes the proposed Project, its location and facilities, an overview of its operation, and schedule;
- **Section 3.0 – Alternatives and Cumulative Projects** describes the alternatives to the Project carried forward for analysis, the alternatives that were considered but eliminated from detailed evaluation, and those projects considered during the evaluation of cumulative impacts to the Project;
- **Section 4.0 – Environmental Impact Analysis** describes existing environmental conditions within issue areas, Project-specific impacts and associated mitigation measures, and includes impact analysis of Project alternatives and cumulative impacts;

- **Section 5.0 – Other Required CEQA Sections** addresses other required CEQA elements, including evaluation of growth-inducing impacts of the Project;
- **Section 6.0 – Commercial and Sport Fisheries** addresses impacts to these resources;
- **Section 7.0 – Socioeconomics and Environmental Justice** describes existing conditions and Project-related effects related to socioeconomics and environmental justice;
- **Section 8.0 – Mitigation Monitoring and Reporting Program** provides a tabular summary of all applicant-proposed measures and recommended mitigation measures identified to avoid or reduce significant impacts, the party(ies) responsible for tracking each mitigation measure, and how compliance with the mitigation measure will be reported; and
- **Section 9.0 – List of Preparers and References** presents information on the individuals who prepared the EIR and their qualifications and list of reference materials used to prepare the report.

Information from relevant documents, including the Shell Martinez Marine Oil Terminal Lease Consideration Project Final EIR (CSLC 2011a, State Clearinghouse [SCH] No. 2004072114) and the Shore[3] Terminals LLC Martinez Marine Terminal Lease Consideration Project Final EIR (CSLC 2012, SCH No. 2007112108), has been referenced, as appropriate for the preparation of this EIR. Information from previous EIRs pertinent to oil spill modeling has been reviewed for applicability to the Project. The types of significant impacts that could occur from vessels transiting to and/or from the Amorco Terminal in the San Francisco Bay and along the outer coast have remained similar to impacts discussed in both the 2004 and 2011 analyses. Particularly relevant are the data presented in the Shell Martinez Marine Oil Terminal Lease Consideration Project EIR, as both the Shell and Tesoro facilities are located on the Carquinez Strait, just west of the Benicia-Martinez Bridge, less than 0.5 mile from one another (see Figure 2-1 of Section 2.0, Project Description). Other resource information referenced has been reviewed for the age of data and validity to the current Project. Where appropriate, these information sources have been included.

[3] Formerly known as the Wickland Marine Oil Terminal, this marine oil terminal is currently known as the ~~Shore Selby Marine Oil Terminal~~ Plains Products Terminals, LLC under current ownership titles by NuStar.

2.0 PROJECT DESCRIPTION

As discussed in Section 1.0, Introduction, this Environmental Impact Report examines the potential environmental impacts associated with the Amorco Marine Oil Terminal Lease Consideration Project (Project). Section 2.0 provides a detailed description of the proposed Project, including: Project overview, Project location, existing Project components and 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) has applied to the California State Lands Commission (CSLC) for a new 30-year lease of sovereign land to allow Tesoro to continue operations at the Amorco Marine Oil Terminal (Amorco Terminal). The Amorco Terminal is primarily used to facilitate the transfer of crude oil feedstocks from tanker vessels to Tesoro's Amorco Tank Farm (Tank Farm) immediately upland; the feedstocks are later transferred via pipelines from the Tank Farm to the Golden Eagle Refinery (Refinery), located approximately 2.5 miles east of the Amorco Terminal.[1] The vicinity and location of the Amorco Terminal, Tank Farm, and Refinery are shown on Figure 2-1 and Figure 2-2.

The current Tesoro lease agreement (Lease No. PRC 3453.1, a General Lease – Industrial Use) was authorized by the CSLC with a 25-year term beginning in 1984. Tesoro has operated under the "holdover" provisions of the lease since its expiration on December 31, 2008. (i.e., the Amorco Terminal continues to operate under the terms of Lease PRC 3453.1 until the CSLC either terminates the current lease or authorizes the issuance of a new lease).

2.2 PROJECT LOCATION

2.2.1 Local Setting

The Amorco Terminal is located in the Carquinez Strait, approximately 0.25 mile west of the Benicia-Martinez Bridge, in the city of Martinez, Contra Costa County (see Figure 2-1). The Amorco Terminal currently operates on 16.6 acres of sovereign land leased from the CSLC, which will be reduced to 14.9 acres under the new 30-year lease proposed as part of the Project. Tesoro's associated Tank Farm, located approximately 0.3 mile south of the Amorco Terminal on 35.7 acres of Tesoro-owned property, is used

[1] The Refinery is served by Tesoro's Amorco and Avon Marine Oil Terminals. The Tank Farm, Refinery, and Avon Marine Oil Terminal are not part of the Amorco Terminal lease. Refinery operations are addressed here only as they pertain to Amorco Terminal import operations. The Avon Marine Oil Terminal has a separate CSLC lease (Lease No. PRC 3454).

to store product. The Tank Farm consists of five crude oil feedstock storage tanks with a combined capacity of 425,000 barrels, two firewater tanks with a combined capacity of 48,000 barrels, and associated pumps and pipelines connecting the Amorco Terminal, Tank Farm, and Refinery. Vehicular access to the facility is via Amorco Road, which connects to Marina Vista Road.

Tesoro's Golden Eagle Refinery is located approximately 2.5 miles east of the Amorco Terminal and Tank Farm on approximately 2,000 acres of Tesoro-owned property. Pipelines that connect the Tank Farm to the Refinery traverse the Pacheco Slough Pipeline Bridge, which is part of Tesoro's Amorco Wharf lease agreement (PRC 3453.1). 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 receives approximately 150,000 barrels per day (bpd) of crude oil import from waterborne and land-based sources.

2.2.2 Regional Setting

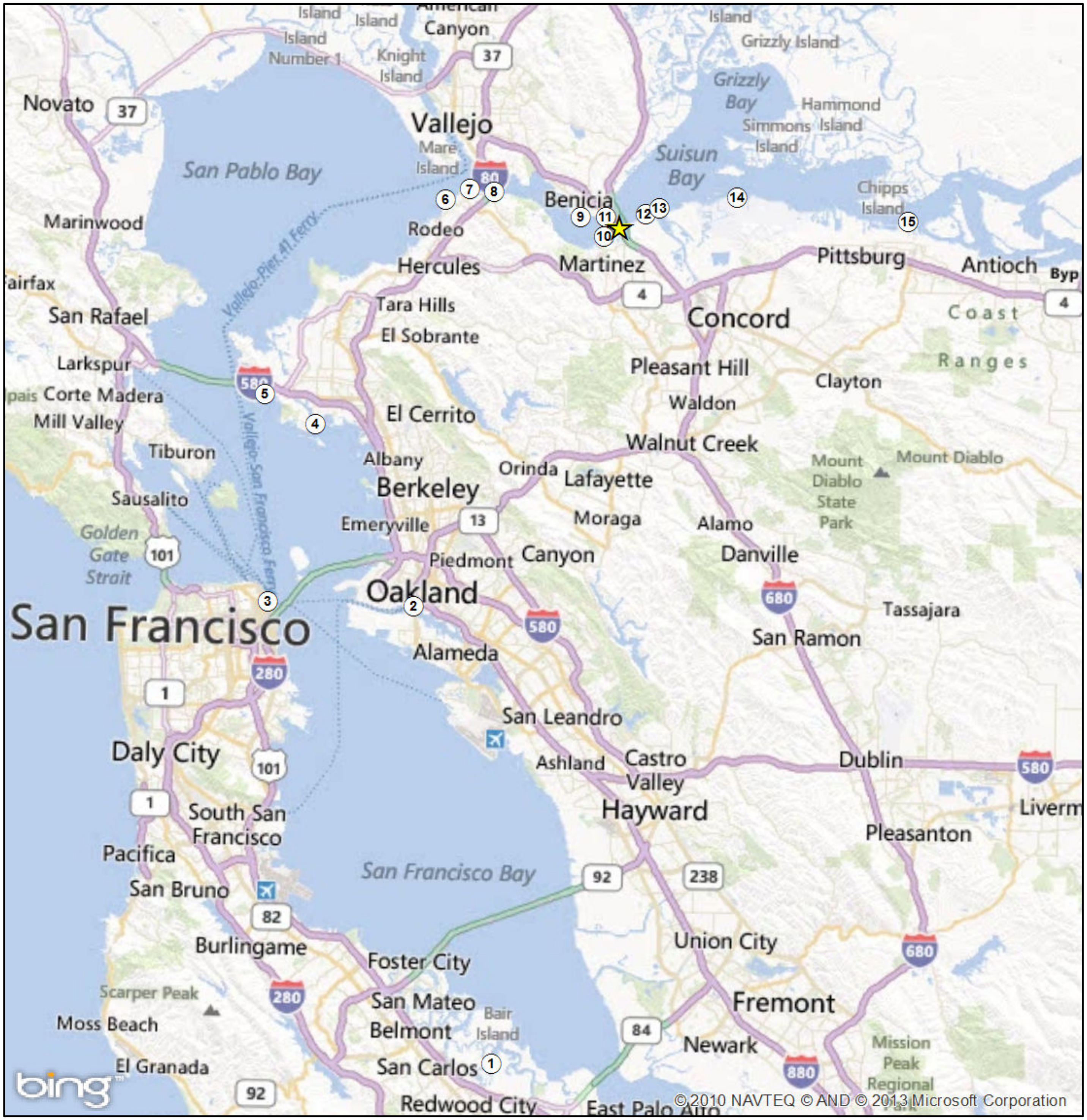
Five of California's 13 gasoline-producing refineries are located in the San Francisco Bay Area (Bay Area) (CARB 2009). In addition to the Golden Eagle Refinery, these refineries include (see Figure 2-1):

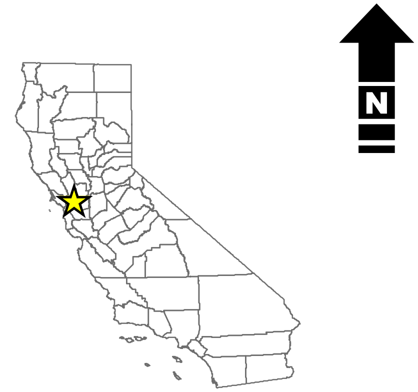
- Shell Oil Products U.S. Martinez Refinery (Shell) in Martinez;
- Valero Benicia Refinery (Valero) in Benicia;
- Phillips 66 San Francisco Refinery (Phillips 66) in Rodeo; and
- Chevron U.S.A. Inc. Richmond Refinery (Chevron) in Richmond.

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 Shell-owned pipeline from the SJV, a heated, proprietary system, supplies San Joaquin Valley Heavy (SJVH) crude to the Phillips 66, Valero, and Shell Refineries.

Figure 2-1 Project Overview
California State Lands Commission
Amorco Marine Oil Terminal
Lease Consideration Project





Amorco Terminal Location

Major Bay Area Terminals

1 Port of Redwood City
2 Port of Oakland
3 Port of San Francisco
4 Port of Richmond
5 Chevron Long Wharf
6 ConocoPhillips Rodeo
7 Shore Selby
8 C&H Sugar
9 Port of Benicia
10 Shell, Martinez
11 Valero, Benicia
12 Pacific Atlantic
13 Tesoro, Avon
14 Military Ocean Terminal Concord
15 PG&E Pittsburg

1 inch = 6 miles

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8/15/2013

TRC

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X:\CSLC\Amorco MOT\02 Project Description\mxd\Figure 2-2 Project Location.mxd

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

TRC

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CSLC Lease Boundary
Amorco Tank Farm

N

1:28,000

1 in = 2,333 ft

0 0.2 0.4 mi

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- 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 Rodeo refinery.
- 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.

Carquinez Strait and Further Inland

Two terminals, Phillips 66 Rodeo Marine Terminal and Shore Marine Oil Terminal (also known as NuStar or Selby Marine Terminal), lie west of the Carquinez Bridge in San Pablo Bay. In addition to the Amorco Terminal, marine oil terminals that lie inland, east of the Carquinez Bridge include: Shell Martinez, Plains Product Terminals, LLC, and Tesoro Avon Marine Oil Terminals 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[2] cargoes (City of Richmond 2013). 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.

[2] General cargo that must be loaded individually (i.e., not in intermodal containers or in bulk).

Port of San Francisco

The Port of San Francisco's (Port) marine facilities typically handle cargo,[3] rolling stock,[4] 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 2013).

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 of Oakland occupies miles of waterfront on the eastern shore of San Francisco Bay, with 665 acres devoted to maritime activities and another 3,000 acres devoted to aviation activities. Since 1962, 1,210 acres of marine terminals, an intermodal rail facility, and maritime support areas have been 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, and 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 not strictly within the Port of Oakland, but considered a part of the Oakland area. These include additional container terminals and a variety of large and small recreational craft harbors.

The former Oakland Army Base (OAB), consisting of 368 acres, is also located in the Oakland Harbor area, and was shuttered by the Base Realignment and Closure Commission in 1993 and transferred to the city of Oakland and Port of Oakland from 2003 to 2006. In April 2011, the city of Oakland led a joint planning effort along with the port for a master-planned development of both the port and city-owned OAB lands. The plans include a new intermodal rail terminal, a new bulk marine terminal, 30 acres of truck parking and service areas, 2 million square feet of new warehousing space, and a new recycling center (Port of Oakland 2013).

Port of Redwood City

The Port of Redwood City has no marine oil terminals and primarily handles cargo, liquid bulk, and dry bulk commodities for firms located near the port. The port is also a U.S. Coast Guard (USCG)-certified oil waste reception facility. Facilities include five wharves (Port of Redwood City 2010).

[3] Large shipments of varied cargo destined for one location and/or one specific project.
[4] Vehicles that move on a railway (e.g., railroad cars, coaches and locomotives).

2.3 PROJECT COMPONENTS

2.3.1 Marine Oil Terminal Configuration

The Amorco Terminal currently operates as an import-only facility for crude oil, although it has the capability to export crude oil or other heavy petroleum products (and in the past has been used in this capacity). The facility allows waterborne vessels to berth and moor, and supports the required equipment to transfer product, namely crude oil, between vessels and onshore storage tanks, otherwise known as unloading. Crude oil is generally a petroleum refinery feedstock that is extracted from underground sources and is minimally treated to reduce water content to merchantable grade, which is typically less than 3 percent water.

Amorco Wharf

While in the past the Amorco Terminal has supported multiple active berths, the existing Amorco Terminal is a single-berth docking facility supporting one active berth (located on the eastern end of the wharf). The wharf supports associated unloading equipment, including pumps, pipelines, electrical utilities, fire protection equipment, spill response equipment, and other mechanical equipment. The main docking facility is approximately 1,130 feet long by 150 feet wide. It is made up of 21 dolphins that are interconnected with walkways and/or continuous decking and two oil containment boom reel platforms, located at the far eastern and western ends of the Amorco Terminal (see Figure 2-3).

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 the terminal. Breasting dolphins are often equipped with mooring hardware for spring lines. Table 2-1 includes a summary of dolphins at the Amorco Wharf, including a description of piles and each dolphin's primary function (see Figure 2-3).

Table 2-1: Amorco Terminal Dolphins

Dolphin Number(s)	Pile Description (No of Piles, Pile Diameter, and Material)	Primary Function
A32, A33, A35, A36, A68, A69, A74, A75	• 331, 16-inch, timber • 13, 24-inch, steel	Provide pedestrian access between adjacent structures
A-34	• 113, 16-inch, timber • 4, 24-inch, steel • 6, 36-inch, steel	Supports offshore firewater pump and emergency backup generator; also serves as a turnaround area for vehicles
A70, A73	• 88, 16-inch, timber • 3, 24-inch, steel	Support elevated fire monitors and foam tanks
A-71	• 85, 16-inch, timber • 32, 24-inch, steel	Used for main transfer operations; supports unloading hoses, main piping manifold, and the building hosting the Amorco Terminal Person-in-Charge
A72	• 52, 16-inch, timber • 4, 20-inch, steel • 1, 24-inch, steel	Supports aluminum gangway structure that provides access to and from vessels
A-76, A-77, A-80	• 45, 24-inch, steel • 18, 36-inch, steel • 72, 20-inch, concrete (square) • 14, 14-inch, steel (H-pile)	Breasting and mooring dolphins that support fender system components and double quick-release hooks
A78, A79, A81, A82, A83	• 20, 16-inch, timber • 52, 20-inch, steel • 44, 20-inch, concrete (square) • 14, 14-inch, steel (H-pile)	Mooring dolphins

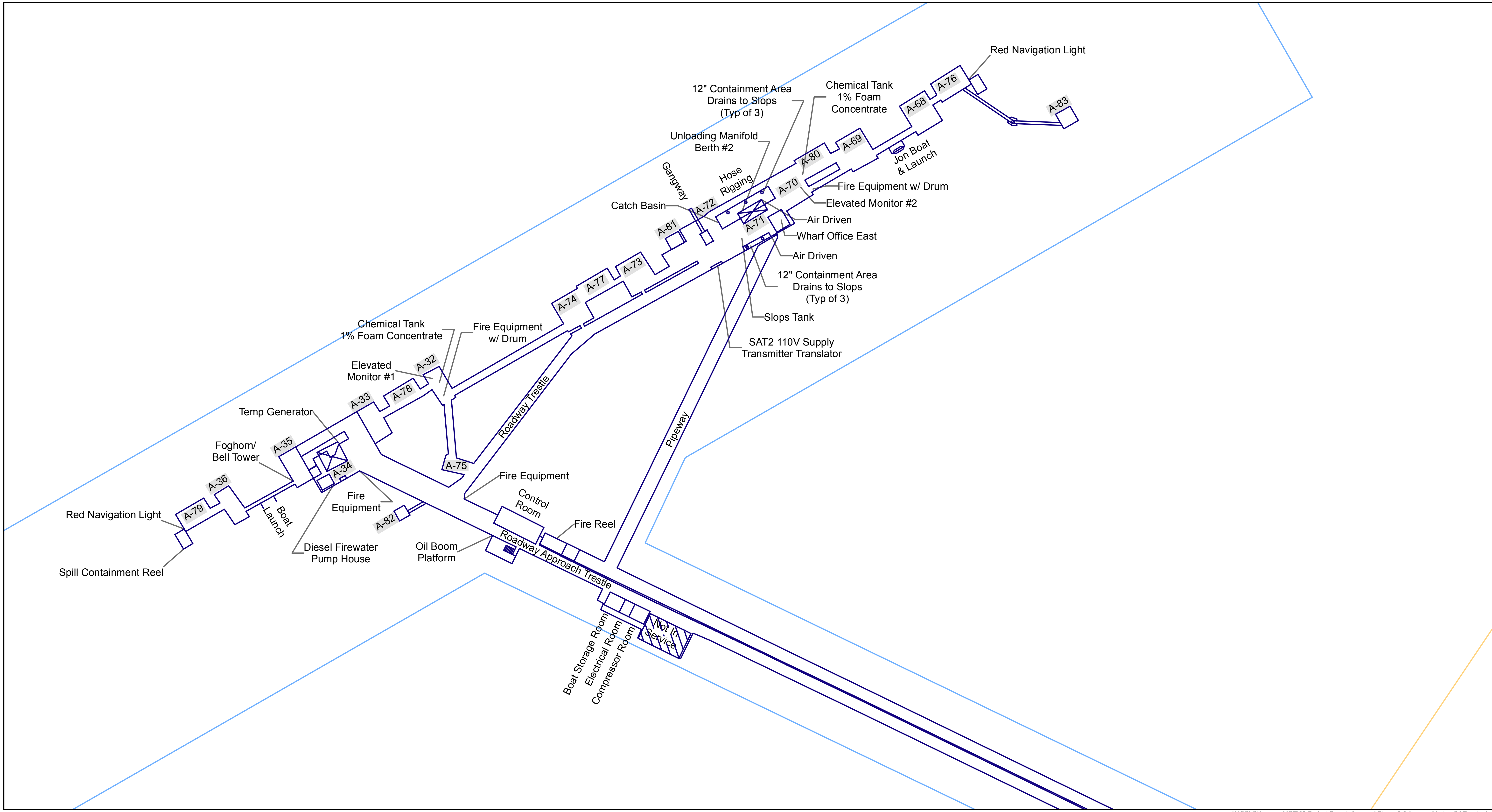
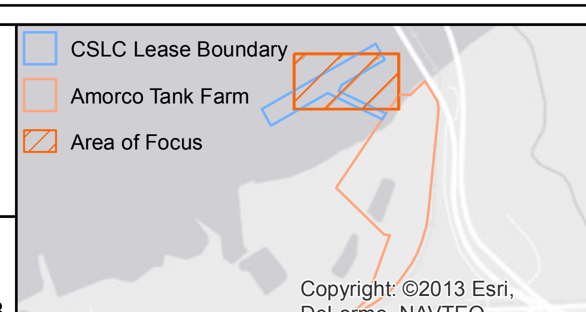


Figure 2-3
Amorco Marine Terminal
California State Lands Commission
Amorco Marine Oil Terminal Lease

7/1/2013



CSLC Lease Boundary
Amorco Tank Farm
Dolphins

1:1,200

N

1 inch = 100 feet

0 75 150 ft

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Approach Trestle

Access to the Amorco Terminal from the onshore Tank Farm is provided by a 28-foot-wide by approximately 1,500-foot-long approach trestle. The approach trestle is constructed of timber piles, pile caps, and other structural components such as cross-bracing, handrails, and decking. Timber decking provides pedestrian and vehicle access along the approach trestle. The approach trestle terminates at Dolphin A-34 on the west end of the facility (refer to Figure 2-3). Approximately 160 feet from the approach trestle termination point, another trestle branches off toward the northeast and provides pedestrian and vehicle access to Dolphin A-71.

Dock Pipelines and Loading Hoses

The pipelines that serve the Amorco Terminal are supported on the east side of the approach trestle. Amorco Terminal pipelines traverse above the water to approximately 1,100 feet from the shoreline. Approximately 350 feet before reaching the approach trestle termination point, the pipelines turn northeast and are supported by a dedicated 400-foot pipeway that connects to Dolphin A-71. Dolphin A-71 supports the Amorco Terminal manifolds and hoses. The manifolds service vessels that call on the northeast side of the Amorco Terminal.

Crude oil is offloaded at the Amorco Terminal with two USCG-approved 10-inch off-loading hoses. Product is transferred by the ship pumping system through the hoses, block valves, and a 20-inch diameter pipeline to onshore tankage. Crude oil remaining in the off-loading hoses is pumped back into the crude oil transfer line before hoses are uncoupled from the ship. In addition to the 20-inch diameter crude oil pipeline, the Amorco Terminal requires a 14-inch diameter firewater pipeline, a 4-inch diameter wastewater and recovered oil pipeline, a 3-inch diameter fire foam pipeline, and a 3-inch diameter compressed air pipeline. All pipelines are located above water and are accessible for inspection.

Additional Buildings

Four major buildings are located on the wharf. The first building, located on the west end of the Amorco Terminal, houses a diesel-driven firewater pump. The second building, located on the east end of the Amorco Terminal adjacent to the unloading manifold, 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 crude oil transfer and remote pipeline valve operations), and a panel for monitoring wind and currents. The third building, located on the approach trestle, is a personnel building containing a redundant tank- and pipeline-monitoring panel, wind- and current-monitoring display, and employee lockers and lunch facilities. The fourth building, located on the approach trestle, houses spill-response equipment, electrical and instrumentation panels, and an air compressor. For a depiction of building locations, refer to Figure 2-3.

Mooring & Berthing Capacities

As the Amorco Terminal has only one berth, it can only accommodate one vessel at a time. Nine mooring points are available, providing single pelican hooks, double pelican hooks, double quick-release hooks, and triple quick-release hooks.[5] Movements of product are accomplished using hoses, block valves, and associated steel pipelines. Transfer pumps located on the berthing vessel assist with transferring product through equipment.

The Amorco Terminal is currently authorized to accommodate up to 190,000 dead-weight ton (DWT) vessels with displacements up to 200,000 long tons (although the water depth at the berth limits vessel drafts to 38 to 40 ft. depending on vessel size).

Stormwater Management, Drip, and Recovered Oil Collection

A drip pan or catch basin provides stormwater and surface liquid containment at the unloading manifold area of the Amorco Terminal (refer to Figure 2-3). Stormwater and surface drips are collected and drained into a 500-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 the product transfer pipeline, but can also go via a 4-inch diameter slops pipeline. Collections are treated onshore at the Refinery's Wastewater Treatment Plant (WWTP).

In addition, the Amorco Terminal has the capability of receiving 'oily ballast water' (defined in Section 2.3.3) 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 is 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 Golden Eagle Refinery slops system, where water is pumped through the Refinery's oily water sewer and separator. 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 wastewater treatment system. The segregated tank onshore holds a maximum of approximately 14,600 barrels.

[5] Current mooring plans are on file with the CSLC Marine Facilities Division.

2.3.2 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). Crude oil tankers typically have specially constructed segregated water tanks that hold ballast water. Ships discharging ballast water from other areas may introduce nonindigenous species that can invade and possibly harm ecosystems. 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 Code of Federal Regulations (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.[6] 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. The USCG also amended its regulations for engineering equipment by establishing an approval process for ballast water management systems.

[6] 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.

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. In December 2008, the USEPA released the NPDES Vessel General Permit (VGP) for Discharges Incidental to the Normal Operation of Commercial Vessels and Large Recreation Vessels. In March 2013, the USEPA released the 2013 NPDES VGP, set to replace the 2008 VGP when it expires in December, 2013. The 2013 final VGP will continue to regulate 26 specific discharge categories that were contained in the 2008 VGP, and would provide coverage for fish hold effluent in the event that a permitting moratorium currently in effect expires in December 2014. For the first time, the final VGP contains numeric ballast water discharge limits for most vessels. The permit generally aligns with requirements contained within the 2012 U.S. Coast Guard 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

Amorco 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) and Public Resources Code sections 71200-71217 that specify ballast water management practices. Several of these ballast water management practices are permissible for vessels arriving from a California port; others are allowable for vessels arriving from a port or place outside the Pacific Coastal Region.[7] Ballast water management practices for vessels arriving from places outside the Pacific Coastal Region (Pub. Resources Code § 71204.3) include:

- exchanging the vessel's ballast water in mid-ocean waters, before entering the coastal waters of the State;
- retaining the 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;

[7] The Pacific Coast Region refers to all coastal waters on the Pacific Coast of North America east of 154 degrees West longitude and north of 25 degrees North latitude, exclusive of the Gulf of California.

- using an alternative, environmentally sound method of ballast water management that, before the vessel begins the voyage, has been approved by the CSLC in consultation with 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 the time of the request.

Ballast water management practices for vessels arriving from places within the Pacific Coastal 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, before entering the waters of the State, if that ballast water has been taken on in a port or place within the Pacific Coastal Region;
- retaining the ballast water onboard the vessel;
- using an alternative, environmentally sound method of ballast water management that has been approved by the CSLC 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
- under extraordinary conditions, conducting a ballast water exchange within an area agreed to by the CSLC in consultation with the USCG at 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 2010 and 2016. Through the interim, performance standards for ballast water discharges are outlined in section 2293. Subject to the implementation Schedule in section 2294, before discharging ballast water in waters subject to the jurisdiction of California, the master, owner, operator, or person in charge of a vessel to which this section applies shall conduct ballast water treatment so that ballast water discharged will contain 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 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 Vessel General Permit.

Amorco Terminal Requirements

As outlined in Tesoro's Amorco Marine Oil Terminal Operations Manual (Operations Manual), the Amorco Terminal has various requirements regarding the handling of ballast 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' SLOP tanks without causing undue delay to these ships.
- USEPA regulations concerning the storage, treatment, and disposal of hazardous and non-hazardous wastes.
- Tesoro corporate and Martinez refinery policies and procedures regarding wastewater treatment plant operations.

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-WWTP ballast transfer. The TPIC is responsible for taking custody of the samples for retention and completing the required documentation forms.

2.3.3 Marine Vapor Recovery System

Bay Area Air Quality Management District (BAAQMD) regulations require a Marine Vapor Recovery (MVR) system to capture hydrocarbon emissions from ships loading at a terminal. Because the Amorco Terminal is presently precluded from ship loading, an MVR system has not been included in current Amorco Terminal operations. Should Tesoro decide at a later date to use the Amorco Terminal for loading purposes, an MVR system would be developed and incorporated into current operations.

2.3.4 Marine Oil Terminal Engineering and Maintenance Standards

The Marine Oil Terminal Engineering and Maintenance Standards (MOTEMS) became effective on February 6, 2006, and are codified in Chapter 31F of the California Building Code – Marine Oil Terminals (Cal. Code Regs., tit. 24, § 3101F et seq.). The MOTEMS are reviewed and updated at least every 3 years and all terminals are required to comply with the most recent version. These minimum engineering, inspection, and maintenance standards 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.

Tesoro completed its initial MOTEMS Audit of the Amorco Terminal in November 2007, including comprehensive inspections and evaluations of the existing structural and non-structural facilities. Based on Tesoro's findings, seismic structural strengthening, fire system upgrades and comprehensive structural and non-structural improvements were initiated and completed at the Amorco Terminal between 2008 and 2013.

Tesoro also completed their first subsequent MOTEMS Audit of the Amorco facility in March 2011, and is required to continue to perform routine Audits and inspections of the Amorco Terminal in accordance with MOTEMS. Future actions to comply with MOTEMS Audit and inspection findings may include physical changes to the Amorco Terminal and associated lease area. Depending on the nature and extent of any such changes, additional discretionary review by the CSLC Marine Facilities Division and/or Land Management Division may be required. Such discretionary review may also trigger California Environmental Quality Act review of future actions.

The following primary modifications, among several other minor changes, were completed as a result of the 2007 and 2011 MOTEMS Audits.

- The Amorco Terminal firewater system was upgraded to include a new Uninterruptable Power Supply system, fire detection and alarm system, and back-up electrical generator.
- The seismic strengthening work was the largest undertaking, to address identified vulnerabilities to earthquakes, and included seismic improvement of the concrete breasting dolphins (Dolphins A-76, A-77 and A-80), timber loading platform (A-71), and timber fire pump platform (A-34). This project was completed in June 2013.
- Additional repairs identified in MOTEMS Audits and inspections have been completed, such as repair of sleeves on grout-filled fiberglass piles, installation of structural reinforcement fiberglass cross-bracing between piles, and installation of structural reinforcement of existing pile caps.

For more information regarding seismic upgrades, see Section 4.5, Geology, Sediments, and Seismicity.

2.4 OPERATIONS

Present operations at the Amorco Terminal involve the transfer of crude oil from tanker vessels to Tesoro's Tank Farm, from which the oil is eventually piped to Tesoro's Refinery. Equipment throughout the facility is controlled by both manual operators and automatic control systems. Marine 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 Amorco Terminal is capable of operating 365 days per year, 24 hours per day. Crude oil transfer operations are conducted in accordance with all applicable regulations and the Amorco Terminal Operations Manual required by California Code of Regulations, Title 2, section 2385.

2.4.1 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 Amorco 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 2.6, Emergency Response.

2.4.2 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 Amorco Terminal. The FSP is subject to approval at 5-year intervals by the USCG. The current agency-approved FSP will expire 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 Amorco 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 Amorco Terminal security building. Pedestrian access to the approach trestle is provided via an automated rotating gate that requires a valid Tesoro access badge to operate. Vehicle access is provided via an automated gate that is controlled by security staff. Over-water access ladders are provided at the Amorco Terminal; all ladders are secured with locked metal gates that must be manually unlocked for access.

Video camera surveillance is provided at various priority locations within the Amorco Terminal and associated onshore facilities. Multiple security video cameras are mounted and operated at the Amorco Terminal. Roaming security vehicles operate 24 hours a day, 365 days a year. Exterior lighting is provided along the approach trestle and at the wharf to allow for night operations and provide safety for employees. The wharf cannot be accessed from adjacent public shore areas.

2.4.3 Preliminary Amorco Terminal Inspection and Testing

The TPIC supervises all ship mooring and transfer operations, including inspection and testing of the Amorco 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 slops tank;
- inspect the fire water 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 assure 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 assure 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 Amorco Terminal is ready to transfer cargo;

- select and verify set points of pressure switches and valves;
- assure that any other traffic at the wharf is stopped; and
- notify the ship that the Amorco Terminal is ready for docking.

2.4.4 Berthing

Ships are required to berth in compliance with applicable USCG and MOTEMS requirements, including restrictions on size (both DWT and displacement) and draft of ships. Specific berthing procedures for the Amorco 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 Amorco Wharf Operations Manual. As indicated in these guidelines and the San Francisco Harbor Safety Plan, all berthing vessels must maintain 3 feet of under-keel clearance (UKC) when underway. Tesoro requires that vessels maintain 2 feet of UKC through any stage of the tide while alongside the Amorco Terminal. All vessels must have 3 feet of UKC when passing Pinole Shoal.

Additionally, the Amorco Terminal has the following tug boat requirements.

- Barges with 5,000 long tons of petroleum cargo on board must use a twin screw Class C tug or better for docking and undocking to complement the barge's line haul tug.
- Ships up to 50,000 DWT will require a minimum of two twin screw conventional Class A tugs for docking and undocking.
- Ships between 50,000 DWT and 120,000 DWT will require a minimum of one tractor and one twin screw conventional Class A tug for docking and undocking.
- Ships between 120,000 DWT and 188,500 DWT will require a minimum of two tractors and one twin screw conventional Class A tug for docking and undocking.

2.4.5 Mooring

Tesoro is required to maintain mooring configurations in accordance with MOTEMS. Ships are moored to minimize drift, with the center of a ship's manifold directly opposite the cargo hoses. In general, a minimum of 10 mooring lines are used for all vessel classes. Mooring limits also provides 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, Amorco Terminal staff are responsible for ensuring that the Amorco Terminal Operating Limits (TOLs) are enforced. Due to high currents and passing vessel effects at the Amorco Terminal, vessels are required to be tightly moored against the breasting dolphins. Tensioning is monitored by both vessel and wharf personnel throughout the time the vessel is moored.

Even though the ship is required to be moored to minimize drift, the wharf hoses can tolerate up to 10-foot drifts from the base centerline of the hose/manifold in either direction or parallel to the wharf. 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. Pumping rates to the wharf range from approximately 3,500 to 30,000 barrels per hour (bph).

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.

2.4.6 Transfers

Crude oil is transferred to the Amorco Terminal 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 is required to observe pump discharge pressures. Uninterrupted radio communication between the TPIC, VPIC, and the onshore operator is required to be maintained during the entire crude oil transfer. The TPIC closely observes 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 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 VPIC secures the pumps with a remote 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 slops system or pumped to the crude 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 landside 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 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 in the Amorco 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 Amorco Terminal are immediately suspended, including the suspension of transfer pumps and the closing of valves onboard the vessel. For more information regarding emergency response during product transfer, see Section 2.6.1, Emergency Shutdown.

2.4.7 Vessel Calls and Throughput Volumes

Table 2-2 shows the annual vessel calls and throughput for the Amorco Terminal for the years 2008 through 2012 in barrels per year (bpy). (For more information regarding vessel calls and throughput volumes, see Section 4.1, Operational Safety/Risk of Accidents.) As presented, over the last 5 years, Amorco Terminal crude oil receipts have ranged from 16.9 to 26.8 million bpy. Averaging 69 tankers per year (between 2008 and 2012), the Amorco Terminal has previously averaged less than two calls per week. Mooring time varies with vessel volume and type of cargo; however, ships are generally off-loaded at a rate of 17,000 to 18,000 bph. Typically, ships with a cargo between 360,000 and 530,000 barrels of product dock for approximately 20 to 30 hours.

The level of shipment activity and throughput is not expected to change substantially during the proposed 30-year lease agreement period. The development of new inland crude sources within California, such as Bakersfield, or the trans-shipment of crude oil from other domestic sources outside of California (e.g., via rail), which would replace marine shipments, is not anticipated. Marine shipments of crude oil and demands for refinery products are expected to continue at a similar or slightly increased rate as seen in previous years.

Anticipated Terminal use for operations in the immediate future ranges from approximately 20 million bpy (55,000 bpd) to approximately 30 million bpy (82,000 bpd) of imported crude oil. This corresponds to annual ship and barge traffic of approximately 60 to 90 vessels (anticipated maximum). This number of vessel calls serves as the basis for the impact analysis in Section 4.0, Environmental Impact Analysis.

Table 2-2: Amorco Terminal Vessel Calls and Terminal Receipts

Year	Total Vessels	Amorco Terminal Receipts (barrels per year)
2008	85	26,859,593
2009	76	22,540,607
2010	53	16,900,791
2011	64	22,634,330
2012	67	23,941,608

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 bpy. The Amorco Terminal is limited by the BAAQMD to 70,080,000 barrels per 12 consecutive months.

2.4.8 Terminal Operating Limits

MOTEMS requires terminals to establish Terminal Operating Limits (TOLs), berthing-system operating limits that are primarily based on mooring and berthing assessments. These TOLs are terminal-specific restrictions, addressing vessel size, environmental, berthing, mooring, gravity-loading, and other operating limitations. TOLs for the Amorco Terminal are included in the Operations Manual, per California Code of Regulations, Title 2, section 2385.

As mentioned in Section 2.3.1, the Amorco Terminal is currently authorized to accommodate up to 190,000 DWT. However, TOLs resulting from the draft of a ship's hull (the vertical distance between the waterline and the bottom of the hull [keel], with the thickness of the hull included) and the arrival mass of the vessel typically limit vessel sizes. The maximum overall length of vessels permitted to call at the Terminal is 941 feet. The minimum UKC of vessels ranges between 4 and 6 feet, depending upon vessel size.

Additional limiting factors for vessels calling at the Amorco Terminal involve water depth and bridge clearance. The maximum current draft of vessels transiting to the Terminal is restricted by the Pinole Shoals Channel, whose calculated maximum depth is approximately 34.5 feet Mean Lower Low Water (MLLW),[8] plus or minus the tide height at the transiting time, with allowance of at least 3 feet for under-keel clearance.[9] The maximum vertical bridge clearance (i.e., distance from the waterline to the lowest point

[8] Tides in the San Francisco Bay Area are mixed. Usually two cycles of high and low tides, each cycle characterized by varying height, occur daily. Occasionally, the tidal cycle will become diurnal (only one cycle of tide in a day). Depths in the san Francisco Bay are based on MLLW, which is the average daily low tide whereby the lowest low tide is averaged.

[9] Federal, State, and local agencies and shipping interests have considered deepening the Pinole Shoals.

along the bridge) for the Carquinez Bridge is approximately 134 feet Mean Higher High Water (MHHW) and for the Benicia-Martinez Bridge is approximately 135 feet MHHW.[10]

2.4.9 Shipping Routes

In 1992, the Western States Petroleum Association, in agreement with the California Department of Fish and Wildlife (CDFW, formerly the 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 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 2-4).

Once inside the Precautionary Area, vessels use the USCG Vessel Traffic Service on Yerba Buena Island. Vessels pass through Regulated Navigational Areas (RNA) on their way to the Terminal (see Figure 2-5). 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 the San Francisco Bay and San Pablo Bay up through the Carquinez Strait and enter Bulls Head Channel along the south side of Suisun Bay (see Figure 2-6). Vessels calling at the 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 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 crude oil from a large ship to a smaller vessel) to reduce draft prior to traveling through the shallower shipping channels that reach the Amorco Terminal. Lightering of crude oil is restricted to the Anchorage 9 area that is located south of the San Francisco Bay Bridge (see Figure 2-7). 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 the 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

[10] Ordinary circumstances do not require a tanker to go under the Benicia-Martinez Bridge for turning movements or shipments.

on alternative methods that would be implemented to partially load and unload or lighter cargos prior to berthing at the Terminal dock. Over the past approximately 6 years, Tesoro has had approximately six vessels lighter at Anchorage 9. None of these events occurred in 2012. In summary, during the proposed lease period, Amorco Terminal-bound vessels may lighter.

The distance from the Golden Gate Bridge to the Amorco 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 Bridge. This local pilot assists the ships in maintaining safe maneuvering upstream. At an average speed of 10 nm per hour (knots), it takes approximately 3 hours to reach the Terminal.

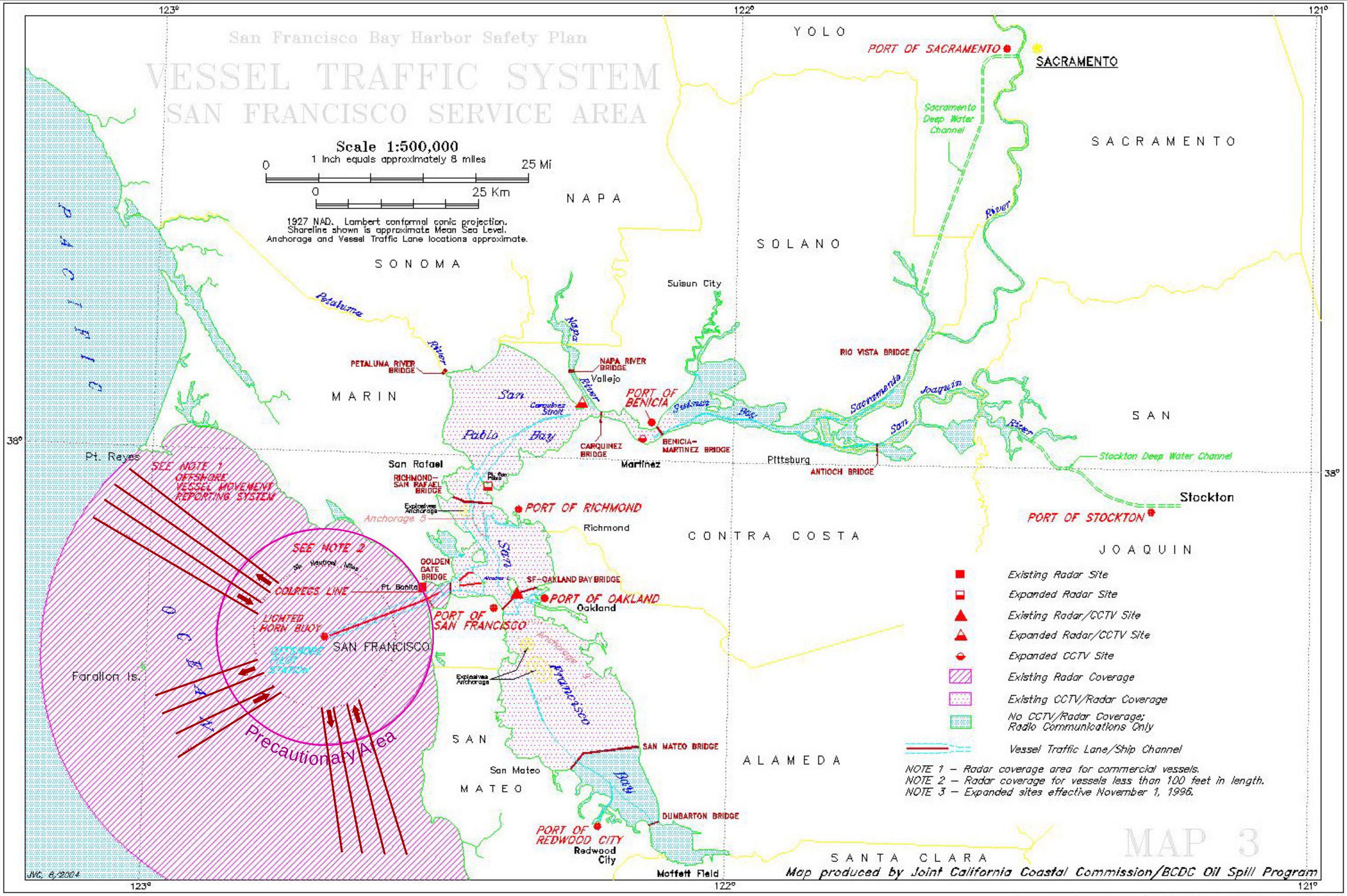
2.4.10 Waste Management

Waste generated during operations is minimal and of a household/commercial nature. Containerization and removal of solid municipal waste is currently accommodated by Golden Gate Disposal and Recycling Company.

2.5 INSPECTION AND MAINTENANCE

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

- The 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 deadweight 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 2.3.5.
- 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.



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

X:\CSLC\Amorco MOT\02 Project Description\mxd\Figure 2-4 Vessel Traffic System.mxd

Figure 2-4
Vessel Traffic System
California State Lands Commission
Amorco Marine Oil Terminal Lease Consideration Project

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Source: Marine Exchange of the San Francisco Bay Region

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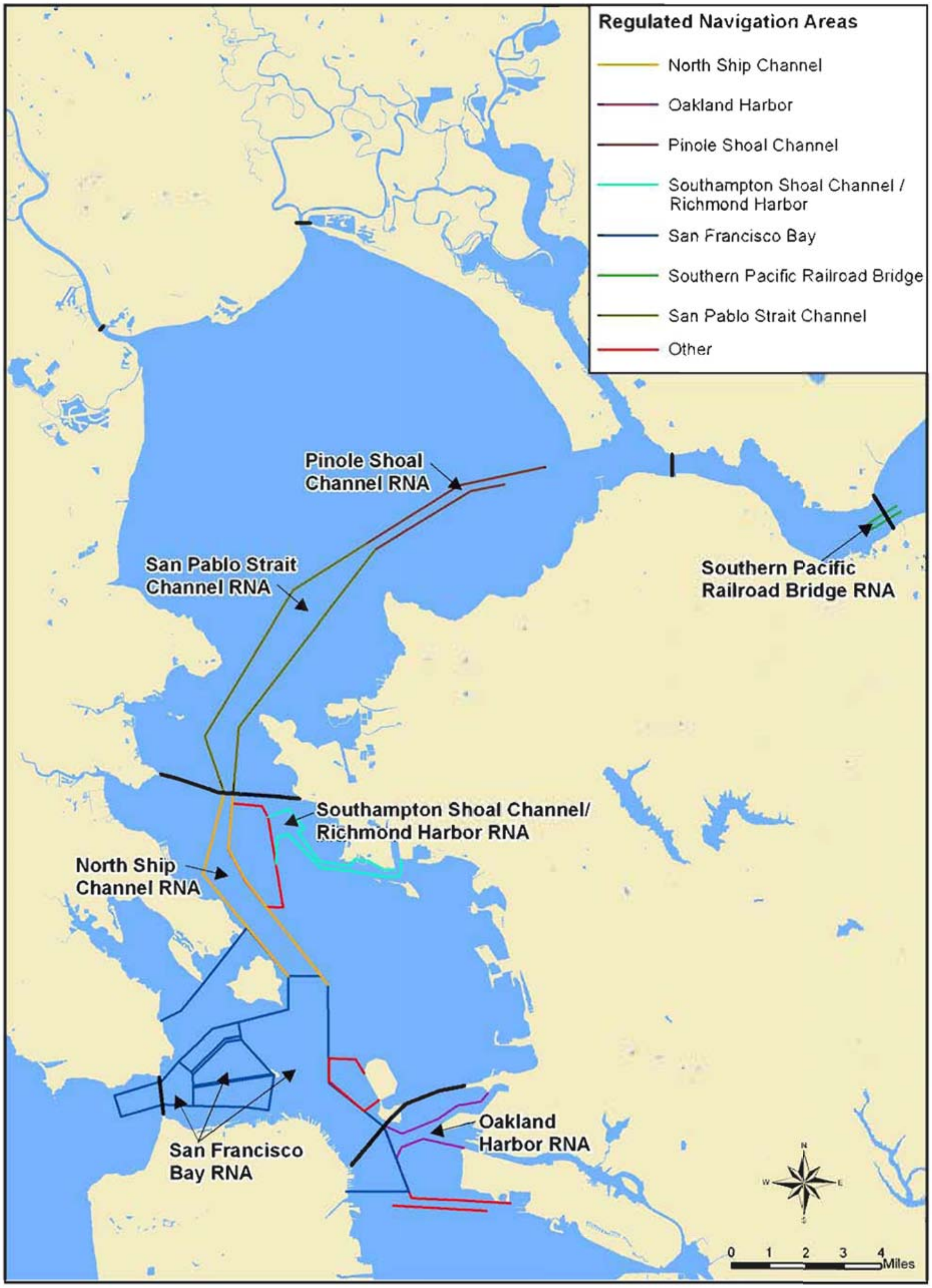

X:\CSLC\Amorco MOT\02 Project Description\mxd\Figure 2-5 Regulated Navigation Areas.mxd

Figure 2-5 Regulated Navigation Areas
California State Lands Commission
Amorco Marine Oil Terminal Lease Consideration Project

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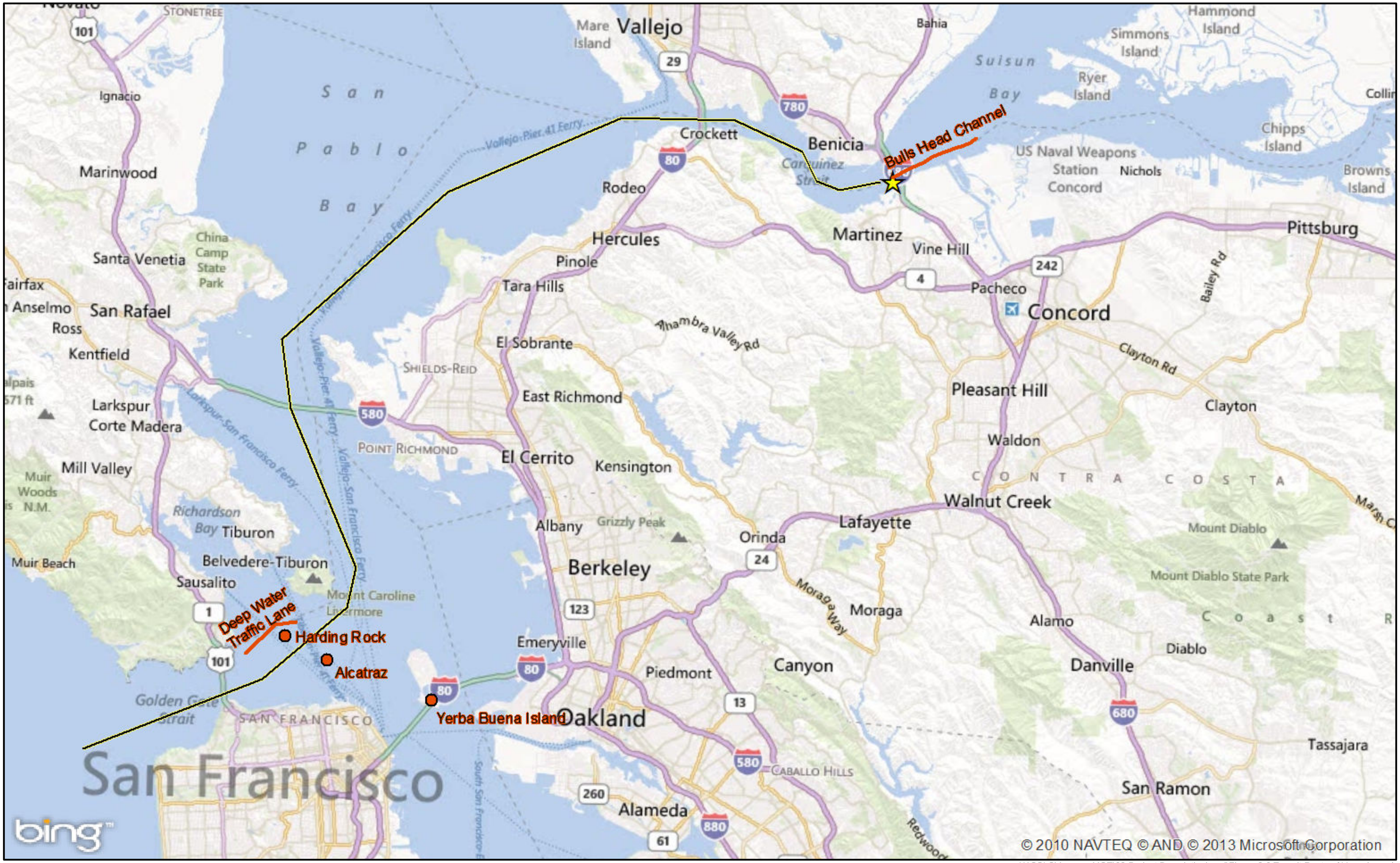

X:\CSLC\Amorco MOT\02 Project Description\mxd\Figure 2-6 Transit Route of Vessels.mxd

Figure 2-6
Transit Route of Vessels
California State Lands Commission
Amorco Marine Oil Terminal Lease Consideration Project

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★ Amorco Terminal Location
— Typical Transit Route

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1:250,000

1 inch = 4 miles

0 1.5 3 mi

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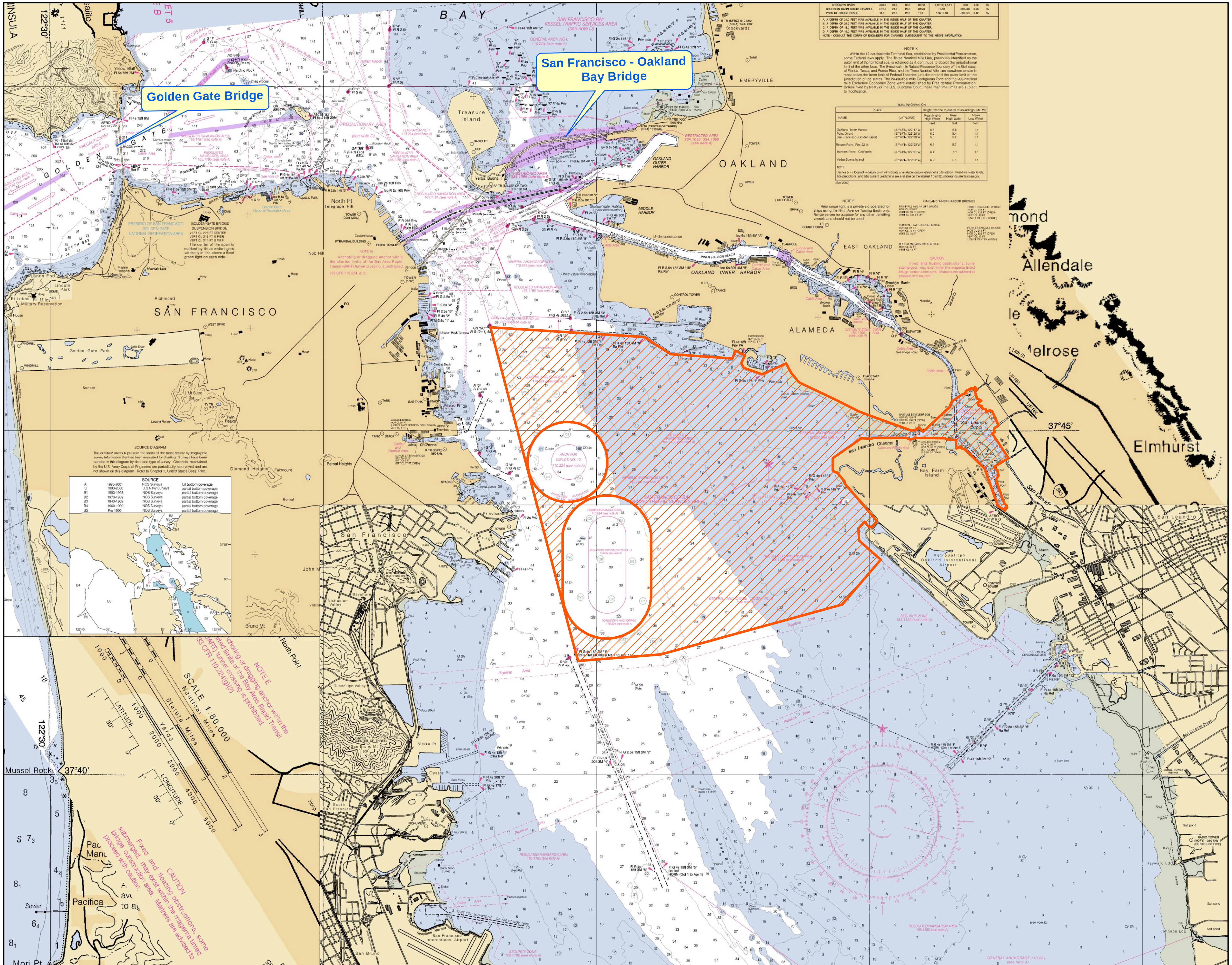

Figure 2-7 Lightering Area
California State Lands Commission
Amorco Marine Oil Terminal Lease Consideration Project

2/13/2013

1 inch = 2 mile

1:125,000

0 1.75 3.5 mi

TRC

CH X:\CSLC\Amorco MOT\02 Project Description\mxd\Figure 2-7 Lightering Area.mxd

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- 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.
- The fabrication and inspection requirements of American Society of Mechanical Engineers 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.

2.5.1 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 wharf 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 own maintenance and inspections of the facility. The Terminal equipment inspection program consists of annual component inspections and structural inspections of the wharf, approach trestle, 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 Amorco Terminal mechanical, instrumental, electrical, and structural systems are performed in accordance with MOTEMS requirements. Inspection reports are transmitted to the CSLC Marine Facilities Division upon completion. MOTEMS audits are completed and transmitted to the CSLC Marine Facilities Division on a triennial basis. Audit results 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.

2.5.2 Maintenance Dredging

The ship berthing area north of the Terminal is dredged periodically to maintain a depth of approximately 48 feet below MLLW, although the Terminal’s operating limits indicate that a minimum water depth of 44 feet must be maintained. Bathymetric surveys are conducted quarterly and maintenance dredging is only conducted as required to maintain minimum required depths. The last Amorco dredging event, conducted in 2005, entailed removal of 500 cubic yards of spoils. Spoils removed in 2005 were disposed at the

Hanson Aggregate site, located north of Waterfront Road just west of Pacheco Creek, in accordance with Amorco Terminal Water Quality Certification requirements of the San Francisco Bay Regional Water Quality Control Board (RWQCB). 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 spoils are tested and managed according to permits issued by jurisdictional agencies, including the CSLC, U. S. Army Corps of Engineers, San Francisco Bay Conservation and Development Commission, and San Francisco Bay RWQCB.

2.6 EMERGENCY RESPONSE

2.6.1 Emergency Shutdown

Transfer operations at the Amorco 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 Terminal);
- excessive wind, current, or passing vessel conditions that compromise safe mooring management of vessels;
- marine incidents such as 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 will 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 on board the vessel. Shut-off valves, both manual and motor operated, are located on the wharf to close off the transfer hoses and the crude lines connected to the shore pumps and tankage. Isolation valves for all transfer lines are located onshore at the end of the approach trestle. 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.

The TPIC will 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 spillage, agencies would be notified in accordance with Tesoro's Operations Manual and the Oil Spill Contingency Plan.

2.6.2 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 United States West Coast where the Amorco 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 Amorco Terminal or assist in setting sail.

Per MOTEMS, Tesoro maintains a Tsunami Response Plan that considers the possible effect of tsunamis on the Amorco Terminal.

2.6.3 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. Tesoro has and will continue to consider sea-level rise in Amorco Terminal assessments.

Tesoro conducts hydrographic surveys at the Amorco 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 Amorco Terminal Operating Limit diagrams will be re-evaluated when subsequent MOTEMS audits deem the sea-level rise to be significant enough to impact operations.

2.6.4 Amorco Terminal Oil Spill Response Capability

Table 2-3 lists available oil spill response equipment, as identified in Tesoro's Amorco 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.

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's Office of Spill Prevention and Response and the 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 Amorco 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.

1 **Table 2-3: Amorco 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
Miscellaneous 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
Miscellaneous PPE	Various	Various	1	Boat house
Miscellaneous equipment and absorbents	Various	Various	Various	Various
Miscellaneous 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 wharf
	2,400 ft	8 by 24	--	Amorco wharf
	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 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 wharf
	13	8 in by 40 ft bag	--	Amorco wharf
Type 151 sorbent sheets	100	100 per package	1 to 4	Boat house
	46	100 per package	1 to 4	Avon wharf
	14	100 per package	--	Amorco wharf
Type 126 sorbent sweeps	80	100 ft per package	1 to 4	Boat house
	48	100 ft per package	1 to 4	Avon wharf
	25	100 ft per package	--	Amorco wharf
Type 100 absorbent rolls	35	100 ft per package	1 to 4	Boat house
	5	100 ft per package	--	Avon wharf
	5	100 ft per package	--	Amorco wharf

Type/Model	Quantity	Size[1]	Deployment Time (hours)	Location
Vessels "Avon I" Munson Hammerhead Serial No. ALF with Volvo/Penta AQAD 42/290 single prop motors. • Motor Serial Nos. 2204132960, Stern Drive Serial Nos. 3102051898 • Motor Serial Nos. 2204132936, Stern Drive Serial Nos. 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. (Back-up 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 wharf
SV I, Make: Avon (1992), Model S4. 65 RIBS, Vessel No. CF4908 JZ. Work Order No. 86649	1	13 ft	2	Boat house
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 Amorco 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

2.6.5 Process Safety Controls

The objective of the Amorco Terminal control systems is to provide controls to transfer crude oil from a ship docked at the Amorco Terminal to onshore tankage both reliably and safely while minimizing environmental concerns. The controls to meet these objectives consist of the following systems and subsystems:

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

Descriptions of these systems are provided below.

Isolation Valve Monitoring and Control System

Amorco Terminal isolation valves are motor-operated valves (MOV) equipped with Limitorque actuators, push-button controls, and status lights. Valves are controlled via Local Control Panels located in offshore buildings (refer to Section 2.3.1). Remote switches are also located at each MOV so that valves can be manually opened or closed if required. MOVs located at the unloading manifold can close within 30 seconds, per CSLC requirements.

As discussed in Section 2.4.7, crude oil is pumped from the Amorco Terminal to onshore tankage via pumps located on the vessels. Pump and over-pressurization protection for the vessel and associated discharge lines are provided by the vessel. Thermal relief to the slops system is provided via relief valves located on each of two 10-inch discharge lines. Pressure transmitters on the crude line display pressure in the control room and alert operators to abnormal conditions. Under emergency conditions, Amorco Terminal operators would alert the ship and shut down the transfer.

Two 10-inch hoses used for unloading crude from the vessel connect to the two 10-inch discharge lines, each equipped with its own MOV. The purpose of the two 10-inch manifold MOVs is to isolate the wharf from the tank fill lines in the event of a leak or a fire. As the valves are located within the zone of a potential wharf fire, they are fireproofed. These are high-performance valves, specially designed for fast closure (under 30 seconds). In addition to the two 10-inch isolation valves, another isolation valve is provided on the 20-inch line at the Y on the wharf approach, and another 20-inch MOV is located onshore.

The Local Control Panels can open and close the MOVs on the wharf and can close the 20-inch MOV onshore. In addition to these Local Control Panels, offshore control panels receive status information from all isolation valves and can be used to open or close the MOVs, as needed.

Crude Metering Skid System

A new system to meter the amount of crude being discharged from a vessel was installed in 2007. This crude metering skid, which is located just downstream from the onshore Jurisdictional Valve, also analyzes the crude for water. There are two Instrument Analyzer overview screens available to assist the TPIC in monitoring the process of safely discharging crude oil feedstock. In addition to the metering skid display, the screen also shows the status of the on-wharf fire pump, high-pressure alarm settings, and sump level.

Mooring Line Tension Monitors

This system is designed to continuously monitor the tension of vessel's mooring lines while moored at the Amorco 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 start-up of equipment.

Equipment and vessels are protected from over-pressuring by Pressure Safety Valves (PSVs) and by locking open valves to insure an open relief path. At the Amorco Wharf 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 PSVs set points. PSVs associated with pipelines and the Amorco wharf are replaced yearly per CSLC and USCG regulations to ensure correct operation.

Fire Protection System

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

- onshore firewater pump that takes suction from land-based tankage;
- offshore firewater pump that takes suction from the Suisun Bay;
- two fireboat connections that extend over water and tie into the Amorco Terminal firewater header;
- multiple hose reels, monitors (portable and fixed), hydrants, and foam tanks located at the Amorco Terminal;
- hydrants and monitors located along the approach trestle, spaced at a maximum of 150-foot intervals;
- two elevated monitors with foam supply tanks that can be controlled both manually and automatically from remote locations (back-up foam supply line that can be supplied from onshore pumper trucks);
- offshore subdeck sprinkler systems, located underneath the firewater pump; and
- multiple portable and wheeled dry chemical extinguishers at the Amorco Terminal.

The offshore and onshore firewater protection systems are interconnected and work in conjunction to maintain firewater pressure. San Francisco Bay water from the vertical firewater pump located on the wharf is used as the primary source of water. If a low-pressure situation occurs, the wharf pump will start automatically. If the low-pressure situation were to continue, the secondary onshore firewater pump would start and provide fresh water from the two firewater tanks onshore.

A 14-inch line supplies firewater from the onshore firewater tanks to the Amorco Terminal (refer to Figure 2-3). The line runs the length of the approach trestle to the extreme eastern end of the wharf, ending with a valve and fireboat connection for hook up to the firewater system. A 12-inch line splits off of the 14-inch line and supplies firewater to the western end of the wharf. This line also has a valve and fireboat connection. There is also a 6-inch line that comes off the 14-inch line near the eastern end of the wharf. Monitors and hose reels are installed at reasonable intervals. Additional dry hydro-chem carts are placed along the wharf near the elevated monitors.

Two 30-foot-tall monitors located on each side of the unloading manifold have automatic and remote start-up capabilities. These monitors are capable of vertical and horizontal sweeps with foam water mixers and adjustable-nozzle water patterns. A 1,000-gallon tank containing 1 percent foam is located near each monitor. There is enough foam to fight a fire for 1 hour. If a fire lasts more than 1 hour, emergency equipment can be hooked up to a 3-inch dry line, and 3 percent foam can be pumped onto the wharf. Portable trailers filled with 3 percent foam are stationed at the shore end of the wharf. Solenoid valves are used to open the separate 1 percent and 3 percent foam lines. Flow of water/foam is rated at 1,500 gallons per minute and 100 pounds per square inch. Two control panels allow crews to remotely fight fires. A manual control unit is also located at the monitors.

In addition, a sprinkler system has been installed at the berth, under the containment pan, on the eastern end of the wharf. This is necessary because foam and water sprayed on top of the wharf will not flow under the wharf due to the (intentional) sealing that the pan creates. At appropriate spacing along the wharf approach and berth, holes have been cut in the wooden wharf deck planking (covered by metal plates) to allow personnel to lower cellar nozzles to fight fires below deck. Part of the under-deck sprinkler system also protects the firewater pump shelter that houses the pump, motor, gearbox, and support structures in case of a fire.

Fire protection equipment and procedures, including fire equipment function, features, operation, and arrangement, are compiled in the *Amorco Marine Oil Terminal Fire Protection Plan (2011)*. This plan includes photos and maps documenting the locations of fire-protection equipment for Amorco Terminal personnel. Fire response is performed by Tesoro’s Emergency Response Team (ERT) on-site at the Golden Eagle 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 Golden Eagle 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 is 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 Amorco wharf, in accordance with Tesoro’s Operations Manual and Fire Response Plan. All other onshore or offshore fires at the Amorco Terminal would be managed by Amorco Terminal personnel and the ERT, in accordance with Tesoro’s Operations Manual and Fire Response Plan.

3.0 ALTERNATIVES AND CUMULATIVE PROJECTS

The California Environmental Quality Act (CEQA) requires the California State Lands Commission (CSLC), as the CEQA Lead Agency, to analyze (1) alternatives to a proposed project that could feasibly achieve the objectives of the project while substantially reducing significant environmental effects and (2) cumulative impacts. This section describes the alternatives considered for the Amorco Marine Oil Terminal Lease Consideration Project (Project) and evaluates their environmental impacts in comparison to those from the proposed Project. The section concludes with an analysis of potential cumulative impacts, or “two or more individual effects which, when considered together, are considerable or which compound or increase other environmental effects” (State CEQA Guidelines § 15355).

3.1 SELECTION OF ALTERNATIVES

3.1.1 Alternatives and Screening Development

An important aspect of the environmental review process is the identification and assessment of reasonable alternatives that have the potential to avoid or reduce the significant impacts of a proposed project to allow for a comparative analysis for consideration by decision-makers. The State CEQA Guidelines provide the following guidance for evaluating alternatives in Environmental Impact Reports (EIRs).

An EIR need not consider every conceivable alternative to a project. Rather, it must consider a reasonable range of potentially feasible alternatives that will foster informed decision-making and public participation. An EIR is not required to consider alternatives which are infeasible. (§ 15126.6, subd. (a).)

- The discussion of alternatives shall focus on alternatives to the project or its location which are capable of avoiding or substantially lessening any significant effects of the project, even if these alternatives would impede to some degree the attainment of the project objectives, or would be more costly. (§ 15126.6, subd. (b).)
- In selecting a range of potential reasonable alternatives to the proposed project, the Lead Agency shall include those that could feasibly accomplish most of the basic objectives of the project and could avoid or substantially lessen one or more of the significant effects. Among the factors that a Lead Agency may use to eliminate alternatives from detailed consideration are: (i) failure to meet most of the basic project objectives, (ii) infeasibility, or (iii) inability to avoid significant environmental impacts. (§ 15126.6, subd. (c).)
- The EIR shall include sufficient information about each alternative to allow meaningful evaluation, analysis, and comparison with the proposed project. If an alternative would cause one or more significant effects in addition to those that

> would be caused by the project as proposed, the significant effects of the alternative shall be discussed, but in less detail than the significant effects of the project as proposed. (§ 15126.6, subd. (d).)

CEQA also requires an EIR to evaluate a "no project" alternative. The purpose of describing and analyzing a no project alternative is to allow decision-makers to compare the impacts of approving the proposed project with the impacts of not approving the project. The analysis of the no project alternative must discuss the existing conditions at the time the Notice of Preparation is published, as well as what would be reasonably expected to occur in the foreseeable future if the project were not approved.

3.1.2 Alternatives Screening Method

Alternatives to the proposed Project were selected based on input from the EIR study team, the Applicant (Tesoro Refining and Marketing Company LLC [Tesoro]), and the public and local and State jurisdictions during scoping and agency consultations. The alternatives screening process consisted of three steps:

Step 1: Define the alternatives to allow comparative evaluation.

Step 2: Evaluate each alternative in in the context of the following criteria:

- the extent to which the alternative would accomplish most of the basic goals and objectives of the Project;
- the extent to which the alternative would avoid or lessen one or more of the identified significant environmental effects of the Project;
- the potential feasibility of the alternative, taking into account site suitability, economic viability, availability of infrastructure, general plan consistency, and consistency with other applicable plans and regulatory limitations; and
- the requirement of the State CEQA Guidelines to consider a "no project" alternative and to identify, under specific criteria, an "environmentally superior" alternative in addition to the "no project" alternative. (State CEQA Guidelines § 15126.6, subd. (e).)

Step 3: Determine suitability of the proposed alternative for full analysis in the EIR. If the alternative is unsuitable, eliminate it, with appropriate justification, from further consideration. Feasible alternatives that did not clearly offer the potential to reduce significant environmental impacts and infeasible alternatives were removed from further analysis. In the final phase of the screening analysis, the environmental advantages and disadvantages of the remaining alternatives were carefully weighed with respect to potential for overall environmental advantage, technical feasibility, and consistency with the Project and public objectives.

If an alternative clearly does not provide any environmental advantages as compared to the proposed Project, it is eliminated from further consideration. At the screening stage, it is not possible to evaluate potential impacts of the alternatives or the proposed Project with absolute certainty. However, it is possible to identify elements of the proposed Project that are likely to be the sources of impact. A preliminary assessment of potential significant effects of the proposed Project resulted in identification of the following environmental resource areas for which potential Project-related impacts may occur:

- Operational Safety/Risk of Accidents
- Biological Resources
- Water Quality
- Air Quality
- Greenhouse Gas Emissions
- Geology, Sediments, and Seismicity
- Cultural Resources
- Land Use/Recreation (oil spill impacts)
- Noise
- Land-based Transportation
- Visual Resources, Light and Glare
- Commercial and Sport Fisheries
- Integrity of Amorco Terminal
- Environmental Justice

For the screening analysis, the technical and regulatory feasibility of various potential alternatives was assessed at a general level. Specific feasibility analyses are not needed for this purpose. The assessment of feasibility was directed toward reverse reason, that is, an attempt was made to identify anything about the alternative that would be infeasible on technical or regulatory grounds. CEQA does not require elimination of a potential alternative based on cost of construction and operation/maintenance. For the proposed Project, those issues relate to:

- engineering feasibility and feasibility of implementation;
- reasonableness when compared to other alternatives under consideration; and
- adequacy of the alternative to meet the Project’s purpose and need.

Those alternatives that were found to be technically feasible and consistent with the Applicant’s objectives were reviewed to determine if the alternative had the potential to reduce the environmental impacts of the proposed Project.

Table 3-1 summarizes the evaluation and selection of potential alternatives to be addressed in this EIR. Those listed in the first column have been eliminated from further consideration (see rationale in Section 3.2, Alternatives Eliminated from Full Consideration), and those in the second column are described in Section 3.3, Alternatives Evaluated in this EIR, and evaluated in detail in Section 4.0, Environmental Impact Analysis.

Table 3-1: Summary of Alternative Screening Results

Alternatives Eliminated from Consideration	Alternatives Evaluated in this EIR
• Consolidation Terminal • Deep-water Port Consolidation • Limitations of Terminal for Emergency Product Transfer Use Only • Alternative Lease Term with Phase Out • Trucking-Only Alternative	• No Project • Restricted Lease taking Amorco Out of Service for Oil Transport

This EIR alternatives analysis includes alternatives that potentially would result in greater environmental impacts to some issue areas, or would transfer a similar level of environmental impacts to other existing marine terminal facilities, as compared with the proposed Project. These alternatives are included for analysis to demonstrate that, regardless of lease renewal, similar levels of impacts may occur in meeting the refining needs of the San Francisco Bay Area (Bay Area) region by increased activities at other Bay Area marine oil terminals and associated refineries.

3.2 ALTERNATIVES CONSIDERED BUT ELIMINATED FROM FULL CONSIDERATION

3.2.1 Consolidation Terminal

A potential alternative to the proposed future use of the Amorco Terminal is a consolidated marine oil terminal where petroleum and product are offloaded and onloaded at a central facility and delivered to and from refineries, storage terminals, and other facilities in the Carquinez Strait and east Bay Area via smaller marine vessels or pipelines. The Draft EIR/Environmental Impact Statement (EIS) for the San Francisco to Stockton Phase III (John F. Baldwin) Navigation Channel Project (USACE 1997) presented the Richmond Marine-Link Pipeline System (RMLPS) as an alternative to channel deepening and continued dredging within San Pablo Bay and Carquinez Strait. This RMLPS proposal was withdrawn by its proponent, Wickland Pipelines LLC, in February 1999, due to a lack of potential user participation.

The RMLPS was proposed as a consolidated facility. The pipeline systems associated with the RMLPS were intended to provide flexibility in the areas of cargo handling and transportation cost control, reduce vessel-to-vessel lightering of crude oil at Anchorage 9, and reduce tanker traffic in the greater San Francisco Bay and Carquinez Strait. This would have been possible because the pipeline system would have allowed tankers of up to 300,000 dead weight, long tons to proceed at high tide (when ships drafting 48 to 49 feet can pass through the 45-foot-deep channel to Richmond) to the new RMLPS marine terminal and off-load in the natural 53- to 55-foot depths of the berth at a new deep-water wharf.

The west end of the RMLPS pipeline would have commenced within the Richmond city limits at a new deep-water wharf to be constructed at Point Molate, north of the Chevron Richmond Long Wharf. The pipeline would have connected to a new tank farm on the San Pablo peninsula, either at Point San Pablo or Point Orient, and continued along the shorelines of San Pablo Bay and Carquinez Strait, terminating in Pittsburg at the existing Pacific Gas and Electric Company power plant.

As compared to use of other existing Bay Area marine oil terminals for replacement of the Amorco Terminal, the RMLPS consolidated terminal, as a new facility, would have generated a greater number of environmental impacts in the Point Molate area. In comparison with the alternatives, potential impacts would be transferred from Amorco to that new location. Also, with both the RMLPS and Long Wharf operating in proximity to each other, consideration would need to have been given to the potential for increased risk of vessel collisions. Because the RMLPS is no longer a viable option for a new Bay Area terminal, and because there is a potential for a greater risk of significant environmental impacts, the RMLPS consolidated terminal has been eliminated from further consideration as a viable alternative.

3.2.2 Deep-water Port Consolidation

The concept of an offshore port located outside of San Francisco Bay was also considered. This would involve development of a port several miles off the California coastline to minimize the potential for spills that would impact San Francisco Bay shorelines, and to reduce the number of tankers entering United States ports and related risks of environmental damage. One such offshore terminal, the Louisiana Offshore Oil Port, operates in deep water 18 miles offshore. This facility became operational in 1982 (U.S. Department of Interior 1990). The port consists of three single-point mooring buoys used for the offloading of crude tankers and a marine terminal consisting of a two-level pumping platform and a three-level control platform.

While such concepts appear to have potential to reduce near-shore tanker accidents, significant questions remain unanswered as to the environmental and economic benefits of these facilities off the coast of California. As such, this concept was eliminated from further analysis as an alternative in this EIR.

3.2.3 Limitations of Amorco Terminal for Emergency Product Transfer Use Only

For consideration of emergency use only, the Amorco Terminal would not be used for day-to-day operations, but would be retained in a state of readiness with all equipment operational. Under emergency conditions, use of the Amorco Terminal would be restricted for use by any tanker or barge that would require unloading of its contents. While reduced use of the Amorco Terminal would decrease the risk of spills, it would not necessarily cause a proportionate decrease in vessel calls or throughput. The Amorco Terminal would still present a continuous potential for a pipeline spill release. In addition, the method used to replace the throughput (pipelines with connections to other terminals) could shift the risk to other terminals. It would also be difficult to maintain the existing level of training and experience of personnel now working at the Amorco Terminal, as well as raise questions as to who would maintain and operate such a facility. It is unlikely that the Amorco Terminal would be able to operate efficiently or economically, nor would there be any environmental benefit gained by limiting usage only to emergency oil transfer use; therefore, this alternative has been eliminated from further consideration as a viable alternative.

3.2.4 Alternative Lease Term with Phase Out

An alternative lease option would involve granting a shorter-term lease to Tesoro, in the event that Tesoro would phase out its operation of the Amorco Terminal. The alternatives considered in this document are designed to focus on avoiding or substantially lessening significant effects of the Project, but to still meet Project objectives that allow the Golden Eagle Refinery (Refinery) to continue to operate. With a phase-out of operations of the Amorco Terminal, Tesoro would be required to find another means of receiving crude to maintain Refinery operations. This is similar to the No Project Alternative, except that Tesoro would be granted a specific phase-out period and conditions under lease, rather than having no lease (as with the No Project Alternative). The terms under which the CSLC would implement a phase-out of operations would need to be specifically developed for this facility; as such, discussion of a short-term lease is not considered further in this document.

3.2.5 Trucking-only Alternative

This alternative would involve using only trucks to import product to the Refinery. A minimal number of trucks currently deliver materials to the Amorco Refinery. However, the additional number of trucks likely needed under this Alternative would require construction of additional roadways and roadway improvements for transfer of product to the Refinery. Amorco Terminal throughput has ranged from to 16.9 to 26.8 million barrels per year (bpy) (between 46,301 and 73,425 barrels per day [bpd]) over the past 5 years. Since the average truck carries approximately 200 barrels per tandem tanker truck, as many as 367 tandem tanker trucks per day or approximately 134,000 trucks per year would be required to make up the difference in product for the Refinery without the Amorco Terminal. The installation of additional access gates and parking capacity to allow appropriate entering and exiting of the facility would be required. In addition, pumps and piping to transfer the contents of trucks would be needed. Due to the number of truck trips, this alternative is not economically practical, would exceed the capacity of the local roadway systems, have significant air quality impacts, and create a significant safety risk. As a result, this alternative was eliminated from further consideration.

3.3 ALTERNATIVES EVALUATED IN THIS EIR

3.3.1 No Project

Under the No Project Alternative, Tesoro's Amorco Terminal lease would not be renewed and the existing Amorco Terminal would be subsequently decommissioned with its components abandoned in place, removed, or a combination thereof. The decommissioning of the Amorco Terminal would be governed by an Abandonment and Restoration Plan, and an Abandonment Agreement, both of which would require CSLC review and approval. Decommissioning of the Amorco Terminal would include, but not be limited to, the following actions:

- magnetic survey of seafloor, multi-beam survey and/or side-scan sonar;
- abandon and/or remove all Amorco Terminal components above and below the seafloor, including pipelines;
- site Clean-up Verification using such means as side-scan sonar, remotely operated vehicles and video, and;
- completion of a Phase 1 Site Assessment (and more detailed assessment if needed). Based on the results, a Site Closure Plan would be prepared for approval by appropriate agencies.

Under the No Project Alternative, Tesoro might pursue transitioning the Avon Marine Oil Terminal (currently an export-only terminal) to absorb import operations from the Amorco Terminal, thereby increasing the throughput at the Avon Marine Oil Terminal to the Refinery to meet regional refining demands. Tesoro's Avon Marine Oil Terminal would only be capable of operating as both an import and export facility if the wharf was substantially upgraded and expanded to meet the current combined throughput capacities for both terminals. An additional CEQA evaluation would be required to analyze the impacts from expanding import/export operations at the Avon Terminal to accommodate Amorco Terminal's importing capacity.

In addition, Tesoro may consider alternative means of traditional crude oil transportation such as a pipeline and/or rail transportation to absorb import operations from the Amorco Terminal. Sources may include land-based transportation such as rail cars and trucks, and/or pipeline connections to other Bay Area terminals, or a combination thereof. Pipeline delivery may require construction of new pipelines and/or the purchase of existing pipeline capacity from other local petroleum refinery competitors. While the CSLC may have no jurisdiction over any of these land-based forms of transportation (except for pipeline or road- and railway construction underneath and/or across waterbodies under CSLC jurisdiction), construction and operation of facilities would be subject to substantial environmental review and permitting by other local and state agencies.

Land-based alternatives to the use of marine tankers at the Amorco Terminal include pipelines, railcars and trucks. There are two rail lines into the Refinery, which are currently used for shipment via railcar. If developed as part of the No Project Alternative, rail lines and associated handling facilities would require additional construction. As shown in Table 2-2 in Section 2.0, Project Description, the Amorco Terminal throughput has ranged from to 16.9 to 26.8 million bpy (between 46,301 and 73,425 bpd) over the past 5 years. Since the average railcar holds approximately 700 barrels, up to approximately 105 rail cars per day would be required to make up the difference without the Amorco Terminal (assuming no other non-marine sources were used in combination with rail transportation). Additional pumps and piping to transfer the contents of these railcars would also need to be installed. Note that the required number of railcars would need to be adjusted dynamically as Refinery throughput varies. This alternative would entail construction of additional rail and rail handling facilities at the Refinery associated with regional demand increases. Additional labor effort and logistics would likely be required for the unloading of fuel from individual railcars; as such, Tesoro would likely use rail transportation in combination with truck and pipeline delivery to meet existing regional refining demands.

The Refinery can also currently ship refined (lighter) products, such as gasoline components or intermediates, via pipeline to the Plains All America Martinez Terminal (Plains Terminal). There may be some ability to increase storage capacity at the Plains Terminal for eventual transfer of product to the Refinery. Currently, the Plains Terminal Pipeline can transfer a maximum of 10,000 barrels per hour (bph) (240,000 bpd) of light crude oil products. If used for heavier, more viscous, crude oil products (as would be needed for the No Project Alternative), capacity would need to be reduced. In addition, Tesoro currently uses a nearby Kinder Morgan Pipeline in which it leases capacity for transfers from other Bay Area refineries. As a partial solution, if the Amorco Terminal was decommissioned, the Refinery may be able to increase use of this pipeline, expand existing storage capacity at other refineries, or increase pipeline capacity.[1] Currently, the maximum transfer capacities of the Kinder Morgan Pipeline on the north and south ends of the Amorco Terminal are 4,000 bph (96,000 bpd) and 5,000 bph (120,000 bpd), respectively. However, again, these lines are currently used for transferring lighter crude oil products and would likely require a reduction in capacity to pump and transfer heavier crude oils to the Refinery. Pipeline transfer rates would have to meet a capacity of 3,750 bph (90,000 bpd) to meet existing regional refining demands.

[1] According to Tesoro Refining and Marketing Company LLC, there are currently no known domestic or international crude oil sources that are currently accessible by pipeline for Tesoro's Refinery. This premises that replacement of regional demand from land-based sources via pipeline would still require the use of waterborne crude oils, but would be transported to the Refinery via pipeline from other marine oil terminals. Therefore, the No Project Alternative assumes that impacts associated with the transport of oil would be removed from the local setting, but may not be removed from the regional setting.

Construction of new or modified pipelines and additional storage tanks would be required to meet regional refining demands for the Refinery by pipeline delivery. Pipelines capable of handling this capacity may be viable from an environmental perspective. However, prior to construction and use of any new pipelines, lengthy and complex regulatory processes, land availability evaluations, and acquisition of easements or rights-of-way would be required. In general, any modifications to other Bay Area marine oil terminals would require substantial environmental review and local permitting. Since specific modifications are assumed on a general basis, brief analyses are presented in Section 4.0 of this EIR.

For the purposes of this EIR, it is assumed that the No Project Alternative would result in a decommissioning schedule for the Amorco Terminal. The potential implementation of one or more future crude oil or product transportation alternatives to the Golden Eagle Refinery would be the subject of a subsequent application to other agencies having jurisdiction pertinent to the proposed alternative. Decommissioning, abandonment, and/or deconstruction of the Amorco Terminal or any other proposed reuse of the Amorco Terminal would require a separate CEQA review by the CSLC. Since details associated with decommissioning, abandonment, and/or deconstruction would need to be developed if they were to occur, for the purposes of this EIR, impacts are discussed herein only generally.

3.3.2 Restricted Lease Taking Amorco Terminal Out of Service for Oil Transport

Under this alternative, Tesoro's Amorco Terminal lease would be renewed with modification to restrict its allowed use such that the existing Terminal would be left in place, taken out of service and placed into caretaker status for any petroleum product transfer, and not decommissioned or demolished. No environmental impacts would be associated with these activities. Because the structure of the terminal would remain in place, Tesoro would retain the option to apply to bring it back into service for oil transport at some time in the future, should the need arise. Any future change in use of the Amorco Terminal would require a lease action and potential separate CEQA review by the CSLC. Alternative uses for the Amorco Terminal could include:

- use of the Amorco Terminal as a staging area for dredging operations, maintenance and upgrades to other terminals, or training exercises;
- the option for Tesoro to bring the Amorco Terminal back into service as a fully operational petroleum product transfer facility, or;
- sale of the Amorco Terminal to another entity for the above, or for other uses.

As with the No Project Alternative, Tesoro might absorb import operations from the Amorco Terminal by transitioning the Avon Marine Oil Terminal to import and export operations or consider alternative means of traditional crude oil transportation such as a pipeline and/or rail transportation, or use some combination of the these sources.

3.3.3 Environmentally Superior Alternative (Summary)

State CEQA Guidelines section 15126.6, subdivision (e)(2) states:

> *The "no project" analysis shall discuss the existing conditions at the time the notice of preparation is published, or if no notice of preparation is published, at the time environmental analysis is commenced, as well as what would be reasonably expected to occur in the foreseeable future if the project were not approved, based on current plans and consistent with available infrastructure and community services. If the environmentally superior alternative is the "no project" alternative, the EIR shall also identify an environmentally superior alternative among the other alternatives*." (Emphasis added.)

The EIR's Environmentally Superior Alternative is discussed in Section 5.0, Other Required CEQA Sections, after the analyses of potential significant environmental effects associated with the proposed Project have been addressed (see Sections 4.0 through 4.12).

3.4 CUMULATIVE RELATED PROJECTS

This discussion provides a listing and map identifying other related past, present, and future projects near the location of the proposed Project and alternatives. State CEQA Guidelines section 15355 requires that an EIR consider cumulative impacts of a project when the project's incremental effect is cumulatively considerable, as identified in section 15065, subdivision (c). Where a lead agency is examining a project with an incremental effect that is not "cumulatively considerable," a lead agency need not consider that effect significant, but shall briefly describe its basis for concluding that the incremental effect is not cumulatively considerable. As defined in State CEQA Guidelines section 15355, a cumulative impact consists of an impact that is created as a result of the combination of the project evaluated in the EIR together with other projects causing related impacts. An EIR should not discuss impacts that do not result in part from the project evaluated in the EIR.

3.4.1 Boundary of Cumulative Projects Study Area

The study area for the proposed Project includes the San Francisco Bay to San Pablo Bay regions, Carquinez Strait, and the outer coast of California (see Section 1.0, Introduction). Because the geographical region that could be affected by the Project is the same, the cumulative projects study area coincides with the Project study area, and is comprised of the following components presented in Section 3.4.2:

- foreseeable projects in the general vicinity of the Amorco Terminal; and
- projects in or near the shipping lanes used by other carriers for transport of petroleum or other goods and materials within the Carquinez Strait, San Pablo Bay, and San Francisco Bay.

Most vessel traffic in the study area is not the responsibility of Tesoro. However, these vessels could have an accidental spill/release of oil in the San Francisco Bay, San Pablo Bay, or outer coast en route to the Amorco Terminal. A general overview of cumulative impacts is presented in Sections 4.1 through 4.10, including a description of the existing environment and impact analysis within each environmental discipline. A description of the regional characteristics of transport in the San Francisco Bay and San Pablo Bay regions and outer coast is presented in Section 3.4.3.

3.4.2 Description of Cumulative Impacts

Projects in Vicinity

Shell Martinez Marine Oil Terminal (Shell Terminal)

The Shell Terminal has operated at its current location offshore of the city of Martinez, Contra Costa County, since 1915. The Shell Terminal is a tanker and barge petroleum loading/unloading facility used to receive raw materials for the Shell Martinez Refinery and for exports of its refined products. In 2011, the CSLC, as CEQA lead agency, certified a Final EIR (State Clearinghouse [SCH] No. 2004072114) in conjunction with its approval of a new 30-year lease of approximately 20 acres of California sovereign land on which the Shell Terminal is located.

The Shell Terminal falls under the Marine Oil Terminal Engineering and Maintenance Standards (MOTEMS), which and are codified in the California Code of Regulations, Title 24, Chapter 31F – Marine Oil Terminals (Cal. Code Regs., tit. 24, § 3101F et seq.). MOTEMS requires that all marine oil terminals be audited and inspected every 3 years to determine compliance with the most recent standards. As a result of the inspections and audits, deficiencies that require repair, rehabilitation or retrofit are identified and plans prepared, required permits are obtained, and corrections are implemented. Shell completed an initial audit in 2008 and a subsequent audit in 2011. As a result of these audits, several deficiencies were identified requiring repair, rehabilitation, or retrofit. Many of these deficiencies have been completed. Projects remaining to be addressed include an ongoing project to perform minor seismic upgrades to some pile-to-pile cap connections on the timber approach trestle and two long-term capital projects in the planning and design phase that involve a seismic upgrade of the loading platforms and an increase in fender systems at the main berths.

The Shell Terminal docking facility has four berths—Berths #1 and #2 located on the north side (channel side) and Berths #3 and #4 south side (inland side). The north side of the Shell Terminal normally maintains a minimum draft of 38 feet Mean Lower Low Water (MLLW), and has not been historically dredged. The southern berths are normally used for barges and are not currently in use due to the accumulation of silt. These berths were dredged to -20 feet MLLW in 1989 and Shell currently has no plans for dredging them.

Should dredging be required during the lease period, Shell would pursue the appropriate plans and permits.

Martinez Marina

The Martinez Marina and Yacht Club are located immediately west of the Amorco Terminal. The Martinez Marina has been in operation since the 1950s. In 1993, the city of Martinez adopted a Marina Master Plan that called for upgrades including: installation of a new boat launch ramp; deepening of existing water channels for boats; and installation of a new bait shop, additional boat storage, and a new waterfront restaurant. Marina progress to date includes: removal of the old ferry pier, construction of Ferry Point Plaza, installation of the new boat launch, initial dredging of the marina entrance, and removal of underground storage tanks. The next phase will include more dredging, break-water wall repair, and entrance reconfiguration. This is a multi-phase project that will take place over the next several years and is contingent upon the availability of public and private funding. In addition, the Yacht Club offers a variety of amenities and services to its members, including a store, kitchen, outdoor seating and barbeque area, showers, dance floor, bar, television and wireless internet media, and views of the Carquinez Strait.

San Francisco Bay to Stockton Phase III – John F. Baldwin Navigation Channel Project

This project involves the assessment of the feasibility of deepening a 65-mile-long, 35-foot-deep draft navigation channel, extending from the San Francisco Bay entrance to the Port of Stockton (through San Francisco, Marin, Contra Costa, Solano, Sacramento, and San Joaquin counties). In July 2002, the U.S. Army Corps of Engineers (USACE) and Port of Stockton executed a Pre-construction, Engineering and Design (PED) Agreement, initiating the first phase of the channel-deepening assessment, which focused on potential saltwater-intrusion issues and project economics. As a result of this first phase, the Port of Stockton and USACE found sufficient evidence to support the continuation of the study and the initiation of a General Reevaluation Report, and executed a revised PED Agreement in April 2004.

A Draft Supplemental EIS/Subsequent EIR for the Sacramento River Deepwater Shipping Channel, Contra Costa, Solano, and Yolo Counties, California, February 2011 (CEQ 20110055) was prepared by the USACE. The U.S. Environmental Protection Agency (USEPA) had some comments primarily related to the use and disposal of the generated dredge spoils from the project and water quality impacts. The Central Valley Regional Water Quality Control Board (RWQCB) has placed severe restrictions on all dredging activities occurring within the Delta; restrictions that, if unchanged, will make the project very difficult to construct, including required operations and maintenance on the existing channel.

San Francisco Water Emergency Transit Authority (WETA) Ferry Expansion (Antioch to San Francisco)

The WETA was established by Senate Bill (SB) 976 to replace the existing Water Transit Authority. SB 1093 was later passed to further detail the mandate of WETA. WETA is tasked to provide emergency response during times of disaster by providing improved infrastructure through the use of water-based response. WETA's main priorities were the creation of an Emergency Water Transportation System Management Plan for the Bay Area. Part of its focus is on developing a more comprehensive ferry system, which includes adding 7 new routes and up to 31 new ferries. One of the new routes will go between San Francisco, Martinez, and Antioch (refer to Figure 2-1 in Section 2.0, Project Description).

Plains All American (Plains) Martinez Marine Oil Terminal 20-year Lease

The Plains Martinez Marine Oil Terminal is a 225-acre site located at 2801 Waterfront Road in the city of Martinez near the south shore of the Carquinez Strait. Originally, Urich Oil leased the parcel location in 1973 and operations began in 1974. Since 1974 the lease has been amended several times as ownership has changed. Most recently, the terminal was acquired by Plains. In 2005, the CSLC, as CEQA lead agency, certified a Final EIR (SCH No. 2001042022) in conjunction with its approval of a new 20-year lease of approximately 5 acres of California sovereign land on which the Terminal is located. The Plains Terminal's upland property contains storage tanks, an inactive truck loading rack, inactive rail spur, pumps and associated pipelines, vapor collection and combustion systems, and an office building. The wharf is a single-vessel docking facility with associated pumps, pipelines, electrical utilities, and other mechanical equipment. Cargo pumps for vessel unloading are located in the upland portion of the facility, about 1 mile from the wharf (CSLC 2011a).

Tesoro Avon Marine Terminal

Tesoro is seeking approval for a new 30-year lease from the CSLC for its existing Avon Marine Oil Terminal operations located approximately 2 miles east of the Amorco Terminal (refer to Item 13 on Figure 2-1). In addition to seeking a new lease, Tesoro must conduct substantial maintenance work for the existing terminal to meet MOTEMS.

Military Ocean Terminal Concord (MOTCO)

MOTCO, which is located approximately 4.5 miles east of the Amorco Terminal (refer to Item 14 on Figure 2-1), was formerly a part of the Naval Weapons Station Seal Beach Detachment Concord. Prior to that, it was known as Concord Naval Weapons Station. MOTCO consists of an approximately 115-acre inland area and an approximately 6,526-acre tidal area, which includes 2,045 acres of offshore islands. The inland area is within the boundaries of the city of Concord and neighbors the unincorporated community of

Clyde. The tidal area is part of unincorporated Contra Costa County and adjacent to the city of Pittsburg and the unincorporated community of Bay Point. Five of MOTCO's seven offshore islands are located within Solano County. The inland and tidal areas are connected by a stretch of Port Chicago Highway. The tidal area contains approximately 5 miles of shoreline and facilities for reception, staging, and loading of ammunition; railroad and truck classification yards; and three ocean terminal piers. Its purpose is to allow the Department of Defense operations plan for the Pacific Rim.

MOTCO operates three ocean terminal piers and a U.S. Army-owned rail system that connects with two major public rail lines. The long-term vision for MOTCO is to transform the facility into a versatile, modern, and efficient seaport capable of receiving, staging, and onward-moving of ammunition and general cargo as necessary to meet Department of Defense requirements.

<u>San Francisco Bay and Delta Sand Mining Project</u>

In 2005, the CSLC, as CEQA lead agency, certified a Final EIR (SCH No. 2007072036) in conjunction with its renewal of existing 10-year sand-mining leases for construction-grade sands from three main areas, including the Central Bay Lease, located primarily west of Angel Island and Alcatraz Island; the Suisun Bay/Delta Lease, located north of Bay Point and extending east toward Antioch; and the Middle Ground Shoal Lease, located offshore of the former Concord Naval Weapons Station. Sands are mined using a trailing-arm hydraulic suction dredge and barge. Sands are then typically transported and offloaded at one of several sites located throughout San Francisco Bay, San Pablo Bay, and the Delta. A total of up to approximately 2 million cubic yards (Mcy) of sand are proposed to be mined each year.

Projects In or Near Bay Area Shipping Lanes

<u>Long-term Management Strategy (LTMS) Program</u>

The LTMS program is designed to provide a regional plan for the disposal of dredged material from the San Francisco Bay over the next 50 years. The LTMS program began in January 1990 as a federal/State partnership among the four agencies that have regulatory authority for dredged material in the San Francisco Bay: the USACE, USEPA, San Francisco Bay RWQCB, and San Francisco Bay Conservation and Development Commission. These four lead agencies share responsibility for managing the various components of the LTMS. The LTMS Final EIR/EIS indicates that approximately 6 Mcy of sediments must be dredged and disposed each year from shipping channels and related navigational facilities in the Bay Area. The estimated total volume of dredged material that would require disposal over the 50-year LTMS planning horizon is approximately 300 Mcy. The policy alternatives involve different volumes of dredged sediment being disposed at in-Bay, ocean, and upland/wetland reuse sites. Under current regulatory conditions, 80 percent or more of the dredged material would continue to be disposed at designated sites in the Bay, with only a small percentage of material disposed outside the estuary at the new offshore ocean site or used in “beneficial reuse” applications, such as wetlands restoration.

Delta Dredged Sediment LTMS Program

In late 2004, local sponsors of Delta dredging projects and the USACE met to explore the feasibility of developing an LTMS for dredging and dredged materials placement or reuse in the Delta. A similar process was used to successfully develop a collaborative, coordinated approach to dredging and sediment management in San Francisco Bay. In 2007 the USACE, California Bay-Delta Authority, USEPA, California Department of Water Resources (DWR), State Water Resources Control Board, Delta Protection Commission, and Central Valley RWQCB signed the charter to develop and implement a long-term plan.

The Delta is the source of California’s two largest water-distribution systems: The Central Valley Water Project, operated by the United States Bureau of Reclamation, and the State Water Project operated by the DWR. Maintaining high-quality water in the Delta is critical for drinking-water supplies, agricultural irrigation, and ecosystem function. The Sacramento and San Joaquin river channels also provide important shipping access to the ports of Sacramento and Stockton.

In recent years, conflicts about levee rehabilitation, dredging, and placement of dredged sediments have been increasing. There is an ongoing need to dredge Delta channels for navigation, water conveyance, flood control, and levee maintenance. At the same time, there are increasing regulatory concerns about the potential impacts to water quality and the ecosystem from levee work, dredging activities, and dredge materials placement and reuse. In the last several years, agencies, political leaders, and the public have become increasingly concerned about the urgent need for levee rehabilitation in the Delta. One possible contributor to Delta levee rehabilitation is sediment management and reuse from dredging activities. At the same time, the Delta environment is showing signs of major stress and dysfunction, as evidenced by the rapid decline of pelagic species in recent years. Concerns about the complex and sensitive environment in the Delta have resulted in stringent regulatory requirements for dredging and sediment reuse and placement in the Delta. These two apparently conflicting objectives, protection of the Delta environment and increased dredging and sediment reuse and placement, highlight the need for better coordination and management of Delta dredging and sediment management and reuse requirements.

Chevron Richmond Refinery Long Wharf Terminal

In 2007, the CSLC, as CEQA lead agency, certified a Final EIR (SCH No. 98112080) and approved a 30-year lease for the Chevron Richmond Long Wharf Marine Terminal (refer to Item 5 on Figure 2-1). The project was to maintain the current operation and viability of the Chevron Richmond Refinery by continuing current Chevron Richmond Long Wharf Marine Terminal operations through which the Chevron Richmond Refinery both receives its raw materials and exports its refined products. The Chevron Richmond Refinery uses the Richmond Long Wharf to receive all its crude oil, and some intermediate feed and blending stocks from across the Richmond Long Wharf. In addition, the Chevron Richmond Refinery uses the Richmond Long Wharf to ship products and intermediate stocks to domestic and foreign markets.

The Richmond Long Wharf was originally constructed in 1902 as a wooden structure supported on timber piles, but was modified in 1946 with the construction of a concrete wharf and causeway structure supported on deeper, concrete piles. Three buildings and a concrete-repaired Richmond Long Wharf were also built in 1946. In 1974, the Richmond Long Wharf was modified to accommodate larger vessels: Berth # 1 was expanded and Berth #4 was extensively modified. Over the years, improvements have continued. Recent improvements include a southern capstan platform added to Berth #4 in 1986, a breasting dolphin at Berth #3 in 1990, and a voice-communication system installed in 1991. In 2000, a major structural upgrade program was completed that will enable the structure to withstand a 475-year return period seismic event resulting in minor, repairable damage with no oil spills. In November 2004, the Richmond Long Wharf completed a comprehensive electrical infrastructure upgrade project.

<u>Mare Island Reuse Project (formerly Naval Shipyard Mare Island)</u>

Mare Island was the nation’s first naval shipyard on the West Coast, established in 1854 and ultimately closed in 1996. Mare Island is located on the western edge of the city of Vallejo in southwestern Solano County. Mare Island is approximately 3.5 miles long and 1 mile wide, and occupies approximately 5,460 acres, of which 1,650 acres are developed uplands. Tidal and non-tidal wetlands comprise the remaining acreage. The Mare Island naval facility was transferred to the city of Vallejo in May 2002. Conversion of the Naval Shipyard Mare Island and related properties from military to civilian use continues under the direction of the city’s economic development division. Today, the Island is home to more than 85 businesses, nearly 2,000 jobs, and approximately 3.5 million square feet (ft^2) of occupied commercial space. Additionally, Touro University educates over 900 full-time students at its campus. Lennar Mare Island has entitlements for over 7 million ft^2 of industrial/office product (with a workable inventory of approximately 5.5 million ft^2. Mare Island has approximately 960 buildings that comprise about 10.5 million ft^2 of industrial, office, residential, commercial, and recreational facilities.

3.4.3 Regional Characteristics of Crude/Product in the San Francisco Bay and Along Coastal Shipping Lanes off Northern California

Many types of marine vessels call at terminals in the greater Bay Area, including passenger vessels, cargo vessels, tankers, tow/tug vessels, dry cargo barges, and tank barges. The USACE, Marine Exchange, CSLC, and U.S. Coast Guard track vessel transits into the San Francisco Bay; however, data tracked are generally limited to inbound/arrival information from outside to inside the San Francisco Bay and do not include vessel transit information for transits originating in the San Francisco Bay.

Table 3-2 presents information on only inbound vessel transits through the Golden Gate during 2008 and 2011 from USACE data. The number of outbound transits would be expected to be the same. During 2008, 40,284 vessels transited to Bay Area harbors, and in 2011 the number increased to 169,953. In 2008, 3,285 vessels paid calls in the Carquinez Strait, and in 2011 the number increased to 3,435. The Carquinez Strait includes the general area of Tesoro's Amorco Terminal.

Table 3-2: Inbound Vessel Traffic in San Francisco Bay (2008 and 2011)

Location	Self-Propelled Vessels			Non-Self Propelled Vessels		Total Number of Vessels
	Dry Cargo	Tankers	Towboat	Dry Cargo	Tank Barge	
2008						
San Francisco Bay Entrance	2,561	810	286	19	320	**3,996**
San Francisco Harbor	9,564	409	1,434	481	358	**12,246**
Redwood City Harbor	36	0	165	15	0	**216**
Oakland Harbor	10,734	2	1,607	156	747	**13,246**
Richmond Harbor	113	431	4,847	143	1,092	**6,627**
San Pedro Bay and Mare Island Strait	382	268	9	2	7	**668**
Carquinez Strait	957	392	1,362	282	292	**3,285**
Totals	**24,347**	**2,312**	**12,110**	**1,098**	**2,816**	**40,284**
2011						
San Francisco Bay Entrance	2,658	757	284	9	257	**3,965**
San Francisco Harbor	45,282	3	937	152	67	**46,441**
Oakland Harbor	10,734	2	1,607	156	747	**13,246**
Redwood City Harbor	20	0	91	13	0	**124**
Richmond Harbor	91	410	4,353	44	1,126	**6,024**
San Pedro Bay and Mare Island Strait	10,062	375	1,074	383	236	**12,131**
Carquinez Strait	1,524	342	1,086	251	232	**3,435**
Totals	**70,371**	**10,532**	**35,271**	**7,223**	**12,316**	**169,953**

Sources: USACE 2008; USACE 2011

Of six anchorages located in the Bay, Anchorage 9, located south of the Bay Bridge between San Francisco and Oakland, had the majority (439 of the total 612) of arrivals. Some tankers bound for the Amorco Terminal occasionally transfer oil, or conduct lighterage operations, from one vessel to another at Anchorage 9, to reduce the draft of the vessel prior to its destination.

Vessels entering and leaving the Golden Gate entrance to San Francisco Bay do so through the Traffic Separation Scheme, which consists of a circular Precautionary Area with three traffic lanes (northern, main or western, and southern) exiting the Precautionary Area. A detailed description of the regulated navigation areas is included in Section 4.1, Operational Safety/Risk of Accidents.

The CSLC Marine Facilities Division in Hercules also tracks ship and barge calls to those marine oil terminals for which they have jurisdiction. Table 3-3 summarizes USACE and CSLC data for 2008 and 2012. The 2012 data indicate a decrease of 18 vessels over 2008 in vessel traffic to Tesoro's Amorco Wharf. The anticipated vessel traffic over a 30-year lease term ranges from 50 to 200 vessels per year, as analyzed in this EIR.

Table 3-3: Vessel Calls to Marine Oil Terminals in San Francisco Bay (2008 and 2012)

Marine Oil Terminals	Tankers 2008	Barges 2008	Total 2008	Tankers 2012	Barges 2012	Total 2012
Shell Martinez	67	130	197	69	96	165
Tesoro Amorco	82	3	85	67	0	67
Tesoro Avon	30	80	110	51	25	76
Phillips 66 Rodeo	77	179	256	48	100	148
Plains All American Martinez	87	119	206	33	73	106
Shore Selby Terminal	34	24	58	50	24	74
Plains All American Richmond	10	333	343	15	307	322
Chevron Richmond Long Wharf	410	370	780	380	247	627
BP West Coast Richmond	22	8	30	24	11	35
BP Lubricants Richmond	0	12	12	0	11	11
Valero Benicia	134	22	156	116	91	207
IMTT Richmond	5	443	448	3	382	385
Phillips 66 Richmond	0	177	177	0	127	127
Kinder Morgan Richmond	5	0	5	13	0	13
Total	**961**	**1,340**	**2,301**	**886**	**1,543**	**2,429**

4.0 ENVIRONMENTAL IMPACT ANALYSIS

INTRODUCTION TO ENVIRONMENTAL ANALYSIS

Section 4 of this Environmental Impact Report (EIR) examines the potential environmental impacts of the proposed Amorco Marine Oil Terminal Lease Consideration (Project) and Project alternatives identified by the California State Lands Commission (CSLC) as Lead Agency under the California Environmental Quality Act (CEQA). This section includes analyses of environmental issue areas listed below:

- 4.1 – Operational Safety/Risk of Accidents;
- 4.2 – Biological Resources;
- 4.3 – Water Quality;
- 4.4 – Air Quality;
- 4.5 – Geology, Sediments, and Seismicity;
- 4.6 – Cultural Resources;
- 4.7 – Land-based Transportation;
- 4.8 – Land Use and Recreation;
- 4.9 – Noise; and
- 4.10 – Visual Resources, Light and Glare.

Each environmental issue area analyzed in this EIR provides background information and describes the environmental setting (baseline conditions) to help the reader understand the conditions that exist currently, prior to project implementation, and the relationship between those existing conditions and potential Project-related impacts. In addition, each section describes the approach to analysis that results in a determination whether an impact is "significant" or "less than significant." Finally, individual sections recommend mitigation measures (MMs) to reduce significant impacts. Throughout Section 4, both impacts and the corresponding MMs are identified by a **bold letter-number designation** (e.g., Impact **BIO-1** and **MM BIO-1a**).

Based on an initial review and analysis, it is likely that the Project would have a less-than-significant impact, or no impact, on the environmental issue areas identified below. The primary reasons for these determinations are as follows:

- <u>Air Quality</u>. Measured and calculated criteria pollutant emissions are limited by the clean air plans included in the Bay Area Air Quality Management District (BAAQMD)-issued Title V Operating Permit encompassing the Golden Eagle Refinery and the Amorco Terminal. By virtue of the Permit, continued operation of the Amorco Terminal up to the permitted throughput levels would not result in significant air quality emission impacts because the limits set by the BAAQMD were determined to be sufficient to render these emissions less than significant. As discussed in Section 4.3.3, recent years indicate that the Amorco Terminal use is well below its BAAQMD-permitted limit, and is expected to be so over the proposed lease period.

- Geology, Sediments, and Seismicity. The Amorco Terminal lies outside of the Alquist-Priolo earthquake fault zone, so surface faulting and ground rupture from known active faults is not anticipated. Tesoro Refining and Marketing Company, LLC (Tesoro) completed required Marine Oil Terminal Engineering and Maintenance Standards (MOTEMS) seismic upgrades at the Amorco wharf in June 2013. Because potential seismic events have been considered within the upgrades design, potential adverse impacts are considered to be less than significant.
- Cultural Resources. No construction activities would occur as part of the lease renewal; therefore, there would be no disturbance to previously unrecorded or recorded historical, archaeological, or paleontological resources, or human remains. Because there are no shipwrecks in the immediate area of the Amorco Terminal, maintenance dredging would also have no impact on cultural resources.
- Land-based Transportation. No vehicular activity is associated with the existing Amorco Terminal operations beyond Terminal employees and associated delivery vehicles. Because there would be no construction associated with continued operation of the Amorco Terminal, no impacts would result.
- Noise. Based on the noise measurement data collected and observations of monitoring personnel (TRC 2013), Project operations (i.e., ship docking and unloading processes) do not measurably increase ambient noise at the Amorco Terminal or in the vicinity, and do not create discernible individual sources of increased noise that would allow the Project to approach the significance threshold.

ASSESSMENT METHODOLOGY

Environmental Baseline

The analysis of each issue area begins with an examination of the existing physical setting or baseline conditions as determined pursuant to section 15125, subdivision (a) of the State CEQA Guidelines that may be affected by the Project. The effects of the Project are defined as changes to the environmental setting that are attributable to Project components or operation.

Baseline conditions are the local and regional physical environmental conditions in the Project vicinity as they exist at the time the Notice of Preparation was published (May 1, 2012), unless specified otherwise. The baseline conditions for the Project include the existing Amorco Terminal operations.

As discussed in Section 1.0, Introduction, information from relevant documents, including the Final EIRs for the Shell Martinez Marine Terminal Lease Consideration (CSLC 2011a, State Clearinghouse [SCH] No. 2004072114) and Shore[1] Terminals LLC Martinez Marine Terminal Lease Consideration (CSLC 2012, SCH No. 2007112108), have been referenced appropriate for the preparation of this EIR. Where appropriate, these information sources have been included.

Significance Criteria

Significance criteria are identified for each environmental issue area; these criteria serve as benchmarks for determining if a component action will result in a significant adverse environmental impact when evaluated against the baseline. According to State CEQA Guidelines section 15382, a significant effect on the environment means "a substantial, or potentially substantial, adverse change in any of the physical conditions within the area affected by the project..."

Impact Analysis

Impacts are classified as according to one of the following five categories:

- **Significant and Unavoidable** – significant adverse impact that remains significant after mitigation;
- **Less than Significant with Mitigation** – significant adverse impact that can be eliminated or reduced below an issue area's significance criteria;
- **Less than Significant** – adverse impact that does not meet or exceed an issue area's significance criteria;
- **Beneficial** – beneficial impact; or
- **No Impact** – the Project would not result in any impact to the resource area considered.

A determination will be made, based on the analysis of any impact within each affected environmental issue area and compliance with any recommended MM, of the level of impact remaining in comparison to pertinent significance criteria. If the impact remains significant, at or above the significance criteria, it is deemed to be "significant." If a significant adverse impact has the potential to be reduced to a less-than-significant level with application of identified mitigation, then it is "potentially significant." If an action creates an adverse impact above the baseline condition, but such impact does not meet or exceed the pertinent significance criteria, it is determined to be "less than significant." An action that provides an improvement to an environmental issue area in comparison to baseline conditions is recognized as a "beneficial" impact.

[1] Formerly known as the Wickland Terminals LLC Martinez Marine Oil Terminal, this marine oil terminal is currently known as the Shore Selby Marine Oil Terminal under current ownership titles.

Formulation of Mitigation Measures and Mitigation Monitoring Program

When significant impacts are identified, feasible MMs are formulated to eliminate or reduce the severity of impacts and focus on the protection of sensitive resources. The effectiveness of a MM is subsequently determined by evaluating the impact remaining after its application. Impacts that still meet or exceed the impact significance criteria after mitigation are considered residual impacts that remain significant. Implementation of more than one MM may be needed to reduce an impact below a level of significance. The MMs recommended in this document are identified in the impact sections and presented in a Mitigation Monitoring Program (MMP) provided in Section 8.

If any MMs are ultimately incorporated as part of a project's design, they are no longer considered MMs under CEQA. If they eliminate or reduce a potentially significant impact to a level below the significance criteria, they eliminate the potential for that significant impact since the "measure" is now a component of the action. Such measures incorporated into the project design have the same status as any "applicant-proposed measures." The CSLC's standard practice is to include all measures to eliminate or reduce the environmental impacts of a proposed project, whether applicant-proposed or recommended mitigation, in the MMP.

Timing of Project Elements

Tesoro is proposing to enter into a new 30-year lease of State sovereign land with the CSLC, allowing Tesoro to continue operations at the Amorco Terminal. The current Tesoro lease agreement (Lease PRC 3453.1) had an initial term of 25 years, beginning in 1984. Since 2008, Tesoro has operated under a "holdover" month-to-month tenancy agreement (i.e., the Terminal continues to operate under the terms of Lease PRC 3453.1 while a decision on a new lease is pending). This EIR addresses the impacts of continued operation of the Amorco Terminal.

Impacts of Alternatives

Section 3 describes alternatives to the Project. Presentation of each issue area in Section 4 includes the impact analysis for each alternative scenario. A summary of collective impacts of each alternative in comparison with the impacts of the Project is included within the Executive Summary.

Cumulative Impacts Analysis

Each issue area in Section 4 presents the cumulative impact scenario, the focus of which is to identify the potential impacts of the Project that might not be significant when considered alone, but that might contribute to a significant impact when viewed in conjunction with the other projects.

FEDERAL AND STATE REGULATIONS

Each of the issue areas is considered in terms of the federal, State, regional, and local laws, regulations, and policies that apply to the issue area. Federal and State laws, regulations and policies, including a summary of each, are provided in Table 4.0-1, organized by issue area. Applicable regional and local laws, regulations, and policies are summarized in each of the sections.

Table 4-1: Major Federal and State Laws, Regulations, and Policies Potentially Applicable to the Project

U.S./ CA	Law/Regulation/Plan	Key Elements and Thresholds/Applicable Permits
4.0 Multiple Environmental Issues		
U.S.	Coastal Zone Management Act (CZMA) (42 United States Code [USC] 4321 et seq.)	The CZMA recognizes a national interest in coastal zone resources and in the importance of balancing competing uses of those resources, giving full consideration to aesthetic, cultural and historic, ecological, recreational, and other values as well as the needs for compatible economic development. Pursuant to the CZMA, coastal states develop and implement comprehensive coastal management programs (CMPs) that describe uses subject to the CMP, authorities and enforceable policies, and coastal zone boundaries, among other elements. The CZMA also gives state coastal management agencies regulatory control (“federal consistency” review authority) over federal activities and federally licensed, permitted, or assisted activities, if the activity affects coastal resources. The California Coastal Commission and San Francisco Bay Conservation and Development Commission coordinate California’s federally approved CMPs and federal consistency reviews within their respective jurisdictions.
CA	California Environmental Quality Act (CEQA) (Pub. Resources Code, § 21000 et seq.)	The CEQA requires State and local agencies to identify the significant environmental impacts of their actions and to avoid or mitigate those impacts, if feasible. A public agency must comply with CEQA when it undertakes an activity defined by CEQA as a "project" that must receive some discretionary approval (i.e., the agency has the authority to deny the requested permit or approval) that may cause either a direct physical change in the environment or a reasonably foreseeable indirect change in the environment.
CA	California State Lands Commission (CSLC)	The CSLC has jurisdiction and management authority over all ungranted tidelands, submerged lands, and the beds of navigable lakes and waterways, as well as certain residual and review authority for tidelands and submerged lands legislatively granted in trust to local jurisdictions (Pub. Resources Code, §§ 6301, 6306). All tidelands and submerged lands, granted or ungranted, as well as navigable lakes and waterways, are subject to the protections of the Common Law Public Trust. The State of California acquired sovereign ownership of all tidelands and submerged lands and beds of navigable lakes and waterways upon its admission to the United States in 1850. The State holds these lands for the benefit of all people of the State for statewide Public Trust purposes, which include but are not limited to waterborne commerce, navigation, fisheries, water-related recreation, habitat preservation, and open space. On tidal waterways, the State's sovereign fee ownership extends landward to the mean high tide line, except for areas of fill or artificial accretion. The CSLC’s jurisdiction also includes a 3-nautical-mile-wide section of tidal and submerged land adjacent to the coast and offshore islands, including bays, estuaries, and lagoons; the waters and underlying beds of more than 120 rivers, lakes, streams, and sloughs; and 1.3 million acres of “school lands" granted to the State by the federal government to support public education. The CSLC is responsible for implementing State laws and regulations, including CEQA, for activities affecting State lands.
CA	McAteer-Petris Act (Gov. Code, § 66600 et seq.)	The McAteer-Petris Act of 1965 established the Bay Conservation and Development Commission (BCDC) as the agency responsible for protection of San Francisco Bay’s critical and sensitive shoreline areas. The BCDC regulates San Francisco Bay Area dredging and filling to protect marshes, wetlands, and other resources. Its

U.S./ CA	Law/Regulation/Plan	Key Elements and Thresholds/Applicable Permits
		jurisdiction includes the San Francisco Bay, 100 feet inland from the line of highest tidal action, salt ponds, managed wetlands, and certain other waterways and marshes.
CA	Marine Invasive Species Act (MISA) (Assembly Bill [AB] 433)	The MISA is charged with preventing or minimizing the introduction of non-indigenous species to California waters from vessels over 300 gross registered tons, capable of carrying ballast water, consistent with the Vessel General Permit. In general, regulations prohibit the discharge or exchange of ballast water unless the water is treated or is discharged and/or exchanged at the same port/place that it originated. Compliance with MISA is the responsibility of the vessel owners/operators and not the responsibility of marine terminals.
4.1 Operational Safety/Risk of Accidents		
U.S.	Oil Pollution Act (OPA) of 1990	The OPA includes provisions to expand prevention and preparedness activities, improve response capabilities, provide funding for natural resource damage assessments, ensure that shippers and oil companies pay the costs of spills that do occur, and establish an expanded research and development program. Pursuant to a Memorandum of Understanding established to divide areas of responsibility, the United States Coast Guard (USCG) is responsible for tank vessels and marine terminals, the United States Environmental Protection Agency (USEPA) for tank farms, and the Research and Special Programs Administration for pipelines; each of these agencies has developed regulations for its area of responsibility. In addition, the Secretary of Interior is responsible for spill prevention, oil-spill contingency plans, oil-spill containment and clean-up equipment, financial responsibility certification, and civil penalties for offshore facilities and associated pipelines in all federal and State waters. All facilities and vessels that have the potential to release oil into navigable waters are required by the OPA to have up-to-date oil spill response plans and to have submitted them to the appropriate federal agency for review and approval. Of particular importance in the OPA is the requirement for facilities and vessels to demonstrate that they have sufficient response equipment under contract to respond to and clean up a worst-case spill.
U.S.	40 Code of Federal Regulations (CFR) Parts 109, 110, 112, 113, and 114	The Spill Prevention Countermeasures and Control (SPCC) plans covered in these regulatory programs apply to oil storage and transportation facilities and terminals, tank farms, bulk plants, oil refineries, and production facilities, and bulk oil consumers (e.g., apartment houses, office buildings, schools, hospitals, government facilities). These regulations include minimum criteria for developing oil-removal contingency plans, prohibit discharge of oil such that applicable water quality standards would be violated, and address oil spill prevention and preparation of SPCC plans. They also establish financial liability limits and provide civil penalties for violations of oil spill regulations.
U.S.	33 CFR - Navigation and Navigable Waters	Title 33 regulates aids to navigation, vessel operations, anchorages, bridges, security of vessels, waterfront facilities, marine pollution financial responsibility and compensation, pollution, ports and waterways safety, boating safety, and deep-water ports. The USEPA is responsible for the National Contingency Plan and regulates disposal of recovered oil and is responsible for developing regulations for SPCC plans.
U.S.	46 CFR - Shipping	Title 46 regulates vessel inspections, marine casualties and investigations, tank vessel design, equipment requirements, manning levels, and operation.
U.S.	Resource Conservation and	The RCRA authorizes the USEPA to control hazardous waste from “cradle-to-grave,” which encompasses its generation, transportation, treatment, storage, and disposal. The RCRA’s Federal Hazardous and Solid Waste

U.S./ CA	Law/Regulation/Plan	Key Elements and Thresholds/Applicable Permits
	Recovery Act (RCRA) (42 USC 6901 et seq.)	Amendments from 1984 include waste minimization and phasing out land disposal of hazardous waste as well as corrective action for releases. The Department of Toxic Substances Control is the State lead agency for corrective action associated with RCRA facility investigations and remediation.
U.S.	California Toxics Rule (40 CFR 131)	In 2000, the USEPA promulgated numeric water quality criteria for priority toxic pollutants and other water quality standards provisions to be applied to waters in the State of California. The USEPA promulgated this rule based on the Administrator's determination that the numeric criteria are necessary in the State of California to protect human health and the environment. (Under Clean Water Act section 303(c)(2)(B), the USEPA requires states to adopt numeric water quality criteria for priority toxic pollutants for which the USEPA has issued criteria guidance, and the presence or discharge of which could reasonably be expected to interfere with maintaining designated uses.) These criteria have been adopted by the State; together with State-adopted designated uses, they satisfy Clean Water Act requirements for the establishment of water quality standards for California inland surface waters, enclosed bays, and estuaries.
U.S.	National Oil and Hazardous Substances Pollution Contingency Plan (40 CFR 300)	Authorized under the Comprehensive Environmental Response, Compensation, and Liability Act of 1980, 42 USC 9605, as amended by the Superfund Amendments and Reauthorization Act of 1986, Pub. L. 99 through 499; and by Clean Water Act section 311(d), as amended by the OPA, Pub. L. 101 through 380. The plan outlines requirements for responding to both oil spills and releases of hazardous substances. It specifies compliance, but does not require the preparation of a written plan. It also provides a comprehensive system for reporting, spill containment, and cleanup. The USCG and the USEPA co-chair the National Response Team. In accordance with 40 CFR 300.175, the USCG has responsibility for oversight of regional response for oil spills in coastal zones, as described in 40 CFR 300.120.
U.S.	Toxic Substances Control Act (TSCA) (15 USC 2601–2692)	The TSCA authorizes the USEPA to require reporting, record keeping, testing requirements, and restrictions related to chemical substances/mixtures. It also addresses production, importation, use, and disposal of specific chemicals, such as polychlorinated biphenyls, asbestos-containing materials, lead-based paint, and petroleum.
CA	California Code of Regulations, Title 2, Division 3, Chapter 1	CSLC regulations pertain to oil and gas leases, exploration permits, and operating requirements, as described below. • Article 3.3 pertains to oil and gas production operations on tide and submerged lands under CSLC jurisdiction, and is applicable to operations conducted from mobile rigs, fixed offshore structures, and upland locations serving these leases. Provisions in this article include administrative prevention and elimination of any contamination or pollution of the ocean and tidelands, prevention of waste, regulations on wellhead equipment, subsurface safety valves, surface safety valves, remedial and well maintenance work, supervision and training, anomalous casing annulus pressure, subsurface injection, conversion of a well to fluid injection (requires prior approval of the CSLC), waste disposal, pressure relief valves, personal protective equipment, and pipeline inspections. • Article 3.4 pertains to oil and gas drilling and production to operations on State oil and gas leases located on State tide and submerged lands under the jurisdiction of the CSLC, and is applicable to operations conducted from mobile rigs, fixed offshore structures, and upland locations serving these leases. The article includes provisions for administration, prohibitions of pollution and contamination, suspension of operations and

U.S./ CA	Law/Regulation/Plan	Key Elements and Thresholds/Applicable Permits
		corrective action, disposal of drill cuttings and drilling muds, oil spill contingency plan requirements, pollution control and removal equipment, critical operations and curtailment plans, and pollution reports to the USCG and State Office of Emergency Services. • Article 3.5, which pertains to disposal of royalty oil, gas, or other hydrocarbons, sets forth the procedures whereby the CSLC may enter into agreements for the disposition and sale of oil, gas, or other hydrocarbons. • Article 3.6, which pertains to operation manual and emergency planning, includes requirements for operators to prepare an operations manual describing equipment and procedures that the operator employs or would employ to protect the public health and safety and the environment and to prevent oil spills.
CA	California Public Resources Code, Division 6, Parts 1 and 2	The CSLC issues and administers oil and gas leases covering tide and submerged lands in accordance with the provisions of Division 6, Parts 1 and 2 of the California Public Resources Code, including the following sections: • Section 6829 includes provisions for specifying methods of operation and standard requirements for conducting operations properly; the prevention of waste, the protection of the safety and health of the workers; and the liability of the lessee for personal injuries and property damage; and • Sections 6873.2 and 6873.5 include provisions for carrying out the requirements of CEQA.
CA	Lempert-Keene-Seastrand Oil Spill Prevention and Response Act (OSPRA; Gov. Code, § 8670.1 et seq., Pub. Resources Code § 8750 et seq., and Rev. & Tax. Code, § 46001 et seq.)	The OSPRA and its implementing regulations seek to protect State waters from oil pollution and to plan for the effective and immediate response, removal, abatement, and cleanup in the event of an oil spill. The Act requires applicable operators to prepare and implement marine oil spill contingency plans and to demonstrate financial responsibility, and requires immediate cleanup of spills following the approved contingency plans, and fully mitigating impacts on wildlife. The Act assigns primary authority to the Office of Spill Prevention and Response division within the California Department of Fish and Wildlife (CDFW) to direct prevention, removal, abatement, response, containment, and cleanup efforts with regard to all aspects of any oil spill in the marine waters of the State; the CSLC is also provided with authority for oil spill prevention from and inspection of marine facilities. Notification is required to the Governor's State Office of Emergency Services, which in turn notifies the response agencies, of all oil spills in the marine environment, regardless of size. The Act also created the Oil Spill Prevention and Administration Fund and the Oil Spill Response Trust Fund.
CA	California Health and Safety Code Regulations, Titles 22 and 26	California regulates the management of hazardous wastes in large part through the Health and Safety Code and California Code of Regulations, Titles 22 and 26. The Hazardous Material Release Response Plans and Inventory Law (Health & Saf. Code, Ch. 6.95) is designed to reduce the occurrence and severity of hazardous materials releases. This State law requires businesses to develop a Release Response Plan for hazardous materials emergencies if they handle more than 500 pounds, 55 gallons, or 200 cubic feet of hazardous materials. In addition, the business must prepare a Hazardous Materials Inventory of all hazardous materials stored or handled at the facility over the above thresholds, and all hazardous materials must be stored in a safe manner. • The Hazardous Waste Control Law (Health & Saf. Code, Ch. 6.5 and Cal. Code Regs., tit. 22 and 26) is the basic hazardous waste law for California. It establishes the criteria for defining hazardous waste and its safe handling, storage, treatment, and disposal. The law is designed to provide cradle-to-grave management of hazardous wastes and reduce the occurrence and severity of hazardous materials releases.

U.S./ CA	Law/Regulation/Plan	Key Elements and Thresholds/Applicable Permits
4.2 Biological Resources		
U.S.	Endangered Species Act (ESA) (7 USC 136, 16 USC 1531 et seq.)	The ESA, which is administered in California by the United States Fish and Wildlife Service (USFWS) and National Marine Fisheries Service (NMFS), provides protection to species listed as threatened or endangered, or proposed for listing as threatened or endangered. Section 9 prohibits the "take" of any member of a listed species. • Take is defined as "...to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect, or to attempt to engage in any such conduct." • Harass is "an intentional or negligent act or omission that creates the likelihood of injury to a listed species by annoying it to such an extent as to significantly disrupt normal behavior patterns that include, but are not limited to, breeding, feeding, or sheltering." • Harm is defined as "...significant habitat modification or degradation that results in death or injury to listed species by significantly impairing behavioral patterns such as breeding, feeding, or sheltering." When applicants are proposing projects with a federal nexus that "may affect" a federally listed or proposed species, the federal agency is required to consult with the USFWS or NMFS, as appropriate, under Section 7, which provides that each federal agency must ensure that any actions authorized, funded, or carried out by the agency are not likely to jeopardize the continued existence of any endangered or threatened species or result in the destruction or adverse modification of areas determined to be critical habitat.
U.S.	Marine Mammal Protection Act (MMPA) (16 USC 1361 et seq.)	The MMPA is designed to protect and conserve marine mammals and their habitats. It prohibits takes of all marine mammals in the United States (including territorial seas) with few exceptions. The NMFS may issue a take permit under section 104 if the activities are consistent with the purposes of the MMPA and applicable regulations at 50 CFR, Part 216. The NMFS must also find that the manner of taking is "humane" as defined in the MMPA. If lethal taking of a marine mammal is requested, the applicant must demonstrate that using a non-lethal method is not feasible.
U.S.	Migratory Bird Treaty Act (MBTA) and Executive Order 13186	The MBTA governs the taking, killing, possession, transportation, and importation of migratory birds, their eggs, parts, and nest, and requires harvests to be limited to levels that prevent overuse. Further, the MBTA prohibits the take, possession, import, export, transport, selling, purchase, barter, or offering for sale, purchase, or barter, of any migratory bird, their eggs, parts, and nests, except as authorized under a valid permit (50 CFR 21.11).
U.S.	Nonindigenous Aquatic Nuisance Prevention and Control Act (16 USC 4701-4751)	The 1990 Act was established to: (1) prevent unintentional introduction and dispersal of nonindigenous species into Waters of the United States through ballast water management and other requirements; (2) coordinate and disseminate information on federally conducted, funded, or authorized research, on the prevention and control of the zebra mussel and other aquatic nuisance species; (3) develop and carry out control methods to prevent, monitor, and control unintentional introductions of nonindigenous species from pathways other than ballast water exchange; (4) understand and minimize economic and ecological impacts of established nonindigenous aquatic nuisance species; and (5) establish a program of research and technology development and assistance to states in the management and removal of zebra mussels.

U.S./ CA	Law/Regulation/Plan	Key Elements and Thresholds/Applicable Permits
U.S.	National Invasive Species Act (NISA) (33 CFR, Part 151, Subpart D)	Provisions of the 1990 Act, as amended by the NISA of 1996, are regulated by the USCG. The USCG requires ballast water management (i.e., ballast water exchange) for vessels entering United States waters from outside the 200-nautical-mile United States Exclusive Economic Zone.
U.S.	Magnuson-Stevens Fishery Conservation and Management Act (MSA) (16 USC 1801 et seq.)	The MSA is the primary law governing marine fisheries management in United States federal waters. The MSA was first enacted in 1976 and amended in 1996. Amendments to the 1996 MSA require the identification of Essential Fish Habitat (EFH) for federally managed species and the implementation of measures to conserve and enhance this habitat. Any project requiring federal authorization is required to complete and submit an EFH Assessment with the application and either show that no significant impacts to the essential habitat of managed species are expected or identify mitigations to reduce those impacts. Under the MSA, Congress defined EFH as “those waters and substrate necessary to fish for spawning, breeding, feeding, or growth to maturity” (16 USC 1802(10)). The EFH provisions of the MSA offer resource managers a means to heighten consideration of fish habitat in resource management. Pursuant to section 305(b)(2), federal agencies shall consult with the NMFS regarding any action they authorize, fund, or undertake that might adversely affect EFH.
U.S.	Estuary Protection Act 16 USC 1221-1226)	The Estuary Protection Act authorized the Secretary of the Interior to enter into cost-sharing agreements with states and subdivisions for permanent management of estuarine areas in their possession. Federal agencies were required to assess the impacts of commercial and industrial developments on estuaries.
CA	California Endangered Species Act (CESA) (Fish & G. Code, § 2050 et seq.)	The CESA provides for the protection of rare, threatened, and endangered plants and animals, as recognized by the CDFW, and prohibits the taking of such species without its authorization. Furthermore, the CESA provides protection for those species that are designated as candidates for threatened or endangered listings. Under the CESA, the CDFW has the responsibility for maintaining a list of threatened species and endangered species (Fish & G. Code, § 2070). The CDFW also maintains a list of candidate species, which are species that the CDFW has formally noticed as under review for addition to the threatened or endangered species lists. The CDFW also maintains lists of Species of Special Concern that serve as watch lists. Pursuant to the requirements of the CESA, an agency reviewing a proposed project within its jurisdiction must determine whether any State-listed endangered or threatened species may be present in the project site and determine whether the project will have a potentially significant impact on such species. In addition, the CDFW encourages informal consultation on any proposed project that may affect a candidate species. The CESA requires a permit to take a State-listed species through incidental or otherwise lawful activities.
CA	California Wetlands Conservation Policy	States that there shall be no net loss of wetland acreage and a long-term gain in the quantity, quality, and permanence of California’s wetlands.
CA	Other Regulations	• Lempert-Keene-Seastrand Oil Spill Prevention and Response Act – See above under Section 4.1. • The California Species Preservation Act (Fish & G. Code, §§ 900-903) provides for the protection and enhancement of the amphibians, birds, fish, mammals, and reptiles of California. • Fish and Game Code sections 3503 and 3503.5 prohibit the taking and possession of native birds’ nests and eggs from all forms of needless take. These regulations also provide that it is unlawful to take, possess, or destroy any birds in the orders Falconiformes or Strigiformes (birds of prey) or to take, possess, or destroy the

U.S./ CA	Law/Regulation/Plan	Key Elements and Thresholds/Applicable Permits
		nests or eggs of any such bird except as otherwise provided by this Code or any regulation adopted pursuant thereto. • Fish and Game Code sections 3511 (birds), 4700 (mammals), 5050 (reptiles and amphibians), and 5515 (fish) designate certain species as “fully protected.” Fully protected species, or parts thereof, may not be taken or possessed at any time without permission by the CDFW. • Fish and Game Code section 3513 does not include statutory or regulatory mechanisms for obtaining an incidental take permit for the loss of non-game, migratory birds.
CA	Other Plans	• California Aquatic Invasive Species Management Plan, produced by the CDFW, provides a framework for agency coordination and identifies actions to minimize the harmful effects of aquatic invasive species. • California Noxious and Invasive Weed Action Plan, produced by the California Department of Food and Agriculture, to protect and enhance the California economy, natural environment, and safety of the citizens through awareness, cooperation, and action in the prevention and control of noxious and invasive weeds. • Delta Smelt Action Plan of 2005, produced by the Department of Water Resources and CDFW, is a 14-point program of scientific research activities and studies to identify and understand the causes of the Pelagic Organism Decline, and other actions to benefit the species.
4.3 Water Quality		
U.S.	Clean Water Act (CWA) (33 USC 1251 et seq.)	The CWA is comprehensive legislation that generally includes reference to the federal Water Pollution Control Act of 1972, and its substantial supplementation by the CWA of 1977. Both Acts were subsequently amended in 1981, 1987, and 1993. Overall, the CWA seeks to protect the nation’s water from pollution by setting water quality standards for surface water and by limiting the discharge of effluents into waters of the United States. These water quality standards are promulgated by the USEPA and enforced in California by the State Water Resources Control Board (SWRCB) and nine Regional Water Quality Control Boards (RWQCBs). The CWA also provides for development of municipal and industrial wastewater treatment standards and a permitting system to control wastewater discharges to surface waters. Under CWA section 404, the United States Army Corps of Engineers (USACE) has primary federal responsibility for administering regulations that concern waters of the United States wetlands, which are defined as those areas that are inundated or saturated by surface or groundwater at a frequency and duration that are sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions.
U.S.	National Pollutant Discharge Elimination System (NPDES)	The CWA also established the basic structure for regulating discharges of pollutants into the waters of the United States through the NPDES, which specifies minimum standards for the quality of discharged waters. It required states to establish standards specific to waterbodies and designate the types of pollutants to be regulated, including total suspended solids and oil. Under NPDES, all point sources that discharge directly into waterways are required to obtain a permit regulating their discharge. NPDES permits fall under the jurisdiction of the SWRCB or RWQCBs when the discharge occurs within the 3-nautical-mile territorial limit.
U.S.	Rivers and Harbors Act (33 USC 401)	This Act governs specified activities in “navigable waters” (waters subject to the ebb and flow of the tide or that are presently used, have been used in the past, or may be susceptible to use to transport interstate or foreign commerce). Specifically, it limits the construction of structures and the discharge of fill into navigable waters of the

U.S./ CA	Law/Regulation/Plan	Key Elements and Thresholds/Applicable Permits
		United States. Under section 10 of the Rivers and Harbors Act, the building of any wharf, pier, jetty, or other structure is prohibited without Congressional approval, and excavation or fill within navigable waters requires approval from the USACE.
CA	Porter-Cologne Water Quality Control Act (Wat. Code, § 13000 et seq.) (Porter-Cologne)	Porter-Cologne is the principal law governing water quality in California. The Act established the SWRCB and nine RWQCBs that have primary responsibility for protecting State water quality and the beneficial uses of State waters. Porter-Cologne also implements many provisions of the federal CWA, such as the NPDES permitting program. Pursuant to the CWA § 401, applicants for a federal license or permit for activities that may result in any discharge to waters of the United States must seek a Water Quality Certification (Certification) from the State in which the discharge originates. Such Certification is based on a finding that the discharge will meet water quality standards and other appropriate requirements of State law. In California, RWQCBs issue or deny certification for discharges within their jurisdiction. The SWRCB has this responsibility where projects or activities affect waters in more than one RWQCB's jurisdiction. If the SWRCB or a RWQCB imposes a condition on its Certification, those conditions must be included in the federal permit or license. Statewide water quality control plans include: individual RWQCB basin plans, the California Ocean Plan, San Francisco Bay/Sacramento-San Joaquin Delta Estuary Water Quality Control Plan, Water Quality Control Plan for Enclosed Bays and Estuaries of California, and the Water Quality Control Plan for Control of Temperature in the Coastal and Interstate Waters and Enclosed Bays and Estuaries of California. These plans contain enforceable standards for the various waters they address. For example: • Basin Plan. Porter-Cologne (§ 13240) requires each RWQCB to formulate and adopt a Basin Plan for all areas within the region. Each RWQCB must establish water quality objectives to ensure the reasonable protection of beneficial uses and a program of implementation for achieving water quality objectives within the basin plans. 40 CFR 131 requires each State to adopt water quality standards by designating water uses to be protected and adopting water quality criteria that protect the designated uses. In California, the beneficial uses and water quality objectives are the State's water quality standards. • The California Ocean Plan establishes water quality objectives for California's ocean waters and provides the basis for regulation of wastes discharged into the State's ocean and coastal waters. For example, the Ocean Plan incorporates the State water quality standards that apply to all NPDES permits for discharges to ocean waters.
CA	Other California Water Code sections	• California Water Code section 13142.5 provides marine water quality policies stating that wastewater discharges shall be treated to protect present and future beneficial uses, and, where feasible, to restore past beneficial uses of the receiving waters. The highest priority is given to improving or eliminating discharges that adversely affect wetlands, estuaries, and other biologically sensitive sites; areas important for water contact sports; areas that produce shellfish for human consumption; and ocean areas subject to massive waste discharge. • California Water Code section 13170.2 directs the SWRCB to formulate and adopt a water quality control plan for the ocean waters of California. The SWRCB first adopted this plan, known as the California Ocean Plan, in 1972. The California Water Code also requires a review of the plan at least every three years to ensure that

U.S./ CA	Law/Regulation/Plan	Key Elements and Thresholds/Applicable Permits
		current standards are adequate and are not allowing degradation to indigenous marine species or posing a threat to human health. The amendments to the California Ocean Plan are reviewed and approved by the USEPA under the CWA. The most recent update of the California Ocean Plan was completed in 2005. The California Ocean Plan establishes water quality objectives for California's ocean waters and provides the basis for regulation of wastes discharged into the State's coastal waters. The plan applies to point and non-point sources. In addition, the Ocean Plan identifies applicable beneficial uses of marine waters and sets narrative and numerical water quality objectives to protect beneficial uses.
CA	California Clean Coast Act of 2005 (Senate Bill [SB] 771)	The California Clean Coast Act went into effect January 1, 2006, and includes several requirements to reduce pollution of California waters from large vessels. The Act prohibits the operation of shipboard incinerators within 3 miles of the California coast; prohibits the discharge of hazardous wastes, other wastes, or oily bilge water into California waters or a marine sanctuary; prohibits the discharge of grey water and sewage into California waters from vessels with sufficient holding-tank capacity or vessels capable of discharging grey water and/or sewage to available shore-side reception facilities; and requires reports of prohibited discharges to the SWRCB.
CA	Bay Protection and Toxic Cleanup Program Legislation	In 1989, the Legislature required the SWRCB to develop sediment quality objectives (SQOs) as part of a comprehensive program to protect beneficial uses in enclosed bays and estuaries. The objectives are required for "toxic pollutants" that were identified in toxic hot spots or that were identified as pollutants of concern by the SWRCB. In 2009, the SWRCB adopted SQOs and an implementation policy for bays and estuaries in the State (Part 1). Part 1 includes narrative SQOs for the protection of aquatic life and human health, identification of the beneficial uses that these objectives are intended to protect, and requirements for program of implementation. The SWRCB is proposing amendments to the Sediment Quality Plan for Enclosed Bays and Estuaries to incorporate additional SQOs for the protection of wildlife and finfish and implementation policy.
4.4 Air Quality		
U.S.	Federal Clean Air Act (FCAA) (42 USC 7401 et seq.)	The FCAA requires the USEPA to identify National Ambient Air Quality Standards (NAAQS) to protect public health and welfare. National standards are established for ozone (O_3), carbon monoxide (CO), nitrogen dioxide (NO_2), sulfur dioxide (SO_2), particulate matter (PM_{10} and $PM_{2.5}$), and lead. In 2007, the United States Supreme Court ruled that carbon dioxide (CO_2) is an air pollutant as defined under the FCAA, and that the USEPA has authority to regulate greenhouse gas (GHG) emissions. Pursuant to the 1990 FCAA amendments, the USEPA classifies air basins (or portions thereof) as in "attainment" or "nonattainment" for each criteria air pollutant, based on whether or not the NAAQS are achieved. The classification is determined by comparing monitoring data with State and federal standards. • An area is classified as in "attainment" for a pollutant if the pollutant concentration is lower than the standard. • An area is classified as in "nonattainment" for a pollutant if the pollutant concentration exceeds the standard. • An area is designated "unclassified" for a pollutant if there are not enough data available for comparisons. Pursuant to the 1990 FCAA amendments, the USEPA also regulates hazardous air pollutants (HAPs), which are pollutants that result in harmful health effects, but are not specifically addressed through the establishment of NAAQS. Instead, HAPs require the use of the maximum or best available control technology (MACT or BACT) to limit emissions.

U.S./ CA	Law/Regulation/Plan	Key Elements and Thresholds/Applicable Permits
CA	California Clean Air Act of 1988 (CCAA) (AB 2595)	The CCAA requires all air districts in the State to endeavor to achieve and maintain State ambient air quality standards for O_3, CO, SO_2, NO_2, and PM; attainment plans for areas that did not demonstrate attainment of State standards until after 1997 must specify emission-reduction strategies and meet milestones to implement emission controls and achieve more healthful air quality. California's ambient air standards are generally stricter than national standards for the same pollutants. The State has also established standards for sulfates, hydrogen sulfide, vinyl chloride, and visibility-reducing particles. The California Air Resources Board (CARB) sets air quality standards for the State at levels to protect public health and welfare with an adequate margin of safety. The California Ambient Air Quality Standards describe adverse conditions; that is, pollution levels must be below these standards before a basin can attain the standard. Air quality is considered in “attainment” if pollutant levels are continuously below or equal to the standards and violate the standards no more than once each year. The 1992 CCAA amendments divide O_3 nonattainment areas into four categories of pollutant levels (moderate, serious, severe, and extreme) to which progressively more stringent requirements apply. The CARB also regulates toxic air contaminants (TACs), which, similar to federal HAPs (see above), are pollutants that result in harmful health effects, but are not specifically addressed through the establishment of air quality standards. The CARB regulates TACs through the use of air toxic control measures (ATCMs); where there are federal MACTs or BACTs, the CARB must, at minimum, adopt these.
CA	California Global Warming Solutions Act of 2006 (AB 32)	Under AB 32, the CARB is responsible for monitoring and reducing GHG emissions in the State and for establishing a statewide GHG emissions cap for 2020 that is based on 1990 emissions levels. CARB (2009) has adopted the AB 32 Climate Change Scoping Plan (Scoping Plan), which contains the main strategies for California to implement to reduce CO_2 equivalent (CO_2e) emissions by 169 million metric tons (MMT) from the State’s projected 2020 emissions level of 596 MMT CO_2e under a business-as-usual scenario. The Scoping Plan breaks down the amount of GHG emissions reductions the CARB recommends for each emissions sector of the State’s GHG inventory, but does not directly discuss GHG emissions generated by construction activities.
CA	Other	• Pursuant to SB 97, the State Office of Planning and Research prepared guidelines for the feasible mitigation of GHG emissions or the effects of GHG emissions, which were adopted by the Natural Resources Agency in 2009 and became effective in March 2010. These amendments to the State CEQA Guidelines establish a framework to address global climate change impacts in the CEQA process, and include revisions to the CEQA Environmental Checklist Form (Appendix G) and the Energy Conservation Appendix (Appendix F). A new section was also added to the State CEQA Guidelines (§ 15064.4) that provides an approach to assessing impacts from GHGs. • SB 375 (effective January 1, 2009) requires the CARB to develop regional reduction targets for GHG emissions. The targets apply to the regions covered by California’s 18 metropolitan planning organizations, which are required to develop regional land use and transportation plans and demonstrate an ability to attain the proposed reduction targets by 2020 and 2035. • Executive Order S-01-07 set forth a low carbon fuel standard for California; the carbon intensity of California’s transportation fuels is to be reduced by at least 10 percent by 2020.

U.S./ CA	Law/Regulation/Plan	Key Elements and Thresholds/Applicable Permits
		• Executive Order S-3-05 established statewide GHG emission targets of reducing emissions to 2000 levels by 2010, to 1990 levels by 2020, and to 80 percent below the 1990 level by 2050. • Under California's diesel fuel regulations, diesel fuel used in motor vehicles, except harbor craft, has been limited to 500 parts per million (ppm) sulfur since 1993. The sulfur limit was reduced to 15 ppm beginning September 1, 2006, and harbor craft were included starting in 2009. • The CARB's Heavy Duty Diesel Truck Idling Rule (Cal. Code Regs., tit. 13, § 2485) prohibits heavy-duty diesel trucks from idling for longer than five minutes at a time. Truck idling for longer than five minutes while queuing is allowed, however, provided the queue is located beyond 100 feet from any homes or schools. • The Statewide Portable Equipment Registration Program (PERP) establishes a uniform program to regulate portable engines/engine-driven equipment units. Once registered in the PERP, engines and equipment units may operate throughout California without the need to obtain individual permits from local air districts.
4.5 Geology, Sediments, and Seismicity		
U.S.	The Uniform Building Code (UBC)	The UBC designates and ranks regions of the United States, according to their seismic hazard potential, as Seismic Zones 1 through 4, with Zone 1 having the least seismic potential and Zone 4 having the highest seismic potential.
CA	California Building Code (CBC) (Cal. Code Regs., tit. 23)	The State of California provides a minimum standard for building design through the CBC, which is based on the UBC, but has been modified for conditions unique to California. The CBC is selectively adopted by local jurisdictions, based on local conditions.
CA	Alquist-Priolo Earth-quake Fault Zoning Act (Pub. Resources Code, §§ 2621-2630)	This Act requires that "sufficiently active" and "well-defined" earthquake fault zones be delineated by the State Geologist. The criteria most commonly used to estimate fault activity in California are described in this Act, which addresses only surface fault rupture hazards. Legislative guidelines to determine fault activity status are based on the age of the youngest geologic unit offset by the fault. This legislation prohibits the construction of buildings used for human occupancy on active and potentially active surface faults. However, only those potentially active faults that have a relatively high potential for ground rupture are identified as fault zones. Therefore, not all potentially active faults are zoned under the Alquist-Priolo Earthquake Fault Zone, as designated by the State of California.
CA	California Seismic Hazards Mapping Act (Pub. Resources Code, § 2690 and following as Division 2, Chapter 7.8)	These regulations were promulgated for the purpose of promoting public safety by protecting against the effects of strong ground shaking, liquefaction, landslides, other ground failures, or other hazards caused by earthquakes. Special Publication 117, *Guidelines for Evaluating and Mitigating Seismic Hazards in California* (California Division of Mines and Geology 1997), constitutes the guidelines for evaluating seismic hazards other than surface fault rupture, and for recommending mitigation measures as required by Public Resources Code section 2695, subdivision (a). To date, the California Geological Survey has not zoned offshore California under the Seismic Hazard Mapping Act.
CA	Public Resources Code, Division 6, Parts 1 and 2	The CSLC issues and administers oil and gas leases covering tide and submerged lands in accordance with Division 6, Parts 1 and 2 of the Public Resources Code and Title 2 of the California Code of Regulations. Relevant provisions of the Public Resources Code include the following: section 6829 includes provisions for specifying methods of operation and standard requirements for conducting operations properly, the prevention of

U.S./ CA	Law/Regulation/Plan	Key Elements and Thresholds/Applicable Permits
		waste, the protection of the safety and health of the workers, and the liability of the lessee for personal injuries and property damage; section 6829.2 includes provisions for the possible arresting or amelioration of land subsidence; and sections 6873.2 and 6873.5 include provisions for carrying out the requirements of CEQA.
CA	California Code of Regulations, Title 2	The CSLC issues and administers oil and gas leases covering tide and submerged lands in accordance with Division 6, Parts 1 and 2 of the Public Resources Code and Title 2 of the California Code of Regulations. Relevant provisions of the California Code of Regulations include the following. • Articles 3 through 3.4 (Cal. Code Regs., tit. 2, §§ 2101-2142) provide regulations covering oil and gas leasing and operating requirements, oil and gas drilling and production regulations, and pollution control for leases located on State tide and submerged lands under the jurisdiction of the CSLC. The CSLC regulations are applicable to operations conducted from mobile rigs, fixed offshore structures, and upland locations serving these leases. Provision of these articles include protection of human health, regulations on wellhead equipment, subsurface safety valves, surface safety valves, remedial and well maintenance work, supervision and training, anomalous casing annulus pressure, subsurface injection, conversion of a well to fluid injection, waste disposal, pressure relief valves, personal protective equipment, and pipeline inspections. • Article 3.6 (Cal. Code Regs., tit. 2, §§ 2170-2175) includes (1) requirements for operators to prepare an operations manual describing equipment and procedures that the operator employs or will employ to protect public health and safety and the environment, and (2) provisions for development and maintenance of emergency response plans that include natural disaster response planning.
4.6 Cultural Resources		
U.S.	National Historic Preservation Act (NHPA) (16 USC 470 et seq.)	This applies only to federal undertakings. Archaeological resources are protected through the NHPA, as amended, and its implementing regulation, Protection of Historic Properties (36 CFR 800), the Archaeological Historic Preservation Act, and the Archaeological Resources Protection Act. This Act presents a general policy of supporting and encouraging the preservation of prehistoric and historic resources for present and future generations by directing federal agencies to assume responsibility for considering the historic resources in their activities. The State implements the NHPA through its statewide comprehensive cultural resource surveys and preservation programs coordinated by the California Office of Historic Preservation (OHP) in the State Department of Parks and Recreation, which also advises federal agencies regarding potential effects on historic properties. The OHP also maintains the California Historic Resources Inventory. The State Historic Preservation Officer is an appointed official who implements historic preservation programs within the State's jurisdictions. Under the NHPA, historic properties include "any prehistoric or historic district, site, building, structure, or object included in, or eligible for inclusion in, the National Register of Historic Places" (16 USC 470w [5]).
U.S.	Abandoned Shipwreck Act of 1987 (ASA) (43 USC 2101-2106);	Provides that any abandoned shipwreck embedded in a state's submerged lands, or that is located on a state's submerged lands and is included in or determined eligible for inclusion in the National Register, is the property of that state and subject to that state's jurisdiction.

U.S./ CA	Law/Regulation/Plan	Key Elements and Thresholds/Applicable Permits
U.S.	Archaeological and Historic Preservation Act (AHPA)	The AHPA provides for the preservation of historical and archaeological data that might be irreparably lost or destroyed as a result of: (1) flooding, the building of access roads, the erection of workmen's communities, the relocation of railroads and highways, and other alterations of terrain caused by the construction of a dam by an agency of the United States or by any private person or corporation holding a license issued by any such agency; or (2) any alteration of the terrain caused as a result of a federal construction project or federally licensed project, activity, or program. This Act requires federal agencies to notify the Secretary of the Interior when they find that any federally permitted activity or program may cause irreparable loss or destruction of significant scientific, prehistoric, historical, or archaeological data. The AHPA built upon the national policy set out in the Historic Sites Act of 1935 "to provide for the preservation of historic American sites, buildings, objects, and antiquities of national significance...."
U.S.	Archaeological Resources Protection Act (ARPA)	The ARPA states that archaeological resources on public or Indian lands are an accessible and irreplaceable part of the nation's heritage and: • establishes protection for archaeological resources to prevent loss and destruction due to uncontrolled excavations and pillaging; • encourages increased cooperation and exchange of information between government authorities, the professional archaeological community, and private individuals having collections of archaeological resources prior to the enactment of this Act; • establishes permit procedures to permit excavation or removal of archaeological resources (and associated activities) located on public or Indian land; and • defines excavation, removal, damage, or other alteration or defacing of archaeological resources as a "prohibited act" and provides for criminal and monetary rewards to be paid to individuals furnishing information leading to the finding of a civil violation or conviction of a criminal violator. ARPA has an enforcement provision (which provides for the imposition of both criminal and civil penalties against violators of the Act) and a permitting component (which allows for recovery of certain artifacts consistent with the standards and requirements of the National Park Service's Federal Archeology Program).
U.S.	Native American Graves Protection and Repatriation Act (NAGPRA)	For activities on federal lands, the NAGPRA, enacted in 1990, provides a framework for determining the rights of lineal descendants and Native American tribes to repatriate Native American remains, funerary objects, sacred objects, or other objects of cultural patrimony with which they are associated. NAGPRA applies to items found on federal lands, and to agencies that obtain federal funding. It requires consultation with appropriate Indian tribes prior to the intentional excavation, or removal after inadvertent discovery, of several kinds of cultural items, including human remains and objects of cultural patrimony.
U.S.	Paleontological Resource Preservation Act	Enacted on March 30, 2009, the Act requires the Secretaries of the Interior and Agriculture to manage and protect paleontological resources on federal lands using scientific principles and expertise. New policies from these agencies regarding paleontological resources are in progress.

U.S./ CA	Law/Regulation/Plan	Key Elements and Thresholds/Applicable Permits
CA	CEQA *(see also under Multiple Environmental Issues)*	As the CEQA lead agency, the CSLC is responsible for complying with all provisions of the CEQA and State CEQA Guidelines that relate to "historical resources." A historical resource includes: (1) a resource listed in, or eligible for listing in, the California Register of Historic Resources (CRHR); (2) a resource included in a local register or identified as significant in an historical resource surveys; and (3) any resource that a lead agency determines to be historically significant for the purposes of CEQA, when supported by substantial evidence in light of the whole record. The CRHR was created to identify resources deemed worthy of preservation on a State level and was modeled closely after the National Register. The criteria, which are nearly identical to those of the National Register but focus on resources of statewide significance (see State CEQA Guidelines § 15064.5, subd. (a)(3)), are defined as any resource that meets any of the following criteria: (1) is associated with events that have made a significant contribution to the broad patterns of California's history and cultural heritage; (2) is associated with lives of persons important in our past; (3) embodies the distinctive characteristics of a type, period, region, or method of construction, or represents the work of an important creative individual, or possesses high artistic values; or (4) has yielded, or may be likely to yield, information important in prehistory or history. Properties listed, or formally designated as eligible for listing, on the National Register are automatically listed on the CRHR, as are certain State Landmarks and Points of Interest. A lead agency is not precluded from determining that the resource may be an historical resource as defined in Public Resources Code sections 5020.1, subdivision (j), or 5024.1 (State CEQA Guidelines § 15064.5, subd. (a)(4)).
CA	California Register of Historical Resources	This resource provides an authoritative guide to identify the state's historical resources and to indicate which properties are to be protected, to the extent prudent and feasible, from substantial adverse change.
CA	California Native American Graves Protection and Repatriation Act (Cal NAGPRA)	The Cal NAGPRA of 2001 is contained in the California Health and Safety Code sections 8010-8021 and 8025 to 8030. Cal NAGPRA provides for the repatriation of human remains and cultural items in the possession or control of a State or local agency or museum to the culturally affiliated California Native American tribe. This law defines the term California Native American tribe to include non-federally recognized groups.
CA	California Public Resources Code section 5097.5	Section 5097.5 prohibits excavation or removal of any "vertebrate paleontological site or historical feature situated on public lands, except with the express permission of the public agency having jurisdiction over such lands." Penal Code section 623 spells out regulations for the protection of caves, including their natural, cultural, and paleontological contents. It specifies that no "material" (including all or any part of any paleontological item) will be removed from any natural geologically formed cavity or cave.
CA	California Public Resources Code, sections 6309, 6313, and 6314	Provides for CSLC administration of the Shipwreck and Historic Maritime Resources Program; establishes that title to all of the State's abandoned shipwrecks and all archaeological sites and historic resources on or in the tide and submerged lands of California is vested in the State and under the jurisdiction of the CSLC; establishes that any submerged archaeological or submerged historic resource remaining in State waters for more than 50 years shall be presumed to be significant; establishes requirements for salvage when justified by an educational, scientific, or cultural purpose, or the need to protect the resource; and establishes penalties for unauthorized removal or damage to archaeological or historic resources located on State submerged lands and that are the property of the State.

U.S./ CA	Law/Regulation/Plan	Key Elements and Thresholds/Applicable Permits
CA	Health and Safety Code section 7050.5	This code states that if human remains are exposed during construction, no further disturbance shall occur until the County Coroner has made the necessary findings as to origin and disposition pursuant to Public Resources Code section 5097.998. The Coroner has 24 hours to notify the Native American Heritage Commission (NAHC) if the remains are determined to be of Native American descent. The NAHC will contact most likely descendants, who may recommend how to proceed.
4.7 Land-based Transportation		
U.S.	Hazardous Materials Transportation Act of 1974	The Hazardous Materials Transportation Act of 1974, 49 CFR 397.9, directs the United States Department of Transportation (DOT) to establish criteria and regulations for the safe transportation of hazardous materials. There are no specific conformance measures required under this law.
CA	Caltrans	Caltrans is responsible for the design, construction, maintenance, and operation of the California State Highway System and the portion of the Interstate Highway System within State boundaries. Chapter 2, Article 3 of the Vehicle Code defines the powers and duties of the California Highway Patrol, which has enforcement responsibilities for the vehicle operation and highway use in the State.
4.8 Land Use and Recreation		
CA	CEQA *(see also under Multiple Environmental Issues)*	The State CEQA Guidelines require State and local agencies to analyze and publicly disclose environmental impacts, including land use and recreation, of proposed projects and adopt all feasible measures to mitigate those impacts.
4.9 Noise		
U.S.	Noise Control Act (42 USC 4910)	The Noise Control Act required the USEPA to establish noise emission criteria, as well as noise testing methods (40 CFR Chapter 1, Subpart Q). These criteria generally apply to interstate rail carriers and to some types of construction and transportation equipment. The USEPA published a guideline (USEPA 1974) containing recommendations for acceptable noise level limits affecting residential land use of 55 dBA L_{dn} for outdoors and 45 dBA L_{dn} for indoors.
U.S.	Department of Housing and Urban Development Environmental Standards (24 CFR Part 51)	The Department of Housing and Urban Development Environmental Standards put forth the following exterior noise standards for new home construction (for interior noise levels, a goal of 45 decibels on the A-weighted scale (dBA) is set forth and attenuation requirements are geared to achieve that goal): • 65 L_{dn} or less – Acceptable • 65 L_{dn} and < 75 L_{dn} – Normally unacceptable, appropriate sound attenuation measures must be provided • > 75 L_{dn} – Unacceptable
U.S.	NTIS 550\9-74-004, 1974	In response to a federal mandate, the USEPA provided guidance in NTIS 550\9-74-004, 1974 (“Information on Levels of Environmental Noise Requisite to Protect Health and Welfare with an Adequate Margin of Safety”), commonly referenced as the “Levels Document” that establishes an L_{dn} of 55 dBA as the requisite level, with an adequate margin of safety, for areas of outdoor uses, including residences and recreation areas. The USEPA recommendations contain a factor of safety and do not consider technical or economic feasibility (i.e., the document identifies safe levels of environmental noise exposure without consideration for achieving these levels or other potentially relevant considerations), and should not be construed as standards or regulations.

U.S./ CA	Law/Regulation/Plan	Key Elements and Thresholds/Applicable Permits
4.10 Visual Resources, Light and Glare		
CA	California Scenic Highway Program	The California Scenic Highway Program, managed by Caltrans, was created to preserve and protect scenic highway corridors from change that would diminish the aesthetic value of lands adjacent to highways. State highways identified as scenic, or eligible for designation, are listed in California Streets and Highways Code § 260 et seq.

Abbreviations commonly used in this table include (see also List of Abbreviations and Acronyms): AB = Assembly Bill; Caltrans = California Department of Transportation; CARB = California Air Resources Board; CDFW = California Department of Fish and Wildlife; CEQA = California Environmental Quality Act; CFR = Code of Federal Regulations; CSLC = California State Lands Commission; CWA = Clean Water Act; CZMA = Coastal Zone Management Act; NMFS = National Marine Fisheries Service; RWQCB = Regional Water Quality Control Board; SB = Senate Bill; SWRCB = State Water Resources Control Board; USACE = United States Army Corps of Engineers; USC = United States Code; USCG = United States Coast Guard; USEPA = United States Environmental Protection Agency; USFWS = United States Fish and Wildlife Service

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4.1 OPERATIONAL SAFETY/RISK OF ACCIDENTS

Section 4.1 describes those aspects of the existing environment that may impact operational safety, or that may be affected by an accident associated with the operation of the Amorco Marine Oil Terminal (Amorco Terminal), including transportation of crude oil and petroleum products to and from the Amorco Terminal. A summary of the existing vessel traffic levels and patterns and other marine terminals within the San Francisco Bay Area (Bay Area), and a summary of the historical casualties involving tank vessels and marine terminals within the Bay Area, are provided. This is followed by a description of measures in place to allow the safe movement of marine vessels within the San Francisco Bay and to respond to emergency situations. Also included is a summary of laws and regulations that may affect the safety and potential risk from the facility and its operation. Finally, this section analyzes the potential for impacts and presents appropriate mitigation.

4.1.1 ENVIRONMENTAL SETTING

4.1.1.1 Bay Area and Amorco Terminal Vessel Traffic

Bay Area

Many types of marine vessels call at terminals in the Bay Area, including passenger vessels, cargo vessels, tankers, tow/tug vessels, dry cargo barges, and tank barges. Section 2.2.2 (refer to Figure 2.2) describes the regional setting for the Bay Area, including a discussion of the five refineries, eight ports, 14 marine oil terminals, and other terminal facilities.

Table 4.1-1 presents information on vessel visits to the Bay Area during 2011 (USACE 2012), which is the most recent year of data available and is generally representative of the baseline conditions for the Project. The numbers in the table represent inbound transits, and numbers for outbound transits are approximately the same. A vessel that visits multiple terminals is counted at each terminal. With the exception of San Francisco Harbor, these numbers do not reflect vessel traffic transits originating in San Francisco Bay. Excluding San Francisco Harbor, over 39,000 vessels called at terminals in the Bay Area in 2011. Of these, 3,435 vessels transited up the Carquinez Strait, which includes the general area of the Amorco Terminal.

Table 4.1-2 presents information on tanker traffic in the Bay Area for 2003 through 2012 and tank barge traffic for 2008 through 2012, as presented in the San Francisco, San Pablo, and Suisun Bay Harbor Safety Plans for the years 2004 through 2013 (Harbor Safety Committee). As can be seen from the table, tanker traffic has been fairly constant ranging from a high of 868 in 2006 to a low of 699 in 2010. The average over the 10-year period was 760 tanker arrivals per year. Tank barge arrivals were only available for the 5-year period from 2008 through 2012. Tank barge arrivals varied from a high of 474 in

2008 to a low of 306 in 2011 with an annual average of 388. For the 5-year period from 2008 through 2012, the total annual tank vessel traffic (tanker and tank barge) varied from 1,012 to 1,243 with an average of 1,148. Table 4.1-3 summarizes the volume of the various petroleum products that were loaded and discharged at marine terminals in the Bay Area in 2012. Vessel calls to marine oil terminals in San Francisco Bay in 2008 and 2012 are shown in Table 4.1-4. For comparison, there were 2,863 and 2,363 vessel calls to marine oil terminals in 2008 and 2012, respectively.

Table 4.1-1: Inbound Vessel Traffic in San Francisco Bay (2011)

Location	Type of Vessel					Total Number of Vessels
	Dry Cargo	Tanker	Tow or Tug	Dry Cargo Barge	Tank Barge	
San Francisco Bay Entrance	2,658	757	284	9	257	3,965
San Francisco Harbor	45,282	3	937	152	67	46,441
Oakland Harbor	10,734	2	1,607	156	747	13,246
Richmond Harbor	91	410	4,353	44	1,216	6,024
San Pablo Bay and Mare Island Strait	10,062	375	1,074	383	236	12,131
Carquinez Strait	1,524	342	1,086	251	232	3,435
Suisun Bay Channel	162	82	426	255	68	993
Sacramento River Deepwater Channel	17	2	4	1	0	24

Source: USACE 2012

Table 4.1-2: Tank Vessel Traffic within San Francisco Bay

Year	Annual Number of Trips		
	Tankers	Barges	Tank Vessels
2012	712	333	1,045
2011	706	306	1,012
2010	699	371	1,070
2009	758	455	1,213
2008	769	474	1,243
2007	854	Not Available	Not Available
2006	868	Not Available	Not Available
2005	716	Not Available	Not Available
2004	760	Not Available	Not Available
2003	763	Not Available	Not Available
Annual Average	**760**	**388**	**1,148**

Source: San Francisco, San Pablo, and Suisun Bay Harbor Safety Plans

1 **Table 4.1-3: Petroleum Product Transfers in San Francisco Bay (2012)**

Product	Load (in barrels)	Discharge (in barrels)
Additives - Alkylate	471,000	1,373,210
Additives - Carbob		175,000
Additives – Denatured Ethanol	163,000	336,500
Additives - Ethanol	1,321,000	774,000
Additives - Isomerate	0	460,000
Additives – Iso-Octane	0	40,000
Additives - Naphtha	2,442,000	86,775
Additives - Other	810,630	497,650
Additives - PenHex	0	64
Additives – Reformate	972,600	216,000
Additives – Toulene	10,000	47,000
Crude – ANS	0	24,172,587
Crude – Import	415,000	112,724,729
Crude – Other	0	847,996
Cutter Stock	47,250	19,300
DECANT	3,500	413,500
Diesel	23,062,463	5,910,484
Fuel Oil	15,218,413	8,607,572
Gasoline	29,391,781	10,631,943
Jet Fuel	8,203,903	6,401,815
Light Cycle Oil	5,211,000	27,744,925
Lube Oil	3,187,956	247,800
Other	147,951	150,899
TRANSMIX	14,000	1,000
Totals:	**91,178,807**	**202,233,679**

Source: Harbor Safety Committee 2013

Table 4.1-4: Vessel Calls to Marine Oil Terminals in San Francisco Bay (2008 and 2012)

Marine Oil Terminals	2008			2012		
	Tankers	Barges	Total	Tankers	Barges	Total
Shell	67	130	197	69	96	165
Tesoro Amorco	82	3	85	67	0	67
Tesoro Avon	30	80	110	51	25	76
Phillips 66 Rodeo (formerly ConocoPhillips)	77	179	256	48	100	148
Phillips 66 Richmond	0	177	177	0	127	127
Plains All American Martinez	87	119	206	33	73	106
Shores Terminals Crockett	34	24	58	50	24	74
Plains All American Richmond	10	333	343	15	307	322
Chevron	410	370	780	380	247	627
BP West Coast Richmond	22	8	30	24	11	35
BP Lubricants	0	12	12	0	11	11
Kinder Morgan Richmond	5	0	5	13	0	13
Valero	134	22	156	116	91	207
IMTT Richmond	5	443	448	3	382	385
Total all Marine Oil Terminals	**963**	**1,900**	**2,863**	**869**	**1,494**	**2,363**

Sources: CSLC 2011a, CSLC 2013a

Lightering (transfer of oil from one vessel to another) takes place in Anchorage No. 9, located south of the San Francisco–Oakland Bay Bridge between China Basin and Central Basin. Lightering is normally conducted from a large tanker, whose draft is too deep to allow it to call at a certain terminal with a full load, to a smaller tanker. Lightering has decreased in the Bay Area since the inception of air quality regulations requiring receiving vessels to be equipped with vapor recovery systems

Amorco Terminal

Section 2.3 describes the Amorco Terminal and Section 2.4 describes its operation. Table 2-2 in Section 2.4.7 shows the annual vessel calls and throughput for the Amorco Terminal for the years 2008 through 2012 in barrels per year. As presented, over the last 5 years, annual vessel calls have ranged from 53 to 85, averaging 69 calls per year (between 2008 and 2012). The level of shipment activity and throughput is not expected to change substantially during the proposed 30-year lease agreement period. Hence, an annual ship and barge traffic level of approximately 60 vessels to approximately 90 vessels (anticipated maximum) has been used as the basis for the impact analysis.

Outer Coast

Vessels entering and leaving the Golden Gate entrance to San Francisco Bay do so through the Traffic Separation Scheme (TSS), which consists of a circular Precautionary Area with three traffic lanes (northern, main or western, and southern) exiting from the Precautionary Area. This TSS was recently modified to enhance navigational safety and mitigate the co-occurrence of endangered marine species with commercial vessel traffic. This modification became effective June 1, 2013. Figure 4.1-1 shows the TSS with the recent modifications. In a special one-time study, data compiled by the U.S. Coast Guard (USCG) Vessel Traffic Center for November 1993 through July 1994 show that approximately 50 percent of the tankers used the western lane, while approximately 25 percent of the tankers used the northern and southern lanes, respectively. For all types of vessel traffic, approximately 25 percent used the western lane, while 37 percent used the northern and southern lanes, respectively.

Limited information is available on vessel routes after the vessels leave the traffic lanes. Tankers essentially remain at least 50 miles offshore when transiting to and from Alaska, and 25 miles offshore when transiting to and from other locations. Tank barges normally transit at least 15 miles offshore.

4.1.1.2 Vulnerable Resources

Vulnerable resources are those resources that could potentially be harmed by an accident or spill. These resources are addressed in Section 4.2, Water Quality, and Section 4.3, Biological Resources. Besides commercial vessel traffic in the San Francisco Bay, a great deal of fishing and recreational boating traffic occurs, as well as ferry service.

High-speed commuter ferries frequently operate in central/south San Francisco Bay and San Pablo Bay. Concentrations of these ferries are highest around the San Francisco Ferry Building on San Francisco’s north shore, where most Central Bay routes terminate. Ferry routes in the San Francisco Bay and San Pablo Bay are shown on Figure 4.1-2. Many ferries also operate between San Francisco’s north shore, Alcatraz, and Sausalito/Tiburon. These ferries do not run along charted routes. The San Francisco Harbor Safety Committee, in conjunction with the USCG, has established a Ferry Traffic Routing Protocol for: (1) the area surrounding the Ferry Building terminal along the waterfront of San Francisco, (2) the waters of central San Francisco Bay, and (3) the waters of San Pablo Bay. The protocol is intended to increase safety in the area by reducing traffic conflicts and, while not compulsory, the guidelines set forth in the protocol are strongly recommended. The Bay Area ferry system annually makes over 85,000 trips (Harbor Safety Committee 2012).

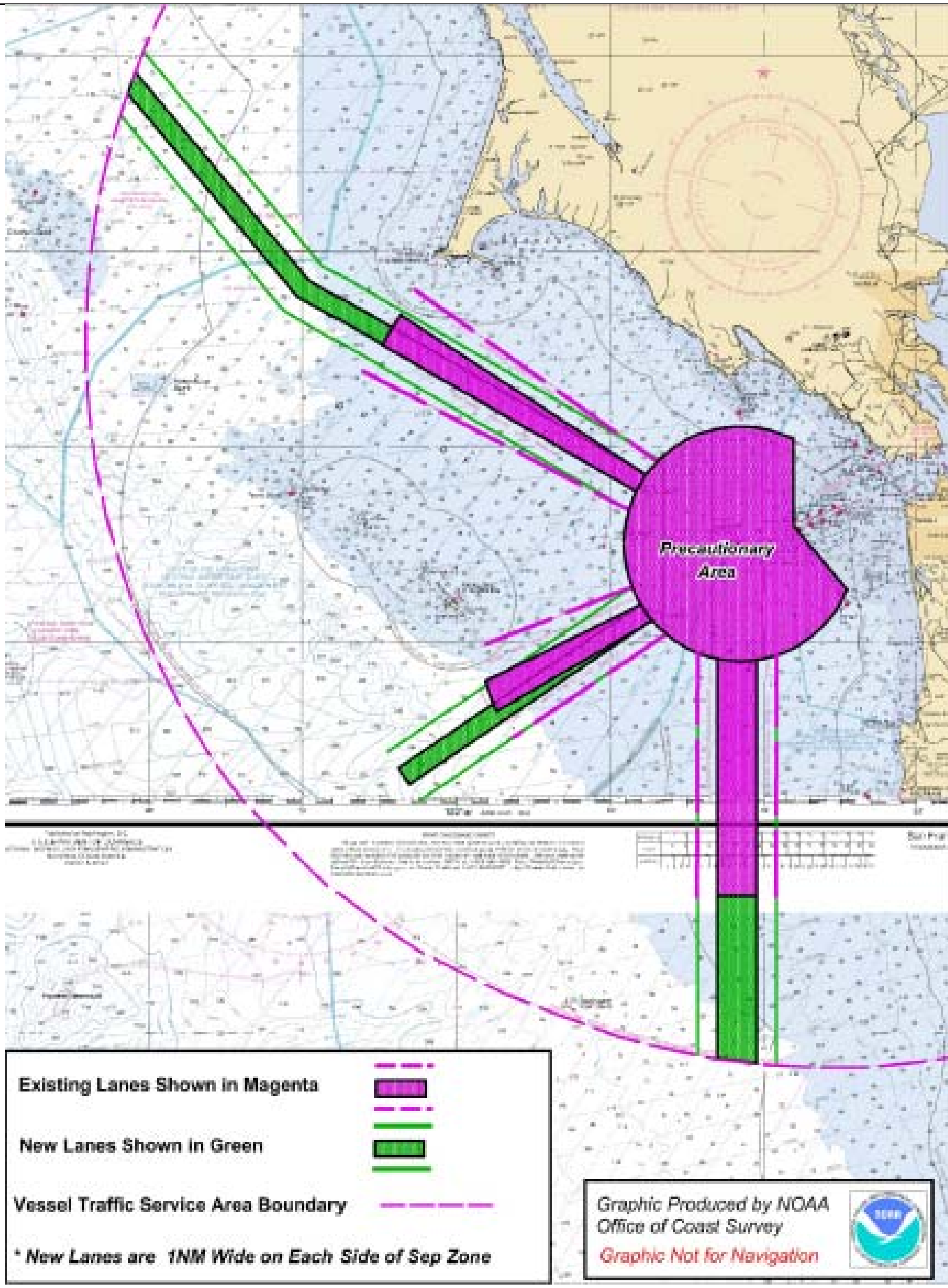


Figure 4.1-1: San Francisco Bay Entrance TSS

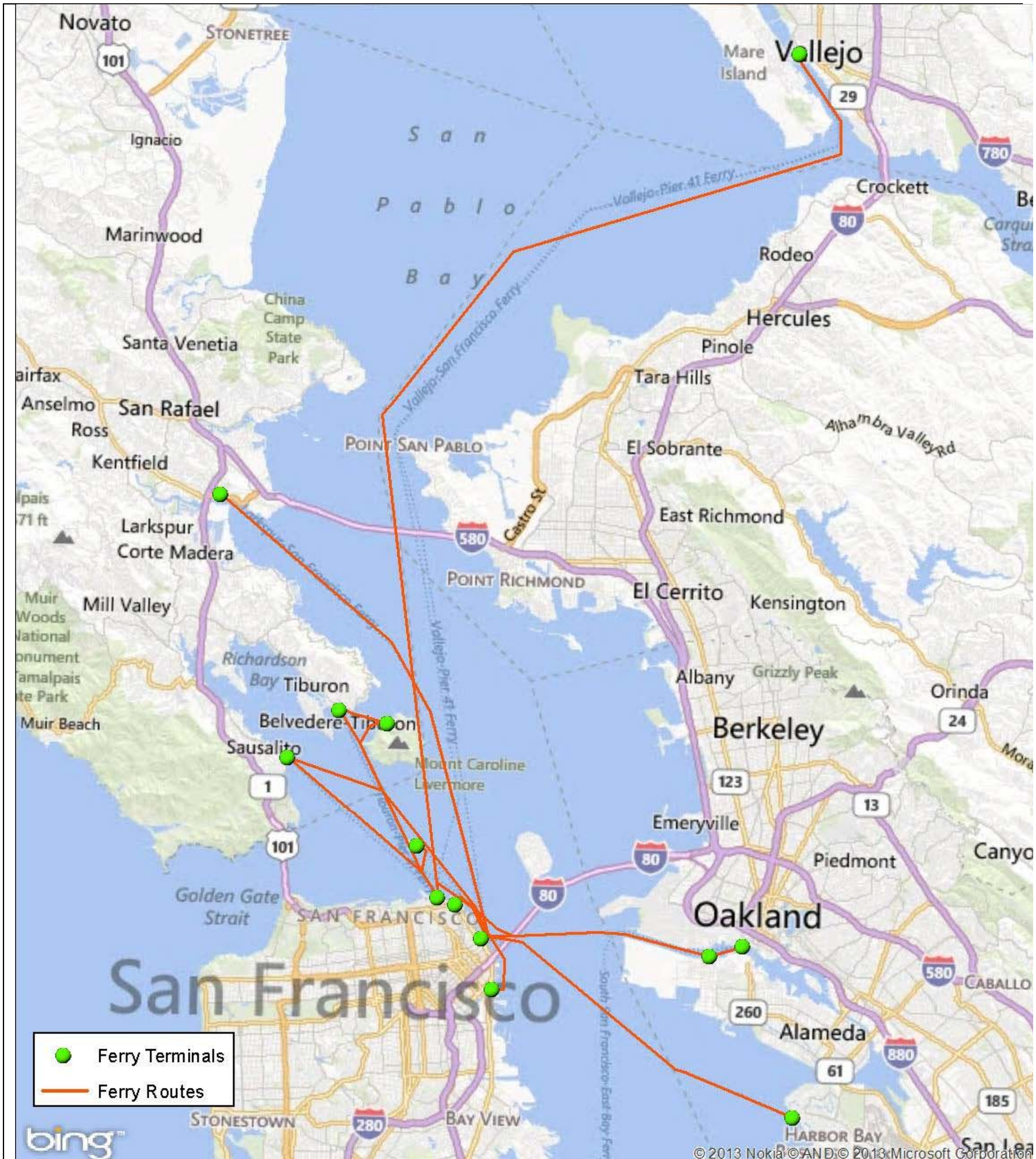


Figure 4.1-2: San Francisco Bay Ferry Routes

There are approximately 20,000 boat berths around the San Francisco Bay, exclusive of the Sacramento and San Joaquin Rivers, as well as numerous boat-launch sites. Two-thirds of these are located in the Central Bay. Motorized vessels occupying berths in the San Francisco Bay Area constitute only 15 percent of registered vessels using the Central Bay. Numerous boat ramps and launches encourage use of the San Francisco Bay by smaller motorized vessels and increasingly popular non-motorized vessels such as canoes, kayaks, windsurfers, and paddleboards. While only a small percentage of boat owners and renters are on the San Francisco Bay at any given time, sunny weekends may bring thousands of pleasure boat users on the San Francisco Bay's waterways. Fishing and recreational boating are discussed in more detail in Section 6.0, Commercial and Sport Fisheries.

Tank vessels transiting between the San Francisco Bay entrance and the Amorco Terminal must pass beneath the Carquinez Bridge complex located at the western end of the Carquinez Strait. There are two separate bridges, one suspension bridge (the Alfred Zampa Memorial Bridge) completed in 2003 carrying southbound traffic, and one completed in 1958 carrying northbound traffic. Since the new bridge is a suspension bridge, the channel opening and height restrictions are governed by the older bridge. The channel on each side of the center pier is 998 feet wide. The minimum vertical clearances are 146 feet through the north span and 134 feet through the south span.

Storage tanks and vacant land are located on the shore south of the Amorco Terminal. The Shell Martinez Marine Oil Terminal (Shell Terminal) is located west of the Amorco Terminal, and the Benicia-Martinez Bridge is located approximately 600 feet to the east. The nearest residence is located over a mile southwest, and a marina and park are located approximately 3,000 feet southwest on the western side of the Shell Terminal.

4.1.1.3 Bay Area and Amorco Oil Spill Response Capability

Bay Area

All of the marine terminals and all vessels calling at the marine terminals are required to have oil spill response plans and a certain level of initial response capability. However, it is not economically feasible or practical for individual terminal operators and vessels to each have their own equipment to respond to more than minor spills. Therefore, operators rely on pooled or contract capabilities. The vessel and terminal owners use various companies and organizations to provide their response capability. The USCG and California Department of Fish and Wildlife’s (CDFW) Office of Spill Prevention and Response (OSPR) have created the Oil Spill Response Organization (OSRO) classification program so that facility and tank vessel operators can contract with and list an OSRO in their response plans in lieu of providing extensive lists of response resources to show that the listed organization can meet the response requirements. Organizations that want to receive a USCG OSRO classification submit an extensive list of their resources and capabilities to the USCG for evaluation. The State of California has a similar OSRO classification program to allow facility and tank vessel operators to list OSROs in meeting State oil spill response requirements. OSROs currently listed in the Bay Area that provide on water services include, Marine Spill Response Corporation (MSRC), National Response Corporation, and Clean Harbors.

The MSRC is the largest, dedicated, standby oil spill response program in the United States, including open water, shoreline, and mid-continent river operations. MSRC response services are available to all Marine Preservation Association members, companies that have contracted with MSRC, and on a reimbursable basis. The MSRC has an extensive inventory of response equipment located throughout the Bay Area, including Benicia, Concord, Martinez, Pittsburg, Richmond, and Vallejo. Equipment located near Benicia/Martinez is listed in Table 4.1-5.

Table 4.1-5: MSRC Benicia/Martinez Spill Response Equipment

Equipment Type	Description
Response Boats	• Raider II (38 feet) • Raider IV (38 feet) • Sentinel (90 barrels storage, skimmer, boom) • Mini Spoiler I (18 barrels storage, skimmer, boom) • Mini Spoiler II (18 barrels storage, skimmer, boom)
Other Vessels	• 4 Mini Barges (100 barrels storage each) • 2 Shallow Water Push Boats • 2 Fast Tank (35 and 37 barrel storage) • 2 21-foot Small Boats • 6 12-foot Punts • 1 Kepner Sea Curtain (12 barrel) • 1 Shallow Water Barge (self propelled @ 400 barrel)
Skimmers	• 1 Marco Class III (18,450 barrel/day EDRC[1]) • 2 Marco Class I (7,176 barrel/day EDRC) • 1 6” Oil Mop (480 barrel/day EDRC) • 7 4” Oil Mop (266 barrel/day EDRC) • 1 GT-185/w adapter (1,371 barrel/day EDRC) • 2 Walosep mini (596 barrel/day EDRC) • 2 Oil Hawg 6-foot (1,372 barrel/day EDRC) • 1 Skim Pac (240 barrel/day EDRC)
Boom	• 14,850-foot, 10-inch Curtain Internal Foam • 5,000-foot, 18-inch Curtain Internal Foam • 9,600-foot, 20-inch Harbor Boom

Source: MSRC 2013

[1] EDRC = Effective Daily Recovery Capacity

Amorco Terminal

Tesoro Refining and Marketing Company, LLC (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 the MSRC to serve as the primary OSRO contractor in its Oil Spill Response Plan for offshore, onshore, and shallow-water response services. Section 2.6.4 discusses Tesoro's oil spill response capability in more detail and Table 2-3 lists available oil spill response equipment as listed in their Oil Spill Response Plan.

The Tesoro Spill Response Team has approximately 25 personnel trained in oil spill containment and recovery procedures. Training is ongoing on a monthly basis. Key areas of training are boom deployment and boat handling.

Federal and State regulations specify response capability requirements for marine facilities. In response to these regulations, Tesoro was required to submit an oil spill response manual, which included calculations to establish a worst-case discharge (WCD) from the Amorco Terminal; and to show how and with what assets Tesoro would respond to such a spill. WCD calculations are required by OSPR, USCG, and U.S. Environmental Protection Agency (USEPA) regulations. Tesoro is also required to calculate maximum most probable and average most probable release sizes for response planning.

The USEPA WCD is the contents of the largest tank located on the Tesoro property and is 283,000 barrels. The largest tank at the Amorco Terminal is 120,000 barrels. None of the storage tanks are located in the California State Lands Commission (CSLC) lease area and, hence, are not addressed in this document. However, responses to these WCD spills are presented in Tesoro's Oil Spill Response Plan.

The USCG/OSPR WCD for the Amorco Terminal consists of the volume of the pipeline plus the amount of oil that can be pumped out before the pumps are shut down. The Tesoro Oil Spill Response Plan lists the WCD as 22,178 barrels. This volume was determined by calculating the pipeline volume in barrels from the end of the pipeline on the wharf to the first onshore isolation valve (757 barrels) and the amount of oil that could be released from continued pumping until the release is discovered, pumps are shut down, and the isolation valves closed. Tesoro assumed a maximum pumping rate of 30,000 barrels per hour and 30 minutes to detect the release and shut down the line, which would result in 15,000 barrels of pumping loss. As described in Section 2.6.5, 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. The 30-minute detection time used by Tesoro to calculate the WCD is extremely conservative. As a comparison, a detection and shutdown time of two minutes was assumed in the Shell Martinez Oil Spill Response Plan.

CSLC regulations (Cal. Code Regs., tit. 2, § 2395) require that all onshore marine terminals, except those “subject to high-velocity currents,” be able to deploy a boom in a specified manner to enclose the water surface surrounding the vessel prior to transfer operations. An “onshore marine terminal subject to high-velocity currents” is defined as an onshore terminal at which the maximum current velocities are 1.5 nautical miles per hour (knots) or greater for the majority of the days in the calendar year. The Amorco Terminal fits into this category. Onshore marine terminals subject to high-velocity currents must provide sufficient boom appropriate to the conditions at the terminal, trained personnel, and equipment maintained in a standby condition at the berth for the duration of the entire transfer operation, so that a length of at least 600 feet of boom can be deployed within 30 minutes of a spill. Tesoro maintains 2,400 feet of boom on the wharf that can be deployed within 30 minutes.

The USCG requires that marine terminals must be able to respond to a small (50 barrels) spill with the following equipment:

- 1,000 feet of containment boom and a means of deploying it within 1 hour;
- oil recovery devices within 2 hours; and
- oil storage capacity for recovered oily material.

4.1.1.4 Spills from Bay Area Marine Terminals and Amorco Terminal

Bay Area

The CSLC maintains a database of all tanker and tank barge calls to marine oil terminals and of all spills from marine terminals in the San Francisco Bay. This includes spills of all sizes no matter how small. During the past 10 years (2003-2012), there have been a total of 80 spills, varying from a teaspoon to 115 gallons (2.74 barrels). During this same 10-year period, annual tank vessel traffic has ranged from a high of 3,168 in 2006 and a low of 2,369 in 2001, with an average of 2,659 calls per year. This equates to eight spills per year, or one spill every 332 vessel calls.

Terminals were the responsible party for approximately 66 percent of the spills, while vessels were responsible for the remaining 34 percent. The largest spill from a marine oil terminal in the San Francisco Bay since 1992, the year CSLC started tracking such spills, was 1,092 gallons (26 barrels).

Amorco Terminal

Tesoro reported in its Oil Spill Response Plan that there has only been one reportable spill at the Amorco Terminal since 1991. This spill occurred on February 4, 2000, and involved a release of less than one barrel of gasoline/diesel from the D line to the water. The spill was cleaned up and the line was taken out of service.

4.1.1.5 Other Major Vessel Incidents

Over the past 40 years, several incidents involving vessels have drawn public attention.

- In 1971, a collision of the Oregon Standard and the Arizona Standard under the Golden Gate occurred in heavy fog and resulted in a spill of approximately 27,600 barrels of bunker heavy fuel oil. Spilled oil impacted the outer coast to the north as far as Double Point (north of Point Reyes Bird Observatory) in Marin County, and to the south near San Gregorio Beach in San Mateo County, as well as within San Francisco Bay. Approximately 4,000 seabirds died as a result of the spill. This incident led to the Bridge to Bridge Radiotelephone Act, which requires all vessels to monitor Channel 14 VHF-FM, and the development of the Vessel Traffic Service in San Francisco Bay.
- In 1984, the chemical tanker Puerto Rican experienced an explosion in a void space surrounding a cargo tank while the vessel was in open waters about 8 miles west of the Golden Gate Bridge. The accident resulted in injury to crew members and the release of over 30,000 barrels of lubricating oil and fuel oil, impacting the Farallon Islands, Point Reyes, and Bodega Bay.
- In 1989, the tug Standard IV with an oil barge in tow lost control while approaching its berth at the Richmond Long Wharf. The barge struck the pier, destroying a catwalk and parting the bow lines on the tanker “Overseas Juneau.” The tanker’s bow began to swing away from the pier. The tanker dropped an anchor and hailed a passing light tug. The tug held the tanker’s bow against the dock while it made preparations to get underway. The tanker transited to anchorage without any further damage. The barge suffered minor damage and the tug none.
- The partially laden tanker Overseas Philadelphia was moored portside at the Wickland (now Shore) Selby marine oil terminal on February 20, 1997, when the vessel broke loose from her mooring lines and drifted without power into the Carquinez Strait. As a result, the terminal sustained severe damage to the fixed loading arms and the concrete wharf. Reportedly, 420 gallons of jet fuel were released into the Carquinez Strait. The cause may have been due to a surge from the passing of another vessel that caused the breast lines to part and allowed the vessel to swing outward away from the dock. Since no cargo transfer operations were in process at the time of the incident, the spilled contents consisted of jet fuel remaining in the loading arms. Within approximately eight minutes of the incident, the drifting vessel started her engines and then safely anchored approximately one nautical mile from the Wickland (now Shore) Selby terminal.

- The Singapore-flagged Neptune Dorado was detained in San Francisco on September 24, 2000, by the USCG after port State inspections revealed safety deficiencies. The four safety deficiencies cited were two inoperative main fire pumps, a leaking starboard boiler oil settling tank, inoperative main vent blowers for the engine room, and leaking fuel oil lines to the main diesel engine. The vessel was allowed to proceed to a terminal and offload its cargo of crude oil in early October after repairs were made.
- In November 2007, a container ship, the Cosco Busan, struck the San Francisco-Oakland Bay Bridge and released almost 1,400 barrels of fuel oil into the water. Oil contamination occurred on the waterfront in the San Francisco Bay, and several beaches in San Francisco and in Marin County were closed due to the oil. On-water and shoreline oil cleanup activities were undertaken, and many beaches have since been cleaned up and re-opened. As a result of this spill, State legislation was passed in 2008 to improve spill preparedness and response measures, including assigning responsibility for cleanup in the event of a spill.

4.1.1.6 Factors Affecting Vessel Traffic Safety

This section summarizes environmental conditions described in the USCG Pilot, Volume 7, 45th Edition, 2013 (NOAA 2013a), the San Francisco, San Pablo and Suisun Bays Harbor Safety Plan Year 2012 (Harbor Safety Committee 2013), and San Francisco Bar Pilots Operations Guidelines for the Movement of Vessels on San Francisco Bay and Tributaries that could have an impact on vessel safety in the Bay Area. More detailed information on many of the areas can be found in the existing conditions description in other sections of this document (e.g., detailed meteorological data can be found in Section 4.6, Air Quality).

Winds

San Francisco Bay Area weather is seasonably variable. Winter is the season with the most significant seas, both in terms of locally driven wind waves as well as open-ocean swells that are generated by long fetches of strong winds over the eastern Pacific. Winter winds from November to February shift frequently and have a wide range of speeds depending on the procession of offshore high and low-pressure systems. Spring tends to be the windiest season, with average speeds in the San Francisco Bay of 6 to 12 knots, with wind speeds of 17 to 28 knots up to 40 percent of the time. Summer winds are the most constant and predictable. Wind speed can affect track keeping, mooring operations, and can cause strain on mooring lines during transfer operations.

Fog

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

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

The reduced visibility caused by fog can increase the potential for collisions and allusions.

Currents

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

Tides

Tides in the San Francisco Bay Area are mixed. Usually two cycles of high and low tides occur daily, but with inequality of the heights of the two. Occasionally, the tidal cycle will become diurnal (only one cycle of tide in a day). Depths in the San Francisco Bay are based on mean lower water level (MLLW), which is the average height of the lower of the two daily low tides. The mean range of the tide at the Golden Gate is 4.1 feet, with a diurnal range of 5.8 feet. During the periodic maximum tidal variations, the range may reach as much as 9 feet and have lowest low waters 2.4 feet below MLLW datum. Tides affect water depth, which in turn can have potential impact groundings. In addition, tidal action has an impact on currents in the San Francisco Bay.

Water Depths

Water depths in the San Francisco Bay are generally shallow and subject to silting from river runoff and dredge spoil recirculation. Therefore, channel depths must be regularly maintained, and shoaling, the deposition of silt and sand that decreases water depth, must be prevented to accommodate deeper-draft vessels. The U.S. Army Corps of Engineers (USACE) attempts to maintain the depth of the main ship channel from the Pacific Ocean into the San Francisco Bay at 55 feet; however, the continual siltation results in actual main-channel depths ranging between 49 and 55 feet. Deep-draft vessels in the San Francisco Bay must carefully navigate many of the main shipping channels because channel depths in some areas are barely sufficient for navigation by some modern larger vessels, depending upon how deeply laden the vessel is. While the USACE surveys specific areas of concern on a frequent basis, recent survey charts may not show all seabed obstructions or shallow areas due to highly mobile bottoms (due to localized shoaling). In addition, recent observations indicate that manmade channels may influence tidal currents to a greater degree than earlier anticipated. Water depth impacts under-keel-clearance and groundings are a potential impact. Additional information on water depth and quality at the Amorco Terminal is found in Section 4.2, Water Quality.

4.1.1.7 Bay Area Vessel Traffic Control Systems

Navigational Description

The USCG has established a TSS off the entrance of San Francisco Bay (refer to Figure 4.1-1). It includes three directed traffic areas, each with one-way inbound and outbound traffic lanes separated by defined separation zones, and a Precautionary Area. The TSS is recommended for use by vessels approaching or departing the San Francisco Bay, but is not necessarily intended for tugs, tows, or other small vessels that traditionally operate outside the usual steamer lanes or close to shore. The TSS has been adopted by the International Maritime Organization (IMO).

The USCG established the Vessel Traffic Service (VTS) in San Francisco Bay in 1972. The USCG operates the VTS and monitors nearly 400 vessel movements per day. The region is considered a difficult navigation area because of its high-traffic density, frequent episodes of fog, and challenging navigational hazards. The VTS for the San Francisco Bay region has six components: (1) automatic identification system, (2) radar and visual surveillance, (3) VHF communications network, (4) a position reporting system, (5) traffic schemes within the San Francisco Bay, and (6) a 24-hour center that is staffed with specially trained vessel traffic-control specialists.

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

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

Position Reporting, Communication, and Surveillance

The USCG VTS at Yerba Buena Island is the communications center for the TSS. The TSS was extensively upgraded in 1997. The upgraded system includes state-of-the-art computer-digitized radar displays shown on electronic charts. The new system automated many of the controller's duties, allowing more time for monitoring traffic. There are three classes of VTS user: passenger vessels, power-driven vessels, and towing vessels. There are four report types that may be required of each. In general, communications with VTS are brief, succinct, and to the point. Power-driven vessels over 40 meters in length are required to call VTS 15 minutes prior to entering a VTS area, when getting underway, at certain specified points, when there are changes to the sailing plan, and when leaving the VTS area.

Pilotage

Pilotage in and out of the San Francisco Bay and adjacent to the waterways is compulsory for all vessels of foreign registry and United States vessels under enrollment not having a federal licensed pilot on board. The San Francisco Bar Pilots provide pilotage to ports in San Francisco Bay and to ports on all tributaries to the Bay. Pilots board the vessels in the Pilot Boarding Area outside the Golden Gate entrance, and then pilot the vessels to their destinations. Pilots normally leave the vessels after docking and reboard the vessels when they are ready to leave and pilot them to sea or other destinations within the Bay Area.

Physical Oceanographic Real Time System (PORTS)

PORTS is designed to provide real-time information to mariners, oil spill response teams, coastal resource managers, and others about San Francisco Bay's water levels, currents, salinity, and winds. The National Oceanic and Atmospheric Administration's (NOAA) National Ocean Service, OSPR, U.S. Geological Survey, local community, and Marine Exchange of the San Francisco Bay operate PORTS as a partnership to provide service to those who must make operational decisions based on oceanographic and meteorological conditions in the Bay. Instruments are deployed at strategic locations in the San Francisco Bay to collect and provide data at critical locations and to allow nowcasting and forecasting using a mathematical model of the Bay's oceanographic processes. Data from these sensors are fed to a central data-collection point; raw data from the sensors are integrated and synthesized into information and analysis products, including graphical displays of PORTS data. These displays are available over the Internet and through a voice-response system. Station S0601 is located at the Amorco Pier (NOAA 2013b).

4.1.2 REGULATORY SETTING

Federal and State laws that may be relevant to the Project are identified in Table 4-1.

4.1.3 IMPACT ANALYSIS

4.1.3.1 Significance Criteria

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

- The existing facility does not conform to its oil spill contingency plans or other plans that are in effect; or if current or future operations may not be consistent with federal, State, or local regulations (Note: conformance with regulations does not necessarily mean that there are not significant impacts).
- There is a significant risk for fires, explosions, releases of flammable or toxic materials, or other accidents from the Amorco Terminal or from vessels that could cause injury or death to members of the public.
- The Project is located on a site that is included on a list of hazardous materials sites compiled pursuant to Government Code section 65962.5 and, as a result, would create a significant hazard to the public or the environment.
- Existing and proposed emergency response capabilities are not adequate to effectively mitigate spills and other accident conditions, such that a level of concern would be reached at shoreline environments.

The Project site is not on a list of hazardous materials sites compiled pursuant to Government Code section 65962.5 (the Cortese list), so this significance criterion is not discussed further in this Environmental Impact Report (EIR) (No Impact).

4.1.3.2 Approach to Analyzing Impacts of Upset Conditions

System safety/risk-of-upset impact assessment is different than those of other environmental issue areas because an accident must occur before an impact can occur. The expected frequency of accidents must be factored into the analysis. Furthermore, even the occurrence of an accident does not mean significant impacts will result. Whether or not a significant impact may be expected depends on the magnitude of the accident, and as the magnitude of a given potential accident scenario increases the probability of that accident scenario occurring decreases. Thus, the system safety/risk-of-upset impact analysis considers both probability and potential magnitude of reasonably foreseeable upset scenarios, including: (1) spills that can potentially impact the environment, and (2) incidents that can potentially impact the safety of the public.

The expected frequency of spills occurring as a function of volume was estimated, as was the extent of area that may be impacted by these spills using available oil spill trajectory modeling results. Note that a spill itself does not necessarily impact the environment unless specific resources are impacted. How a spill impacts the environment is addressed in other resources sections of this EIR. Any deficiency in Tesoro's ability to respond to upset conditions and the potential for impacts to public safety is assessed in this section.

The analysis quantifies the probability of an accident due to the Project from both the tank vessel traffic and the Amorco Terminal. The analysis considers the specific type, such as tankers, barges, and number of vessels that will be calling at the Amorco Terminal over the lease period; specific design features of the Amorco Terminal; and the historical accident record. Information regarding potential hazards during vessel approaches and departures is evaluated based on historical data, information from agencies and organizations knowledgeable of the area, and information available from the Harbor Safety Committee.

Risk/safety analysis of types of incidents that can occur at the Amorco Terminal, the consequences of spill incidents, and their expected frequency of occurrence are based on Amorco Terminal operations. The worst-case and most likely spill sizes that could occur from the various components of the Amorco Terminal have been estimated. The Tesoro Oil Spill Response Plan approved by the OSPR serves as the basis for this analysis, including a worst-case spill and risk and hazard analysis. Tesoro's ability to respond to and mitigate potential incidents has also been evaluated.

4.1.3.3 Impacts Analysis and Mitigation Measures

The following subsections describe the Project's potential impacts on the environment and public safety. Where impacts are determined to be significant and there are feasible means to reduce or avoid the impact, mitigation measures (MMs) are identified.

Proposed Project

Impact Operational Safety (OS)-1: Potential for spills and response capability for containment of oil spills from the Amorco Terminal during transfer operations. (Significant and unavoidable.)

The presence of oil and handling of oil associated with the Project would result in the potential for spills. Consequences would depend on the spill conditions and could range from relatively small spills that can be contained during first-response efforts with rapid cleanup and no significant impacts, to spills that are larger or difficult to clean up with significant residual impacts after remediation. Tesoro would be required by regulations to maintain response capabilities for containment of the reasonable WCD spill event.

Potential for Spills from the Amorco Terminal

Spills may originate from the Amorco Terminal or from the tank vessel and may be due to natural factors (earthquake, tsunami, severe environmental conditions, etc.), human error (berth collision, bad hose connection, ineffective mooring line tending, etc.), or equipment failure. Potential sources of a spill from the Amorco Terminal include drip pans, hydraulic hoses, loading hoses and fittings, pipelines and fittings, and valves.

The transfer area on the wharf is impounded by a raised berm that drains into a collection system that engages automatically by level control switches. Collection pans are located under all piping manifolds at the berth and are designed to collect potential drips from bolted flanges, fittings, and expansion joints. A description of the drip and recovered oil facilities is contained in Section 2.3.2. A description of the oil/product transfer procedures is contained in Section 2.4.6. The emergency shutdown system is described in Section 2.6.1, with activation of the emergency shutdown system able to close the pipeline block valves within 30 seconds.

The Marine Oil Terminal Engineering and Maintenance Standards (MOTEMS) minimum engineering, inspection, and maintenance standards apply to all existing and new marine oil terminals in California, and include criteria for maintenance, inspection, structural and seismic analysis and design; mooring and berthing; geotechnical considerations (including site-specific assessment); and analysis and review of the fire, piping, mechanical, and electrical systems. Tesoro is required to comply with the MOTEMS, which became effective on February 6, 2006. A discussion of MOTEMS is contained in Section 2.3.5.

A detailed MOTEMS Audit of the Amorco wharf was recently completed (Eichleay and Gerwick 2011). In addition, a detailed geotechnical investigation was performed (Treadwell and Rollo 2010). These two audits/studies found that the wharf did not meet MOTEMS seismic standards and, in addition, found other MOTEMS deficiencies. Tesoro has implemented a program to upgrade the wharf to meet MOTEMS seismic standards and to fix the other deficiencies. To date, the seismic upgrades are reportedly complete and most of the other deficiencies have been corrected.

A release from a vessel while at the Amorco wharf is also possible. As a worst case, the entire contents of a vessel could be released; however, this is not considered a realistic scenario. The CSLC spill database (refer to Section 4.1.1.4) differentiates between spills from marine terminals and spills from tank vessels at marine terminals. The largest release from a tank vessel in the San Francisco Bay between 1992 and 2001 was 420 gallons of jet fuel oil (10 barrels). The largest release from a tank vessel between 2001 and 2013 was 58,082 gallons of fuel oil (1,383 barrels) in 2007.

Spill Planning Volumes

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

- **Reasonable Worst-case Discharge.** The WCD volume is discussed in Section 4.1.1.3, and equates to 22,178 barrels of oil.
- **Maximum Most Probable (Medium Volume) Discharge.** The USCG defines this discharge as the lesser of 1,200 barrels, or 10 percent of the volume of the WCD. The WCD is 22,178 barrels and thus, the maximum most probable discharge is 1,200 barrels.
- **Average Most Probable (Small Volume) Discharge.** The USEPA defines the average most probable discharge as 50 barrels, not to exceed the WCD, while the USCG defines it to be the lesser of 50 barrels or 1 percent of the WCD (222 barrels in this case). Thus, the average most probable (small) discharge planning volume is 50 barrels.

Probability of Release

The CSLC spill data, augmented by additional data for larger spills, were used to estimate the probability of spills from the Amorco Terminal. The average number of tank vessel calls to marine oil terminals in the San Francisco Bay over the past 10 years (2003 through 2012) has been approximately 2,659 per year, resulting in a probability of a spill per vessel call of 3.0×10^{-3} (refer to Section 4.1.1.4). The largest spill between 2003 and 2012 was 115 gallons. The largest recorded spill from a tank vessel or marine oil terminal since 1992, the year the CSLC began collecting these data, was 1,092 gallons (26 barrels). While the probability of a spill is presented in terms of spills per vessel transfer, the database includes spills that occur even when a vessel is not present. However, the vast majority of spills occur when vessels are present and it is generally believed that including other spills in the calculations does not bias the results.

Therefore, the cited probability reflects the probability of spills at Bay Area marine oil terminals from all causes and not just those associated with transfer operations. Because very few large spills have occurred at terminals within the San Francisco Bay, the CSLC (2011a) integrated worldwide data with the CSLC data to estimate the potential for large spills from marine oil terminals. Figure 4.1-3 presents a graph of the percent of spills as a function of size. Because the majority of spills are small, a logarithmic scale was used for the spill size axis. As the figure indicates, 54 percent of spills are less than 1 gallon, 70 percent are less than 10 gallons, 86 percent are less than 100 gallons, and 95 percent are less than 1,000 gallons.

The maximum number of vessels projected to call annually at the Amorco wharf is 90. Using the spill probability presented above, one spill approximately every 3.7 years (an annual probability of spill of 0.27) is anticipated. A spill larger than 1 gallon would be expected approximately every 7.9 years. The probability of a spill larger than 1,000 gallons from the Amorco Terminal is 0.01, or one spill every 73 years. These probabilities as applied to the Amorco Terminal are very conservative because the spill data used are for all marine oil terminals, many of which are not or were not in compliance with MOTEMS.

The consequences of a spill would depend on the size of the spill; the effectiveness of the response effort; and the biological, commercial fishery, shoreline, and other resources affected by the spill. A spill of 1 gallon or less would result in an adverse impact that can be mitigated, while a large spill of 1,000 barrels (42,000 gallons) most likely would result in a significant, adverse impact that would have residual effects after mitigation. The impacts of spills between 1 gallon and 1,000 barrels (42,000 gallons) depend on the effectiveness of response efforts and the resources impacted.

Worst-case Release Spill Trajectory

Tesoro (2012) conducted oil spill trajectory modeling for a reasonable worst-case oil spill release of 22,178 barrels at the wharf. The area at risk from a release was evaluated using the OILMAP™ trajectory and fates model. A sensitivity analysis was performed on these results to evaluate possible seasonal environmental and weather impacts. This was performed using a stochastic evaluation technique for trajectories over each seasonal period. The identified pessimistic conditions were used to develop trajectory plots depicting the projected areas of impact over a 72-hour period. The trajectory and fates mode of modeling predicts both the movement and weathering of surface oil. The fate processes simulated are spreading, evaporation, entrainment, emulsification, and shoreline stranding.

Seasonal variations have been evaluated through the stochastic model. Historical winds for the period were categorized into summer and winter seasons. Wind velocity and direction vectors representative for the seasons were evaluated creating a range of probable spill trajectories.

Generally, the regional weather has two seasonal conditions, summer and winter. In the summer, winds are dominated by the prevailing west wind and thermal induction from the valley. In the early morning and evening, winds can be light and variable. In the winter or fall, the winds are generally light and variable, with occasional stronger winds representative of passing winter storm systems. Generally, a strong wind across the tidal flow tends to act as a driving function forcing the spill out of the main tidal flow. This can result in earlier grounding on the shoreline and may result in less travel and shoreline area impact.

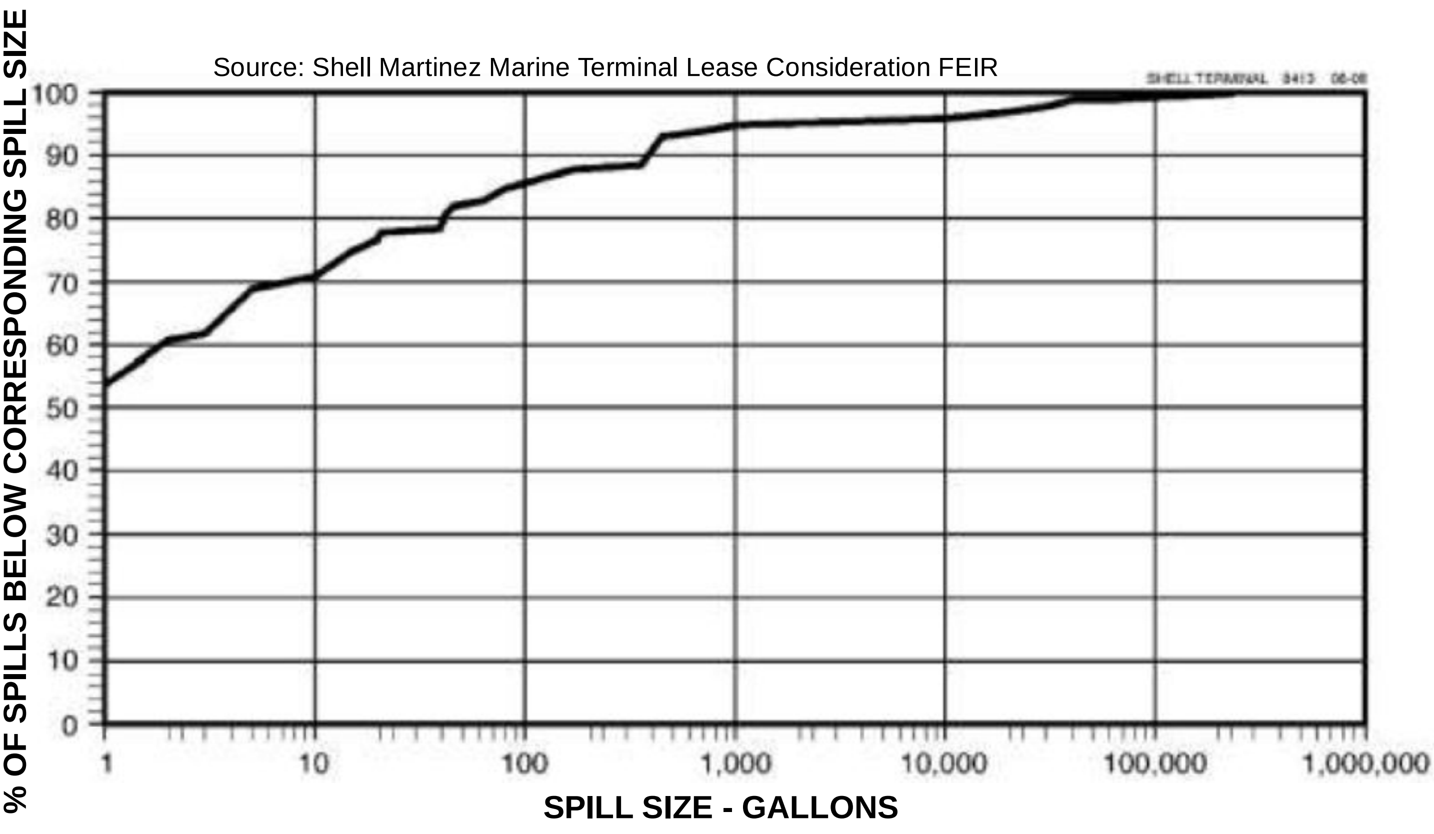
Appendix B provides maps summarizing results of modeling for the worst-case spill using both summer and winter wind influences on the spill trajectory. The maps represent a summary of 100 iterations of spill trajectories from various states of tidal currents and seasonal environmental factors. Results are depicted on color maps delineating time contours in 0.25-day (6-hour) increments. A legend to the color scale is provided on each map. Shoreline impacts are identified by red markings or by the overrun of the time contour across the shoreline. Either name or colored shoreline identifies key geographic and sensitive environmental site references. A legend of the color key is also provided on each map. Each trajectory is presented with information displaying the extent of oiling by time periods. In addition, a separate map describes the relative probability of oiling for those geographic areas identified to be at risk.

It can be observed from Figures D.13 and D.15 in Appendix B that the greatest shoreline impact occurs during the winter season with increased impact to the northern reaches of Honker, Suisun and Grizzly Bays and further propagation outside the Carquinez Strait into San Pablo Bay.

A summary of Tesoro’s oil spill response capabilities is presented below. The impacts of a release on other resources are addressed in the other resources sections of this EIR, including Section 4.2, Biological Resources; Section 4.3, Water Quality; Section 4.5, Geology, Sediments, and Seismicity; Section 4.8, Land Use and Recreation; Section 4.10, Visual Resources, Light and Glare; and Section 6.0, Commercial and Sport Fisheries.

Response Capability

Tesoro’s response assets are described in Section 4.1.1.4. The following describes the steps Tesoro would most likely follow in the event of a spill and the potential effectiveness of the response. The responses described below are for releases of crude oils and persistent products, which are the only products handled at the Amorco Terminal.



X:\CSLC\Amorco MOT\4.1 Operational Safety\mxd\Figure 4_1-3 Worldwide Spill Size Cumulative Distribution at Large Marine Terminals.mxd

Figure 4.1-3
Worldwide Spill Size Cumulative Distribution at Large Marine Terminals
California State Lands Commission
Amorco Marine Oil Terminal Lease Consideration Project

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CSLC regulations (Cal. Code Regs., tit. 2, § 2395) require that all onshore marine terminals, except those "subject to high-velocity currents," deploy boom to enclose the water surface at the waterline when discharging and either of the following: (1) the entire dock, or (2) portions of the dock where oil may spill into the water, prior to transfer operations. An "onshore marine terminal subject to high-velocity currents" is defined as an onshore terminal at which the maximum current velocities are 1.5 knots or greater for the majority of the days in the calendar year. The Amorco Terminal is in this category.

This conditional exemption from the pre-booming requirement is based upon the lack of effectiveness of a boom in containing oil at higher-current velocities, and the considerable difficulty that is encountered in deploying boom under such conditions. When water moves at speeds greater than 1.5 knots, oil on the surface is entrained under (and, dependent upon wind, sometimes overtops) containment boom, thus reducing the effectiveness of oil containment. Deployment of boom in open water and against the current is highly labor-intensive and creates personnel hazards. Additionally, there is constant difficulty in providing a stand-off (a gap between the side of the vessel and the boom), so that oil does not merely flow over the boom.

Tesoro's first step upon discovering a release would be to attempt to stop it (e.g., by activating the emergency shutdown system). Tesoro would then activate its spill-response team. This would include the personnel on duty at the Amorco Terminal and spill-response personnel at the Golden Eagle Refinery (Refinery), as well as its initial response contractor, Bay Area Ship Services. The next step would most likely be to deploy the boom on the Amorco wharf. Bay Area Ship Services maintains spill-response boats that are capable of deploying 600 feet of boom at the Amorco wharf within approximately 30 minutes. The boom would be deployed on the down-current side of the spill in an attempt to prevent the oil from drifting to where it could impact sensitive environmental resources and commerce. Additional fast-response vessels, boom-carrying/deploying vessels, boom, personnel, and other response equipment are available from MSRC. The current itself would assist in deploying the boom in the shape of a catenary curve. Oil would be recovered with sorbent material and/or skimmers.

Tesoro maintains sorbent material at the Amorco Terminal. Numerous skimming vessels and additional sorbent material are available from MSRC. A number of response boats are berthed in Martinez, including the Spill Spoiler and Sentinel, both of which are equipped with skimmers, boom, and 90 barrels of storage. MSRC can also supply oil storage devices to collect the recovered oil. Even though Tesoro is compliant with USCG regulations for spill response, a spill could have significant effects if the spill is large or if sensitive biological resources are affected. The use of dispersants would need to be authorized in consultation with the Environmental Unit within the Planning Section of a Unified Command; due to a number of concerns, it is not likely that dispersant use would be authorized within the San Francisco Bay/Delta Estuary; although offshore use may be considered.

The MOTEMS have set minimum requirements for preventative maintenance that includes periodic inspection of all components related to transfer operations. Tesoro is required to comply with those requirements. In addition, MM OS-1a requires Tesoro incorporate a remote release system that would allow the quick release of mooring lines in the event of an emergency. In the event of a fire, tsunami, explosion or other emergency, simultaneous and expeditious release of mooring lines (within 60 seconds) would allow a vessel that is not also connected by product transfer hoses to quickly leave the Amorco Terminal which could help prevent damage to the Amorco Terminal and a vessel and avoid and/or minimize spills. A remote release system may also help isolate an emergency situation, such as a fire or explosion, from spreading between the terminal and vessel, reducing oil spill potential. By providing mooring release devices capable of being engaged by a locally initiated electric/push button release system and by a remotely-operated release mechanism, Tesoro shall have several different options to cover emergency situations.

MM OS-1b proposes the installation of Tension Monitoring Systems (TMSs) to monitor mooring line tension and integrated environmental conditions. As the Amorco Terminal is located in a high velocity current area in the Carquinez Strait, monitoring moored vessels line strains and environmental conditions enables informed and controlled transfer operations to continue in harsh weather conditions, high velocity current conditions and/or other conditions where excessive tension or slack in the mooring lines could result in failure of mooring lines and/or significant movement of the vessel, resulting in damage to the Amorco Terminal and/or vessels. (Note, however, TMSs cannot directly monitor vessel movements; this is addressed in MM OS-1c.)

Devices able to continuously monitor moored vessels' movements, line strains and alarm at preset limits can warn operators of the development of dangerous mooring situations, allowing time to take corrective action and minimize the potential for the parting of mooring lines, which can escalate to the breaking of hose connections, the breakaway of a vessel, and/or other unsafe mooring conditions, that could ultimately lead to an oil spill. Real time data monitoring and control room information provide the Terminal Person-In-Charge with immediate knowledge of whether safe operating limits of the moorings are being exceeded. Backed up by an alarm system, mooring adjustments can be made to prevent damage and accidental conditions.

Located in a high velocity current area, the Amorco Terminal is subject to "unfavorable" site conditions in accordance with the MOTEMS section 3103F.6.7. At present, the docking system relies on the pilot's judgment to determine the vessel's approach speed and angle. As proposed as part of MM OS-1c, Allision Avoidance Systems (AASs) would monitor an approaching vessel's speed, approach angle, and distance from the dock to keep the potential impact velocity within the maximum elastic allowable limits of the fender and/or structural system, and thus help to prevent damage to the Amorco Terminal and/or vessel due to vessel impact, which could lead to an oil spill. Monitoring these factors will ensure that all vessels can safely berth at the Amorco Terminal and comply with the minimum standards required in the MOTEMS. Furthermore, monitoring moored vessels' movements and passing vessels ensures that all vessels can remain securely moored against the Amorco Terminal and comply with the minimum standards required in the MOTEMS. Excessive surge or sway of vessels (motion parallel or perpendicular to the wharf, respectively) and/or passing vessel forces may result in sudden shifts/redistribution of mooring forces through the mooring lines, which can quickly escalate to the failure of mooring lines, breaking of hose connections, the breakaway of a vessel, and/or other unsafe mooring conditions, that could ultimately lead to an oil spill.

Nevertheless, a release from the Amorco Terminal or a given tank vessel berthing at the Amorco Terminal could result in significant impacts on the environment depending on the size of the spill and the resources impacted. A release would not present a safety hazard to members of the public.

Mitigation Measures: The following shall be completed by Tesoro within 24 months of lease implementation, unless otherwise specified. In addition, equipment and systems described in MM OS-1a through MM OS-1c shall require documented procedures and training for systems used, and shall require documented communications between Amorco Terminal and vessel operator(s). Routine inspection, testing and maintenance of all equipment and systems shall be conducted in accordance with manufacturers' recommendations and necessity.

MM OS-1a: Remote Release Systems. Provide and maintain mooring line quick release devices that shall be able to be activated within 60 seconds.

- These devices shall be capable of being engaged by electric/push button release mechanism and by integrated remotely-operated release system.
- Tesoro shall document procedures and training for systems use and communications between Amorco Terminal and vessel operator(s).
- Routine inspection, testing and maintenance of all equipment and systems in accordance with manufacturers' recommendations and necessity are required to ensure safety and reliability, to the satisfaction of CSLC staff.
- Tesoro may install alternate technology that provides an equivalent level of protection, as reviewed by CSLC staff and approved by the Commission at a publicly noticed meeting.

This measure would allow a vessel to leave the Amorco Terminal as quickly as possible in the event of an emergency (fire, explosion, accident, or tsunami that could lead to a spill) that could impact the Amorco Terminal or the vessel.

MM OS-1b: Tension Monitoring Systems. Provide and maintain TMSs to effectively monitor all mooring line and environmental loads, and avoid excessive tension or slack line conditions that could result in damage to the terminal structure and/or equipment and/or vessel mooring line failures that could result in spills.

- Line tensions and environmental data shall be integrated into systems that record and relay all critical data in real time to the control room, terminal operator(s) and vessel operator(s).
- This system shall include, but not be limited to, quick release hooks only (with load cells), site-specific current meter(s), site-specific anemometer(s), and visual and audible alarms that can support effective preset limits and shall be able to record and store monitoring data.
- Tesoro shall document procedures and training for systems use and communications between Amorco Terminal and vessel operator(s).
- Routine inspection, testing and maintenance of all equipment and systems in accordance with manufacturers' recommendations and necessity are required to ensure safety and reliability, to the satisfaction of CSLC staff.
- Tesoro may install alternate technology that provides an equivalent level of protection, as reviewed by CSLC staff and approved by the Commission at a publicly noticed meeting.

MM OS-1c: Allision Avoidance Systems. Provide and maintain AASs at the Amorco MOT to prevent damage to the pier/wharf and/or vessel during docking and berthing operations.

- The AASs shall be used and alarmed to monitor vessel drift (both surge and sway) during all mooring operations, and shall be equipped with an AIS receiver to capture passing vessel parameters.
- This shall be integrated with the TMSs such that all data collected are available in the Control Room and to Amorco Terminal operator(s) at all times and vessel operator(s) during berthing operations. The AASs shall also be able to record and store monitoring data.
- Tesoro shall document procedures and training for systems use and communications between Amorco Terminal and vessel operator(s).
- Routine inspection, testing and maintenance of all equipment and systems in accordance with manufacturers' recommendations and necessity are required to ensure safety and reliability, to the satisfaction of CSLC staff.

Impact OS-2: Amorco Terminal spills from pipelines during non-transfer periods. (Significant and unavoidable.)

Spills from the Amorco Terminal during non-transfer periods would most likely be associated with a leak or spill from pipelines. Tesoro has an extensive pipeline inspection and maintenance program in place (refer to Section 2.5, Inspection and Maintenance). California Code of Regulations, Title 2, Article 5.5 and MOTEMS have set requirements for preventative maintenance that include periodic testing of oil pipelines and inspection of all Amorco Terminal pipeline components. Tesoro reports fully complying with those requirements. Nevertheless, leaks or spills are possible and considering the Amorco Terminal pipeline volume of 757 barrels, a substantial spill is possible. Tesoro would respond to a pipeline leak or spill as described for OS-1 according to the extent of the spill and affected area. Even with response measures in place, depending on the size of the spill and the environmental resources affected, impacts of a spill could be significant.

The Project pipelines are reportedly fully compliant with California Code of Regulations, Title 2, Article 5.5 and MOTEMS release prevention requirements and Tesoro is already required to ensure readiness of spill response capabilities for the worst case discharge from the Amorco Terminal, which far exceeds any leak or spill that could occur from the pipeline. These prevention and response capabilities are considered to be inclusive of feasible measures to reduce the risk of oil spills from the MOT during non-transfer periods. No feasible mitigation measures have been identified that would be capable of substantial further reduction of the risk from releases during non-transfer periods.

Mitigation Measure: No additional mitigation measures available.

Impact OS-3: Potential for fires and explosions and response capability. (Significant and unavoidable.)

The closest populated public areas are residential areas, parks, and marinas that are all located too far away to be impacted by heat from a potential fire or flying debris from a potential explosion at the Amorco Terminal. Therefore, the risk to the public from such an event at the Amorco Terminal is less than significant. If an oil spill were to occur from the Amorco Terminal and become ignited it could drift toward residential, park, or marina areas and present a hazard to the public or property. The intervening distance would provide time to respond and evacuate public areas if needed for safety so the risk to persons from a potential ignited oil spill is low. Furthermore, because of the extremely low probability of an oil spill with fire, the risk of such an event to the public is less than significant. However, a major fire at the Amorco Terminal could result in an oil spill with significant impacts similar to Impact OS-1.

Risk Potential and Safety Features

There have been no reported fires or explosions at the Amorco Terminal during the past 10 years; however, fires and explosions involving vessels and/or at the Amorco Terminal are possible.

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

Tank vessels loading or unloading low-flash cargoes (cargoes having a flash point of less than 150 degrees (º) Fahrenheit (F)) are required to have properly operating inert gas systems (IGS). An IGS generates an inert gas that is injected into the cargo tanks to displace the oxygen to a level that will not support ignition. The Vessel Person-in-Charge is required to verify that the tanks are inerted and that the IGS is working properly before transfer operations can commence. Products with flash points greater than 150ºF do not generate enough vapors to support ignition unless the product is heated to a temperature above 150ºF. The Amorco Terminal does not transfer any products that would produce gas cloud hazard footprints that would cause health and safety risks to the public.

The potential for a tank vessel explosion at the Amorco Terminal is considered to be reduced because of the USCG regulations requiring that tank vessels be equipped with IGS. The CSLC (2011a) calculated the potential hazard areas from a tanker fire and explosion. The radiant-heat footprint capable of causing second-degree burns to exposed skin after 30 seconds of exposure (1,600 British thermal units per square foot per hour) was calculated to be 300 feet around the vessels. The radiant-heat hazard footprint would not pose a significant hazard to the public because there are no public areas within 300 feet of the wharf area. An explosion involving one of the cargo tanks could send flying debris up to 1,500 feet from the ship (Reese-Chambers 1981, CSLC 2011a). The closest marina and park are approximately 3,000 feet from the wharf and the closest residence is located more than a mile away. Hence, these areas would not be expected to be impacted by flying debris from a vessel explosion. Considering the separation distance, the fire or explosion risk to the public is less than significant. Furthermore, the very low (less than one in a million per vessel call [CSLC 2011a]) probability of such an incident makes its occurrence unlikely.

Fire Response Capability

In response to the MOTEMS Audit (Eichleay and Gerwick 2011), Tesoro upgraded the fire protection system on the wharf to meet the requirements of MOTEMS. In addition, Tesoro has developed a comprehensive Fire Protection Plan for the Amorco wharf (HYT

Corporation 2011). Tesoro also maintains its own fire/emergency response department with full-time trained personnel at the Refinery. These personnel are trained in fighting petroleum fires at the Amorco Terminal.

Tesoro is also a member of the local Petro-Chemical Mutual Aid Organization, an agreement between large industries in the San Francisco Bay Area to provide aid in the form of spill/hygiene/fire-response equipment and assistance. In addition, the Contra Costa County Fire Protection District would respond to a marine fire and provide support.

The USCG (2008) prepared and issued a Marine Fire Fighting Contingency Plan that addresses risk assessment, including damage potential, strategic planning, management of response efforts, and available response resources. The plan outlines the resources that the USCG provides to manage and coordinate response in the event of a tanker fire.

Minimal discussion of procedures for dealing with tank vessel fires could be found in Tesoro's manuals addressing fires, emergency response, or for conducting periodic fire drills. This has been identified as a deficiency in the manual and in planning for emergency response, therefore, the potential for a significant, adverse (Class II) impact results.

The risk to the public from fire or explosion at the Amorco Terminal is less than significant due to separation distance. If an oil spill were to occur at the Amorco Terminal and become ignited, it could drift away from the Amorco Terminal toward residential, park, or marina areas and present a significant hazard. Consequences of an ignited spill would depend on the spill conditions. The distances between the Amorco Terminal and the closest residence, park, and marina would provide time to respond and evacuate areas if needed for safety so the risk to persons from a potential ignited oil spill is low. Furthermore, because of the extremely low probability of an oil spill with fire, such an event is not a significant public safety risk. However, a major fire at the Amorco Terminal could result in a significant oil spill similar to that addressed in Impact OS-1. Tesoro would be required by regulations to maintain response capabilities for containment of the reasonable WCD spill, but significant impacts are still possible. The potential for a spill to occur that could become ignited would be decreased to the extent feasible through the spill prevention measures that would be implemented through MM OS-1, but the risk of significant impacts cannot be eliminated.

As discussed above under MM OS-1a, quick release of mooring lines would allow a vessel to quickly leave the Amorco Terminal, which could help prevent damage to the Amorco Terminal and vessel, avoid and/or minimize spills (and/or associated fires or explosions), and help to prevent spreading of fire between the terminal and vessel.

In addition, MM OS-3 requires the development of adequate procedures, including the steps to follow in the event of a tank vessel fire that describe how Tesoro and a vessel will coordinate activities. Procedures required per California Code of Regulations, Title 2, Article 5, Article 5.3, Article 5.5 and the findings of the MOTEMS Audit is expected to provide guidance for fire safety practices. Tesoro's existing Operations Manual, Fire Protection Plan, and MOTEMS Audit provide additional discussion of procedures for dealing with tank vessel fires and/or emergency response. The procedures shall also identify other capabilities that can be procured if necessary in the event of a major incident. Procedures, training, and drills need to be in place in planning for emergency response, so that the Amorco Terminal operations crew has the appropriate steps to follow to ensure that emergency response measures are implemented without incident in an emergency situation. These measures will help to reduce the probability of a fire or increase response capability. Implementation of these measures can reduce impacts to less than significant.

Mitigation Measure:

MM OS-3: Fire Protection Assessment. Tesoro shall develop a Fire Protection Assessment, including a set of procedures, training and drills consistent with Marine Oil Terminal Engineering and Maintenance Standards (Cal. Code Regs., tit. 24, §3108F2.2). Tesoro shall also develop a set of procedures and conduct training and drills for dealing with tank vessel fires and explosions for tank vessels berthed at the terminal. The procedures shall include the steps to follow in the event of a tank vessel fire and describe how Tesoro and the vessel will coordinate activities. The procedures shall also identify other capabilities that can be procured if necessary in the event of a major incident. The Fire Plan and procedures shall be submitted to the California State Lands Commission (CSLC) staff within 90 days of lease renewal. The CSLC staff shall have final approval of the plan.

Impact OS-4: Response capability for accidents in the San Francisco Bay and outer coast. (Significant and unavoidable.)

Spills from accidents in the San Francisco Bay or outer coast could result in impacts to water quality or biological resources. Impacts could be limited by spill response to a less than significant level for those spills that can be contained during first-response efforts without lasting impacts to sensitive resources; however, impacts from larger spills or spills affecting sensitive resources could be significant and adverse even considering response capabilities.

Probability of San Francisco Bay Vessel Traffic Accidents

Probability estimates for tanker and barge spills from vessel traffic accidents are based primarily on data obtained from the Unocal San Francisco Refinery Marine Terminal EIR (Chambers Group 1994), Gaviota Terminal Company EIR (Aspen 1992), the Port Needs Study (John A. Volpe National Transportation Center 1991), and the Shell Martinez Marine Lease Consideration Final EIR (CSLC 2011a). Table 4.1-6 presents oil spill probabilities from barges and tankers from three causes: (1) collisions, which are impacts between two or more moving vessels; (2) rammings (or allisions), for which moving vessels run into stationary objects; and (3) groundings.

These probabilities were calculated from the individual probabilities of small, medium, and large vessels, considering the volume of traffic in each category (derived from data in John A. Volpe National Transportation Center 1991). In accordance with the methodology in Aspen (1992), a 0.10 reduction factor has been applied to tanker and barge groundings for double-bottom and double-hull vessels, and a 0.71 reduction factor has been applied to tanker and barge collisions for double-hull vessels. Regulations prohibit single-hull vessels from operating in United States navigable waters, and double-bottom and double-sided vessels cannot operate after the end of 2015. Hence, it has been assumed that all tank vessels calling at the Amorco Terminal will be double hull. The estimated probabilities of spills from tankers and barges, after applying the reduction factors, are presented in Table 4.1-7.

Table 4.1-6: Spill Probabilities by Vessel Type

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

Source: Derived from Volpe, 1991

Table 4.1-7: Spill Probabilities per Vessel Type per Vessel Calling

Vessel Type	Spill Probability per Vessel Calling
Tanker	8.4×10^{-7}
Barge	5.0×10^{-6}

The probability estimates in Table 4.1-7 have been used to estimate the probability of a release in the San Francisco Bay from a tank vessel transiting to the Amorco Terminal. The maximum number of tank vessels that will call at the Amorco Terminal is 90. In 2008, 3 of the 85 tank vessels that called at the Amorco Terminal were barges, while in 2012 no barges called at the Amorco Terminal. For estimating the probability of a release from Amorco Terminal-bound tank vessels, it has been assumed that five are tank barges and the other 85 are tankers. Table 4.1-8 presents the annual probabilities of spills from tank vessels calling at the Amorco Terminal while transiting the San Francisco Bay. This equates to one spill every 10,400 years.

Table 4.1-8: Expected Number of Annual Spills from Vessels Calling at the Amorco Terminal While Transiting the San Francisco Bay

Vessel Type	Probability of Release
Tanker	7.1×10^{-5}
Barge	2.5×10^{-5}
Tankers and Barges	9.6×10^{-5}

Release Extent and Impacts

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

To provide a basis for evaluating where an oil spill from a vessel could flow and how large an area could be impacted, results from a 20,000-barrel tanker spill scenario near the Carquinez Bridge complex, conducted using the NOAA Trajectory Analysis Planner II (TAPII) software for the Shell Crude Tank Replacement Project Final EIR (Contra Costa County 2011) are summarized here and presented in detail in Appendix C. Both a summer spill and winter spill were modeled.

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

Although a spill could become ignited, this is an unlikely scenario. If a fire were to occur, the potential for safety impacts to members of the public is low, because of the isolated nature of spill locations on the water, away from residential areas. The potential for a tank vessel explosion is remote, because tankers are required to be equipped with IGS that maintain an inert gas in the vapor space of the cargo tanks, preventing the formation of a flammable gas-oxygen mixture in the explosive range.

Response to a spill from a tanker is the responsibility of the vessel owner/operator. Under the National Contingency Plan and National Incident Management System, a Unified Command would be formed, with the Federal On-Scene Coordinator (USCG Captain of the Port) and the State On-Scene Coordinator (CDFW/OSPR) coordinating priorities, resources, and efforts to protect the public; facilitating commerce; and mitigating the impacts of the spill. As a result of the Oil Pollution Act of 1990 (OPA 90), each vessel is required to have an oil plan that identifies the worst-case spill (defined as the entire contents of the vessel) and the assets that will be used to respond to the spill. The response capability of tanker companies and barge companies has not been analyzed in detail, but must be documented in their oil spill response manuals. All tanker companies operating within California waters must demonstrate by signed contract to the USCG and CDFW that they have, either themselves or under contract, the necessary response assets to respond to a worst-case release as defined under federal and State regulations.

Response to a vessel spill would most likely consist of containment (deploying booms), recovery (deploying skimmers), and protection of sensitive resources. If the oil were to reach the shore and/or foul wildlife, the shoreline and wildlife would be assessed to determine what level, if any, of cleaning would present the least detrimental impacts. MSRC would make its local equipment and manpower available. If required, additional equipment and manpower would be made available from local contractors, OSROs, and MSRC at other locations.

While MSRC can provide the equipment and manpower required by OPA 90 and OSPR, it is unlikely that they could prevent a large spill from causing significant effects on the shoreline potentially including sensitive resources. The Regional Resource Manual and the Area Contingency Plan identify sensitive resources within the Bay Area and methodologies for protecting and cleaning up those areas. A large spill from a tank vessel could result in significant adverse impacts depending on spread of the spill and resources impacted as presented in other sections of this document.

The responsibilities and organization for releases outside the San Francisco Bay would essentially be the same as for those inside the Bay; however, response to spills outside the Bay would be somewhat different from that inside the Bay. First, the environment outside the San Francisco Bay may be more difficult to work in because of sea conditions. Booms become less effective as wave heights increase, losing much of their effectiveness once waves exceed 6 feet. There may be conditions when it would be impossible to provide any response actions. However, when wave energy is such that it is impossible to deploy response equipment, the wave energy causes the oil to be dispersed much more rapidly.

Second, it may not be necessary to try to contain a spill if it does not threaten the shoreline or a sensitive area, although impacts upon sea life and navigation must be considered. In this case, the spiller would monitor the trajectory of the spill in accordance with methodologies presented in the Area Contingency Plan. If the spill could affect the shoreline or sensitive area, then the response efforts would be based upon assessments to determine what level, if any, of cleaning would present the least detrimental impacts.

The MSRC large response vessels are located inside the San Francisco Bay. It would take the vessels a minimum of 2 hours to get underway and exit the Bay, and up to 24 hours to reach areas as distant as offshore of Fort Bragg, approximately 150 miles to the north. Again, additional resources would be available from other response cooperatives and other MSRC sites. While the response capability meets the minimum requirements of OPA 90 and OSPR, a large spill could still result in significant, adverse impacts to sensitive resources as described in other resources sections of this document.

Vessel owners/operators are responsible for spills from their tanker. Tanker and barge owners/operators are required by federal and State regulations to demonstrate that they have, or have under contract, sufficient response assets to respond to worst-case releases. Tankers and tank barges operating in United States and California waters must certify that they have the required capability under contract. All terminals are under contract with one or more OSROs to respond to spills with all the necessary equipment and manpower to meet the response requirements dictated by regulations. MM OS-4a would further reduce the risk of spills in the San Francisco Bay or near approaches to the Bay by requiring Tesoro's participation in USCG Ports and Waterways Safety Assessment (PAWSA) workshops for the San Francisco Bay Area to improve transit issues and response capabilities in general, and to support overall safety improvements to the existing VTS in the future.

While vessel owners/operators are responsible for their own spills, if a spill were to occur near the Amorco Terminal, Tesoro and its contractors may be in a better position to provide immediate response to a spill using their own equipment and resources, rather than waiting for mobilization and arrival of the vessel's response organization. The Tesoro staff is fully trained to take immediate actions in response to spills. Such action could result in a quicker response and more effective control and recovery of spilled product. MM OS-4b would require Tesoro to respond to any spill from a vessel traveling in the San Francisco Bay to or from the Amorco Terminal or moored at its wharf, without assuming liability, until such time as the vessel's response organization can take over management of the response actions in a coordinated manner. This requirement would further reduce the potential impacts of spills in the San Francisco Bay.

Even with the implementation of MMs OS-4a and OS-4b, the consequences of a spill could result in significant, adverse impacts in the San Francisco Bay or outer coast. This is an unavoidable risk of the Project. No additional feasible mitigation measures have been identified that would further reduce the potential for significant impacts.

Mitigation Measures:

MM OS-4a: U.S. Coast Guard (USCG) Ports and Waterways Safety Assessment workshops. Tesoro shall participate in USCG PAWSA workshops for the San Francisco Bay Area to support overall safety improvements to the existing Vessel Traffic Service in the Bay Area or approaches to the Bay, if such workshops are conducted by the USCG during the life of the lease.

MM OS-4b: Spill response to vessel spills. Tesoro shall respond to any spill from a vessel traveling in the San Francisco Bay to or from the Amorco Terminal or moored at the Amorco Terminal, as if it were its own, without assuming liability, until such time as the vessel's response organization can take over management of the response actions in a coordinated manner.

Alternative 1: No Project

Impact OS-5: Risk of spills, fire, or explosion from displaced product transit. (Significant and unavoidable.)

Under the No Project Alternative, Tesoro's lease for the Amorco Terminal would not be renewed and the existing Amorco Terminal would be subsequently decommissioned with its components abandoned in place, removed, or a combination thereof. The decommissioning of the Amorco Terminal would follow an Abandonment and Restoration Plan. During decommissioning of the Amorco Terminal there would be a risk of a spill during the pipeline purging and removal process; however, the Amorco Terminal contains the necessary equipment to contain and recover the size spills that would be most likely during decommissioning without lasting impacts, so it is expected that impacts if such a spill were to occur would be less than significant.

It is likely that under the No Project Alternative, Tesoro would pursue transitioning the Avon Marine Oil Terminal to absorb all import operations from the Amorco Terminal, thereby increasing the throughput at the Avon Marine Oil Terminal to the Refinery to meet regional refining demands. Tesoro's Avon Marine Oil Terminal is capable of operating as both an import and export facility, and similar to the proposed Project, is currently subject to California Environmental Quality Act evaluation for a new 30-year lease of sovereign land to continue operations.

With no lease renewal for the Amorco Terminal, there would be no potential for related spills, fire, explosion (at the Amorco Terminal), or from vessel transit associated with the

Amorco Terminal. However, the potential for spills, fire, or explosion would likely be transferred to the Avon Terminal OR other transportation methods such as pipelines, rail, or trucks.

Use of Avon Terminal or Other Marine Oil Terminals

Using the Avon Terminal to absorb the tank vessel traffic from the Amorco Terminal would present terminal accident risks similar to those described for the proposed Project in Impacts OS-1 through OS-4. Vessel transit risks would also be similar, but there would be a slightly higher probability of an upset occurrence in transit due to the slightly longer distance the tank vessels would have to travel in the San Francisco Bay including passage through the Benicia-Martinez bridge complex. The Avon Terminal is also currently undergoing an upgrade to be compliant with MOTEMS. The Avon Terminal is located in an area similar to that of the Amorco Terminal (away from residences, parks, and marinas) and, therefore, would not present a significant safety hazard to members of the public.

Import to other marine oil terminals may either increase or decrease the potential risk of accident to various areas, depending on the characteristics and locations of the terminals used. Characteristics that could alter the risk include:

- tankers may travel a shorter distance to reach other terminals, since most are located closer to the San Francisco Bay entrance;
- the added tanker traffic at other terminals may create congestion and increase the risk for a collision or other incident;
- other terminals may have a different (better or worse) level of spill response; and
- use of other marine terminals would require application of mitigation measures comparable to the mitigation for the proposed Project because there would likely be a lease renewal or permit modification for the change/increase in operation.

Once the crude oil is imported at one of the marine oil terminals, it would then have to be transported to the Refinery. Sources may include land-based transportation, such as railcars, trucks, pipeline connections to other San Francisco Bay Area terminals, or a combination thereof. Pipeline delivery may require construction of new pipelines and/or the purchase of existing pipeline capacity from other local petroleum refinery competitors. The potential risk from land-based transportation would be in addition to the tank vessel and terminal risk transferred to other terminals in the Bay Area. The potential risk from land-based transportation is discussed below.

Use of Pipelines

Pipeline spills of crude oil generally result in less of an impact on the environment than tank vessel transportation spills. The probability of a spill is not necessarily less; however, the maximum amount of oil that can be released from a pipeline is generally less than that which can be released from a tanker. In addition, oil spilled on land generally causes less environmental impact than oil spilled on water; although this is a function of the size and location of the spill and the environment impacted by the spill.

Failure rates for pipelines are generally described in terms of spills per unit length per year and factor in pipeline characteristics of age, design, depth of burial, corrosion protection, wall thickness, and operating temperature. A failure rate range of 0.03 to 0.5 releases per year per 100 miles of pipeline has been cited (CSLC 2011a). In addition, the following spill estimates for pipelines with diameters greater than 16 inches have been cited:

Leaks:
- 0.08 per 100 miles per year for pipelines 40 years or older
- 0.03 per 100 miles per year for “existing” pipelines (approximately 20 years old)
- 0.012 per 100 miles per year for “new” pipelines (in first 10 years)

Ruptures
- 0.04 per 100 miles per year for “old” pipelines
- 0.016 per 100 miles per year for “existing” pipelines
- 0.006 per 100 miles per year for “new” pipelines

A leak is defined as a relatively small rate of release from a pipeline. A typical cause would be a small hole that results in corrosion pitting, a leaking flange, or valve. A rupture represents a relatively high rate of release as might occur if the pipe were breached by an external force.

The maximum spill volume is a combination of drainage potential and the pumping rate for the period of time before the breached segment can be isolated. Worst-case calculations of spill volumes are normally based on the assumption of complete drainage by gravity of the section of pipe between high ground and the point of rupture (called drainage volume). Additional spillage depends on the flow rate and response time to shut down the pipeline. The drainage volume assumes that the drainage will be complete. This may not necessarily be the case because: (1) the breach may be less than a full rupture, (2) a block valve within the affected pipe section may be successfully closed before complete evacuation occurs, or (3) a check valve in an uphill stretch can prevent backflow of oil between high ground and the valve. The gradient of the terrain determines the hydrostatic force available to drain the pipe after the pumps are turned off. Draining will take much longer in nearly flat terrain. The average spill size from 16-inch diameter crude oil pipelines, as reported to OSPR between 1980 and 1990, was 2,680 barrels (USDA

1991). This is the volume in 2 miles of 16-inch diameter pipe. A pipeline leak or rupture, depending on its size and location, could result in a significant, adverse impact where sensitive resources are affected. Spills in areas where they can be contained and cleaned up (such as roadways) could be remediated to a level such that impacts would be less than significant.

While there is an existing infrastructure of pipelines among the various marine oil terminals and refineries in the Bay Area, additional pipelines and/or pipeline connections most likely would be required. Pipeline construction work would result in a risk of accidents during construction, such as construction equipment fuel spills and releases from damage to third-party utilities, including oil and gas pipelines. Pipeline construction typically results in less than significant risk of release impacts because of the requirement for detailed construction planning and the preconstruction identification of utilities in the area.

Truck and/or Rail Transportation

The shipping of petroleum products via pipeline is generally considered to be the safest means of bulk transportation. The California State Fire Marshal, Hazardous Liquid Pipeline Risk Assessment (EDM 1993) indicated that the fatality rate for bulk transportation by rail was 40 times higher than by pipeline. The same study indicated that the fatality rate for bulk transportation by truck was 300 times higher than by pipeline. As a result, any increased volumes being shipped by truck or rail will increase the impacts to the public compared to using a pipeline. When comparing the relative safety of pipeline, truck, and rail transportation of bulk hazardous liquids, Aspen (2003) noted the following:

- The frequency of unintentional releases was three to four times higher for a mix of rail and truck transportation than for similar volumes being transported exclusively by pipeline.
- The frequency of all injuries, regardless of severity, was roughly 30 times higher for a mix of rail and truck transportation than for similar volumes being transported exclusively by pipeline.
- The frequency of fatalities was approximately 50 times higher for a mix of rail and truck transportation than for similar volumes being transported exclusively by pipeline.
- The frequency of small releases was higher for truck and rail transportation, while the frequency of large spill volumes was higher for pipeline transportation. This was due primarily to the limited size of the truck and rail car volumes; the release size is limited to the volume of the damaged car(s).

As with the proposed Project, the mitigation applied to the other terminals would lower the probability of spills and increase response capabilities at the other terminals if and when such time occurred that each lease was renewed and mitigation implemented. Mitigation measures would not apply to pipelines, rail, or trucks. Even with mitigation, risk of impacts from spills, fire, or explosion under this alternative would be higher than for the proposed Project due to the similar volumes of oil being imported by vessels to other terminals and increased risk of onshore transportation methods.

Alternative 2: Restricted Lease Taking Amorco Out of Service for Oil Transport

Impact OS-6: Risk of spills, fire, or explosion from displaced product transit. (Significant and unavoidable.)

Refer to Impact OS-5.

Cumulative Impact Analysis

Impact CUM-OS-1: Upset conditions. (Significant and unavoidable.)

All terminals and tanker/barge operators are required by federal and State regulations to demonstrate that they have, or have under contract, sufficient response assets to respond to worst-case releases. Even so, oil spills can still result in significant, adverse impacts to the environment depending on whether first-response efforts can contain and clean up the spill without lasting impacts to sensitive resources. The renewal of the Amorco Terminal lease would contribute incrementally to the cumulative risk environment.

Spills from a Marine Terminal

As discussed in Section 4.1.1.3, a total of 80 spills have occurred from marine terminals in the San Francisco Bay between 2003 and 2012. The potential exists for spills at all marine terminals operating within the Bay. The actual probability varies depending on the design and operational procedures in place. The potential impacts of spills vary depending on the location of the terminals and the response equipment and procedures available.

Spills from Tank Vessels Inside and Outside the San Francisco Bay

Chambers Group (1994) analyzed historical data to estimate tanker and barge traffic within the San Francisco Bay. Based on the amount of tanker and tank barge traffic along the various routes within the San Francisco Bay, cumulative probabilities of a spill were developed for various sections within the Bay. These probabilities were then used to conduct the probabilistic oil spill modeling for cumulative tanker and tank barge traffic within the Bay.

The expected mean time between spills for all tanker and tank barge traffic inside the San Francisco Bay for three minimum-size spills is presented in Table 4.1-9. Based on estimated mileage traveled within the San Francisco Bay, vessel traffic associated with the Amorco Terminal is approximately 4.7 percent of the total probability of a spill from tanker and tank barge traffic in the Bay. This percentage was estimated based estimating the distance from the Golden Gate Bridge to each of the marine terminals in the Bay and then estimating the total distance traveled by all tank vessels by multiplying the distance to each marine oil terminal by the number of tank vessel calls during 2012. It was assumed that there would be 90 tank vessel calls to the Amorco Terminal. The total distance traveled by tank vessels calling at the Amorco Terminal was then divided by the total miles traveled by all tank vessels to get the percentage for the Amorco Terminal.

Chambers Group (1994) also used data from the Marine Exchange that listed the last and next ports of call for all tankers calling at marine terminals in the San Francisco Bay Area to estimate the number of annual tanker trips along various routes outside the Bay. The expected mean time between spills outside the San Francisco Bay is also shown in Table 4.1-9.

Table 4.1-9: Expected Mean Time between Spills Inside and Outside the San Francisco Bay—All Tank Vessels

Spill Size (barrels)	Expected Mean Time Between Spills (Years)	
	Inside Bay	Outside Bay
238	36	Not calculated
1,000	48	42
10,000	238	123

Spill Response

An impact on spill response capability could occur if there were two or more spills at the same time; however, the probability of this is extremely small. Having many marine terminals and extensive vessel traffic in the San Francisco Bay tends to increase the total amount of spill response equipment and services available.

All terminals and tanker/barge operators are required by federal and State regulations to demonstrate that they have, or have under contract, sufficient response assets to respond to worst case releases. All terminals are under contract with one or more OSROs. These OSROs can provide all the necessary equipment and manpower to meet the requirements of existing regulations; however, oil spills can result in significant, adverse impacts to the environment depending on whether first-response efforts can contain and clean up the spill without lasting impacts to sensitive resources. Mitigation measures previously described for Project Impacts OS-1, OS-4a, and OS-4b would reduce the potential for significant cumulative impacts to the extent feasible. No further mitigation for potential cumulative impacts is recommended. Even with mitigation applied, there is a cumulative risk of oil spills that could have significant environmental impacts to sensitive resources as described in other sections of this EIR.

Mitigation Measures: No additional mitigation measures available.

4.1.4 SUMMARY OF FINDINGS

Table 4.1-10 includes a summary of anticipated impacts to operational safety and associated mitigation measures.

Table 4.1-10: Summary of Operational Safety Impacts and Mitigation Measures

Impact	Mitigation Measure(s) (MM[s])
Proposed Project	
OS-1: Potential for spills and response capability for containment of oil spills from the Amorco Terminal during transfer operations	OS-1a: Remote Release Systems. OS-1b: Tension Monitoring Systems. OS-1c: Allision Avoidance Systems.
OS-2: Amorco Terminal spills from pipelines during non-transfer periods	No additional mitigation measures available. (Refer to MMs OS-1a, OS-1b, OS1c, OS4a, and OS-4b.)
OS-3: Potential for fires and explosions and response capability	OS-3: Fire Protection Assessment. (Refer to MM OS-1a.)
OS-4: Response capability for accidents in the San Francisco Bay and outer coast**.**	OS-4a: USCG Ports and Waterways Safety Assessment workshops. OS-4b: Spill response to vessel spills.
Alternative 1: No Project	
OS-5: Risk of spills, fire, or explosion from displaced product transit	Should this alternative be selected, mitigation measures would be determined during a separate environmental review under CEQA.
Alternative 2: Restricted Lease Taking Amorco Out of Service for Oil Transport	
OS-6: Risk of spills, fire, or explosion from displaced product transit	Should this alternative be selected, mitigation measures would be determined during a separate environmental review under CEQA.
Cumulative Impacts	
CUM-OS-1: Upset Conditions	No additional mitigation measures available. (Refer to MMs OS-1a, OS-1b, OS1c, OS4a, and OS-4b.)

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4.2 BIOLOGICAL RESOURCES

Section 4.2 presents the existing environment and impacts analysis of biological resource issues associated with the granting of a new lease to the Amorco Marine Oil Terminal (Amorco Terminal) to continue to operate in the southeastern Carquinez Strait. The existing biological resources in the San Francisco Bay Estuary and in the Amorco Marine Oil Terminal Lease Consideration Project (Project) study area (lower Suisun Bay and upper Carquinez Strait) are described, as well as in the immediate vicinity of the Amorco Terminal. Also included is a summary of laws and regulations that may affect biological resources. This is followed by an analysis of the potential Project impacts. Routine operations at the Amorco Terminal, or an accidental release of oil, present the potential to impact nearby biological resources. An oil spill could have wide-ranging effects on biological resources in the San Francisco Bay Estuary.

4.2.1 ENVIRONMENTAL SETTING

4.2.1.1 San Francisco Bay Estuary

Geographic and Hydrologic Characteristics of the San Francisco Bay Estuary

The San Francisco Bay Estuary is typically divided into five segments: The Sacramento-San Joaquin River Delta (Delta), Suisun Bay, San Pablo Bay, Central Bay, and South Bay (see Figure 4.2-1).

The Delta is the easternmost, or most upstream, segment. The Delta is a 1,150-square-mile triangle-shaped region roughly bounded on the north by the city of Sacramento, on the south by the city of Tracy, and on the west by Chipps Island. The Sacramento and San Joaquin Rivers and their tributaries flowing into the Delta drain about half of the surface area of California and establish the extent of brackish water habitat in Suisun Bay.

Suisun Bay is a shallow estuarine bay bounded by Chipps Island on the east and the Benicia-Martinez Bridge on the west. Suisun Marsh, the largest brackish water marsh in the United States and the largest wetland in California, forms its northern boundary. Suisun Bay has the lowest salinity levels in the San Francisco Bay system, with values ranging from oligohaline (0.5 to 5.0 parts per thousand [ppt]) to mesohaline (5.0 to 18.0 ppt) depending on seasonal variations in tides, evaporation, and freshwater inflows from the Delta. The southern shore of Suisun Bay is home to the Concord Naval Weapons Station and the cities of Pittsburg, West Pittsburg, Avon, and Martinez. Suisun Bay is connected to San Pablo Bay via the Carquinez Strait, a narrow, 12-mile-long band of water that extends from between the Benicia-Martinez Bridge to Mare Island.

San Pablo Bay is the second largest bay in the estuary; it extends from the Carquinez Strait to the San Pablo Strait near the Richmond-San Rafael Bridge, where it forms the upstream boundary of the Central Bay. San Pablo Bay is moderately saline, or polyhaline, with salinity levels ranging from 18.0 – 30.0 ppt. Much of the north shore of San Pablo Bay is protected as part of the San Pablo Bay National Wildlife Refuge.

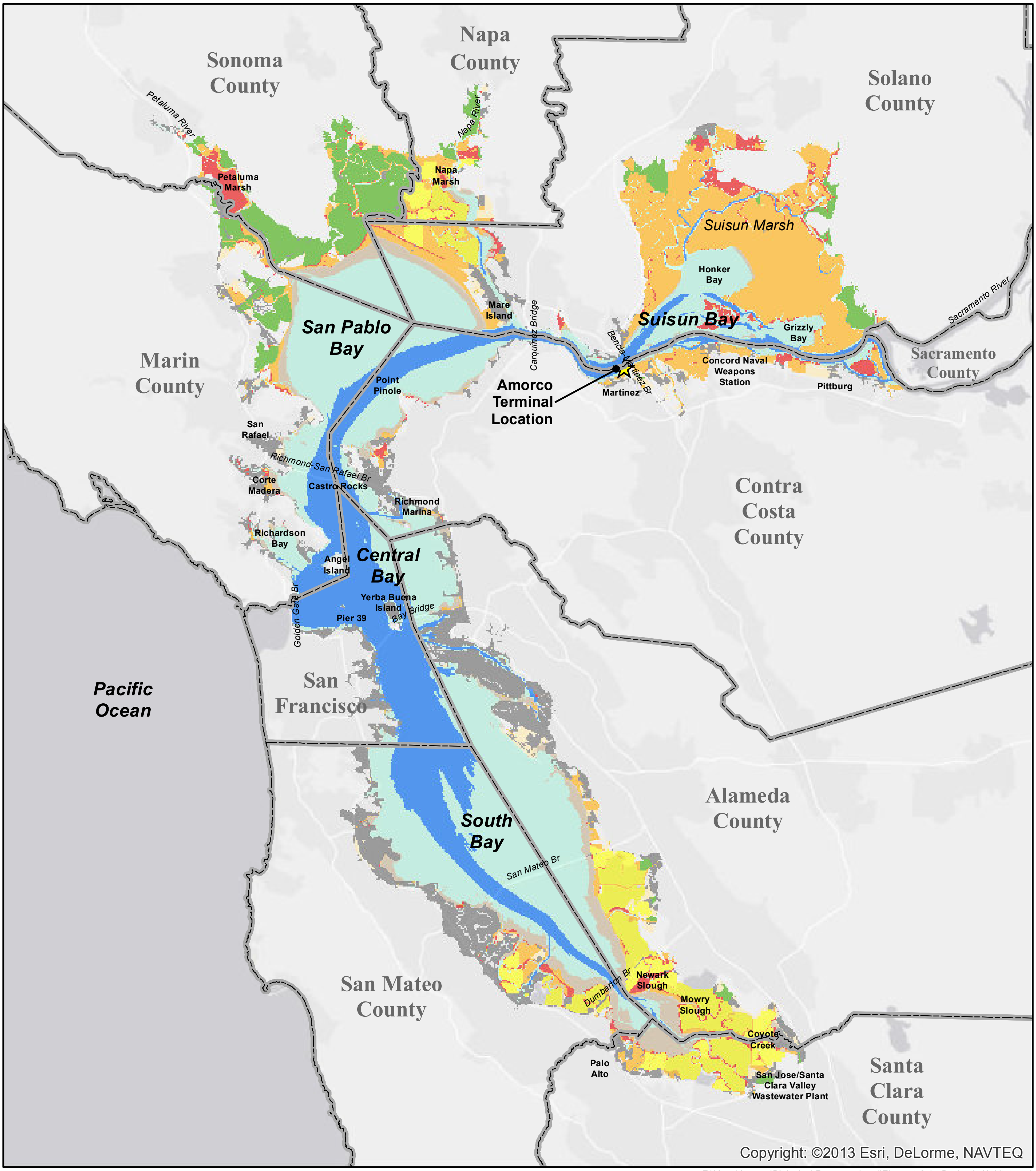
The Central Bay is defined as an area bounded by three bridges: The Richmond-San Rafael Bridge, Golden Gate Bridge, and San Francisco-Oakland Bay Bridge. Central Bay is the coldest, deepest, and most saline of the bays; it is considered euhaline, with salinity levels between 30.0 – 35.0 ppt. Because of its proximity to the Pacific Ocean, its water quality parameters are more stable than its neighboring bays. Ecological conditions in the Central Bay are also more stable than in neighboring bays (SFEP 2011).

The waters south of the San Francisco-Oakland Bay Bridge form the largest embayment, known as the South Bay. The waters here are shallow and polyhaline. Freshwater flows to the South Bay are limited to seasonal flows from Guadalupe River and other streams. Throughout the year, the largest flows into South Bay are treated waters from the San Jose/Santa Clara County Water Pollution Control Plant (Okamoto and Wong 2011). Water circulation and fresh inflows are so limited that this bay is considered a lagoon-like, estuarine backwater.

The estuary's tidal cycle is mixed semidiurnal, resulting in two cycles each day. The average height of the higher tide is called extreme high tide, or local mean higher high water (MHHW), while the average of the high tides is called high tide, or local mean high water (MHW). Extreme low tide or mean lower low water (MLLW) and low tide or mean low water (MLW) refer to the average height of the lowest tide and the average of all low tides, respectively. Mean tide level (MTL) lies midway between MHW and MLW. Tidal highs and lows in the bay vary with time of day, the position of the moon, season, and distance from the Pacific Ocean. The relative height covered by these tidal datums have important implications for shoreline habitat.

Habitats of the San Francisco Bay Estuary

The habitats in the estuary are dynamic and can be influenced by seasonal flooding, extreme tides, drought, and human activity. Characteristics of the biotic communities at each habitat are found in Table 4.2-1. Figure 4.2-2 depicts habitat distribution in the estuary.



F:\Maps\Amorco\Biological Resources\mxd\Figure 4-2-1 - Baylands Habitat.mxd

Figure 4.2-1 Bayland Habitat
California State Lands Commission
Amorco Marine Oil Terminal
Lease Consideration Project

TRC

8/21/2013

Habitat Type

Shallow Bay	Diked Marsh
Deep Bay	Agricultural Bayland
Tidal Flat	Salt Pond
Old Tidal Marsh	Filled Baylands
Tidal Marsh	

DATA: SFEI

N

1:500,000

1 inch = 8 miles

0 19,000 38,000 ft

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Table 4.2-1: Biotic Communities of the San Francisco Bay Estuary[1]

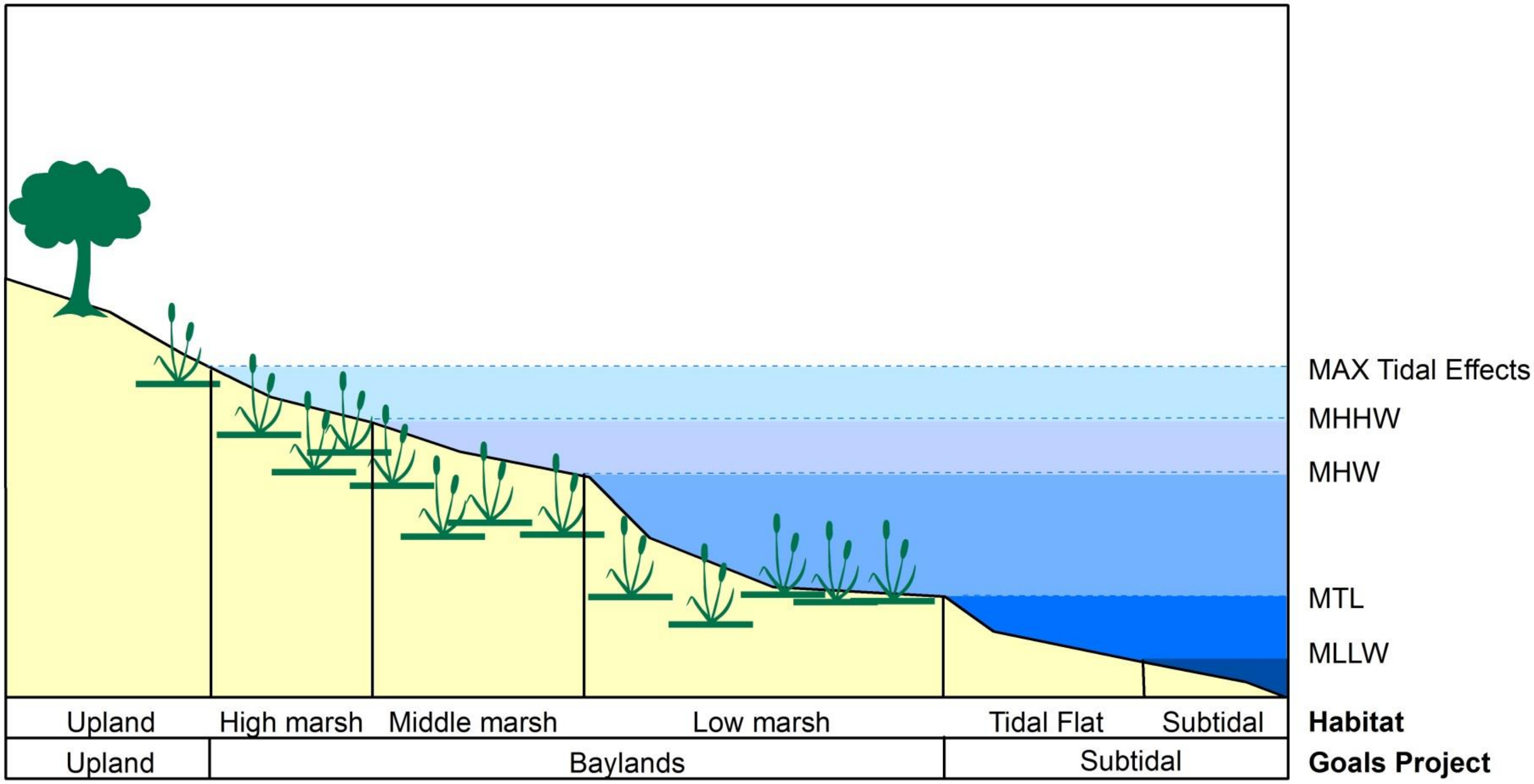
Community	Locations & Examples	Characteristic Plants	Characteristic Animals
Diadromous	Open waters of the San Francisco Bay Estuary, Sacramento and San Joaquin Rivers, Napa River	N/A	Chinook salmon (*Oncorhynchus tshawytscha*), steelhead (*Oncorhynchus mykiss*), delta smelt (*Hypomesus transpacificus*), longfin smelt (*Spirinchus thaleichthys*), striped bass (*Morone saxatilis*)
Limnetic	0 – 0.5 ppt[2] salinity. Sacramento River, San Joaquin River	Sago pondweed (*Potomogeton pectinatus*)	Asian clam (*Corbicula fluminea*)
Oligohaline	0.5 – 5.0 ppt salinity. Suisun Bay	Widgeon grass (*Ruppia maritime*)	California bay shrimp (*Crangon franciscorum*)
Mesohaline	5.0 – 18.0 ppt salinity. Suisun Bay, Carquinez Strait	Widgeon grass (*Ruppia maritime*)	Overbite clam (*Corbula amurensis*), Oriental shrimp (*Palaemon macrodactylus,* starry flounder (*Platichthys stellatus*)
Polyhaline	18.0 – 30.0 ppt salinity. Carquinez Strait, San Pablo Bay, South Bay	*Ulva, Gracilaria pacifica, Fucus, Sargassum muticum,* eelgrass (*Zostera marina*)	Blacktail bay shrimp (*Crangon nigricauda*), Dungeness crab (*Metacarcinus magister*), Pacific herring (*Clupea pallasii*), Pacific staghorn sculpin (*Leptocottus armatus*), English sole (*Parophyrys vetulus*)
Euhaline	30.0 – 35.0 ppt salinity. Central Bay	*Ulva, Gracilaria pacifica, Fucus, Sargassum muticum,* eelgrass (*Zostera marina*)	Blackspotted bay shrimp (*Crangon nigromaculata*), leopard shark (*Triakis semifasciatai*), bat ray (*Myliobatis californica*), Pacific sardine (*Sardinops sagax*), northern anchovy (*Engraulis mordax*), California halibut (*Paralichthys californicus*)

Community	Locations & Examples	Characteristic Plants	Characteristic Animals
Tidal flat	Along bay shore in San Mateo, Santa Clara, Alameda, Marin, Napa, Contra Costa, Solano counties	*Ulva spp., Gracilaria pacifica, Fucus spp., Sargassum muticum,* eelgrass (*Zostera marina*)	California bay shrimp (*Crangon franciscorum*), least sandpiper (*Calidris minutilla*), western sandpiper (*Calidris mauri*), willet (*Tringa semipalmata*)
Tidal marsh	Along bay shore in San Mateo, Santa Clara, Alameda, Marin, Napa, Contra Costa, Solano counties (e.g., Martinez marshes, Peyton Slough)	Pickleweed (*Salicornia virginica*), sea blite (*Suaeda californica*), marsh rosemary (*Limonium commune*), marsh grindelia (*Grindelia hirsutula*), California cord grass (*Spartina foliosa*)	Clapper rail (*Rallus longirostris*), marsh hawk (*Circus cyaneus*), short-eared owl, (*Asio flammeus*), salt-marsh harvest mouse (*Reithrodontomys raviventris*), vagrant shrew (*Sorex vagrans*), salt marsh fly (*Ephydra riparia*), salt marsh mosquitoes (*Aedes sqamiger, A. dorsalis*).
Coastal scrub	Dry rocky or gravelly slopes below 3,000 feet (e.g., steep slopes at the Amorco Terminal)	California sage brush (*Artemesia californica*), black sage (*Salvia mellifera*), coyote brush (*Baccharis pilularis*), bush monkey-flower (*Mimulus aurantiacus*).	Rufous-crowned sparrow (*Aimophila rucifeps*), rock wren (*Salpinctes obsoletus*), wrentit (*Chamaea fasciata*), brush rabbit (*Sylvilagus bachmani*), western fence lizard (*Sceloporus occidentalis*).
Urban shoreline	Manmade shorelines in all San Francisco Bay Area counties, San Francisco shoreline, Oakland shoreline	Himalayan blackberry (*Rubus armeniacus*), pampas grass (*Cortaderia spp.*), Bermuda grass (*Cynodon dactylon*)	House sparrow (*Passer domesticus*), rock dove (*Columba livia*), western scrub jay (*Aphelocoma californica*), domestic cat (*Felis catus*), domestic dog (*Canis lupus familiaris*), raccoon (*Procyon lotor*)

Note: [1] Many aquatic plant and animal species may be found in more than one biotic community and inclusion as a characteristic species does not mean a species can only be found in a single habitat.

[2] Parts by weight of salt per thousand parts of water (ppt)

Sources: Smith 1959, NOAA 2007



Source: Josselyn 1983

Figure 4.2-2: Marsh Zonation
California State Lands Commission
Amorco Marine Oil Terminal Lease Consideration Project

Subtidal

Open-water habitats are divided into two categories: Shallow bay and deep bay. Shallow bays are subtidal areas less than 18 feet deep below extreme low tide; deep bay habitats are deeper. The bay contains approximately 164,000 acres of shallow bay habitat and 81,000 acres of deep bay habitat (Monroe et al. 1999). Deep bay areas are found in the Central Bay and South Bay, and along the main deep-water channel in the San Pablo and Suisun Bays. All bays contain extensive areas of shallow bay habitat.

The open waters of the bay are primarily underlain by soft-bottom bay sediments, although there are small and important areas where the substrate is either vegetated or supports shellfish beds. Areas of eelgrass habitat are found along the urban coastlines west of Richmond and Oakland. The southern shoreline of San Pablo Bay contains the most extensive areas of eelgrass beds in the San Francisco Bay Estuary. Native oyster beds are found in the same general areas as eelgrass habitats. Crushed shell substrate is found in the South Bay (SFEP 2011).

Soft-bottom substrate consists of sedimentary particles such as clay, silt, and sand that can be readily mobilized by tidal currents. This widespread substrate covers 90 percent of the San Francisco Bay Estuary (SFEP 2011). The primary sources of sediment into the San Francisco Estuary are the watersheds of the Sacramento and San Joaquin Rivers. River currents carry sediment into the estuary and deposit it onto the channel bottom, while tidal currents resuspend the fine sediment into the water column. The cyclical deposition and resuspension of fine sediments leads to sorting by grain size, where larger grain sediments are found in the channels and mud/silt/clay accretes into consolidated mudflats near shore. Soft-bottom substrates are characterized by a lack of large, stable surfaces for plant and animal attachment (National Oceanic and Atmospheric Administration [NOAA] 2007). Because of the lack of hard surfaces for rooting, few plants are associated with soft-bottom habitats. However, though mobile, the fine-grained sediment is both stable and compact enough to support a diverse benthic assemblage.

The biotic assemblages in the subtidal habitats of the San Francisco Bay Estuary vary with salinity. Species tolerant of high levels of salinity but less adaptable to variable changes in salinity are found in Central and South Bays. San Pablo Bay and Suisun Bay support brackish water and freshwater species that are more tolerant of the shifting salinity levels.

Suisun Bay is also the site of the entrapment zone, an area where suspended materials concentrate as a result of mixing by the outgoing freshwater flow from the Delta above the heavier saltwater flow from San Francisco Bay. The entrapment zone contains concentrations of suspended materials such as nutrients, plankton, and fine sediments that are often many times higher than in areas upstream or downstream of the entrapment zone (Levine-Fricke 2004). This trophically rich habitat is thought to be important for the rearing of many fish species. Its precise location between the lower Delta and Suisun Bay varies according to the strength and phase of the tides, and the level of freshwater inflow from the Sacramento and San Joaquin Rivers. High freshwater flows from the Delta push the entrapment zone west toward Carquinez Strait; low flows put it closer to the mouth of the Delta.

Tidal Flats

Tidal flat habitat is the strip of intertidal habitat located between MLLW and MTL. It is exposed twice a day during low tide. During high tide, inundated tidal flats provide foraging habitat for fish such as longfin smelt , starry flounder (*Platichthys stellatus*), and several species of sculpin. During low tide, shorebirds feed on clams, shrimp, and worms found in the exposed tidal flats. Extreme high and low tides occur between May and June and in November and December, the latter period coinciding with the time that high numbers of waterbirds migrate through the San Francisco Bay Area (Bay Area).

The most extensive areas of tidal flat are found in the South Bay and along the north shore of San Pablo Bay. About half of the bay's tidal flats are found in the South Bay, making it the region's most important area for shorebirds (Monroe et al. 1999). Tidal flats in the Central Bay are limited by shoreline development. Suisun Bay has a more narrow tidal range than the other bays and has correspondingly less tidal flat.

Tidal Marsh

Tidal marshes are defined as the vegetated habitat between MLW and extreme high water (Josselyn 1983). Though not all tidal marshes are saline, they are sometimes also called salt marshes or saline wetlands. These marshes intergrade on their bay side with tidal flats and on their inland side with freshwater marshes. Tidal marshes are highly productive biological systems. Though only a small number of vascular plant species are capable of living in these areas, they support unique and diverse communities of plants and animals. Vegetation in tidal marshes are nurseries for commercially important species and endangered species; the tidal marshes are feeding and nesting areas for birds. In recognition of the importance of the San Francisco Bay Estuary, the United States named it as its 35th Wetland of International Importance (Ramsar Convention on Wetlands 2013).

Birds that feed or roost in tidal marshes include herons, egrets, ducks, coots, rails, swallows, wrens, and hawks. The majority of birds that use the tidal marshes of San Francisco Bay are migratory. Shorebirds that breed in the marshes include American avocet (*Recurvirostra Americana*), black-necked stilt (*Himantopus mexicanus*), and snowy plover (*Charadrius alexandrines*). Mammals found in these areas include mice, shrews, bats, and raccoons. Lizards and snakes are commonly found here, as are frogs and toads. Tidal marshes provide nursery habitat for fish, offering protection, food, and reduced osmoregulatory stress (Josselyn 1983).

Tidal marshes can be qualitatively divided into low, middle, and high marsh based on tidal inundation (see Figure 4.2-2). Low marsh consists of the area between MTL and MHW (Monroe et al. 1999). In salt marshes, these areas are characterized by saline-tolerant plants, usually grasses, which are adapted to regular inundation. In brackish and freshwater tidal marshes, cattails (*Typha* sp.), California bulrush (*Scirpus* sp.), and alkali bulrush (*Bolboschoenus maritimus*) dominate the low marsh. Waterfowl and rails make extensive use of low marshes. Middle marsh consists of the area between MHW and MHHW. Plant species typically found in the middle marsh include bulrushes (*Scirpus* sp.), spike rush (*Eleocharis* sp.), silverweed (*Potentilla anserine*), and salt grass (*Atriplex* sp.). High marsh consists of the area between MHHW and the highest margin of the marsh. Plants found in the high marsh include pickleweed (*Salicornia* sp.), saltgrass, gumplant (*Grindelia* sp.), and alkali heath (*Frankenia salina*).

Extensive areas of tidal marsh are found in all bays except the Central Bay. Suisun Marsh, found north of Suisun Bay, is the State's largest brackish-water marsh. Most of northern San Pablo Bay is marshland, and the extent of marshland in the South Bay is rising with ongoing restoration of the area's salt ponds.

<u>Urban Shoreline</u>

Much of the historical shoreline of Central Bay has been replaced with artificial fill or structures armored with revetments, seawalls, or rip-rap. Urban land uses tend to encroach on the shoreline in urbanized areas. These areas of shoreline may be fringed with narrow bands of recently formed tidal marshes dominated by common, widespread marsh species, including a high proportion of non-native species. The shorelines of the Central Bay and the northeast and northwest shorelines of the South Bay are heavily urbanized; the south shorelines of San Pablo Bay and Suisun Bay are less intensely urbanized.

<u>Coastal Scrub</u>

California's coastal scrub communities are dominated by low-growing shrubs such as coyote brush (*Baccharis pilularis*), California blackberry (*Rubus ursinus*), and poison oak (*Toxicodendron diversilobum*). Coastal scrub provides habitat for a variety of small-mammal species such as Botta's pocket gopher (*Thomomys bottae*), California mouse (*Peromyscus californicus*), and western harvest mouse *(Reithrodontomys megalotis).* Larger mammals such as bobcat (*Lynx rufus*), coyote (*Canis latrans*), and mule deer (*Odocoileus hemionus*) may occur in or near frequent larger areas of coastal scrub communities. Bird species that frequent coastal scrub habitat include California towhee (*Melozone crissalis*), spotted towhee (*Pipilo maculatus*), white-crowned sparrow (*Zonotrichia leucophrys*), wrentit (*Chamaea fasciata*), California thrasher (*Toxostoma redivivum*), and western scrub jay (*Aphelocoma californica*). Lizards such as western fence lizard (*Sceloporus occidentalis*) and northern alligator lizard (*Elgaria coerulea*) may also occur within coastal scrub and adjacent grassland habitats.

Biological Characteristics of the San Francisco Estuary

Plankton

Phytoplankton (e.g., diatoms, cyanobacteria, dinoflagellates) are photosynthesizing microorganisms that inhabit water. Phytoplankton provide a source of organic carbon and energy at the base of the food chain (Cloern 1979). Compared to other estuaries, phytoplankton primary productivity in the San Francisco Bay Estuary is relatively low. The population density of phytoplankton in the bay cycles throughout the year, with levels higher during spring in San Pablo, Central, and South Bays, and during the summer in Suisun Bay (Cloern 1979). In the northern bays, phytoplankton growth can be separated into three seasons: A spring bloom period during which water-born nitrates are available to phytoplankton; a low-productivity period in the summer when turbidity limits light penetration into the water; and a second, smaller fall bloom based on ammonium uptake (Wilkerson et al. 2006). High levels of phytoplankton (algal blooms) can cause environmental stress, affecting concentrations of dissolved oxygen and carbon dioxide, dissolved organic and inorganic substances, and pH.

Zooplankton are a diverse group that can range in size from microscopic (microplankton) to those that can be seen by the naked eye (macroplankton). This heterogeneous group includes mysid shrimp, clams, jellyfish, copepods, and crustaceans. They feed upon phytoplankton, bacteria, organic detritus, and each other.

Nonnative jellyfish are found throughout the estuary, including three hydrozoan species thought to be native to the Black Sea and one scyphozoan species thought to be introduced from Tokyo Bay. The hydrozoan species are present among the plankton from May through November, with peak abundances coinciding with warmer summer and fall temperatures. It has been suggested that jellyfish are passively spread through all low-salinity areas of San Francisco Bay via attachment to boat bottoms (NOAA 2007).

Icthyoplankton consists of fish eggs and larvae found in near-surface waters, where they float passively on water currents. Ichtyoplankton feed on microplankton and are in turn fed on by larger animals.

Invertebrates

California bay shrimp (*Crangon franciscorum*) is the most common shrimp in San Francisco Bay most years and supports a small commercial fishery. The blackspotted shrimp (*Crangon nigromaculata*) is the second most common shrimp in the San Francisco Bay overall and the most common shrimp in some years.

The San Francisco Bay Estuary is a nursery area for shrimp and crabs, and fish. The highest densities of bay shrimp are found in Suisun Bay, where juveniles rear in shallow, low saline waters (NOAA 2007). Dungeness crab (*Metacarcinus magister*) reproduce in the ocean, and the small juvenile stages settle to the bottom of the ocean where they are carried into the bay on tidal currents and spend the first year or two of their lives rearing in San Pablo and South Bays (NOAA 2007).

Different species of shrimp tend to inhabit different regions of the bay, though species do overlap in distribution. Shrimp species that live in the more saline environment of the bay have grown in abundance over the past 15 years and expanded in range into the upstream regions of the bay, particularly in dry years when saline levels increase upstream. Low-salinity species such as the bay shrimp show no increase in abundance over the past 15 years. Regionally, shrimp abundance increased in all parts of the bay except in Suisun Bay (SFEP 2011).

The abundance of shrimp and crab in the South Bay during the last 15 years is largely in response to increased nutrient availability in coastal waters. Because shrimp and crab prey on large benthic invertebrates, particularly clams, the increased numbers have led to a decline in the abundance of clams in the South Bay (Cloern 2011).

Fish

The health of the San Francisco Bay Estuary's fish communities varies geographically. The Central Bay fish population has been stable for 30 years, but the populations in the other bays have seen declines in health over the same period. This decline has been most dramatic for Suisun Bay, but is also apparent in San Pablo Bay and, increasingly, in the South Bay. Fish abundance, diversity, and percentage of native species have declined in all bays except the Central Bay (SFEP 2011).

Beginning in 2002, abundance indices of four pelagic fishes in the upper San Francisco Estuary declined rapidly to record low levels from which they have not recovered. Since 2004, a consortium of federal and State agencies formed the Pelagic Organisms Decline Management Team to focus attention on the causes of the decline for delta smelt, longfin smelt, threadfin shad (*Dorosoma petenense*), and juvenile striped bass (*Morone saxatilis*). The emerging conclusion from nearly a decade of research is that the decline has its roots in multiple, interacting causes, including low original population abundance, a decrease in suitable habitat, mortality from predation and entrainment into water diversions, and a fundamental shift in the food web in the upper Delta from a phytoplankton-based food web to a detritus-based food web (IEP 2010).

Birds

San Francisco Bay Estuary is a major stopover for birds migrating along the Pacific Flyway, and many birds also nest along the San Francisco Bay. Nearly half of Pacific Coast waterfowl and shorebirds depend upon the San Francisco Bay and its mudflats for foraging during migration, with peak abundance occurring November through mid-March (SFEP 2011). In recognition of its critical conservation importance for shorebirds, San Francisco Bay Estuary is listed as an important shorebird migratory stopover in the Western Hemisphere Shorebird Reserve Network (USFWS 2002). Migratory stopovers are wetlands and associated habitats that have high densities of food available at critical times during waterfowl and shorebird migration. These migrations are energy intensive and may include long-distance, non-stop flights of over 1,000 miles between stopover areas. Migrating flocks are large and migrations may occur in a very tight window, resulting in a large proportion of a species' entire population visiting a single site over a few weeks and requiring a vast quantity of available forage.

Waterbirds are typically classified based on habitat and foraging preference. Waterfowl are those species that depend primarily on open-water habitat for foraging and roosting, but breed in wetland and/or adjacent upland habitats. Ducks, geese, and grebes are all waterfowl. Waterfowl are further divided into dabblers and divers. Dabbling ducks, which feed at or below the surface of shallow water, have increased in Suisun and San Pablo Bays, while populations have held steady in the Central and South Bays (Pitkin and Wood 2011). Diving ducks, which feed in deeper waters, have decreased in San Pablo Bay but increased in Suisun Bay as populations of their primary prey, large invertebrates such as clams, have changed. Overall, populations of dabbling ducks have increased and winter populations of diving ducks have decreased. Seabirds such as gulls, terns, and cormorants forage and nest in many of the habitats found around the San Francisco Bay. Many species make use of human-created habitats such as piers, bridges, and the structures found at Alcatraz Island (Pitkin and Wood 2011).

Shorebirds primarily use beach, tidal flats, salt ponds, and shallow open-water habitats for foraging and roosting, and nest on beaches or adjacent upland areas. Sandpipers, plovers, and dowitchers are all examples of shorebirds. The overall status of shorebirds in tidal flats is stable. Population declines in the South Bay have been offset by population increases in San Pablo Bay. The western sandpiper (*Calidris mauri*), one of the most common species, has declined across the San Francisco Estuary, but populations of two other common species, least sandpiper (*Calidris minutilla*) and willet (*Tringa semipalmata*), have increased greatly (Pitkin and Wood 2011).

Marsh birds include species that depend on emergent marshes for foraging, nesting, and roosting. California black rail (*Laterallus jamaicensis coturniculus*) and song sparrows are examples of marsh birds. Tidal marsh bird abundance has increased in San Pablo Bay and Suisun Bay, mainly driven by increases in common yellowthroat (*Geothlypis trichas*) and California black rail populations, but has decreased in the Central and South Bays (SFEP 2011). Reproductive success of tidal marsh birds has increased in Suisun Bay but is decreasing in San Pablo Bay. In particular, San Pablo song sparrow and Suisun song sparrow populations are below the level required to sustain their populations, and are expected to exhibit long-term declines. The decrease in tidal marsh bird abundance is attributed to predators and nest flooding (Pitkin and Wood 2011).

Wading birds use emergent marsh, marsh edge, and shallow open-water habitats to forage and roost in upland areas. Locally, examples include the great blue heron, cattle egret, and great egret. Heron and many egret populations are increasing in San Pablo Bay, but there has been a decline in the nesting success for great egrets (SFEP 2011).

<u>Mammals</u>

San Francisco Bay Estuary's mammals are found on the shore and in the water. The most common terrestrial species found in coastal marshes include generalists such as Norway rat (*Rattus norvegicus*), house mouse (*Mus musculus*), California vole (*Microtus californicus*), and raccoon (*Procyon lotor*), which are adaptable to a wide range of habitats. Terrestrial mammals that are obligate users of marsh habitat, such as saltmarsh harvest mouse (*Reithrodontomys raviventris*), have seen drastic population declines as a result of habitat loss, and many are now listed as Threatened or Endangered by the federal and State governments.

Populations of beaver (*Castor canadensis*), river otter (*Lontra canadensis*), and sea otter (*Enhydra lutris*) were extirpated from the San Francisco Estuary by over harvesting in the 19th century. Both river otter and beaver have recently recolonized the San Francisco Estuary; river otter have been reported throughout the San Francisco Bay, including Coyote Creek in the South Bay, the Richmond Marina in the Central Bay, Martinez Marina on Carquinez Strait, and from wetlands in Suisun Bay (ROEP 2013). Beaver are now found in the marshes in north San Pablo Bay and on the lower Alhambra Creek in downtown Martinez.

The most common aquatic mammals in the San Francisco Estuary are California sea lion (*Zalophus californianus*) and harbor seal (*Phoca vitullina*) (NOAA 2007). The California sea lions are mainly males that migrate to the San Francisco Estuary to forage and establish a dominance hierarchy; female California sea lions stay south of Santa Barbara. California sea lion haul outs are found throughout the San Francisco Bay, most prominently on San Francisco's Pier 39. Harbor seals are resident breeders. Harbor seals will haul out throughout the San Francisco Bay; major haul out and pupping sites are located in the Central and South Bays at the Castro Rocks near the Richmond-San Rafael Bridge, Yerba Buena Island by the San Francisco-Oakland Bay Bridge, Corte Madera, and Mowry Slough in the South Bay.

Nonindigenous Aquatic Species

San Francisco Bay Estuary has been described as one of the most invaded ecosystems in North America (Cohen and Carlton 1995). Nonindigenous aquatic species dominate many parts of the San Francisco Bay, to the extent that in some locations only introduced species can be found. In 2010, the California Department of Fish and Wildlife (CDFW) collected 497 species from San Francisco Bay Estuary, of which 98 species were classified as introduced, including three newly detected species to San Francisco Bay Estuary that had likely been spread from other locations in California (OSPR 2011). The results indicate high numbers of introduced species are found in the South Bay, San Pablo Bay, and Central Bay. Suisun Bay had the lowest number of introduced species.

Nonindigenous aquatic species have been introduced to the San Francisco Bay via a number of vectors, including the deliberate introduction of species for recreational or commercial purposes. The shipping industry has been identified as one of the major vectors of nonindigenous aquatic species, and vessel biofouling and ballast water are considered the largest contributors of nonindigenous species to the San Francisco Bay (California State Lands Commission [CSLC] 2013e). Eighteen percent of established nonindigenous aquatic species are tied to vessel biofouling as the primary likely vector and 9 percent for ballast water; however, when considering established species with multiple possible vectors, 60 percent could have been introduced via vessel biofouling as one of several possible vectors, and 53 percent could have been introduced via ballast water as one of several possible vectors (OSPR 2011).

Invasive species may compete directly with native species for food or space, or prey upon native species. They can also change the food chain or physical environment to the detriment of native species. Approximately 42 percent of the species on the federal Threatened or Endangered species list are at risk primarily because of predation, parasitism, and competition from nonindigenous invasive species (OSPR 2011). One such currently pernicious invasive species is the overbite clam (*Corbula amurensis*), first found in the San Francisco Bay Estuary in 1986. Thought to have been introduced into the San Francisco Bay Estuary by ballast water discharge from a vessel, this planktivore is now so abundant that the current population is capable of filtering the estuary's water column several times a day. In some portions of the Suisun Bay floor, the clam accounts for the vast majority of biomass, and it has been implicated in the pelagic organism decline by severely reducing the availability of phytoplankton in Suisun Bay (SFEP 2004, Greene 2011).

Rare, Threatened, and Endangered Species

Owing to the diversity of habitat between embayments, the distribution and abundance of rare and sensitive species that depend on the estuarine habitat for some or all of their life cycle vary throughout the region. Each habitat supports a distinct community of sensitive species. To aid in the assessment of impacts, each category of sensitive species is summarized by embayment. Appendix D includes Tables D-1 through D-5, which provide further detailed information about each species that was considered under this assessment and their potential to be present near the Project site and impacted by the Project.

<u>Sensitive Plants</u>

Tidal habitats in the San Francisco Estuary support 12 plant species that are identified by federal and/or State agencies as endangered, threatened, or rare, or are listed by the

California Native Plant Society as status 1B or higher. The distribution of sensitive plant species varies geographically within the estuary. In general, the less urbanized the bay, the more likely it is to retain a proportion of its historical marshland and to support rare or sensitive plants (see Appendix D, Table D-1).

The Central Bay has not retained any historical tidal marsh remnants, which limits the potential for rare plants with few exceptions. Naturally occurring populations of Point Reye's bird's-beak (*Cordylanthus maritimus* ssp*. palustris*) are found along the shores of Richardson Bay, and a population was reintroduced to the Crissy Field wetlands in the Presidio. This species inhabits the high marsh or upper middle marsh zone. It is a hemiparasitic plant, meaning that although it possesses chlorophyll and is capable of limited photosynthesis, it must attach its root system to a host plant to extract water and nutrients and to reproduce. Point Reye's bird's-beak is dependent upon plants that are active in summer such as pickleweed (*Salicornia* sp.), saltgrass (*Distichlis* sp.), and fleshy jaumea (*Jaumea carnosa*), all of which are abundant in Richardson Bay. One other sensitive species is found in the Central Bay: California sea blite (*Suaeda californica*). This species is restricted to the intertidal zone of salt marshes, and was extirpated from the San Francisco Bay region in the 1960s. Since 2000, it has been successfully reintroduced at four sites in the Central Bay: Heron's Head Park at Pier 98, Pier 94, Eastshore State Park north of Oakland, and Roberts Landing near San Leandro in South Bay.

The South Bay retains fragments of historical tidal marshes at upper Newark Slough, Dumbarton Marsh, and along the Palo Alto shoreline. However, no sensitive tidal marsh or estuarine beach plants are known to remain in the South Bay. As mentioned above, one population of California sea blite was re-introduced at Roberts Landing.

San Pablo Bay has retained more of its historic tidal marshes than any other bay, and as a result supports naturally occurring populations of six rare species. Historical tidal marshes are found along the north edge of San Pablo Bay, including China Camp in San Rafael, Heerdt Marsh by Corte Madera, most of Petaluma Marsh, Whittell Marsh by Point Pinole, and areas of Napa marsh, including Fagan's Slough. The richest diversity of sensitive plants is found in the marshes at the mouths of the Petaluma and Napa Rivers.

San Joaquin spearscale (*Atriplex joaquinana*) is a tall annual herb known mainly from alkali grasslands and is only rarely known from tidal marsh edges where it may opportunistically colonize the high-tide shorelines. Recent populations are reported from along the lower Napa River. Saline marsh clover (*Trifolium hydrophilum*) is known to occur in marshes as well as alkaline grasslands. One population is known from the Viansa wetlands in northwest San Pablo Bay. The upper marsh zone of San Pablo Bay's brackish and freshwater marshes supports populations of endemic species known only to San Francisco Bay Estuary: Suisun marsh aster (*Symphyotrichum lentum*), delta tule pea (*Lathyrus jepsonii* var. *jepsonii*), and Mason's lilaeopsis (*Lilaeopsis masonii*). Suisun marsh aster was once widely distributed in San Pablo Bay, but is reported now only from the vicinity of Fagan Slough. The delta tule pea is a climbing species; individuals are present in marshes along the Napa River. Mason's lilaeopsis (*Lilaeopsis masonii*) is also known from the Napa River corridor; it is a shade-sensitive, early successional colonizer of newly deposited or exposed sediments. Two species of bird's-beak are found in the upper marsh zone in San Pablo Bay: Point Reye's bird's beak and the federally endangered soft-bird's beak (*Cordylanthus mollis* ssp*. mollis*). One population of Point Reye's bird's-beak is known from the Petaluma River. Extant populations of soft bird's-beak are found in the marshes along the mouth of the Napa River.

Most of the sensitive plants found in San Pablo Bay are also found in Suisun Bay, where they are more widely distributed and abundant, particularly in the extensive brackish waters of Suisun Marsh. In addition to the plants described above, Suisun Bay contains populations of the federally endangered Suisun thistle (*Cirsium hydrophilum* var. *hydrophilum*) in the northern reaches of Suisun Marsh in the vicinity of Rush Ranch. Bolander's water-hemlock (*Cicuta maculata* var. *bolanderi*) was once common in Suisun Marsh.

<u>Sensitive Fishes</u>

The San Francisco Estuary provides habitat to seven species of sensitive fish. Most of the sensitive fish species in the estuary either rely on brackish water habitat for their adult habitat and/or travel upstream to spawn in freshwaters and have thus been affected by degradation or removal of spawning habitats, entrainment by the State water projects, drought, pollution, predation, disruption of the food web and direct competition for space with and predation by non-indigenous aquatic species. The discussion below summarizes the distribution of sensitive species in the estuary; Table D-2 in Appendix D provides more detailed information for each species. Sensitive fish species are found mainly in the north bays. All sensitive fish species of the San Francisco Estuary have the potential to be impacted by a crude oil spill. Suisun Bay is home to two native species of "true" estuarine fish, i.e. fish that spend all their lives in estuaries: delta smelt and Sacramento splittail (*Pogonichthys macrolepidotus*). Both species are endemic to the Delta, and both travel into fresh water to spawn. Delta smelt are found in greatest abundance in shallow, turbid waters at the freshwater edge of the entrapment zone where they feed on plankton; Sacramento splittail are found mainly along the benthos of small, shallow, turbid sloughs lined with emergent vegetation, where they feed on macroinvertebrates and detritus. The delta smelt population is listed as threatened at the federal level and endangered by the State. As of 2010, populations of the splittail were considered stable by the United States Fish and Wildlife Service (USFWS), which found its listing was not warranted, but the species remains a CDFW species of special concern, and it is a targeted species of the Delta Stewardship Council (USFWS 2010).

Four anadromous species are found in the San Francisco Bay: longfin smelt, chinook salmon (*Oncorhynchus tshawytscha*), steelhead trout (*Oncorhynchus mykiss*), and the Southern Distinct Population of green sturgeon (*Acipenser medirostris*). Longfin smelt are primarily estuarine, though they are found in small numbers in the coastal waters beyond the Golden Gate Bridge. In summer, adults congregate in the cooler waters and deep-water habitats of the Central Bay, where they feed on zooplankton such as the opossum shrimp, *Acanthomysis* sp., and *Neomysis mercedis* when available and on copepods otherwise (Hobbs 2006). They migrate upstream in fall to spawn in the limnetic and oligohaline waters of the Delta. Populations have declined steadily over the past two decades (Rosenfeld and Baxter 2007).

Chinook salmon are born in fresh water and migrate into the Pacific Ocean to mature, reaching maturity between 2 and 5 years of age. They migrate into freshwater streams to spawn, after which they die. Their eggs incubate for several months. Upon hatching, fry undergo physiological changes in preparation for migration and enter the smolt stage. Most chinook smolt migrate to the ocean within a few months of hatching, though some may remain in fresh water for a year. Peak out-migrations are between April and June.

The Sacramento-San Joaquin River basin runs of chinook salmon are differentiated into four runs by their time-of-spawning migrations: Fall-run, late fall-run, winter-run, and spring-run. Fall-run chinook migrate upstream from July to November, late fall-run migrate October to February, winter-run migrate December to April, and spring-run migrate April to July. The Delta is a nursery area for all runs of chinook salmon. Winter-run chinook, the young of which out-migrate during the driest times of the year, are listed as critically endangered at both the federal level and by the State. Spring-run salmon are listed as threatened at both federal and state levels.

A close ally to salmon, the steelhead is an anadromous kind of rainbow trout. They migrate into the estuarine river basins from October to April and spawn from December to May. Populations that spawn eastward to the Napa River are listed as threatened at the federal level. This includes runs in San Pablo Bay's Napa River, Petaluma River, and Sonoma Creek, and the South Bay's Guadalupe River.

Green sturgeon may be found throughout the Central, San Pablo, and Suisun Bays. Adults are primarily marine, but enter the estuary to feed or migrate to spawning grounds. Juveniles rear in the northern bays for 1 to 4 years before joining the more marine adults. Sturgeon are benthic feeders, feeding mainly on shrimp and crabs.

Sensitive Birds

San Francisco Bay Estuary's sensitive birds are generally obligate inhabitants of tidal marshes, and have experienced population declines as a result of the removal and degradation of marsh habitat. Thus, the Central Bay, which possesses few tidal marshes, has few populations of sensitive birds (see Appendix D, Table D-3).

Many sensitive species such as California clapper rail (*Rallus longirostris obsoletus*) and California black rail are widely distributed throughout the bays. Others are subspecies known from single embayments: The Suisun song sparrow (*Melospiza melodia maxillaris*) is found in Suisun Bay, the San Pablo song sparrow (*Melospiza melodia samuelis*) in San Pablo Bay, and the Alameda song sparrow (*Melospiza melodia pusillula*) in the South Bay. California least tern (*Sterna antillarum browni*) is known to nest in the South Bay and along the southern shore of Suisun Bay. Western snowy plover (*Charadrius nivosus* ssp. *nivosus*) also nests in the South Bay, as well as in the San Pablo Bay marshes.

Colonial nesters found in the estuary include double-crested cormorant (*Phalacrocorax auritus*), great blue heron (*Ardea herodias*), great egret (*Ardea alba*), black-crowned night-heron (*Nycticorax nycticorax*), and snowy egret (*Egretta thula*). Double-crested cormorant colony nest sites are found under the bridges that divide the bays and on large electric transmission structures in the South Bay. Heron rookeries, which may consist of several heron and egret species, are found throughout the Bay Area.

<u>Sensitive Mammals</u>

Tidal marshes in the San Francisco Estuary support four sensitive mammalian species, while seven mammalian species use the aquatic habitats of the estuary. Additionally, three species of bats forage over tidal marsh and estuarine waters (see Appendix D, Table D-4).

Many of the sensitive mammals of the tidal marsh habitats are small rodents: Suisun ornate shrew (*Sorex ornatus sinuosus*), saltmarsh wandering shrew (*Sorex vagrans halicoetes*), the federally endangered saltmarsh harvest mouse, and the San Pablo vole (*Microtus californicus sanpabloensis*) all weigh less than an ounce at adult size. Where present, they are prey species for higher order predators. Both shrews are insectivorous, while the mouse and vole are vegetarian. The endemic saltmarsh harvest mouse is generally restricted to tidal marsh habitats. It is found throughout the estuary, albeit in low numbers due to habitat destruction and degradation. The saltmarsh wandering shrew is found in the South Bay, while the Suisun ornate shrew is found in Suisun Bay. The San Pablo vole is known only from a small region in the vicinity of Wildcat Creek, on the southeast shore of San Pablo Bay.

Seven marine mammal species are known to migrate, forage, and rest in the San Francisco Bay. Gray whale (*Eschrichtius robustus*) and humpback whale (*Megaptera novaeangliae*) occasionally enter the Central Bay to feed during seasonal migrations. The harbor porpoise (*Phocoena phocoena*) is another visitor to the Central Bay. Harbor seal and California sea lion both venture as far upstream as Suisun Bay, but in general marine mammals prefer the deep, cold waters of the Central Bay.

The big free-tailed bat (*Nyctinomops macrotis*) has been collected in Martinez. Hoary bat (*Lasiurus cinereus*) has been observed in Suisun Marsh, but is more widely distributed in the South Bay. The pallid bat (*Antrozous pallidus*) has been collected in the Central, South, and San Pablo Bays. The distribution of these species and their use of estuarine habitats has not been well described.

Sensitive Amphibians and Reptiles

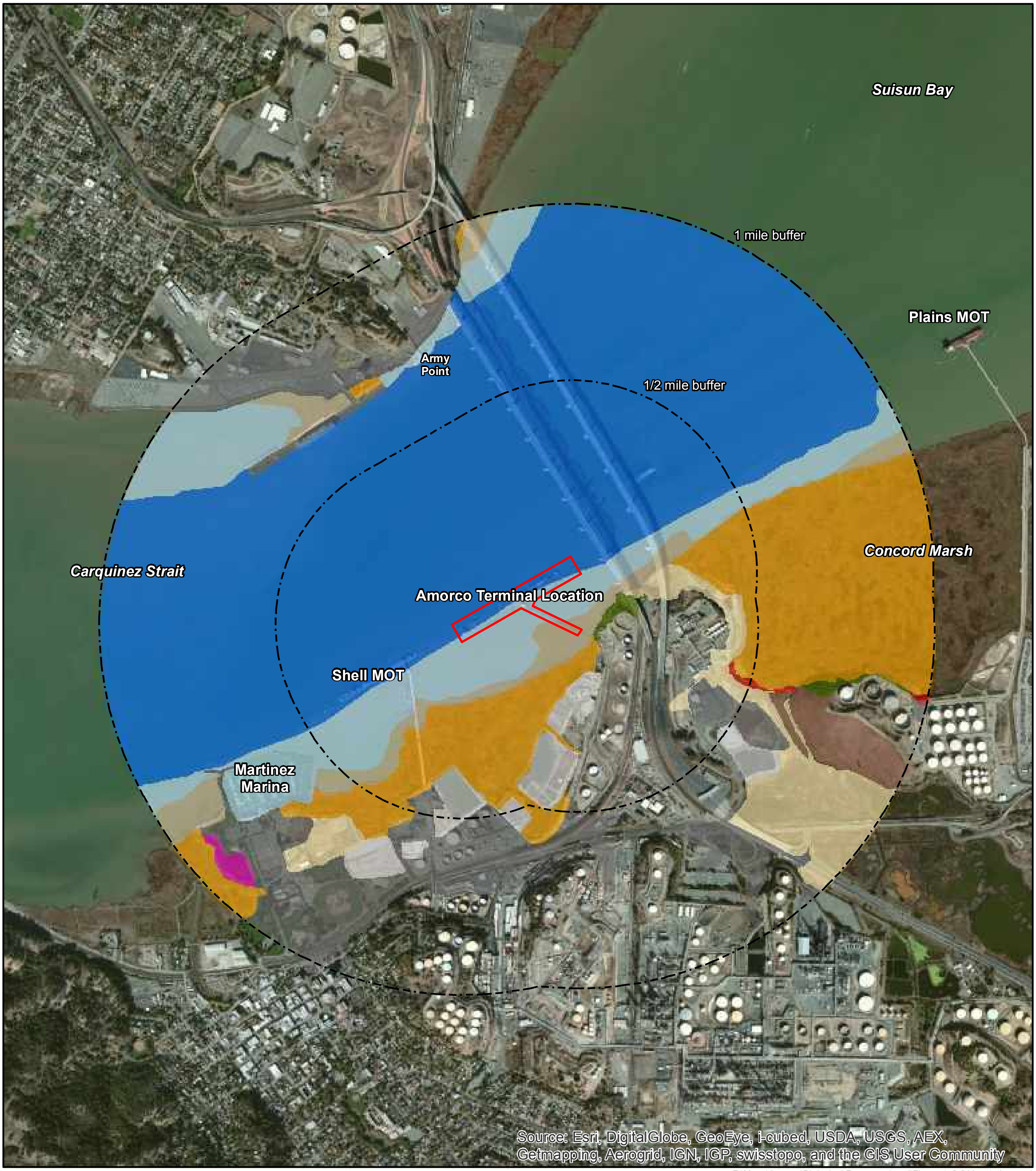
The San Francisco Bay Estuary supports only a handful of sensitive amphibians and reptiles (see Appendix D, Table D-5). Both California red-legged frog (*Rana draytonii*) and western pond turtle (*Actinemys marmorata*) are distributed in low numbers throughout the San Francisco Bay (CDFW 2013c). These species prefer freshwater ponds and streams, but are tolerant of limited saltwater intrusion and are documented from brackish marshes in San Pablo and Suisun Bays. California red-legged frogs appear to be eliminated from the western lowland portions of Contra Costa and Alameda counties (west of Highway 80 and 880, particularly in urban areas). California tiger salamanders, which are found in grasslands and vernal pools, are known only from the Don Edwards National Wildlife Refuge in the South Bay (CDFW 2013c).

4.2.1.2 Project Study Area

The Project study area includes lower Suisun Bay and upper Carquinez Strait, including vegetation at the Amorco Terminal lease area and along the shoreline within a 0.5-mile radius of the Amorco Terminal, as well as known habitats of rare, threatened, or endangered plant or animal species within a 1-mile radius of the Amorco Terminal (see Figure 4.2-3). Table D-6 in Appendix D includes a matrix depicting habitat use by wildlife found in the Project study area.

Characteristics of the Project Study Area

The Project is located on the eastern end of the Carquinez Strait in northern Contra Costa County on 16.6 acres of public land leased from the CSLC (proposed to be 14.9 acres as part of a new lease), approximately 300 feet west of the Benicia-Martinez Bridge. The lease extends approximately 1,300 feet into the Strait.



F:\Maps\Amorco\Biological Resources\mxd\Figure 4_2-2 Vegetation.mxd

Figure 4.2-3 Vegetation and Habitat
California State Lands Commission
Amorco Marine Oil Terminal
Lease Consideration Project

TRC

9/3/2013

Terminal Boundary
Buffer

Habitat

- Deep Bay
- Shallow Bay
- Lagoon
- Tidal Flat
- Tidal Marsh
- Old Tidal Marsh
- Diked Marsh
- Ruderal
- Coastal Scrub
- Storage or Treatment Basin
- Filled Baylands

N

1:24,000

1 inch = 2,000 feet

0 900 1,800 ft

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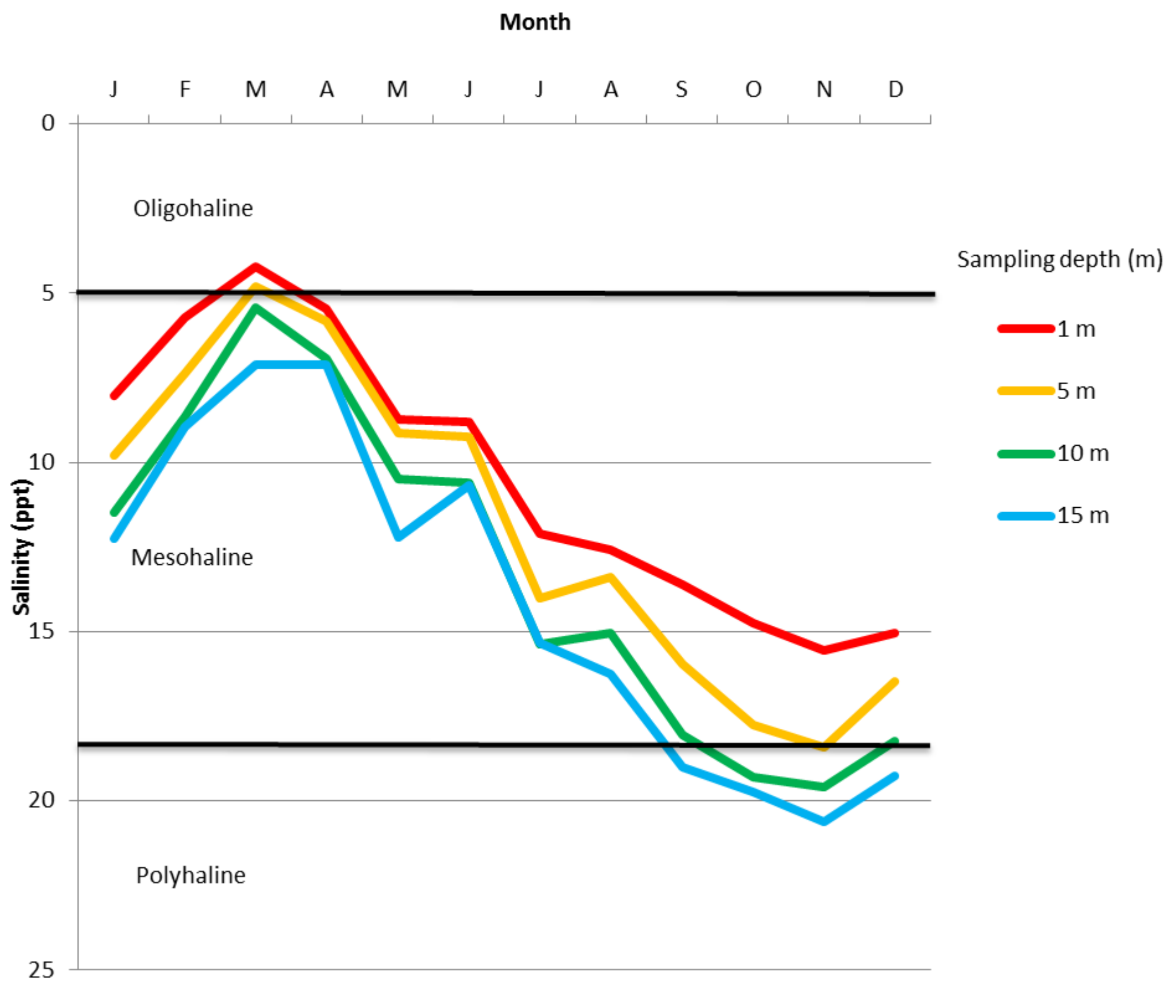
Water depths in the lease area range from 15 meters at the lease edge to 3 meters along the dock. The benthic substrate consists of soft bay sediments over bedrock, also known as mudstone.

Land use in the vicinity of the Amorco Terminal is a mosaic of industrial and open space. Coastal brackish marsh is present along the shoreline between Bulls Head Point to the east and the Martinez Marina to the west of the Amorco Terminal. Upland areas associated with the marshlands are given over to industrial use with the exception of a small patch of coastal scrub/ruderal vegetation found on the hillside leading up to the Amorco Tank Farm. Directly west of the Amorco Terminal, Hanson Sand Mining has a floating pipeline used to transfer sand slurry from vessels to the shore. The Shell Martinez Marine Terminal is approximately 500 feet west of the Amorco Terminal. The channel north of the Amorco Terminal is about 4,000 feet wide and is bordered by the Port of Benicia and Valero's Benicia Refinery.

Carquinez Strait is a narrow gap in the Coast Range that connects the San Pablo Bay to Suisun Bay and the Sacramento-San Joaquin River Delta. Typical river deltas widen from their source into a fan-shaped, sediment-heavy region. The narrow channel in the Carquinez Strait, however, restricts the outflow of flood waters and sediment from the Central Valley to the ocean, causing waters to pool and sediment to slow and settle in Suisun Bay, and resulting in a rare geological feature known as an inverted river delta. Upstream of the strait, the channel depth transitions rapidly from the deep channel of Carquinez Strait into the shallows of Suisun Bay. This area of bathymetric change is known as the Garnet Sill.

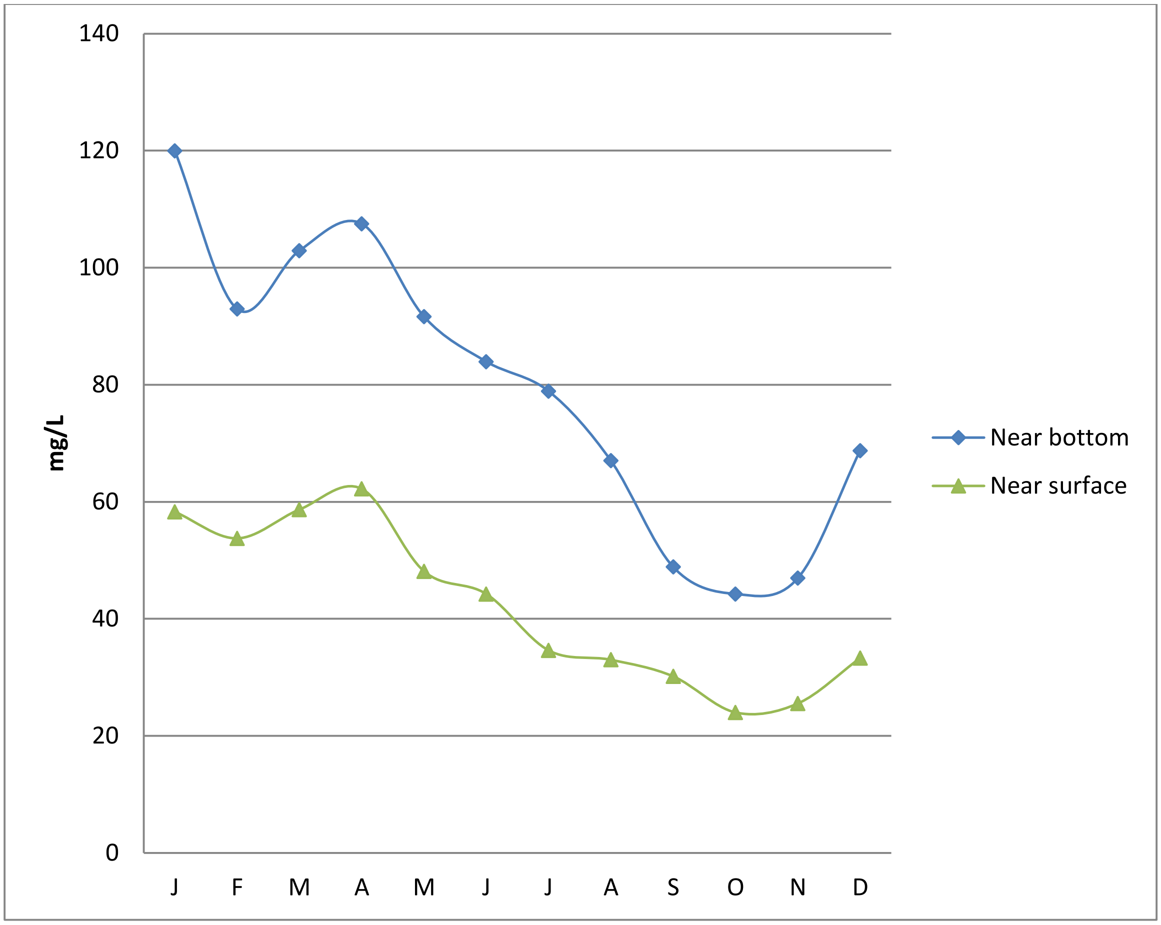
The Garnet Sill is the upstream endpoint of a gravitational circulation cell that forms in response to strong tidal currents that carry salt water upstream along the bottom of the channel while fresh water flows seaward along the top of the channel. Salinity in the water column in Carquinez Stratit is stratified by depth, with fresh water along the surface and saline waters along the bottom (see Figure 4.2-4). Salinity stratification is greatest during neap tides. Following winter storms, the surface waters reach their lowest levels of salinity, and for a brief time, the upper five meters of the channel become oligohaline. Once the winter floods have stopped, the channel waters quickly become mesohaline and then slowly polyhaline.

The area where upstream and downstream currents meet and cancel each other out is known as the null zone; in Carquinez Strait, this zone typically forms near the strait's upper end, downstream of the Garnet Sill. During spring tide, the strait is the site of the San Francisco Bay estuarine turbidity maxima; during neap tide, the estuarine turbidity maximum is found upstream at Middle Ground (Schoellhamer 2002). Suspended sediment concentration (SSC) is greater near the bottom of the channel than higher in the water column. SSCs are seasonally dependent and are at their highest in the winter and spring, and decrease through summer to fall lows (see Figure 4.2-5).



Source: USGS 2001

Figure 4.2-4: Salinity Stratification in Carquinez Strait
California State Lands Commission
Amorco Marine Oil Terminal Lease Consideration Project



Source: USGS 2007

Figure 4.2-5: Average Suspended Sediment Concentration at Benicia Bridge, 2003-2007
California State Lands Commission
Amorco Marine Oil Terminal Lease Consideration Project

Note: Benicia Station is located approximately 0.6 mile north of the Amorco Marine Oil Terminal. Data from this site are considered representative of suspended-solids concentration in the strait.

Terminal Structures

The Amorco Terminal consists of a 1,130-foot-long wharf arm connected to the shore by 1,500 feet of approach trestle. The Amorco Terminal is constructed of wood, concrete, and metal. The wharf has four small buildings on-site, including two buildings for personnel, a pump house, and a tool shed. Lights are placed regularly along the wharf arm and approach trestle, and there is one large light bank under the main loading arm.

The Amorco Terminal provides shade and refuge areas for fish, and resting spots and foraging opportunities for fish, birds, and marine mammals. The Amorco Terminal also provides nesting habitat for some bird species, including a pair of osprey (*Pandion haliaetus*) that have successfully fledged offspring from a nest atop the main loading arm since 2009 (Jim Herron pers. comm.). Support pilings provide attachment areas for sessile invertebrates and a place for fish to spawn.

Subtidal

The water column consists of the area between the benthos and the water surface. The water column contains both channels, which are areas with strong currents and a deep rounded bottom, and shoals, or shallow weak-current areas. Channels provide a connection between marine and freshwater ecosystems, while shoals function as collection areas for sediment and detritus. In San Francisco Bay Estuary, areas of the water column less than 18 feet deep are considered shallow bay; areas deeper than 18 feet are considered deep bay. Approximately 238 acres of shallow bay and 1,097 acres of deep bay are found within 1 mile of the Amorco Terminal. The lease area includes 5.00 acres of shallow bay and 8.93 acres of deep bay. These habitats provide foraging areas for invertebrates, fish, diving birds, and marine mammals, and nursery and spawning habitat for invertebrates and fish.

Compared to other parts of the San Francisco Bay, the Carquinez Strait is not particularly rich in phytoplankton (USGS 2013a). Phytoplankton productivity is generally calculated from measurements of chlorophyll α. Chlorophyll α concentrations below about 10 micrograms per liter are known to cause food-limited declines in zooplankton reproduction. Measurements of water quality in the Carquinez Strait from 2003 to 2013 show that chlorophyll α levels in the strait rarely exceed this threshold in either spring or fall (USGS 2013).

The benthic substrate at the Project site consists of soft bay sediments over bedrock, also known as mudstone. Because of the lack of hard surfaces for rooting, few plants are associated with soft-bottom habitats. However, though mobile, the fine-grained sediment is both stable and compact enough to support a diverse benthic assemblage. The biotic assemblage associated with this habitat is known as the benthos. The benthos consists of bacteria and animals that live in (infauna), on (epifauna), or near (demersal) the bottom of the water channel.

Salinity levels along the substrate are generally polyhaline in summer and fall and mesohaline in the winter and spring, leading to fluxation on the benthic habitat and community composition.

The most common benthic species observed at the Amorco Terminal is *Corbula amerensis* (see Table 4.2-2).

Table 4.2-2: Common Benthic Invertebrates in Carquinez Strait

Species	Status	Group	Salinity	Habitat	Relative Frequency
Ampelisca abdita	I	amphipod	polyhaline	channel, shallow subtidal	common, persistent
Ascidia zara	I	tunicate	polyhaline	hard bottom substrate	common, persistent
Corbula amurensis	I	bivalve	oligohaline, mesohaline, polyhaline	channel, channel edge, shallow subtidal	common, persistent
Gemma gemma	I	bivalve	polyhaline	shallow subtidal	common, persistent
Grandidierella japonica	I	amphipod	mesohaline	channel edge	persistent in low numbers
Heteromastus spp.	U	polychaete	mesohaline, polyhaline	channel, shallow subtidal	persistent in low numbers
Macoma petalum	I	bivalve	polyhaline	shallow subtidal	low numbers, persistent
Monocorophium acherusicum	I	amphipod	polyhaline	shallow subtidal	sporadic
Arcuatula senhousia	I	bivalve	polyhaline	channel, shallow subtidal	low numbers, persistent
Mya arenaria	I	bivalve	polyhaline	channel, shallow subtidal	common, persistent
Alitta succinea	I	polychaete	polyhaline	channel	low numbers, persistent
Nippoleucon hinumensis	I	cumacean	mesohaline, polyhaline	channel, channel edge, shallow subtidal	persistent in low numbers in the channel, and peaks in spring/summer at channel edge
Polydora cornuta	C	polychaete	polyhaline	channel	low numbers, persistent
Streblospio benedicti	I	polychaete	polyhaline	channel	low numbers, persistent

Sources: NOAA 2007, Rowan et al. 2011
Status: I = Nonindigenous; U = Unresolved; C = Cryptogenic

Tidal Flat

A narrow band of tidal flat habitat is located between the shallow waters of the San Francisco Bay and shoreline marsh areas. The Amorco Terminal lease includes approximately 0.96 acre of this habitat; approximately 77 acres are found within 1 mile of the Amorco Terminal. The tidal flats at the Amorco Terminal are comprised of mudflats, which are formed of fine-grained silts and clays, and typically support a diverse community of diatoms, worms, shellfish, and algal flora. These creatures are prey for a wide variety of birds and fish. Wading birds known to use the tidal flats for forage during low tide include western sandpiper, least sandpiper, willet, and dunlin (*Calidris alpina*) (eBird 2012). Harbor seals are also known to frequent tidal flats. Other species such as white pelican (*Pelecanus erythrorhynchos*) rest on the tidal flats between fishing expeditions. During high tide, the flats provide foraging areas for fish, including longfin smelt.

Tidal Marsh

Approximately 432 acres of tidal marsh are found within 1 mile of the Amorco Terminal, mainly along the southern shore of the Carquinez Strait where they are surrounded by heavy industry. The marshes are composed primarily of low/middle tidal brackish marsh, muted tidal brackish marsh, and diked brackish marsh. Small, discrete areas of high tidal marsh occur along the north shore of Carquinez Strait and at the southern edge of the Concord Marshes.

Tidal brackish marsh is found along the southern edge of the Carquinez Strait east of the Benicia-Martinez Bridge and west of the Martinez Marina. East of the bridge, the predominantly low/middle marsh plain extends up to 3,000 feet from the edge of the tidal flat; west of Martinez Marina, the marsh plain is approximately 1,000 feet wide and abuts an area of muted tidal brackish marsh. A narrow band of high marsh is found at its southern edge. Muted tidal brackish marsh is found west of the Carquinez Bridge, where the marsh plain varies in width between 300 and 1,500 feet. Both marsh plains are fairly level. Their tidal channels are a combination of straight channels superimposed on the marsh for drainage or mosquito control and linear dendritic in areas closest to shore. The dominant species present are common reed (*Phragmites australis*), cattails, California tule (*Schoenoplectus californicus*), broad-leaf pepperweed (*Lepidium latifolium*), pickleweed (*Salicornia pacifica*), Baltic rush (*Juncus balticus*) and gumplant.

The muted tidal marsh adjacent to the Amorco Terminal provides habitat for a variety of rare, threatened, and endangered species. California clapper rail was detected during a 2008 survey of the marsh but appeared to be foraging rather than breeding; California black rail forage and breed in the marsh (WRA 2011). Based on habitat quality and survey results from adjacent marshes, saltmarsh harvest mouse are presumed to inhabit this marsh. Several rare plants have potential to be found in the marshes, including soft bird's-beak, delta tule pea, Mason's lilaeopsis (*Lilaeopsis masonii*), and Suisun thistle.

Diked brackish marsh is found adjacent to both the tidal brackish marsh and the muted tidal marsh. Diked marshes may provide important habitat for a variety of wildlife, especially waterfowl, shorebirds, and small mammals. They may provide high-tide refugia for small mammals and roosting habitat for shorebirds.

Lagoon

A 6-acre lagoon is located at the Martinez Marina approximately 0.75 mile from the Amorco Terminal. Lagoons support the same species of aquatic invertebrates and fish found in shallow bays and tidal channels, and provide feeding and resting areas for water birds. They may also provide protected areas that facilitate early colonization by nonindigenous aquatic species (Monroe et al. 1999).

Special-status Habitats

Critical Habitat

The Project is located within critical habitat for delta smelt (59 Federal Register 242), the southern Distinct Population Segment (DPS) of green sturgeon (74 Federal Register 195), winter-run chinook salmon, Central Valley steelhead, and Central California coastal steelhead (70 Federal Register 170).

Primary constituent elements (PCEs) for the delta smelt that are located within the vicinity of the Project include the physical habitat, water, river flow, and salinity concentrations required to maintain delta smelt habitat for (1) larval and juvenile transport, (2) rearing habitat, and (3) adult migration. Because of the fluid nature of the Delta's hydrology, the quality of the PCEs for the delta smelt fluctuate within the designated area. The final ruling on the critical habitat identifies marina construction as activities that, depending on the season of construction and scale of the Project, might result in destruction or adverse modification of critical habitat that could jeopardize the continuing existence of the delta smelt and that would require consultation with the USFWS.

PCEs for the southern DPS of the green sturgeon in the estuary include food resources for all life stages, water flows, water quality, migratory corridors, channel depths, and sediment quality. Dredging, in-water construction, National Pollutant Discharge Elimination System activities, commercial shipping, and habitat restoration are identified in the final critical habitat rule as activities that may affect one or more PCEs through alteration of the physical parameters of the estuary.

The Amorco Terminal is located in critical habitat for steelhead. Critical habitat for steelhead includes the Sacramento River from Keswick Dam in Shasta County to Chipps Island, and all waters downstream of Chipps Island and north of the San Francisco-Oakland Bay Bridge.

California Department of Fish and Wildlife Natural Communities

The California Natural Diversity Database shows two natural communities within and adjacent to the lease area: Coastal Brackish Marsh and Northern Coastal Salt Marsh (CDFW 2013c). Coastal Brackish Marsh is found along the shoreline at the Amorco Terminal. The Coastal Brackish Marsh is dominated by perennial, emergent, herbaceous monocots that create a dense cover up to 2 meters tall. The Amorco Terminal is located approximately 0.3 mile east of Northern Coastal Salt Marsh. Due to the saline and semi-aquatic environment, plant species diversity in these types of marshes is typically low. Plant species are stratified by salinity levels. Both marsh types support a diverse biotic assemblage and provide nursery grounds for numerous organisms, including fish, mammals, and birds (CERES 1996).

4.2.2 REGULATORY SETTING

Federal and State laws that may be relevant to the Project are identified in Table 4-1. Regional and local laws, regulations, and policies are discussed below.

National Estuary Program, Comprehensive Conservation and Management Plan

The San Francisco Estuary Project is a federal-state-local partnership established in 1987 under the CWA Section 320: National Estuary Program. The 1993 plan was mandated under a reauthorization of the CWA in 1987, and revised in 2007. This plan is administered by the San Francisco Estuary Project Implementation Committee.

Contra Costa County

The Amorco Terminal abuts marshes along the shoreline between the Martinez waterfront and the Concord Naval Weapons Station, an area that has been identified in the *Contra Costa County General Plan* (2005) as a Significant Ecological Resource Area. The general plan contains goals and policies to recognize and protect sensitive and significant ecological resources.

4.2.3 IMPACT ANALYSIS

4.2.3.1 Significance Criteria

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

- Substantially affect threatened or endangered species, or protected species (including candidate, sensitive, or special-status species)
- Alter or diminish critical habitat or a special biological habitat, including saltwater, freshwater, or brackish marsh; major marine mammal haul out or breeding area; eelgrass; major seabird rookery; or any Area of Special Biological Significance
- Violate any environmental law or regulation designed to protect wildlife, plants, or habitat areas
- Isolate wildlife populations and/or disrupt wildlife migratory or movement corridors, or use native wildlife nursery sites

- Conflict with any local policies or ordinances protecting biological resources or provisions of an adopted Habitat Conservation Plan, Natural Community Conservation Plan, or other approved local, regional, or State habitat conservation plan
- Re-suspend bottom material, causing turbidity during vessel maneuvering such that suspended sediment concentrations are substantially increased above background levels
- Create underwater sound pressure levels (SPLs) during operation that exceed National Oceanic and Atmospheric Administration Fisheries Service (NMFS) guidelines for protection of marine mammals
- Cause the introduction or substantial spread of nonindigenous species, either aquatic or terrestrial.
- Cause the loss of wetlands or other waters of the United States under the Clean Water Act, 40 Code of Federal Regulations (CFR) 230, Section 404
- Cause a substantial loss of population or habitat of any native fish, wildlife, or vegetation, or an overall loss of biological diversity (*Note: Substantial is defined as any change that could be detected over natural variability*)

4.2.3.2 Assessment Methodology

For the purposes of this Environmental Impact Report, potential impacts to biological resources are evaluated based on available literature, previous biological assessments for the Terminal wharf and adjacent wetlands, and publicly available documents that provided information on species status, distribution, habitat, and sensitivity to impacts. A biological site reconnaissance was conducted on June 11, 2013 by TRC Biologist Molly Sandomire. Impacts that are considered substantial are those that would substantially diminish or cause the loss of an important biological resource, or that would conflict with local, State, or federal resource conservation plans, goals, or regulations.

4.2.3.3 Impacts Analysis and Mitigation Measures

The following subsections describe the Project’s potential impacts on biological resources. Where impacts are determined to be significant, feasible mitigation measures (MMs) are described that would reduce or avoid the impact.

Proposed Project

Impact Biological Resources (BIO)-1: Increase deposition or erosion of sensitive habitats along the vessel path, including marshlands within and adjacent to the lease area, resulting from the resuspension of sediments by calling vessels. (Less than significant.)

Sediment plumes associated with ship traffic vary considerably depending on vessel type and movement (Clarke et al. 2007). The largest, most prominent plumes are caused by deep-draft vessels turning into the entrance of secondary berth access. Clarke et al. observed that these vessel maneuvers increased total suspended solids (TSS) concentrations above 90 milligrams per liter (mg/l), an effect that persisted at least 50 minutes in open water and tidal-washed channels, and indefinitely in secondary channels that lacked current flow to disperse the plumes. A less pronounced but still prominent effect was observed along the bottom of navigation channels, where TSS concentrations increased 40 mg/l from residual plumes along the lower 2 meters of the water column for over 1 hour following the passage of a deep-draft vessel. However, they found little evidence that tug boats and draft barges caused sediment plumes along the channel bottom. In a separate study, Connor et al. (2005) observed that a sediment plume caused by the vessel propeller, movement of tug boats, and water displacement during vessel berthing at Richmond Long Wharf was approximately 350 meters across tidal flow and persisted over 75 minutes.

Vessel calls at the Amorco Terminal are typically fewer than two calls a week, with no more than 90 anticipated per year. Sediment plumes would be generated by calling vessels as they transit along the navigation channels and maneuver into and out of the wharf. Once vessels are moored to the dock, all underwater propulsion is shut off. Sediment lifting from the navigation channel substrate would contribute to the paucity of infaunal abundance typically found in these channels. While sediment levels could potentially be increased at the wharf for approximately 6 hours a week throughout the year, the tidal currents at the wharf are considerable and sediment plumes are expected to be quickly dispersed. In addition, the Amorco Terminal is located in the range of the estuary’s maximum turbidity zone; thus the local biotic community is acclimated to increased turbidity levels and unlikely to be affected by the temporary, intermittent increases caused by vessel maneuvering.

Mitigation Measure: No mitigation required.

Impact BIO-2: Cause substantial impact to special-status wildlife species, including impact to behavior and the composition of biotic communities, in the vicinity of the Amorco Terminal as a result of the use of bright lights during nighttime Amorco Terminal operations. (Less than significant.)

Vessels may visit the Terminal any time of day or night. Lights at the Amorco Terminal are regularly spaced along the wharf arms and dock. Additional lights are located onboard visiting vessels. These lights are reflected in the water beneath the wharf and adjacent to the ship, and cast a long light shadow on the surface of the water. Use of bright lights during nighttime operations can affect the behavior of animals and the composition of the biotic community in the vicinity of the Amorco Terminal. Artificial light may attract pelagic fishes, including juvenile salmonids, larval crabs, and their predators (Hagan et al. 2008, Porter et al. 2008), but repel phytoplankton and shrimp (Moore et al. 2000, Moore et al. 2006). Artificial lights may also put nocturnal migrating birds at risk of collision. Birds are attracted to lights, and young birds are more vulnerable to collision with structures than more experienced migrators. Many species of birds are nocturnal migrants, including shorebirds, waterbirds, and passerines.

The Carquinez Strait is subject to industrial use and is well lit at night. Neighboring light sources include the Shell Martinez Marine Terminal, Benicia Harbor, and Benicia-Martinez Bridge. Because the Amorco Terminal is located within an area that has been historically lit at night, it is likely that the aquatic community and migrating birds have acclimated to the presence of light in this area. No change in Amorco Terminal lighting is proposed as part of this Project; therefore, there would not be any new or increased impacts from night lighting at the Amorco Terminal.

Mitigation Measure: No mitigation required.

Impact BIO-3: Cause substantial direct and/or indirect impacts on aquatic biota through the changing of physical and chemical environmental factors as a result of maintenance dredging. (Less than significant.)

The Amorco Terminal is periodically dredged to maintain a depth of 48 feet below MLLW. Dredging most recently occurred in 2005 and removed 500 cubic yards of material.

Turbidity and SSC can be much greater than ambient conditions in the immediate vicinity of dredging activities. Increased turbidity increases light attenuation, which can reduce phytoplankton productivity, reduce the feeding of some fish species, and change feeding and migration patterns, while increased SSCs can bury the benthic community, reduce the water-filtration rates of filter feeders adjacent to the dredge area, or increase fish gill injury (NMFS 2004). Estimates of the amount of material that is resuspended during dredging ranges from 0 to 5 percent (Suedel et al. 2008). Dredging at the Amorco Terminal would potentially resuspend 25 cubic yards of sediment over the course of dredging activity. The majority of sediment resuspended during dredging activities resettles within 50 meters of the dredge site within 1 hour (Anchor Environmental 2003), though plume effects can be observed as far downstream as 400 meters (Clarke et al. 2007). Densities of suspended sediment over ambient levels decrease with distance from the dredge site and are more pronounced at the bottom of the water column than near the surface (Clarke et al. 2007). However, sediment plumes are unlikely to have lasting effects given the high background turbidity; in one study in San Pablo Bay, dredging plumes were found to have only a localized effect (Schoellhamer 2002). Resuspended sediments near the surface of the water column are expected to dissipate downstream, where they would not increase sediment significantly above ambient levels. Therefore, impacts from increased turbidity and increased SSC concentrations on pelagic species would be less than significant.

Dredging would remove the existing infauna community and alter the substrate composition and topography at the Amorco Terminal. Following the completion of dredging, the benthic community is expected to undergo typical ecological succession patterns. As previously described, the benthic community at any estuarine location is dependent on salinity levels. Following salinity change events, it takes several months for the initial group of benthic organisms to settle and grow. However, dredging at the site is intermittent and minor. Therefore, this impact would be less than significant.

Indirect effects that are anticipated by dredging are the potential spread of nonindigenous species as a result of disturbing the benthic habitat. Dredging would create newly disturbed benthic habitat, making it attractive for settlement by opportunistic nonindigenous species. However, maintenance dredging disturbs areas that are continually disturbed due to maintenance dredging and vessel traffic. Maintenance dredging at the Amorco Terminal is intermittent and minor. As such, it is expected that further introduction of nonindigenous aquatic species to the San Francisco Bay Estuary resulting from maintenance dredging at the Amorco Terminal may impact but is not likely to significantly impact aquatic biota.

Scheduled maintenance dredging is known sufficiently in advance and Tesoro Refining and Marketing Company, LLC (Tesoro) continues to comply with applicable permits to ensure appropriate assessments are conducted prior to conducting maintenance-related dredging. Dredged spoils are 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, and San Francisco Bay Regional Water Quality Control Board. Because disturbance from dredging operations is intermittent and impacts are temporary, impacts from routine maintenance dredging are anticipated to be less than significant.

Mitigation Measure: No mitigation required.

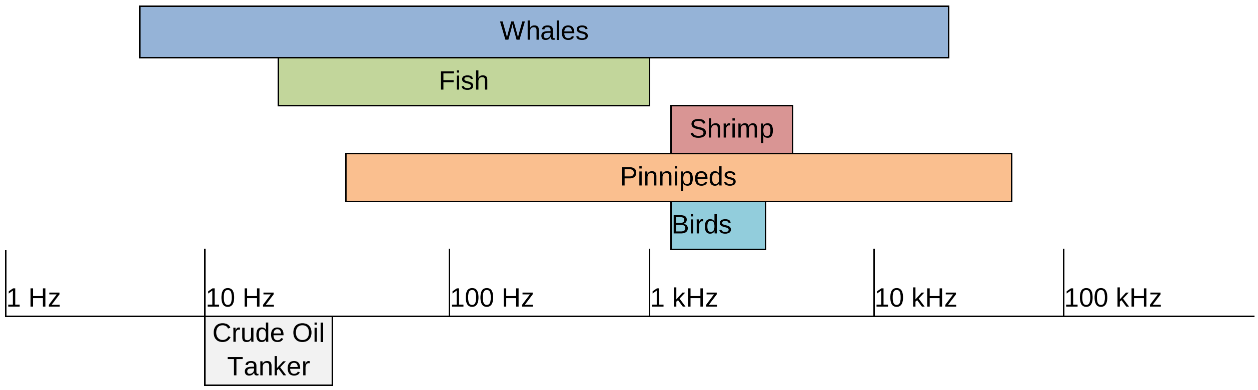
Impact BIO-4: Cause injury or behavioral interruptions to aquatic species as a result of noise from vessels. (Less than significant.)

Ships are the dominant source of low-frequency noise in many highly trafficked coastal zones (OSPAR 2009). Although the effect of increased noise on the underwater environment is still under investigation, there is emerging concern that vessel noise may cause substantial, adverse impacts to the underwater environment and sensitive aquatic species. Much of the noise associated with a vessel is caused by propeller wash. As the propellers spin underwater, small air bubbles form in nicks and gauges along the propeller edge. The bursting of these bubbles is called cavitation. Other sources of noise include mechanical motors and other onboard machinery. Crude oil tankers, which are among the largest marine vessels, move slowly, tend to emit continuous, omnidirectional sounds of around 40 hertz while in motion, and produce source levels at 1 meter between 179 to 182 decibel root mean square (dB_{RMS}) at 1 micro Pascal (µPa; McKenna 2012). Noise produced by vessels transiting the San Francisco Bay tends to be mitigated by the soft-bottom substrate and sediment-rich waters, which help to attenuate sound. Vessel calls are typically fewer than two calls a week. Once inside the San Francisco Bay, it takes each vessel approximately 3 hours to travel to the Amorco Terminal. Once moored, the sound produced by the vessel drops significantly.

Direct impacts from increased sound exposure include masking, behavioral disturbance, and physical damage.

Masking noise can be considered biologically significant if it coincides with the frequency range of the communication or echolocation signals of aquatic organisms (OSPAR 2009). Certain aquatic species that rely on sound to communicate such as whales, shrimp, crab, and certain species of fish may no longer be able to hear each other when ambient noise increases with a vessel's passing. Over the long term, species may adapt the frequency they use to communicate. Figure 4.2-6 shows the typical frequency bands of sounds produced by marine organisms compared with the low-frequency sound associated with crude oil tankers.

Vessels visiting the Amorco Terminal have the potential to cause masking of communications for whales and fish, shrimp, pinnipeds, or birds. However, the typical frequency bands of sound produced by crude oil tankers are lower than the typical frequency bands of sounds produced by shrimp, pinnipeds, and birds and are, therefore, not likely to interfere with their communications. Whales and some species of fish do communicate in the frequency bands at which crude oil tankers emit sound, and thus the noise from vessels visiting the Amorco Terminal may mask communication. However, due to the low number of weekly vessel calls and the limited transit time in the San Francisco Bay (approximately 12 hours per week), impacts to whales and fish from masking caused by shipping noise are not expected to be significant.



Sources: OSPAR 2009, McKenna 2012, Popper and Dooling 2007, Wenz 1962

Figure 4.2-6: Typical Frequency Bands of Sounds Produced by Marine Organisms Compared with the Low Frequency Sounds Associated with Crude Oil Tankers
California State Lands Commission
Amorco Marine Oil Terminal Lease Consideration Project

Behavioral disturbances are changes in activity in response to sound. These effects are difficult to measure and can vary both within a population and with any individual at any time. Rafting or roosting birds tend not to be disturbed by the approach of ships when they are on-site, but it is not known how underwater sound affects diving birds as they forage underwater. The noise from approaching ships causes fish to take evasive actions, moving as far as 400 meters away in a three dimensional space to maintain a buffer between themselves and the source of sound (Mitson 1995). While fish tend to scatter in response to sound, benthic larvae show diverse reactions to anthropogenic sound, with some species attracted to the noise and others repelled or indifferent (Stocks 2012). Marine mammals may stop feeding, resting, or engaging in social behavior, and show increased alertness and avoidance behaviors (Richardson et al. 1995).

The NMFS (2004, 2012) has established thresholds for disturbance to behavior for fish and pinnipeds. SPLs above 150 dB_{RMS} at 1 µPa can alter fish behavior, causing a startle response of avoidance of an area. For pinnipeds, the underwater disturbance level from continuous low-level sound is 120 dB_{RMS} at 1 µPa. Although vessels traveling to and from the Amorco Terminal are expected to cause behavior disturbance to fish and marine mammals, the behavioral disturbance to fish and marine mammals caused by shipping noise is not expected to be significant due to the low number of weekly vessel calls and the limited transit time (about 12 hours per week).

Physical damage may be caused by increased sound levels. Individuals that are exposed to sound could experience temporary (temporary threshold shift [TTS]) or permanent (permanent threshold shift [PTS]) loss of ability to hear at a particular frequency. Both TTS and PTS are triggered by the level and duration of exposure.

Sound can damage non-auditory tissue such as swim-bladders and lateral lines in fish. It may also cause increased levels of stress hormones to circulate in the blood of exposed individuals (OSPAR 2009). The NMFS has established thresholds for harm to fish and pinnipeds; the threshold for physical harm to fish from continuous sound occurs at 183 or 187 dB_{RMS} at 1 µPa depending on size, and at 190 dB_{RMS} at 1 µPa for pinnipeds. Because the source level noise produced by crude oil tankers does not exceed these thresholds, physical injury from shipping noise is not expected to occur.

Little is known about the indirect effects associated with increased underwater noise, though it has been speculated that underwater noise can act as a stressor in marine mammals with consequences to individual health and population viability (OSPAR 2009). Noise that causes adverse effects to prey species could indirectly impact higher-order predators by reducing prey abundance or availability. Because direct impacts to prey species from vessels calling at the Amorco Terminal are expected to be less than significant, no indirect impacts to higher-order predators are expected to occur.

Mitigation Measure: No mitigation required

Impact BIO-5: Cause impacts to the San Francisco Bay Estuary and associated aquatic biota as a result of minor fuel, lubricant, and/or boat-related spills. (Less than significant.)

With continuing operation, the Amorco Terminal would remain a potential point location for minor fuel, lubricant, and other boat-related spills. Any material that is not captured by various BMPs and enters the water would be dispersed around the Amorco Terminal, degrading the quality of the water column and benthic habitat in the vicinity of the Amorco Terminal. Though minor spills are not an occurrence of normal Project operations, and BMPs are in place to prevent them, they are reasonably foreseeable as an occasional result of the Project.

Examples of past minor spills from the Amorco Terminal include the release of small amounts of diesel fuel from pipelines or transfer lines into the strait, discharge of lubricating oil from docking vessels into the strait, and the accidental release of hydraulic fluid from a boom during an oil spill drill (USCG 2013). In the State of California, any release or threatened release of a hazardous material must be reported to the local emergency response agency and to the California Emergency Management Agency. There is no minimum reporting quantity. All reported releases from the Amorco Terminal were minor, ranging from seven drops of hydraulic fluid to one gallon of diesel. Minor spills are quickly cleaned up using vac trucks and absorbent pads to recover the material.

No significant adverse impacts are expected to aquatic life from minor spills associated with the ongoing operation of the Amorco Terminal. Tesoro operators have a demonstrated history of quick containment response and reporting for small spills. Any minor amounts of contaminants that are released into the water would be quickly dispersed by the swift currents in the strait such that concentrations of pollutants would not achieve the levels at which harm to aquatic species is observed.

Tesoro's operators use Consequences of Deviation Tables to monitor, compensate, and correct for operating parameters that deviate due to equipment failure, routine maintenance, feed variations, and other factors. The tables detail mechanical set-point criteria, consequences of deviation from the set point, and operator response for instrument Critical Operating Limits/Process Operating Limits (COL/POL). A COL/POL database for current unit operating limits is maintained on the Golden Eagle Intranet. Adherence to these operating ranges and consequences of deviation reduces the potential for minor spills from transfer of crude oil. Although impacts from minor spills are adverse, they are not expected to have a significant effect on biota at the Amorco Terminal.

Mitigation Measure: No mitigation required.

Impact BIO-6: Cause impacts to the San Francisco Bay Estuary and associated aquatic biota as a result of major fuel, lubricant, and/or boat-related spills. (Significant and unavoidable.)

Impacts from spills would depend on the material and quantity spilled. Light oils such as fuel oil are acutely toxic and cause the greatest impacts to species that live in the upper water column such as juvenile fish. Medium oils such as most crude oils do not mix well with water and can cause severe, long-term contamination to intertidal areas and cause oiling of waterfowl and marine mammals. Heavy oils such as heavy crude and some fuel oils weather slowly and may cause severe long-term contamination of intertidal areas and sediments. These oils have severe impacts on waterfowl and marine mammals, and their cleanup is usually difficult and long term.

Depending on the weight of the oil, spills may harden and wash up along the shoreline. Crude oils contain a large proportion of highly persistent tar-like compounds. Volatile components of crude oil stock disappear over a few days, but the heavier fractions form an emulsion with sea water (called "mousse") which allows greater dispersal of oil. Some fraction of crude oil would aggregate into tarballs or mats. The more exposed to the elements oil is, the more rapidly it weathers. The heaviest oils may sink in the water, contaminating the water column and being forced by tidal waves into the substrate. Buried oils are not weathered.

Short-term, direct impacts to marine biota from an accidental oil spill include physical oiling, which may cause injury or death; toxic exposure to volatile gas; disturbance from clean-up activities; and loss of habitat. Indirect impacts include disruption of predator-prey relationships; introduced toxins in the food web, which may cause low-level health impacts to prey species that bioaccumulate in predator species; possible toxic effects on embryos; and interruption or degradation of reproduction potential. Population recovery from spills is dependent on generation time. Species that reproduce early and often are quick to rebound after spills, while those with longer generation spans may see long-term impacts to abundance.

Birds

Birds can be killed or injured from contact with oil spills. The degree to which a species is susceptible to oil spills depends on its habitat use and behavioral characteristics. Diving birds are particularly susceptible to injury from oil spills because they forage in open waters, and oil slicks may make the water look calmer and more inviting. Seabirds, which dive when disturbed, are also susceptible to injury. Birds that contact oil may get oil on their feathers and lose the ability to stay warm, waterproof, and buoyant. Birds use their beaks to clean their feathers, and thus may ingest oil while trying to remove oil.

The species impacted and the extent of the impact from an oil spill would depend on when the spill occurred. The Amorco Terminal is located within the Pacific flyway, a major migratory corridor for waterbirds. Migrating flocks are large and migrations may occur in a very tight window, resulting in a large proportion of a species' entire population visiting a single site over a few weeks. Following the most recent large petroleum spill in San Francisco Bay, the November 2007 Cosco Busan spill, which spilled 58,000 gallons of fuel into the San Francisco Bay, two thousand bird carcasses representing 57 bird species were recovered during clean up. Fatalities were highest among diving birds: surf scoter (*Melanitta perspicillata*), western grebe (*Aechmophorus occidentalis*), common murre (*Uria aalge*), Clarke's grebe (*Aechmophorus clarkia*), Brant's cormorant (*Phalacrocorax penicillatus*), greater scaup (*Aythya marila*), and eared grebe (*Podiceps nigricollis*).

Birds may also be impacted by the loss or degradation of breeding sites. Colony nest sites for double-crested cormorants are found on the Benicia-Martinez Bridge, and for great blue heron on Mare Island.

Fish and Invertebrates

Fish can be killed or injured from contact with oil spills. The susceptibility of fish to a spill depends on its growth stage, feeding behavior, and the type of oil. Juvenile fish and fish species that use shallow or near-surface waters such as longfin smelt and delta smelt are susceptible to acute toxicity from lighter oils, while fish that swim lower in the water column such as steelhead and salmon are less likely to come in direct contact with oil. Fish may come into direct contact with oil, thus contaminating their gills; they may absorb toxic components of oil through their skin; and they may suffer adverse effects from eating contaminated food.

The number and type of species impacted by an oil spill depends on the season in which the spill occurs. The Carquinez Strait is a migratory corridor for a number of threatened and endangered fish species, including green sturgeon, longfin smelt, steelhead, and chinook salmon. Delta smelt and Sacramento splittail are seasonally abundant in Suisun Bay.

Mammals

The susceptibility of mammals to an oil spill is highly variable. Mammals that need clean fur to stay warm such as river otters, beavers, sea otters, vagrant shrew, and salt-marsh harvest mouse are injured by contact with oil. Harbor seal and sea lion have blubber for insulation and do not groom or depend on fur to stay warm; this makes them less susceptible to crude oil spill than mammals with dense fur, which lose the ability to stay warm when their fur becomes matted with heavy oil. All mammals that come in contact with oil spills are susceptible to the acute effects of light oils, which may cause injury to eyes, nerve damage, behavioral abnormalities, and, if ingested, digestive tract bleeding and liver and kidney damage (Harwell and Gentile 2006).

California sea lions are found in the estuary from August to mid-May. In June and July, most of the sea lions have left for breeding grounds further south. Harbor seals are resident breeders, and their haul out and pupping sites may be degraded by oil spills. Saltmarsh harvest mouse individuals may be directly impacted by oil if the spill reaches tidal marsh. All mammals may be disturbed by containment and clean-up activities.

Habitat

Low-energy marshy sites with high organic content are susceptible to widespread toxic effects from intertidal sediment hydrocarbon exposure. Damage is caused both by the spill and by the clean-up activities that follow. Oils and cleanup may remove massive amounts of marsh vegetation, requiring years to recover. Oils that are buried in the sediments and escape removal during cleanup can cause long-term low-level degradation of the marsh environment, with detectable effect on benthic invertebrates.

Oil Spill Modeling

As presented in Section 4.1, Operational Safety/Risk of Accidents, the average most probable and maximum most probable spills for crude oil shipped through the Amorco Terminal were modeled. Results of these models indicate that while spills at or near the Amorco Terminal have the potential to travel through Carquinez Strait into San Pablo Bay and into Suisun Bay and its associated marshes, the highest probability of contact with oil occurs within the direct vicinity of the Amorco Terminal. The trajectory of the spill and the extent of its distribution vary seasonally. A spill in winter during the flooding season would be carried by heavy Delta outflows into San Pablo Bay, oiling shorelines along the

Carquinez Strait. During the dry summer months, spills are carried upstream along tidal currents and dispersed by wind into Suisun Bay and marshes.

Table 4.2-3 shows impacts to birds, wetlands, and fish and invertebrates from a modeled spill at a Martinez wharf (ASA 2009). In general, bird impacts are higher for heavy fuel oil and crude oil than diesel because the area is confined and oil remains on the water and in the marshes longer than the more volatile diesel.

Appendix E shows sensitive species located within the modeled spill envelope; sensitive species that are more than 50 percent likely to be impacted by an oil spill are listed in Table 4.2-4. It can be seen from the table that a spill in winter would contact a greater number of species due to the migration of birds and fish through the San Francisco Bay at that time.

Table 4.2-3: Biological Impacts of 100,000-gallon Spill from a Martinez Wharf

	Heavy Fuel oil	Crude oil	Diesel
Birds (individuals killed)			
Waterfowl	94	71	67
Seabirds	89	67	63
Wading birds	575	317	299
Shorebirds	2,693	1,485	1,398
Total birds	**3,451**	**1,940**	**1,826**
Fish, invertebrates, vegetation			
Fish and invertebrates (kg)	18.9	128.6	203.8
Wetland invertebrates (m^2)	565,833	453,095	604,264
Mudflat invertebrates (m^2)	1,203,508	930,955	989,983
Wetland vegetation (m^2)	565,546	163,705	256,612

Source: ASA 2009

Table 4.2-4: Sensitive Species With Greater than 50 Percent Chance of Contacting Oil From a Spill at the Amorco Terminal

	Numbers	Reproductive Cycle[1]				Probability of oiling greater than 50 percent	
Birds		**Nesting**	**Laying**	**Hatching**	**Fledging**	**Summer**	**Winter**
Western gull *Larus occidentalis*	High	Apr-Aug	Apr-Jun	May-Jul	Jul-Aug	X	X
Peregrine falcon *Falco peregrinus*	Present	-	-	-	-	X	X
Saltmarsh common yellowthroat *Geothlypis trichas sinuosa*	Present	Mar-May	-	-	-	X	X
California black rail *Laterallus jamaicensis coturniculus*	Present	Mar-May	-	-	-	X	X
California clapper rail *Rallus longirostris obsoletus*	Present	Mar-Jul	-	-	-	X	X
Suisun song sparrow *Melospiza melodia maxillaris*	Present	Mar - Jun	-	-	-	X	X
San Pablo song sparrow *Melospiza melodia samuelis*	Present	Mar - Jun	-	-	-	X	X
Canvasback *Aythya valisineria*	Med	-	-	-	-	X	X
Ruddy duck *Oxyura jamaicensis*	Low	-	-	-	-	X	X
Western grebe *Aechmophorus occidentalis*	High	-	-	-	-	-	X
Shorebirds	Low	-	-	-	-	-	X
Wading birds	High	-	-	-	-	-	X
Diving ducks	High	-	-	-	-	X	X
Dabbling ducks	High	-	-	-	-	-	X
Fish and Invertebrates		**Spawn**	**Eggs**	**Larvae**	**Juvenile**		
Chinook salmon (fall) *Oncorhynchus tshawytscha (fall)*	High	-	-	-	Jan-Dec	X	X
Chinook salmon (late fall) *Oncorhynchus tshawytscha (late fall)*	High	-	-	-	Jan-Dec	X	X

	Numbers	Reproductive Cycle[1]				Probability of oiling greater than 50 percent	
Chinook salmon (spring and winter) *Oncorhynchus tshawytscha*	High	-	-	-	Jan-Dec	X	X
Longfin smelt *Spirinchus thaleichthys*	High	-	Jan-Mar	Jan-Apr	Apr-Apr	-	X
Green sturgeon *Acipenser medirostris*	Med	-	-	-	Jan-Dec	X	X
Striped bass *Morone saxatilis*	High	-	Apr-May	Apr-Jun	Jan-Dec	X	X
White sturgeon *Acipenser transmontanus*	High	-	-	-	Jan-Dec	X	X
Delta smelt *Hypomesus transpacificus*	Low	-	-	Apr-Jun	Apr-Aug	X	X
White croaker *Genyonemus lineatus*	High	-	-	Sep-Mar	Jan-Dec	X	X
American shad *Alosa sapidissima*	High	-	-	-	Aug-Dec	X	X
Dungeness crab *Metacarcinus magister*	High	-	-	-	Apr-Feb	X	X
California bay shrimp *Crangon franciscorum*	High	Jan-Mar	Jan-Sep	Mar-Sep	Mar-Oct	X	X
Mammals							
Salt-marsh harvest mouse *Reithrodontomys raviventris*	Present	-	-	-	-	X	X
Saltmarsh wandering shrew *Sorex vagrans halicoetes*	Low	-	-	-	-	X	X
Plants		**Blooming Period**					
Delta tule pea *Lathyrus jepsonii jepsonii*	Low	May-September				X	X
Soft bird's-beak *Cordylanthus mollis mollis*	Present	April-November				X	X
Mason's lilaeopsis *Lilaeopsis masonii*	Low	April-November				X	X

Sources: NOAA 1998, WRA 2011

[1]A dash (-) indicates that the time frame, for either a given reproductive cycle or the probability of oiling greater than 50 percent, is not applicable.

In addition to the Biological Resources mitigation measures presented below, implementation of Mitigation Measures OS-1, OS-4a, and OS-4b (refer to Section 4.1, Operational Safety/Risk of Accidents) would reduce impacts to biological resources.

Mitigation Measures:

MM BIO-6a: Bird rescue personnel and rehabilitators. Tesoro shall ensure that procedures are in place to bring bird rescue personnel and rehabilitators to the site following a spill event that is not immediately contained at the Amorco Terminal. This requires having contractual arrangements in place as part of the Golden Eagle Refinery Oil Spill Contingency Plan so that bird rescue personnel and equipment can be on-site within hours of the onset of an accidental release.

MM BIO-6b: Cleanup of oil from biological area. When a spill occurs, Tesoro shall develop procedures for cleanup of any sensitive biological areas contacted by oil in consultation with biologists from the California Department of Fish and Wildlife, National Marine Fisheries Service, and U.S. Fish and Wildlife Service.

MM BIO-6c: Natural Resource Damage Assessment (NRDA) Team. Tesoro shall coordinate to the maximum extent feasible with the NRDA Team to determine the extent of damage and loss of resources, cleanup, restoration, and compensation. Tesoro shall keep the CSLC staff informed of its participation in such efforts by providing copies of memos, meeting agendas, emails, or other appropriate documentation. Tesoro shall be responsible for cleanup, restoration, and compensation of damages to resources if Tesoro is determined to be the responsible party for a spill.

Impact BIO-7: Introduce invasive nonindigenous species to the San Francisco Bay Estuary. (Significant and unavoidable.)

The San Francisco Bay and Sacramento-San Joaquin River Delta region is a highly invaded ecosystem, among the most invaded aquatic ecosystems in North America; Since 1970, the rate of invasion has been one new species every 24 weeks (Cohen 1995). In some parts of the estuary, introduced species account for the majority of species diversity, dominate the estuary's food webs, and may result in profound structural changes to habitat (Cohen 1995).

The rate of species introductions, and thus the risk of invasion by species with detrimental impacts, has increased significantly during recent decades. In North America, and particularly in California and the rest of the west coast, the rate of reported introductions in marine and estuarine waters has increased exponentially over the last 200 years (Ruiz 2000a, 2011). Prior to the implementation of ballast water management regulations in California, a new species was believed to become established every 14 weeks on average in the San Francisco Estuary (Cohen and Carlton 1998). One of the primary factors leading to this increase has been the vast expansion of global trade during the past 50 years, which in turn has led to significantly more ballast water, fouled hulls, and associated organisms moving around the world. The increased speed of vessels involved in global trade has allowed many more potentially invasive organisms entrained in ballast tanks to survive under shorter transit times (Ruiz and Carlton 2003) and arrive in recipient ports in better condition. Organisms that arrive "healthy" in recipient regions are more likely to thrive and reproduce in their new habitats.

Once established, NIS can have severe ecological, economic, and human health impacts in the receiving environment. The overbite clam (*Corbula amurensis*) is believed to be a major contributor to the decline of several pelagic fish species in the Sacramento-San Joaquin River Delta, including the threatened delta smelt, by reducing the planktonic food base of the ecosystem (Feyrer 2003, Sommer 2007, MacNally 2010). In California, control of zebra and quagga mussels, which can clog municipal water systems and electric generating plans, has already cost over $14 million; these costs represent only a fraction of the cumulative expenses related to NIS control over time, because control is an unending process. The Japanese sea slug *Haminoea japonica* is a host for parasites that cause cercarial dermatitis, or "swimmer's itch," in humans. Since 2005, cases of swimmer's itch at Robert Crown Memorial Beach in Alameda have occurred on an annual basis and are associated with high densities of *Haminoea japonica* (Brant 2010).

The California Aquatic Invasive Species Management Plan identifies commercial shipping as the most important vector for the introduction of aquatic invasive species (OSPR 2008). Commercial ships can introduce nonindigenous aquatic species through ballast water discharge or vessel biofouling. These vectors are addressed separately below.

Ballast Water Discharge

As discussed in Section 2.0, Project Description, ballast is a material placed low in a vessel to improve its stability. The amount of ballast a ship carries affects how high or low a ship's hull sits in the water; the vertical distance between the waterline and the bottom of the hull is known as a ship's draft. The draft determines the minimum depth of water a ship can safely navigate. Ships commonly use water as ballast because it is freely available and can be easily managed. Ballast water can be released to reduce draft, allowing the boat to sit higher in the water, or it can be taken on to increase draft and further submerge propellers or allow a ship to travel under a bridge or other structure. Ballast tanks are typically filled with water after discharging cargo to improve vessel stability, maneuverability, and propulsion. Tankers carry the highest volume of ballast water of any vessel type in the merchant class: 31,643 MT metric tons (MT) on average. By comparison, container vessels carry less than half this amount.

In commercial ships, ballast water is able to support a host of marine species during transit times in ballast. Ballast water is, therefore, capable of transporting live aquatic species around the world. It is estimated that every day more than 10,000 marine species are transported across oceans in ballast water (Buck 2007).

Vessels calling at the Amorco Terminal are required to comply with all federal and State ballast water laws, regulations, and permits. Ballast water discharges in the United States are under the jurisdiction of the U.S. Coast Guard (USCG) and the U.S. Environmental Protection Agency (USEPA), and at the State level by the CSLC. A detailed discussion of applicable laws, regulations, and permits can be found in Chapter 2.3.3 Ballast Water.

Under the National Aquatic Nuisance Prevention and Control Act, revised as the National Invasive Species Act of 1996, the USCG established regulations and guidelines to prevent the introduction of aquatic invasive species from ballast water discharge. As of 2004, all vessels are required to manage their ballast water in accordance with the USCG-administered Ballast Water Management Program (33 CFR 151 Subparts C and D), which includes provisions for ballast water exchange, good housekeeping, and reporting. The USCG published regulations on March 23, 2012 in the Federal Register that establish federal performance standards for living organisms in ships' ballast water discharged in U.S. waters (Table 4.2-5); however, the rule provides exemptions for Trans-Alaska Pipeline System (TAPS) trade tankers, which are the primary vessels expected to visit the Amorco Terminal. For other tankers calling at the Amorco Terminal, all new vessels must meet the standards as of December 31, 2013 and all existing tankers must meet them by the first scheduled dry docking after January 1, 2016 unless, despite all best efforts, the tanker will not be able to comply with the standards, in which case the vessel owner may request an extension.

Table 4.2-5 Ballast Water Treatment Performance Standards

Organism Size Class	Federal Standard	State Standards
> 50 µm	< 10 viable organisms per cubic meter	No detectable living organisms
10 – 50 µm	< 10 viable organisms per ml	< 0.01 living organisms per ml
< 10 µm		< 103 bacteria/100 ml < 104 viruses/100 ml
Escheria coli	< 250 cfu/100 ml	< 126 cfu/100 ml
Intestinal enterococci	< 100 cfu/100 ml	< 33 cfu/100 ml
Toxicogenic *Vibrio cholera* (O1 & O139)	< 1 cfu/100 ml or < 1 cfu/gram wet weight zooplankton samples	< 1 cfu/100 ml or < 1 cfu/gram wet weight zoological samples

Sources: CSLC 2013e

The USEPA regulates ballast water discharge under the Vessel General Permit for Discharges Incidental the Normal Operation of Vessels (VGP). The 2013 VGP, which is a 5-year permit, contains ballast water discharge performance standards consistent with the USCG standards and ballast water management requirements for vessels traveling along the Pacific Coast. Vessels arriving to California ports from outside the EEZ and intending to discharge ballast in California waters are required by the State of California to exchange ballast water in ballast tanks prior to travelling within 200 nautical miles (nm) of land. Vessels transiting between Captain of the Port Zones along the Pacific Coast of the U.S. are required to conduct ballast water exchange at least 50 nm from shore in waters at least 200 nm deep.

At the state level, the CSLC is the lead implementing agency for the State's Marine Invasive Species Program. As directed by the 1999 Ballast Water Management for Control of Nonindigenous Species Act, as revised and reauthorized by the Marine Invasive Species Act of 2003 (Pub. Resources Code §§ 71200 to 71271), the CSLC formulated recommendations to prevent or minimize the introduction of nonindigenous species discharges for vessels 300 gross registered tons or greater, capable of carrying ballast water, operating in State waters. California Code of Regulations Article 4.6 addresses ballast water management for vessels arriving at California ports from another port or place within the Pacific Coast Region; California Public Resources Code section 71204.3 addresses requirements for vessels whose voyage originated outside of the Pacific Coast Region (PCR), a shipping zone that encompasses coastal waters within 200 nautical miles (nm) of the Pacific Coast of North America from Cooks Inlet in Alaska down through three-quarters of the Baja Peninsula.

Beginning in 2016, all tankers will be required to implement ballast water treatment standards (Table 4.2-5). Until then, ballast water must be managed in compliance with state regulations. California regulations (Cal. Code Regs., tit. 2, § 2280 et seq.) requires that the master, operator, or person in charge of a vessel arriving to a California port or place from another port or place within the PCR with ballast water sourced from within the PCR, manage ballast water in at least one of the following ways:

- Exchange the vessel's PCR-sourced ballast water in near-coastal waters (more than 50 nm from land and at least 200 m deep) before entering the waters of the State.
- Retain all ballast water on board the vessel.
- Use an alternative, environmentally sound, Commission or USCG-approved method of treatment.
- Discharge the ballast water to an approved reception facility (Currently there are no such facilities in California).

Public Resources Code section 71204.3 requires that the master, operator, or person in charge of a vessel arriving to a California port or place from a port or place outside of the Pacific Coast Region, or with ballast water sourced from outside the PCR, shall manage ballast water as above or discharge ballast water at the same location where it was taken on, provided that the ballast water has not been mixed with water taken on in an area other than mid-ocean waters.

All vessels that depart a California port or place are required to submit to the CSLC a Ballast Water Reporting Form that includes information about port of origin, how the ballast water was managed, and how much ballast water was discharged. The CSLC staff has collected mandatory Ballast Water Reporting Forms since 2004. Compliance with the requirement to submit forms is high. Between July 2010 and June 2012, 97 percent of forms for vessels arriving at California ports were submitted as required.

Commercial vessels carrying a combined total of more than 122 MT of ballast water made about 10,000 visits a year to California ports between 2010 and 2012. Tankers account for 21 percent of vessel traffic to all California ports, with 20 percent of these tankers (about 400 vessels each year) destined for Carquinez Strait ports. Most vessels arriving in Carquinez Strait ports originate in the coastal waters of the PCR.

The primary vessel-reported practice for ballast water management is retention of all ballast on board, which is considered the most protective management strategy (CSLC 2013e). However, a quarter of all arriving tankers discharge ballast water in California, with an average discharge of about 10,000 metric tons (MT). Between 2010 and the first half of 2012, Carquinez Strait received the majority of ballast water discharged into San Francisco Bay Estuary (Table 4.2-6). About 80 percent of the ballast water discharged to Carquinez Strait was of coastal origin.

Table 4.2-6: Total Discharge Volume (metric tons) by Port, Six-Month Period (2010b-2012a; a = January to June, b = July to December)

Port	2010b	2011a	2011b	2012a
Sacramento	35,873	106,451	81,408	82,767
Stockton	117,454	418,209	485,650	587,760
Carquinez	1,272,551	1,197,113	1,397,434	1,468,294
Richmond	805,038	983,687	960,611	1,100,030
San Francisco	12,034	24,155	41,328	81,322
Oakland	239,365	334,305	349,514	345,211
Redwood	141,718	90,198	99,198	48,293
Total Discharge Volume	2,624,033	3,154,118	3,415,143	3,713,677

Sources: CSLC 2013e

Total managed ballast discharges have increased between 2006 and 2012. The majority of ballast water discharged from all vessel types into California waters is in compliance with ballast exchange regulations. Vessels primarily conduct two types of ballast water exchange: flow-through (FT) and empty-refill (ER). In FT exchange, ocean water is pumped continuously through a ballast tank to flush out coastal water from the ballast source port. Empty-refill exchange is conducted by draining a ballast tank of coastal source water as much as possible, and refilling it with open-ocean water. Between 2010 and 2012, 56 percent of managed and discharged ballast water, by volume, was exchanged using ER compared to 44 percent using FT. While ballast water exchange, when properly practiced, can remove 95 to 100 percent of the original source water (Hay and Tanis 1998) and reduce the number of coastal species in ballast tanks, differences in the effectiveness of the two management options (FT and ER) exist. Flow-through exchange has been shown to be significantly less effective than ER in reducing the amount of coastal species in exchanged ballast tanks (Cordell 2009).

The volume of noncompliant ballast water discharged as a percentage of total discharges has decreased from 24 percent in 2006 to 10 percent in 2012. Between 2010 and 2012, approximately 2.5 million MT of noncompliant ballast water was discharged to California waters. The majority of noncompliant discharges (88%) between 2010 and 2012 consisted of water that was exchanged offshore, but in a location not acceptable under California law. Approximately nine percent of discharged water was not exchanged at all. Unexchanged ballast water discharge is considered a high-risk for invasive species. In the period between 2010 and 2012, tankers accounted for about half of all noncompliant discharges and one-fifth of high-risk ballast water discharge (CSLC 2013e).

Factors that influence invasion risk, in addition to the volume of ballast water released and the type of exchange, include the age of the ballast water discharged (species often survive better when held for a short period of time), the degree of repeated inoculation (frequency with which ballast is discharged in a given area), and similarity between donor and recipient regions (biological, chemical, and physical characteristics at each port) (Carlton 1996, Ruiz and Carlton 2003). Recent studies have demonstrated that there is a strong pattern of intraregional spread of nonindigenous aquatic species along the North American Pacific coast (Ruiz et al. 2011). Because of the volume of ballast water discharged by tankers to Carquinez Strait, the origin of the ballast water, and ongoing noncompliance with ballast water management regulations, the risk of introduction of further nonindigenous aquatic organisms to the San Francisco Bay Estuary as a result of the Project is significant and unavoidable.

Vessel Biofouling

Many marine organisms that have a sessile or sedentary life stage in which they are attached or associated with hard substrata can readily colonize ships' hulls or niche areas, such as sea chests, bow thrusters, propeller shafts, and inlet gratings, that are inadequately protected by anti-fouling systems. The most common biofouling organisms are barnacles, mussels, seaweed, anemones, and sea squirts (OSPR 2008). Mobile organisms, such as shrimps, worms, and snails can reside in the crevices created by colonies of barnacles and mussels. Biofouling organisms are then transported by vessels into new environments where they may be transferred from the ship into the new environment by spawning, detachment, or mechanical removal.

Thus vessel biofouling has been identified as one of the most important mechanism for marine nonindigenous aquatic species introductions in several regions, including Australia, North America, Hawaii, the North Sea, and California (Ruiz 2000b, 2011, Eldredge and Carlton 2002, Gollasch 2002). The CSLC, which regulates vessel biofouling under the Marine Invasive Species Act of 2003, states that all vessels pose some level of risk from biofouling (CSLC 2013e). Since 2008, the CSLC has required vessels operating in State waters to submit an annual Hull Husbandry Reporting Form. These data have since been used in conjunction with results from CSLC-funded biological research to develop management requirements that will reduce the risk of nonindigenous aquatic species introductions through vessel biofouling. The CSLC is in the process of developing regulations to amend California Code of Regulations Article 4.8 (Title 2, Division 3, Chapter 1) that would establish management requirements for vessel biofouling, including the use of a biofouling management plan specific to the vessel, biofouling logbook, and use of antifouling systems or practices to deter or prevent species attachment.

Tesoro has no control over, ownership of, or authority to direct vessels that would dock at its marine terminal; therefore, specific details of how vessels manage biofouling or ballast water cannot be provided as part of the Project. The vessels would be governed by the applicable CSLC requirements for biofouling management, which would reduce the potential impact of aquatic species invasion from biofouling. Under Mitigation Measure BIO-7a, Tesoro would ensure that vessels seeking to call at the Amorco Terminal are advised of California’s Marine Invasive Species Act and are submitting forms as required by the CSLC. However, the impact of introducing new non-native and invasive species via ballast water and vessel biofouling in the San Francisco Bay and Sacramento-San Joaquin River Delta could potentially be so devastating that even a reduced risk has the potential to cause a significant and unavoidable adverse impact to special-status species and habitats.

Mitigation Measures:

MM BIO-7a: Marine Invasive Species Act Reporting Forms. Following the adoption of the Mitigation Monitoring Program for the Project, Tesoro shall advise both agents and representatives of shipping companies having control over vessels that have informed Tesoro of plans to call at the Amorco Terminal about the California Marine Invasive Species Act and associated implementing regulations. Tesoro shall satisfy itself that all vessels submit required reporting forms, as applicable for each vessel, to the California State Lands Commission Marine Facilities Division, including, but not limited to, the Ballast Water Reporting Form, Hull Husbandry Reporting Form, Ballast Water Treatment Technology Reporting Form, and/or Ballast Water Treatment Supplemental Reporting Form.

MM BIO-7b: Invasive species action funding. Tesoro shall participate and assist in funding ongoing and future actions related to nonindigenous aquatic species as identified in the October 2005 Delta Smelt Action Plan (State of California 2005). The funding support shall be provided to the Pelagic Organism Decline Account or other account identified by the California Department of Water Resources (DWR) and California Department of Fish and Wildlife (CDFW), the lead Action Plan agencies. The level of funding shall be determined through a cooperative effort between the California State Lands Commission, DWR, CDFW, and Tesoro, and shall be based on criteria that establish Tesoro's commensurate share of the plan's nonindigenous aquatic species actions costs.

Alternative 1: No Project

Impact BIO-8: Cause impacts to the San Francisco Bay Estuary and associated biota resulting from the decommissioning and abandoning in place of existing structures. (Significant and unavoidable.)

As described in Section 3.3, under the No Project Alternative, the Amorco Terminal lease would not be renewed, and the Amorco Terminal would be decommissioned and either abandoned in place or partially or completely removed. Decommissioning the Amorco Terminal would have the potentially insignificant beneficial impact of locally reducing the amount of sediment resuspension caused by vessels docking at the Amorco Terminal and removing a potential point source for minor spills.

Crude oil vessel traffic would most likely be transitioned to the nearby Avon MOT, so there would be little reduction in crude oil tanker traffic transiting the estuary. Thus, there would be no overall reduction in shipping noise, and the risk of hazards from an oil spill and from the introduction of nonindigenous aquatic species introduced via ballast water and vessel biofouling would be shifted upstream rather than reduced, and the potential impact to the San Francisco Bay Estuary and associated biota would be continue to be significant and unavoidable.

Impact BIO-9: Cause impacts to the San Francisco Bay Estuary and associated biota resulting from the partial or complete removal of Amorco Terminal structures. (Potentially significant.)

Construction activities associated with partial or complete removal of the Amorco Terminal would cause temporary disturbances to habitat and wildlife that inhabit the Carquinez Strait. Removal of Amorco Terminal structures would result in physical harm or injury fish and wildlife and increased levels of noise that could cause harm to fish and wildlife. Depending on construction timing, noise levels could also impede fish migration. Work that disturbs deeply buried sediments in the channel bottom could release contaminated sediments from the channel floor with potential adverse effects to wildlife. Removal of the structures would also remove an osprey nest site and a potential sea lion haul out. Beneficially, removal of the Amorco Terminal structures would result in a small but probably insignificant lessening of night lights along the Carquinez Strait. Mitigation would be required to ensure that removal of the Amorco Terminal structures was conducted to reduce adverse impacts to habitat and species. Appropriate mitigation measures would include scheduling work to be conducted outside of crucial fish migratory periods and the use of sound dampening measures for pile removal. Ultimately, any Amorco Terminal removal projects would be subject to regulation under existing State and federal regulations, at which point environmental review would be conducted and mitigation measures developed to ensure that the project was in compliance with relevant regulations.

Impact BIO-10: Cause impacts to the San Francisco Bay Region and associated biota by decommissioning and removing the Amorco Terminal and shifting crude oil imports to overland transport. (Significant and unavoidable.)

Under this alternative, the Amorco Terminal would not be in use, and crude oil would be transported overland through a combination of rail, tanker, and/or pipeline to the Golden Eagle Refinery. Decommissioning and removing the Amorco Terminal would result in the same level of impacts as the No Project Alternative. In addition, the overall number of vessels transiting the estuary would be reduced, though not significantly, with beneficial reduction of shipping noise, sediment resuspension, and reduction in the potential for a major oil spill or the introduction of nonindigenous aquatic species via ballast water or vessel biofouling.

However, overland transportation of crude oil could result in potentially adverse environmental impacts, including potential loss of habitat, impacts to riparian areas and wetlands, and additional impacts to upland species. These impacts would be addressed in a separate environmental review of the Project; however, while potentially subject to National Environmental Policy Act review by the USACE and USFWS, development of additional rail track would not be subject to CEQA review.

Alternative 2: Restricted Lease Taking Amorco Out of Service for Oil Transport

Impact BIO-11: Cause impacts to the San Francisco Bay Region and associated biota by shifting crude oil imports to overland transport. (Significant and unavoidable.)

Refer to Impact BIO-10.

Cumulative Impact Analysis

The geographic context for analysis of cumulative impacts to biological resources includes the San Francisco-San Pablo Bay region, Carquinez Strait, and the outer coast of California. Impacts to biological resources from the Project that are less than significant may become significant when combined with impacts from related projects in the region. This analysis identifies cumulative impacts and evaluates whether the incremental contribution of the Project to a cumulative impact would be considerable.

Impact CUM-BIO-1: Cause cumulative adverse impacts to special-status species, biotic communities, and habitat through vessel resuspension of sediment, use of bright night time lights, routine dredging, shipping noise, and potential minor oil spills as a result of Amorco Terminal operations. (Less than significant.)

Sediment Resuspension. Large vessels traveling inside San Francisco Bay are slowly guided along the navigation channels by tug boat. Because they move at speeds around 10 knots or less, these vessels do not typically create waves strong enough to cause erosion along the shoreline. Although large vessels do resuspend sediments in the water column, the waters of the San Francisco Bay Estuary tend to be turbid; therefore, the incremental impact is expected not to be cumulatively considerable.

Light. The Project does not add additional lights to the San Francisco Bay Area. Ambient night conditions in the Bay Area are already very bright, and animals and the composition of the biotic community in urban settings may be habituated to bright nighttime conditions. The impact from the Project is, therefore, not expected to be cumulatively considerable.

Dredging. Dredging could potentially contribute to cumulative impacts to special-status species and habitat conversion. Every year, an average of 3 to 6 million cubic yards of sediments are dredged to maintain safe navigation in and around San Francisco Bay. Maintenance dredging can disturb special-status species and degrade habitat by temporarily increasing turbidity, resuspending sediments, and increasing noise in the dredging area. This impact would contribute cumulatively to the disturbance of sensitive species in the estuary. Tesoro would conduct dredging under the provisions of the 2001 LTMS Management Plan, which identifies work windows during which disturbance of special-status species is expected to be less than significant (USACE 2001). Therefore, intermittent maintenance dredging would not contribute to a cumulatively significant impact to special-status species. Dredging would cause temporary conversion of benthic habitat through removal of benthic species. However, the amount of material removed during each maintenance event is relatively minor. The most recent dredging event occurred in 2005 and removed 500 cubic yards of material. Therefore, the contribution of the Project to this impact would not be cumulatively considerable.

Shipping Noise. Ships are the dominant source of low-frequency noise in many highly-trafficked coastal zones. Although the vessel calls to the Amorco Terminal represent a small fraction of the total number of vessel trips within the San Francisco Bay, the temporary disturbance to aquatic habitat from increased noise has the potential to cause cumulatively considerable impacts to aquatic species and habitat. However, the impacts to aquatic species from the global increase in underwater sound are not well understood, and there is a great deal of uncertainty regarding the risks to marine mammals and marine ecosystems from underwater sound (MMC 2007). Scientific understanding of the impacts of underwater sound from increased shipping is still in its infancy. The cumulative impact from sound is too speculative for evaluation, and therefore this discussion is excluded, per State CEQA Guidelines 15145.

Mitigation Measure: No mitigation required.

Impact CUM-BIO-2: Cause cumulative impacts to San Francisco Bay Estuary and associated biota from oil spills from all marine oil terminals combined, or from all tankering combined. (Significant and unavoidable.)

A major oil spill at the Amorco Terminal or from vessels visiting the Amorco Terminal would potentially affect a wide range of marine and terrestrial biological resources. As discussed in Section 4.1, Operation Safety/Risk of Accidents, operations associated with the Amorco Terminal contribute incrementally to the cumulative risk of an oil spill. Vessel traffic associated with the Amorco Terminal is approximately 4.7 percent of the total probability of a spill from tanker and tank barge traffic in the San Francisco Bay. Among the facilities with potential to contribute to the accidental release of petroleum products are the Chevron Richmond Refinery Long Wharf Terminal, Tesoro Avon Marine Terminal, and the Plains All American Martinez Marine Terminal. As discussed in Impact BIO-6, major spills of fuel, crude oil, or other materials can be expected to have serious adverse effects on species and habitat. Migration of special-status species could be halted and spawning grounds degraded, and critical habitat for listed species would be adversely affected and degraded. Two major spills into the San Francisco Bay Estuary from different sources within the same season would cause even greater adverse impacts to the biota and habitats. Mitigation Measures BIO-6a through BIO-6c collectively aid in the prevention and cleanup of accidental releases of oil spills; however, a major spill could have a residual impact following spill response and cleanup. Therefore, the impact would be cumulatively considerable and significant cumulative impacts would occur from implementation of the Project.

Mitigation Measure: No additional mitigation measures available.

Impact CUM-BIO-3: Cause cumulative impacts by increasing the risk of introduction of nonindigenous aquatic species from vessel traffic to San Francisco Bay. (Significant and unavoidable).

The California Ballast Water Management for Control of Nonindigenous Species Act of 1999, as revised and reauthorized by the Marine Invasive Species Act of 2003 (Pub. Resources Code §§ 71200 to 71271) specify required ballast water and vessel biofouling management practices. These laws and associated regulations were developed to prevent future introductions of nonindigenous species to California waters. Prior to the introduction of these management practices, however, a considerable number of nonindigenous species have been introduced in to the San Francisco Bay Estuary, resulting in a realignment of the biotic communities in the bay. All commercial vessel traffic to the San Francisco Bay has the potential to introduce nonindigenous aquatic species. Although vessels that call at the Terminal are required to comply with federal and State provisions, compliance with the current regulations is not enough to ensure full mitigation of this impact. Thus significant cumulative impacts would occur even with implementation of mitigation measures BIO-7a and BIO-7b.

Mitigation Measure: No additional mitigation measures available.

Impact CUM-BIO-4: Cause cumulative impacts to the biota of the San Francisco Bay Estuary resulting from degradation of water quality from vessels visiting the Amorco Terminal that are coated with antifouling paints. (Less than significant.)

Ships that travel through marine environments are subject to a natural process known as biofouling. Biofouling causes drag, which reduces ship speed and increases fuel expenditure. To inhibit fouling, most vessels visiting the San Francisco Bay use biocidal antifouling coatings that may release copper from the vessel's surface into the surrounding water. Levels of the biocide are higher next to the hull and decrease rapidly with distance from the vessel. By design, small organisms are directly affected by the biocides contained in antifouling coatings. Larger organisms are less susceptible to injury from the small amount of direct exposure to biocides, but may be affected through the bioaccumulation of biocides in their trophic environment.

The greatest contributor of copper to the San Francisco Bay Estuary is from Central Valley rivers, local watershed sources, and erosion of buried sediment (see Table 4.2-7; Looker 2007). Ninety percent of biocide-based coatings on oil tankers entering California's water are copper-based and approximately 8 percent use biocide-free coatings (CSLC 2009). Between 2000 and 2004, antifouling marine coatings loaded approximately 25 kilograms of copper into the San Francisco Bay each day, about 2 percent of the daily load (Looker 2007). The Amorco Terminal receives approximately 90 vessel visits a year, which is a small fraction of the total vessel traffic to the estuary. Although the continuing operation of the Amorco Terminal would contribute to this impact cumulatively, its incremental contribution is not cumulatively significant.

Table 4.2-7: Estimated Inputs of Total Copper to San Francisco Bay, 2000-2004

Source	Load (kg/day)
Sacramento and San Joaquin Rivers	740
Urban and non-urban Runoff	180
Wastewater (north of Dumbarton Bridge)	23
Industrial Wastewater	0.5
Anti-fouling Marine Coatings	25
Atmospheric Deposition (wet)	1.4
Atmospheric Deposition (dry)	2.1
Erosion of Buried Sediment	342
Total	**1314**

Source: Looker 2007

Mitigation Measure: No mitigation required.

4.2.4 SUMMARY OF FINDINGS

Table 4.2-8 includes a summary of anticipated impacts to biological resources and associated mitigation measures.

Table 4.2-8: Summary of Biological Resources Impacts and Mitigation Measures

Impact	Mitigation Measure(s)
Proposed Project	
BIO-1: Increase deposition or erosion of sensitive habitats along the vessel path, including marshlands within and adjacent to the lease area, resulting from the resuspension of sediments by calling vessels	No mitigation required.
BIO-2: Cause substantial impact to special-status wildlife species, including impact to behavior and the composition of biotic communities, in the vicinity of the Amorco Terminal as a result of the use of bright lights during nighttime Amorco Terminal operations	No mitigation required.
BIO-3: Cause substantial direct and/or indirect impacts on aquatic biota through the changing of physical and chemical	No mitigation required.

Impact	Mitigation Measure(s)
environmental factors as a result of maintenance dredging	
BIO-4: Cause injury or behavioral interruptions to aquatic species as a result of noise from vessels	No mitigation required.
BIO-5: Cause impacts to the San Francisco Bay Estuary and associated aquatic biota as a result of minor fuel, lubricant, and/or boat-related spills	No mitigation required.
BIO-6: Cause impacts to the San Francisco Bay Estuary and associated aquatic biota as a result of major fuel, lubricant, and/or boat-related spills	BIO-6a: Bird rescue personnel and rehabilitators. BIO-6b: Cleanup of oil from biological area. BIO-6c: Natural Resource Damage Assessment Team.
BIO-7: Introduce invasive nonindigenous species to the San Francisco Bay Estuary	BIO-7a: Marine Invasive Species Act Reporting Forms. BIO-7b: Invasive species action funding.
Alternative 1: No Project	
BIO-8: Cause impacts to the San Francisco Bay Estuary and associated biota resulting from the decommissioning and abandoning in place of existing structures	Should this alternative be selected, mitigation measures would be determined during a separate environmental review under CEQA.
BIO-9: Cause impacts to the San Francisco Bay Estuary and associated biota resulting from the partial of complete removal of Amorco Terminal structures	Should this alternative be selected, mitigation measures would be determined during a separate environmental review under CEQA.
BIO-10: Cause impacts to the San Francisco Bay Region and associated biota by decommissioning and removing the Amorco Terminal and shifting crude oil imports to overland transport	Should this alternative be selected, mitigation measures would be determined during a separate environmental review under CEQA.
Alternative 2: Restricted Lease Taking Amorco Out of Service for Oil Transport	
BIO-11: Cause impacts to the San Francisco Bay Region and associated biota by shifting crude oil imports to overland transport	Should this alternative be selected, mitigation measures would be determined during a separate environmental review under CEQA.
Cumulative Impacts	
CUM-BIO-1: Cause cumulative adverse impacts to special status species, biotic communities, and habitat through vessel resuspension of sediment, use of bright night time lights, routine dredging, shipping noise, and potential minor oil spills as a result of Amorco Terminal operations	No mitigation required.

Impact	Mitigation Measure(s)
CUM-BIO-2: Cause cumulative impacts to San Francisco Bay Estuary and associated biota from oil spills from all marine oil terminals combined, or from all tankering combined	No additional mitigation measures available. (refer to MMs BIO-6a through BIO-6c.)
CUM-BIO-3: Cause cumulative impacts by increasing the risk of introduction of nonindigenous aquatic species from vessel traffic to San Francisco Bay Estuary	No additional mitigation measures available. (refer to MMs BIO-7a and BIO-7b.)
CUM-BIO-4: Cause cumulative impacts to the biota of the San Francisco Bay Estuary resulting from degradation of water quality from vessels visiting the Amorco Terminal that are coated with antifouling paints	No mitigation required.

4.3 WATER QUALITY

Section 4.3 presents the existing environment and impacts analysis of water quality issues associated with any action by the California State Lands Commission (CSLC) to grant a new offshore lease to Tesoro Refining and Marketing Company, LLC (Tesoro) for the Amorco Marine Oil Terminal (Amorco Terminal) to continue to operate in the southeastern Carquinez Strait. The environmental setting provides information on existing water and sediment quality in the San Francisco Bay/Estuary (San Francisco Bay) and, in more detail, for the local area (Suisun Bay and Carquinez Strait) as well as the immediate vicinity of the Amorco Terminal. Also included is a summary of laws and regulations that may affect water resources. This is followed by an analysis of the potential Project impacts. Water quality issues associated with renewing the Amorco Terminal lease include the chronic water quality impacts of continuing operations and those related to an oil spill. Operational impacts to water quality could come from the release of segregated ballast water, runoff of contaminants on the pier, the leaching of contaminants from anti-fouling paints or sacrificial anodes from ships visiting the Amorco Terminal, the re-suspension of sediments by ship propellers and bow thrusters or by maintenance dredging, and the disposal of dredged sediments. An oil spill could have wide-ranging effects on water quality in San Francisco Bay.

4.3.1 ENVIRONMENTAL SETTING

4.3.1.1 San Francisco Bay

Introduction

San Francisco Bay/Estuary is the largest estuary on the West Coast of the contiguous United States and covers an area of 450 square miles (1,166 square kilometers). The majority of the San Francisco Bay is roughly parallel to the coastline in a north-to-south orientation, approximately 5 miles inland from the coastline. Several bridges span the San Francisco Bay, connecting the urban areas along the coastline. These bridges also serve as dividing lines for the subregions of the San Francisco Bay. South San Francisco Bay is the large body south of the Bay Bridge, and the Central Bay is a relatively smaller body between the Bay Bridge and the Richmond-San Rafael Bridge. San Pablo Bay is the large body north of the Richmond-San Rafael Bridge. From San Pablo Bay, the San Francisco Bay/Estuary extends eastward, through the Carquinez Strait and Suisun Bay, to the delta of the Sacramento and San Joaquin Rivers (Delta). The South Bay is a semi-enclosed embayment with numerous small, local freshwater inflows. The Central Bay is strongly influenced by the ocean, and San Pablo Bay and Suisun Bay are strongly influenced by freshwater flows from the Sacramento and San Joaquin Rivers, through the Delta, which drains approximately 40 percent of California’s rainwater (Thompson et al. 2000). Figure 4.3-1 shows the surface water features of the San Francisco Bay.

The San Francisco Bay is a highly industrialized and urbanized estuary with a long history of human impacts. Many contaminants in the water, sediments, and biota in various parts of the estuary have been detected at concentrations exceeding guidelines. The various embayments have been listed as impaired pursuant to Section 303(d) of the Clean Water Act (CWA). Suisun Bay and Carquinez Strait are identified as impaired for multiple contaminants, including pesticides, dioxins/furans, mercury, nonindigenous aquatic species, nickel, polychlorinated biphenyls (PCBs), and selenium (SFBRWQCB 2013). Suisun Bay receives contaminant inputs from upstream agricultural, urban, industrial, and current and historical mining sources (San Francisco Estuary Institute [SFEI] 2010). Noted potential sources of pollutants in the Carquinez Strait include atmospheric deposition; ballast water; and industrial, municipal, and agricultural point sources (SFBRWQCB 2013).

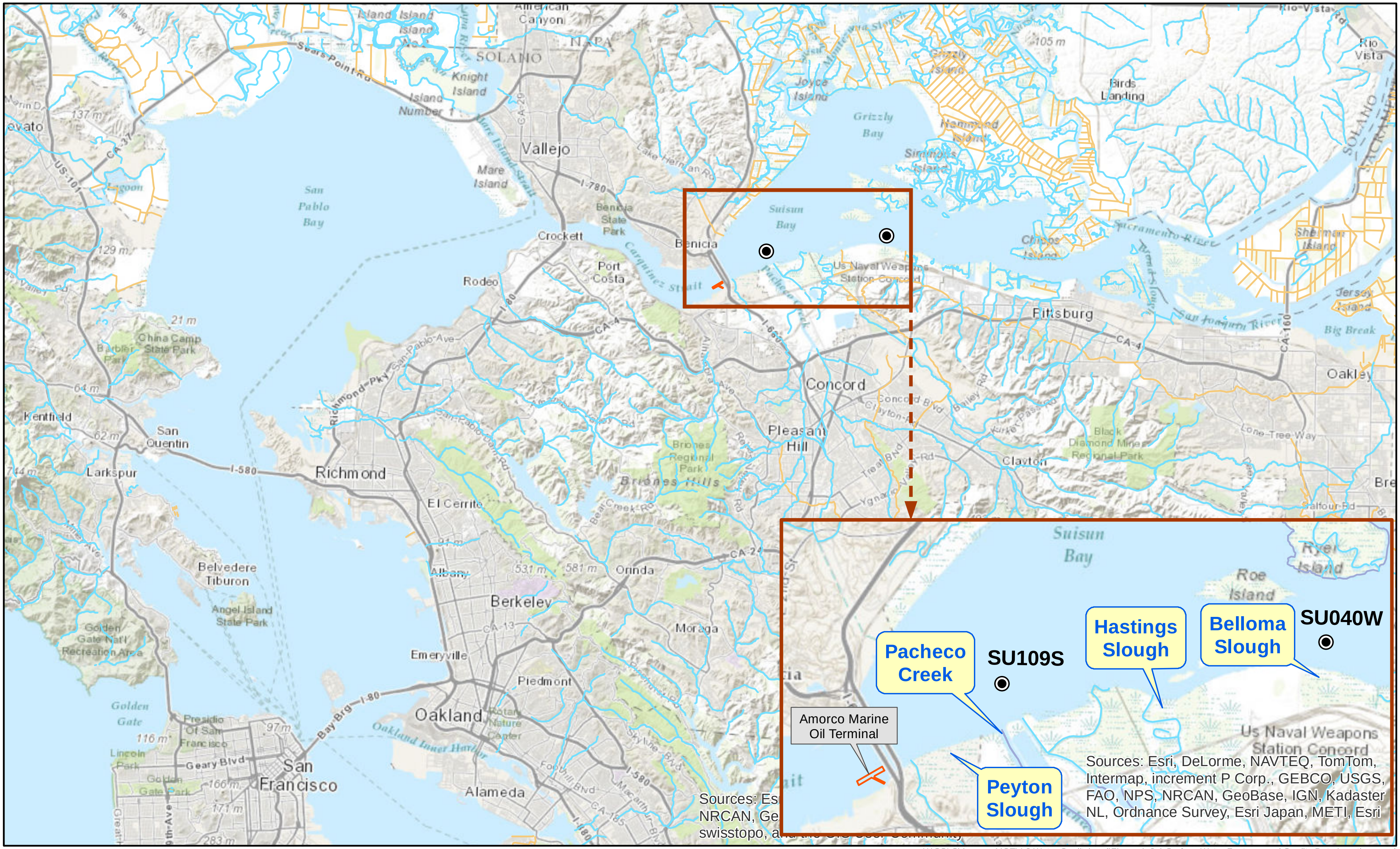
Water quality in the San Francisco Bay is affected by many factors, including:

- geographic configuration of the San Francisco Bay/Estuary,
- tidal exchange with the ocean,
- freshwater inflows,
- industrial and municipal wastewater discharges,
- dredging and dredge material disposal,
- runoff from highly urbanized areas,
- agricultural and pasture land drainage from much of central California,
- marine vessel discharges,
- historic mining activities,
- leaks and spills, and
- atmospheric deposition.

Regulatory objectives and criteria to evaluate water and sediment quality in San Francisco Bay are discussed below. Bathymetry, tidal flows, and circulation within the San Francisco Bay are discussed in the physical processes section, followed by a discussion of the various sources of contaminants. Finally, general information on contaminant levels in the water and sediments of the San Francisco Bay is presented.

Regulatory Objectives and Criteria for San Francisco Bay/Estuary

To protect beneficial uses, the San Francisco Bay Regional Water Quality Control Board (SFBRWQCB) has established water quality objectives (WQOs) for waters covered by the San Francisco Bay Water Quality Control Plan (Basin Plan). Basin Plans are implemented primarily within the National Pollutant Discharge Elimination System (NPDES) to regulate waste discharges. The Basin Plan includes the San Francisco Bay region and portions of the San Joaquin Delta.



X:\CSLC\Amorco MOT\4.3 Water Quality\mxd\Figure 4_3-1 Surface Water Features and Quality Data Locations.mxd

Figure 4.3-1
Surface Water Features and Quality Data Locations
California State Lands Commission
Amorco Marine Oil Terminal Lease Consideration Project

TRC

7/17/2013

Water and Sediment Quality Data Locations
Stream / River
Canal / Ditch
CSLC Lease Boundary

N

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1 inch = 5 miles

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The 2013 version of the Basin Plan and associated amendments were approved by the State Water Resources Control Board (SWRCB), Office of Administrative Law, and U.S. Environmental Protection Agency (USEPA) on June 29, 2013. Resolution R2-2007-0042 amended the Basin Plan to adopt a site-specific objective for copper for the San Francisco Bay Basin. This amendment contained non-regulatory provisions for control of copper-based marine anti-fouling coatings. The SWRCB relies on the authority of the California Department of Pesticide Regulation to regulate the pesticidal use of copper in anti-fouling paints to obtain WQOs (SFBRWQCB, 2013). Table 4.3-1 lists the narrative objectives for San Francisco Bay waters. Water quality criteria for priority toxic pollutants for California inland surface waters, enclosed bays, and estuaries were established by the California Toxics Rule (USEPA 2001). Table 4.3-2 shows the California Toxics Rule criteria for saltwater (applicable to Suisun Bay).

Table 4.3-1: Selected Water Quality Objectives from the San Francisco Bay Basin Plan

Parameter	Basin Plan Water Quality Objective
Bioaccumulation	Controllable water quality factors shall not cause a detrimental increase in concentrations of toxic substances found in bottom sediments or aquatic life.
Biostimulatory Substances	Waters shall not contain biostimulatory substances in concentrations that promote aquatic growths to the extent that such growths cause nuisance or adversely affect beneficial uses.
Color	Waters shall be free of coloration that causes nuisance or adversely affects beneficial uses.
Dissolved Oxygen	For all tidal waters, a minimum of 5.0 milligrams per liter (mg/L) objective is applied for waters downstream of the Carquinez Bridge and 7.0 mg/L for waters upstream of the Carquinez Bridge.
Floating Material	Waters shall not contain floating material, including solids, liquids, foams, and scum, in concentrations that cause nuisance or adversely affect beneficial uses.
Oil and Grease	Water shall not contain oils, greases, waxes, or other materials in concentrations that result in a visible film or coating on the surface of the water or on objects in the water, that cause nuisance, or that otherwise adversely affect beneficial uses.
Population and Community Ecology	All waters shall be maintained free of toxic substances in concentrations that are lethal to or that produce significant alterations in population or community ecology or receiving-water biota.
pH	The pH shall not be depressed below 6.5 nor raised above 8.5.
Salinity	Controllable water quality factors shall not increase the total dissolved solids or salinity of waters of the State so as to adversely affect beneficial uses, particularly fish migration and estuarine habitat.

Parameter	Basin Plan Water Quality Objective
Sediment	The suspended sediment load and suspended sediment discharge rate of surface waters shall not be altered in such a manner as to cause nuisance or adversely affect beneficial uses. Controllable water quality factors shall not cause a detrimental increase in the concentration of toxic pollutants in sediments or aquatic life.
Settleable Material	Waters shall not contain substances in concentrations that result in the deposition of material that cause nuisance or adversely affect beneficial uses.
Suspended Materials	Waters shall not contain suspended material in concentrations that cause nuisance or adversely affect beneficial uses.
Sulfide	All water shall be free from dissolved sulfide concentrations above natural backgrounds levels.
Taste and Odors	Waters shall not contain taste- or odor-producing substances in concentrations that impart undesirable tastes or odors to fish flesh or other edible products of aquatic origin, that cause nuisance, or that adversely affect beneficial uses.
Temperature	Temperature objectives for enclosed bays and estuaries are as specified in the *Water Quality Control Plan for Control of Temperature in the Coastal and Interstate Waters and Enclosed Bays of California.* The temperature of any cold or warm freshwater habitat shall not be increased by more than 5 degrees Fahrenheit (ºF) above natural receiving-water temperature.
Toxicity	All waters shall be maintained free of toxic substances in concentrations that are lethal to or that produce other detrimental responses in aquatic organisms.
Turbidity	Waters shall be free of changes in turbidity that cause nuisance or adversely affect beneficial uses. Increases from normal background light penetration or turbidity relatable to waste discharge shall not be greater than 10 percent in areas where natural turbidity is greater than 50 Nephelometric Turbidity Units.
Un-Ionized Ammonia	The discharge of wastes shall not cause receiving waters to contain concentrations of un-ionized ammonia in excess of the following limits: Annual median of 0.025 mg/L as nitrogen and Central Bay and upstream maximum of 0.16 mg/L as nitrogen.

Source: SFBRWQCB 2013

Table 4.3-2: California Toxics Rule Toxic Materials Concentrations for Saltwater

Constituent	Criterion Maximum Concentration (µg/L[a])	Criterion Continuous Concentration (µg/L)
Arsenic	69	36
Cadmium	42	9.3
Chromium (Hexavalent)	1,100	50
Copper	4.8	3.1
Lead	210	8.1
Mercury[b]	2.1	0.025
Nickel	74	8.2
Selenium	290	71
Silver	1.9	--[c]
Zinc	90	81
Cyanide	1	1
Pentachlorophenol	13	7.9
Aldrin	1.3	--
gamma-BHC	0.16	--
Chlordane	0.09	0.004
4,4-DDT[4]	0.13	0.001
Dieldrin	0.71	0.0019
alpha-Endosulfan	0.034	0.0087
beta-Endosulfan	0.034	0.0087
Endrin	0.037	0.0023
Heptachlor	0.053	0.0036
Heptachlor Epoxide	0.053	0.0036
PCB[5]-1242	--	0.03
PCB-1254	--	0.03
PCB-1221	--	0.03
PCB-1232	--	0.03
PCB-1248	--	0.03
PCB-1260	--	0.03
PCB-1016	--	0.03
Toxaphene	0.21	0.0002

Source: USEPA 2001
[a]µg/L = micrograms per liter
[b]National Toxics Rule 1997
[c]Not available

Currently, no quantitative sediment objectives are established for the project area. In 2009, the SWRCB adopted the following Narrative Sediment Quality Objectives for the San Francisco Bay: Pollutants in sediments shall not be present: (1) in quantities that are toxic to benthic communities in bays and estuaries; (2) at levels that will bioaccumulate in aquatic life to levels that are harmful to human health; and (3) at levels that alone or in combination are toxic to wildlife and resident finfish by direct exposure or bioaccumulate in aquatic life at levels that are harmful to wildlife or resident finfish by indirect exposure.

The National Oceanic and Atmospheric Administration (NOAA) has published effects-based sediment quality values for evaluating the potential for contaminants in sediment to cause adverse biological effects (Long and Morgan 1990, Long et al. 1995). These values are commonly used as guidelines to evaluate sediment contaminant concentrations. These values are referred to as Effects Range-Low (ER-L) and Effects Range-Medium (ER-M) (Long and Morgan 1990, Long et al. 1995). This tool for comparing sediment quality was developed for NOAA based on tests of toxicity of sediments to benthic organisms. In these tests, toxicity effects were rarely seen below the ER-L. Therefore, at chemical concentrations below the ER-L, effects are unlikely. Effects were usually seen above the ER-M. Thus, the ER-M is the concentration at and above which effects are probable. Table 4.3-3 presents these sediment toxicity criteria.

Table 4.3-3: Sediment Effects Guideline Values

Parameter		Effects Range-Low (ER-L)	Effects Range-Median (ER-M)
Metals (mg/kg)	Antimony	2.0	2.5
	Arsenic	8.2	70
	Cadmium	1.2	9.6
	Chromium	81	370
	Copper	34	270
	Lead	46.7	218
	Mercury	0.15	0.71
	Nickel	20.9	51.6
	Silver	1	3.7
	Zinc	150	410
Organics (µg/Kg)	Total PAH	4,022	44,792
	Total DDT	1.58	46.1
	Total PCB	22.7	180

Abbreviations: ER-L=Concentration at lower 10th percentile at which adverse biological effects were observed or predicted; ER-M=Concentration at which adverse biological effects were observed or predicted in 50 percent of test organisms; mg/kg=milligrams per kilogram; µg/kg=micrograms per kilogram; PAH=polycyclic aromatic hydrocarbons; DDT=dichlorodiphenyltrichloroethane; PCB=polychlorinated biphenyls
Source: Long and Morgan 1990, Long et al. 1995

Physical Processes in San Francisco Bay

San Francisco Bay is characterized by complex bathymetry, with broad, shallow embayments that are incised by deeper channels; channel constrictions between the embayments; and connection to the Pacific Ocean through a deep, narrow entrance at the Golden Gate. Water depths in the San Francisco Bay range from zero in the shallowest areas to greater than 330 feet (100 meters) at the Golden Gate. The deeper portions of the San Francisco Bay are along the west side of the Central Bay. The strong tidal currents in the Central Bay create significant sand dunes that have heights of 7 to 10 feet along the bottom. Much of the San Francisco Bay is relatively shallow, with approximately half the surface area having water depths less than 7 feet (2 meters) below mean lower low water (MLLW) when intertidal mudflats are included in the definition of the surface area (Conomos et al*.* 1985).

Water quality of the San Francisco Bay is greatly affected by tidal exchange with the Pacific Ocean through the Golden Gate. The average tide range for the San Francisco Bay Area is approximately 5 feet of elevation change. Given the large surface area of the San Francisco Bay, this results in extremely large volumes (50×10^9 cubic feet, or 1 million acre-feet) of water flowing into and out of the San Francisco Bay every six hours with the change of tides. The bathymetry of the San Francisco Bay directs the flow of the flooding tide into the South Bay and San Pablo Bay, and large eddies are created in the Central Bay by the tidal exchange. Waters from the Pacific Ocean are generally saltier and cooler than waters in San Francisco Bay, and the higher relative density of the ocean waters directs the tidal exchange to primarily the deeper waters of the San Francisco Bay.

San Francisco Bay, especially the northern reach of San Pablo Bay, Carquinez Strait, Suisun Bay, and the Delta, is also strongly influenced by freshwater flows. The Sacramento and San Joaquin Rivers are the largest sources of fresh water, contributing on average 19.3 and 3.4 million acre-feet per year, respectively. The volume and timing of these freshwater inflows vary dramatically from year to year depending on the amount of rain and snowfall. The highest inflows usually occur between November and May. This fresh water is generally warmer, and with its low salinity, is less dense than seawater. Summers are generally dry with little rain or runoff.

Circulation and mixing are relatively complicated in San Francisco Bay because of the complex geometry and variable amount of freshwater flow during the year. The circulation of water in the San Francisco Bay is driven primarily by tides, and to a lesser extent, by wind-induced currents and estuarine circulation. Although tides contribute greatly to the dispersion of material in the San Francisco Bay, tidal motion is oscillatory and, therefore, does not contribute significantly to the net transport of material out of the Bay (Davis 1982). Freshwater flows into the San Francisco Bay from the Delta result in estuarine circulation that is driven by the density difference between freshwater and saline ocean water. Vertical stratification of water-quality parameters such as temperature and salinity also varies substantially depending on the location and the volume of freshwater flows.

Net volume transport out of the San Francisco Bay is equivalent to the freshwater flows in (including publicly owned treatment works and industrial discharges), plus ocean water introduced by tides. During the winter, the water residence time is approximately two weeks for the northern reaches of the San Francisco Bay and approximately two months in southern portions of the Bay. During the summer, residence time is two months for the northern reaches and five months in southern portions (Conomos 1979).

Sources of Pollutants to San Francisco Bay

The largest sources of pollutant input to San Francisco Bay are nonpoint discharges, including urban and non-urban runoff, and inputs from rivers. Point discharges from industrial and municipal facilities also contribute, as well as impacts from sediment dredging, marinas and marine vessels, and atmospheric deposition of particulates.

Urban runoff is the water from urban areas that flows into the San Francisco Bay from local streams and storm drains. It includes stormwater, excess irrigation flows, and wash water for multiple activities (e.g., car washing). Sources of pollutants in urban runoff are extremely varied and include commercial, industrial, and residential land uses, as well as pollutants from managed open space areas such as parks, cemeteries, planted road dividers, and construction sites. Human activities in these areas, such as the application of pesticides and fertilizers to gardens and landscaping, operation of motor vehicles, and construction of roads and buildings, all contribute pollutants to urban runoff. A study of contaminant loads from stormwater to the San Francisco Bay indicated that residential areas appeared to be a large contributor to the metals found to be contaminating water quality (Davis et al. 2000). Commercial and industrial areas also generate substantial loads of phosphate, cadmium, lead, zinc, and other contaminants.

Non-urban sources of nonpoint pollution include agricultural lands, forests, pastures, and natural range, from which contaminants are transported to the San Francisco Bay by rainfall runoff, excess irrigation return flows, and subsurface agricultural drainage. Pollutants of concern in non-urban runoff include dissolved and suspended solids/salts/metals, nitrogen/sulfur/phosphorous compounds, and synthetic organic pollutants (particularly pesticides).

The Sacramento and San Joaquin Rivers are the major rivers that discharge into the San Francisco Bay. These rivers receive drainage from almost 40 percent of the land area of California, draining California's major agricultural region, the Central Valley. Contaminant loading from rivers is considered to be significant for mercury, PCBs, dioxins, polycyclic aromatic hydrocarbons (PAHs), and commercial pesticides, and possibly may be significant for, copper, selenium, and nickel (Davis et al. 2007).

In addition to nonpoint discharges, the San Francisco Bay receives point discharges from industrial and municipal facilities. Municipal discharges are the largest, with total permitted dry-weather flow of 565 million gallons per day (SFBRWQCB 2013). The average dry-weather flow is less than this maximum permitted amount. The major industrial dischargers are oil refineries. Every year, an average of 6 million cubic yards (cy) of sediments are dredged from shipping channels and related navigation facilities throughout San Francisco Bay. Historically, the majority (80 percent) of dredged material was disposed at three designated sites in the San Francisco Bay: the Alcatraz Island site (which historically received up to 4 million cy of sediment per year from Central Bay and South Bay dredging projects); the Carquinez Strait site (1 to 2 million cy); and the San Pablo Bay site (up to 0.5 million cy).

The Long-term Management Strategy (LTMS) for the Placement of Dredged Materials in the San Francisco Bay region was adopted in 2000 to reduce in-Bay disposal of dredged material and to maximize the beneficial reuse of dredged material. The LTMS Management Plan aimed to reduce in-Bay disposal using four three-year “step-down” periods, by the end of which, in-Bay disposal of dredged material would be reduced to approximately 1.25 million cy per year.

Marinas and marine vessels are also sources of pollutants in the San Francisco Bay. Discharge of untreated sewage and greywater (wastewater generated from domestic activities such as laundry, dishwashing, and bathing) from commercial and recreational vessels is prohibited within the San Francisco Bay; however, an unknown amount of waste is believed to be illegally discharged. This type of effluent contributes to coliform bacteria, biochemical oxygen-demanding substances, nutrients, oil and grease, and suspended solids. Other common pollutants from marinas and marine vessels include lead from fuel and ballast material, arsenic in paint pigment, pesticides and wood preservatives, zinc from anodes, and copper and zinc biocides in anti-fouling paint. Additionally, discharge of ballast water from large commercial vessels has been known to introduce nonindigenous aquatic species into the San Francisco Bay, and has disturbed the indigenous aquatic communities. This is discussed further in Section 4.2, Biological Resources. Accidental spills of petroleum products from ships are generally small and result from operator errors, handling accidents at terminals, and damage to ships. Tanker accidents have resulted in major oil spills in the San Francisco Bay.

Contaminants in the atmosphere deposit traces on land and water surfaces. Deposits to the water are a direct source, while deposits to the land result in discharges to the San Francisco Bay in stormwater runoff. Major sources of atmospheric contamination include fuels and particulates from vehicles and other sources; building materials and products; windblown dust; and construction, manufacturing, and industrial facilities (BCDC 2003). Direct atmospheric deposition may be a significant pathway for loading of dioxins, PAHs, PCBs, and mercury (Davis et al. 2000).

Water and Sediment Quality in San Francisco Bay

The San Francisco Estuary Institute Regional Monitoring Program for Trace Substances (RMP) began in 1993 and is sponsored by multiple local, State, and federal agencies and companies through their discharge or San Francisco Bay use permits. The RMP monitors water and sediment quality at 25 sites located throughout the San Francisco Bay (Thompson et al. 2000).

Water and sediment samples are collected from five hydrogeographic regions of the San Francisco Bay: Suisun Bay, San Pablo Bay, Central Bay, South Bay, and Lower South Bay. Typically, in any given year, a substantial number of sampled locations will have water and/or sediments that exceed regulatory objectives or criteria for one or more metals. Organic contaminants which frequently exceed criteria in San Francisco Bay in RMP samples include DDT (dichlorodiphenyltrichloroethane) in water samples and PAHs and PCBs in sediment samples. RMP data for the Project vicinity are presented in Section 4.3.1.2.

Sea Level Rise

The impacts of climate change are expected to alter the San Francisco Bay ecosystem by inundating or eroding shoreline areas. Long-duration tide gauges indicate that sea level in the San Francisco Bay has risen at a rate of approximately 7 inches over a century (CEC 2003). Recent projections by Rahmstorf (2007) and Chao et al*.* (2008) indicate that sea level could rise quickly. By 2050, sea level could be between 11 and 18 inches higher than in 2000, and by 2100, sea level could be between 23 and 55 inches higher than in 2000 (Cal-EPA 2010). The San Francisco Bay Conservation and Development Commission's (BCDC) estimate of long-term global sea-level rise is 16 inches over 50 years (BCDC 2009).

4.3.1.2 Project Area (Carquinez Strait and Suisun Bay)

Physical Characteristics of Carquinez Strait and Suisun Bay

The Project is located within the Carquinez Strait adjacent to Suisun Bay, which are influenced by flows from the Sacramento and San Joaquin Rivers. The response to high river discharge is nearly instantaneous in the Project area, and includes rapid dilution of surface salinity and a large increase in total suspended solids (turbidity), especially during the first large pulse of river flow each year (Cloern et al*.* 1999).

The Carquinez Strait is a deep (mean depth 29 feet), narrow, 12-mile-long waterbody that joins San Pablo Bay with Suisun Bay. The narrow restriction results in strong currents, and most of the bottom is sandy and relatively smooth. Average current velocities measured at the Amorco Terminal in July 2013 were 1.7 knots (87.5 centimeters per second). Carquinez Strait waters are generally turbid from high suspended sediment loads, which are estimated to range from 0.26 to 26 million metric tons per year (McKee et al*.* 2002). The Carquinez Strait is also characterized by a variable salinity regime resulting from fluctuations in freshwater flow from the Sacramento-San Joaquin River system (USACE et al*.* 1998). Water in the Carquinez Strait is stratified into a two-layer flow, known as gravitational circulation, with lighter freshwater moving seaward in the top layer and heavier saltwater moving upstream on the bottom (SFEP 1999). During extremely high outflows, however, waters in the Strait are completely fresh (SFEP 1999; Schoellhamer and Burau 1998).

Suisun Bay is a shallow embayment between Chipps Island, at the western boundary of the Delta, and the Benicia-Martinez Bridge. Suisun Bay covers approximately 36 square miles, has a mean depth of 14 feet, and highly variable salinity levels (USACE et al*.* 1998). Fresh water from the Sacramento and San Joaquin Rivers usually meets saltwater from the ocean in the vicinity of Suisun Bay. The bottom of Suisun Bay is predominantly fine silt and clay, crossed by channels scoured by tidal and riverine flows. The surficial sediments around these channels change according to season (USACE et al*.* 1998). High riverine flows winnow the fine sediment of Suisun Bay and transport it downstream through Carquinez Strait and into San Pablo Bay. As riverine flows decrease, fine sediment again settles in Suisun Bay.

A biologically significant area of high particle concentration, known as the entrapment zone, is located in Suisun Bay. Increasing river flows push the entrapment zone seaward and decreasing river flows allow the entrapment zone to move landward (Schoellhamer and Burau 1998). The entrapment zone is an area of high productivity where nutrients and organisms accumulate, and is considered to be important to many aquatic species in the Suisun Bay. The entrapment zone tends to exist where the surface salinity is between 1 and 6 ppt (Schoellhamer and Burau 1998).

The amount of Delta runoff significantly affects water column characteristics in the Project area and results in a significant variance in water quality conditions from year to year.

The San Francisco Bay Basin Plan designates beneficial uses for waterbodies covered by the plan (SFBRWQCB 2013). Designated beneficial uses for waters in the Project area (Carquinez Strait and Suisun Bay) include: Industrial service supply, industrial process supply, commercial and sport fishing, estuarine habitat, fish migration, preservation of rare and endangered species, fish spawning, wildlife habitat, water contact recreation, and non-contact water recreation (SFBRWQCB 2013).

The Project area, including both Carquinez Strait and Suisun Bay, is identified as impaired, pursuant to CWA Section 303(d), for chlordane, DDT, diazinon, dieldrin, dioxins, exotic species, furan compounds, mercury, PCBs, and selenium (SWRCB 2006). Additionally, Suisun Bay also is on the 303(d) list for nickel.

Table 4.3-4 shows the most recent RMP water quality sampling results available for sampling station SU040W located in Suisun Bay, the nearest sampling point relative to the Project site. The table includes only constituents that have a marine quality objective identified in the Basin Plan. RMP station locations for water quality and sediment quality are represented on Figure 4.3-1.

Table 4.3-4: Water Sampling Results from Suisun Bay

Constituent	2010 RMP Data[a]		Marine Water Quality Objectives[b]	
	Result (Total)	Result (Dissolved)	4-day Average	1-hour Average
Concentration in Micrograms per Liter				
Arsenic	2.06	1.77	36	69
Cadmium	0.049	0.044	9.3	42
Copper	2.72	1.94	6.0[3]	9.4[c]
Lead	0.132	ND[d]	8.1	210
Mercury	0.002	0.0	0.03[e]	2.1
Nickel	1.6	0.86	8.2	74
Selenium	0.083	0.077	5	20
Silver	0.002	0.002	--[f]	1.9
Zinc	1.08	0.19	81	90

[a]Source: Regional Monitoring Program (RMP) data from Sampling Station SU040W in Suisun Bay (SFEI 2010)
[b]Source: Water Quality Control Plan (SFBRWQCB 2013). Water Quality Objectives (WQOs) are dissolved concentrations for waters with salinity between 1 part per thousand (ppt) and 10 ppt
[c]Copper objectives are applicable specifically to Suisun Bay and Carquinez Strait
[d]ND = Not detected.
[e]Marine WQOs for mercury in San Francisco Bay apply. The WQO for the protection of aquatic organisms and wildlife is shown.
[f] -- = Not available

Sediment Quality in Carquinez Strait and Suisun Bay

San Francisco Bay sediments have been influenced by natural and anthropogenic influxes of toxic chemicals over time. Sediments in the San Francisco Bay are both sources and sinks of pollutants. The overall influx of pollutants can cause increases in sediment pollutant levels. These pollutants are not distributed evenly in the San Francisco Bay, and localized areas are highly contaminated. Under the Bay Protection and Toxic Cleanup Program (BPTCP) in 1999, the SFBRWQCB completed a detailed assessment of the levels of pollutants in sediment throughout the San Francisco Bay, and the risks and benefits of cleaning or otherwise managing existing “hot spots.” The BPTCP has identified sediment “toxic hot spots” where sediment dredging could result in the degradation of water quality in the San Francisco Bay. The Final Regional Toxic Hot Spot Cleanup Plan summarizes the situation in the San Francisco Bay, and identifies sites of concern and candidate toxic hot spots (SFBRWQCB 1999). The Project is not within any known toxic hot spots identified by the SFBRWQCB.

To evaluate whether sediments have elevated levels of toxic chemicals, the SFBRWQCB performed a statistical analysis of available sediment analytical data. The results of this study are reported in Gandesbery et al. (1999). The objective of the study was to determine what the SFBRWQCB should consider as ambient levels of PAHs, PCBs, metals, and pesticides in the San Francisco Bay. These ambient concentrations provide a relative measure of comparing sediment contaminant concentrations within the San Francisco Bay. Table 4.3-5 shows the most recent RMP sediment quality results collected from sampling in Suisun Bay compared to San Francisco Bay ambient sediment concentrations from Gandesbery et al. and ER-L and ER-M toxicity thresholds (Long and Morgan 1990, Long et al. 1995). (Data are from sampling station SU109S, the closest sampling point in relation to the Project site [see Figure 4.3-1], in 2010.)

Table 4.3-5: Sediment Sampling Results from Suisun Bay

Constituent	2010 RMP[a] Data (total)	San Francisco Bay Ambient Sediment Concentrations[b]		Environmental Toxicology Thresholds[c]	
		Sandy (<40% fines)	Muddy (>40% fines)	ER-L[d]	ER-M[e]
Concentration in Milligrams per Kilogram					
Arsenic	6.35	13.5	15.3	8.2	70
Cadmium	0.079	0.25	0.33	1.2	9.60
Copper	18.191	31.7	68.1	34	270
Lead	5.515	20.3	43.2	46.7	218
Mercury	0.074	0.25	0.43	0.15	0.71
Nickel	74.051	92.9	112	20.9	51.6
Selenium	0.076	0.59	0.64	--[f]	--
Silver	0.028	0.31	0.58	1	3.7
Zinc	59.296	97.8	158	150	410
Total PCBs[g]	0.00018	0.00059	0.0148	0.0227	0.18
Total DDTs[h]	0.00018	0.0028	0.007	0.0058	0.0461
Total PAHs[i]	0.0757	0.211	3.39	4.022	44.792

[a]Source: Sampling Station SU109S in Suisun Bay (SFEI 2010)
[b]Source: Gandesbery et al. 1999
[c]Source: Long and Morgan 1990, Long et al. 1995
[d]ER-L=Effects Range Low
[e]ER-M=Effects Range Median
[f]-- = Not available
[g]PCBs= Polychlorinated Biphenyls
[h]DDT=dichlorodiphenyltrichloroethane
[i]PAHs=Polycyclic aromatic hydrocarbons

Concentrations of contaminants at sampling station SU109S in Suisun Bay were below the San Francisco Bay ambient concentrations for all the contaminants reviewed. A comparison of environmental toxicity thresholds ER-L and ER-M show that ambient metal and organic compound concentrations in sediment exceed the ER-L concentration for arsenic and mercury. Ambient sediment concentrations exceed the ER-L and ER-M thresholds for nickel; similarly, the 2010 RMP sample concentration for nickel exceeds the ER-L and ER-M values.

Site-specific Conditions

The Amorco Terminal has been used primarily for petroleum industry-related operations for more than 100 years. The Amorco Terminal was originally developed in 1904 as a small refinery and has operated as a refinery (until the late 1920s), petroleum shipping/receiving terminal, and/or storage facility. The Golden Eagle Refinery (Refinery), of which the Amorco Terminal is a part, currently processes an average crude oil volume of approximately 157,300 barrels per day. The Amorco Terminal receives crude oil by tanker or pipelines for the production of gasoline and diesel fuels.

Water depths range from approximately 20 feet and 50 feet landward and seaward, respectively, of the Amorco Terminal wharf (Treadwell and Rollo 2010). Onshore, the soil and groundwater is impacted with fuel oxygenates, including methyl tert-butyl ether and tert-butyl alcohol. Contaminants were first detected in soil and at the Amorco Terminal in 2005. Previous remedial investigations have concluded that the apparent source of contamination was an underground leak emanating from plumbing associated with an aboveground storage tank located within the Amorco Tank Farm (Earth Tech 2008). A groundwater treatment system was been installed to extract groundwater at the source area and to contain the impacted groundwater (Earth Tech 2008) and is still operational.

In general, groundwater flow beneath the site conforms to regional hydrogeology and flows generally west from the upland areas to the low-lying tidal flats along the Carquinez Strait. However, groundwater flow is affected by the complex topography and geology of the site, and flow may vary based on fractures, deformation, and weathering patterns in the subsurface (Earth Tech 2008).

4.3.2 REGULATORY SETTING

Federal and State laws that may be relevant to the Project are identified in Table 4.0-1 and in more detail below, along with regional and local laws, regulations, and policies.

San Francisco Bay Basin Water Quality Control Plan 2013

The Basin Plan (2013) is the primary policy document that guides the SFBRWQCB. The Porter-Cologne Water Quality Act (see above) requires the development and periodic review of Water Quality Control Plans (Basin Plans) that designate beneficial uses of

California's major rivers and groundwater basins and establish numerical WQOs for those waters. The SFBRWQCB is actively working toward numerical sediment objectives that will ensure the protection of all current and potential beneficial uses. In January 2004, amendments to the Basin Plan were adopted that included application of California Toxic Rule water quality criteria and definitions in lieu of Basin Plan Water Quality Objectives, update of Basin Plan provisions relating to implementation of water quality standards, and several non-regulatory updates. The Basin Plan applies to point and nonpoint sources of waste discharge to the San Francisco Bay, but not to vessel wastes or the control of dredge material disposal or discharge. The Basin Plan includes the San Francisco Bay region and portions of the San Joaquin Delta. The 2013 version of the Basin Plan and associated amendments were approved on June 29, 2013.

NPDES Permitting

The WQOs are achieved primarily through effluent limitations embodied in the NPDES permitting program. The SFBRWQCB has NPDES permit authority on any facility or activity that discharges waste into the San Francisco Bay. Effluent limits are contained within the NPDES permit; the discharge of process wastewater containing constituents in excess of the limits stated within the NPDES permit is prohibited.

There are two types of industrial NPDES permits: Individual and general. A general permit is developed to cover multiple facilities with specific categories. The general NPDES permit regulates certain classes of activities under the Industrial Activities General Permit adopted by the SWRCB on April 17, 1997 (WQO 97-03-DWQ NPDES Permit No. CAS000001). SWRCB Order No. 97-03-DWQ is expired and its replacement is currently undergoing public review with adoption scheduled for early 2014. An individual permit is unique to each facility. The limitations and requirements in an individual permit are based on the facility's operations, type and amount of discharge and receiving stream. The Refinery, which includes the onshore Amorco Tank Farm, is subject to site-specific Waste Discharge Requirements under NPDES individual permit No. CA0004961, Order No. R2-2010-0084. To comply with a NPDES permit, facility operators are required to submit a Notice of Intent, develop a Storm Water Pollution Prevention Plan (SWPPP), conduct stormwater monitoring, and submit annual stormwater reports by July 1 of each year.

Tesoro is required under R2-2010-0084, Special Provision 4.c to address elevated levels of total suspended solids in stormwater runoff. To comply with this special provision, Tesoro's SWPPP includes measures (e.g., rip-rap, soil removal, or installation of hay bales) and an implementation schedule to minimize solids in stormwater runoff. Most of Tesoro's stormwater runoff is collected and controlled through a series of ponds and canals. This runoff, combined with treated process wastewater, is referred to in the NPDES permit as discharge E-001. Two other stormwater discharges, E-003 and E-004, are also controlled and identified under the NPDES permit. Prior to release, these two discharges are directed through passive treatment processes consisting of settling storage ponds and launderer systems. (Launderers are L-shaped overflow pipes that draw water from below the surface, thereby allowing any potential oil contamination to remain in the holding pond or ditch and be skimmed off and removed.) An E-002 discharge does not currently exist at the Refinery. Other permitted stormwater outfalls include eight with the designation E-005 and one designated as E-006. The stormwater from the Amorco Terminal is discharged from E-001.

Long-term Management Strategy for Dredging 2001

The San Francisco Bay LTMS is a cooperative effort of the USEPA, USACE, RWQCB, and BCDC to develop an economically and environmentally sound approach to dredging and dredged material disposal in the San Francisco Bay Area. The LTMS established an interagency Dredged Material Management Office (DMMO), which serves as a central regulatory location for dredging permit applications. The purpose of the DMMO is to review sediment quality sampling plans, analyze the results of sediment quality sampling, and make suitability determinations for material proposed for disposal in the San Francisco Bay Area.

The major goals of the LTMS are to: (1) maintain, in an economically and environmentally sound manner, those channels necessary for navigation in the San Francisco Bay/Estuary while eliminating unnecessary dredging activities; (2) conduct dredged material disposal in the most environmentally sound manner; (3) maximize the re-use of dredged material as a resource; and (4) establish a cooperative permitting framework for dredging and disposal of dredged materials.

San Francisco Bay Plan 2008

The San Francisco Bay Plan (Plan) (BCDC 2008) addresses the expected impacts of climate change in San Francisco Bay. Sea-level rise risk assessments are required when planning shoreline areas or designing larger shoreline projects. If sea-level rises and storms that are expected to occur during the life of the project would result in public safety risks, the project must be designed to address flood levels expected by mid-century. If it is likely that the project will remain in place longer than mid-century, the applicant must have a plan to address the flood risks expected at the end of the century. Risk assessments are not required for repairs of existing facilities, interim projects, small projects that do not increase risks to public safety, and infill projects within existing urbanized areas. Risk assessments are only required within the BCDC's jurisdiction, which includes San Francisco Bay, the 100-foot shoreline band, salt ponds, managed wetlands, and certain other waterways and marshes. The Plan specifies that "pipelines and piers may be built over marshes." Policies within the Plan indicate that "pipeline terminal and distribution facilities near the San Francisco Bay should generally be located in industrial areas" and that "marine terminals should also be shared as much as possible among industries and port uses."

4.3.3 IMPACT ANALYSIS

4.3.3.1 Significance Criteria

For the purposes of this analysis, an impact was considered to be significant and to require mitigation if it would degrade water quality in any of the following ways:

- Violate water quality standards, objectives, or criteria
- Violate waste discharge requirements
- Increase contaminant levels in the water column or sediment, so as to potentially cause harm to marine organisms
- Create long-term chemical or physical changes in the receiving environment of the site, area, or region so as to impair beneficial uses of the receiving water
- Create or contribute to runoff that would increase contamination or cause physical or chemical changes in receiving waters so as to impair beneficial uses or potentially cause harm to marine organisms

4.3.3.2 Assessment Methodology

Impacts of the proposed Project to San Francisco Bay/Estuary were assessed by comparing existing conditions to potential changes from ongoing Project operation. Where existing site-specific or nearby water quality data were available or modeled, and where published WQOs were available, impacts were quantified to the extent feasible.

4.3.3.3 Impacts Analysis and Mitigation Measures

The following subsections describe the Project's potential impacts on water quality. Where impacts are determined to be significant, feasible mitigation measures (MMs) are described that would reduce or avoid the impact.

Proposed Project

Impact Water Quality (WQ)-1: Degrade water quality as a result of maintenance dredging. (Less than significant.)

Water quality impacts from dredging activities are two-fold: (1) suspension of bottom sediments and associated water quality changes in the water column (LFR 2004), and (2) associated release of contaminants deposited within disturbed sediments (Eggleton and Thomas 2004). Water quality effects of dredging activities include: Increases in turbidity and suspended solids; changes in salinity, temperature, and pH; reduced dissolved oxygen (DO); and releases of heavy metals and organic contaminants sorbed to the sediment matrix (Connor et al. 2004).

The ship berthing area north of the Amorco Terminal is dredged periodically on an as-needed basis to maintain a depth of approximately 48 feet below MLLW. Bathymetric surveys are performed quarterly to determine when maintenance dredging is required. As discussed in Section 4.3.1.2, the Project area is subject to high-velocity tidal currents in the Carquinez Strait, which tend to keep the bottom clean and relatively smooth, reducing the frequency of maintenance dredging required (Tesoro 2002). The last dredging event at the Amorco Terminal was performed in 2005 and involved the removal of 500 cubic yards of dredged material. Maintenance dredging is scheduled sufficiently in advance to ensure compliance with applicable permits and to conduct appropriate assessments prior to execution.

During dredging activities, bottom sediments are temporarily suspended in the water column, potentially causing increases in turbidity. High turbidity results in low levels of transmitted light and can negatively affect functioning of light-dependent organisms such as phytoplankton. Turbidity changes induced by dredging would only result in adverse environmental effects when the turbidity generated is significantly larger than the natural variation of turbidity and sedimentation rates in the area (Orpin et al. 2004). For maintenance dredging, the extent of these environmental affects is local and temporary, generally only lasting as long as dredging operations are taking place (IADC and CEDA 1998)

In the San Francisco Bay tidal currents, wind-waves, circulation, and weather activities re-suspend sediments in shallow areas and transport suspended particles to other locations (Schoellhamer 2002). As discussed in Section 4.3.1.2, the Carquinez Strait is a narrow, tidally influenced body with high average current velocities throughout the year, and is turbid from high suspended sediment loads. Studies of suspended sediment concentrations within San Pablo Bay indicate that natural processes have a substantially greater influence on turbidity within San Pablo Bay than observed dredging operations (Schoellhamer 2002). The Bay Basin Plan WQOs specify that Bay waters shall be free of changes in turbidity that cause nuisance or adversely affect beneficial uses (SFBRWQCB 2013). The occasional and temporary increased levels of turbidity caused by Project dredging activities are expected to less than those created by natural processes, resulting in a minor to negligible environmental impact.

Dredging can temporarily reduce DO concentrations in the water column. Reduced DO concentrations would be expected to be localized and short term, with minimal impacts (U.S. Navy, 1990). In general, DO issues are less likely in well-oxygenated waters such as those of San Francisco Bay, which generally range from 9 to 10 milligrams per liter (mg/L) during periods of high river flow, 7 to 9 mg/L during moderate river flow, and 6 to 9 mg/L during the late summer months when flows are lowest (SFEI 1994). The reduction of DO during dredging is expected to be minimal (1 to 2 mg/L) and transitory in surface waters, but can be more acute in bottom waters, with an estimated reduction of up to 6 mg/L for four to eight minutes (USACE et al. 1998). Most estuarine organisms are capable of tolerating reduced DO conditions for short periods (U.S. Navy 1990). The narrative Basin Plan WQO for DO states that tidal waters downstream of the Carquinez Bridge shall not be depressed below 5 mg/L. Dredging activities are generally not expected to reduce the DO concentration below the WQO, except possibly for very short periods; therefore, DO issues in San Francisco Bay due to dredging impacts are likely limited.

Dredging and dredged material disposal can release sediment-associated metals and other pollutants by desorption and dispersion within the resulting sediment plume (Eggleton and Thomas 2004, LFR 2004). Bottom sediments often contain high concentrations of settled contaminants. Disturbing sediments through activities such as dredging can reintroduce these compounds into ecosystems, increasing concentrations in water and aquatic life. Contaminated sediments are not distributed evenly in the San Francisco Bay, but tend to be present in localized areas. Trace metals, pesticides, and numerous organic contaminants are monitored for Bay sediments through the RMP. Table 4.3-5, which presents the RMP sediment results for Suisun Bay, shows that sediments near the Project area are below ambient concentrations. The sediment sampling results for Suisun Bay exceed the ER-L and ER-M for nickel; however, the ambient Bay concentration also exceeds these thresholds. Pollutant concentrations in sediments tend to be highest in harbors, harbor entrances, marinas, and industrial waterways, and lowest in the central portions of the embayments. As indicated in Section 4.3.1.2, no known toxic hot spots are located near the Project area.

Dredged material disposal in San Francisco Bay is regulated by the DMMO. This interagency group evaluates the physical and chemical characteristics of the dredged sediments to make sure that they are compatible for in-water disposal in the San Francisco Bay. As part of the DMMO dredging permit requirements, proposed dredging locations are required to be sampled and tested to determine the existence and extent of any contamination and to determine suitability for disposal. Future Project dredged sediment disposal would be managed in accordance with the LTMS for Placement of Dredged Material in the San Francisco Bay Region (USACE et al. 2001). Because the effects of dredging and dredged material disposal on water quality are transitory and because sediment composition is evaluated by the DMMO before a dredging permit is issued, the impacts of Project maintenance dredging on water quality are determined to be less than significant.

Mitigation Measure: No mitigation required.

Impact WQ-2: Degrade water quality as a result of sediment disturbance from vessel maneuvers. (Less than significant.)

Amorco Terminal operations can affect water quality if vessels maneuvering in the immediate vicinity of the wharf erode or disturb bottom sediments. During operations, a ship's propeller generates a turbulent continuous stream of fast moving water flow known as propeller wash, which can impinge directly on the seabed by eroding sediments and potentially damaging benthic communities.

Between 2008 and 2012, an average of 69 tankers visited the Amorco Terminal per year. These vessels are assisted by tugs in berthing and unberthing operations. The number of tugs used in docking or maneuvering of vessels depends on the size of the vessel and environmental conditions. Tankers are more likely to create turbulence that can erode bottom sediments because the large propellers on these ships are closer to the seafloor as they travel through San Francisco Bay. The propeller wash from tugs is nearer the surface so it has less of an erosion effect on bottom sediments. Tesoro performs annual hydrographic surveys of the seafloor surrounding the Amorco Terminal, and sediments appear to be hydrodynamically stable (Tesoro 2002).

The transit of deep-draft vessels through San Francisco Bay to the Amorco Terminal can also re-suspend sediments and benthic biota in the water column where bottom depths are near that of the vessel draft. Depending on the depth of propeller wash scour, re-suspension could cause a brief, localized depression in DO concentrations. However, as discussed in Impact WR-1, this increase in turbidity would disperse rapidly with the strong tidal currents in the area, and be rapidly mitigated by tidal mixing with San Francisco Bay waters of high DO concentration.

Overall, because the effects of vessel maneuvers on water quality are expected to be localized and transitory, and managed during berthing and unberthing by the use of tugs, impacts from propeller wash are considered to be less than significant.

Mitigation Measure: No mitigation required.

Impact WQ-3: Degrade water quality by the discharge of segregated ballast water. (Significant and unavoidable.)

Ballast water is used to stabilize large vessels, including tankers and barges, and is taken up to compensate for the vessel lightering as crude oil and other cargo is delivered. Although a large proportion (over 80 percent) of voyages to California waters retain all ballast water on board, vessels do discharge ballast water for either operational or safety purposes (CSLC 2013e). Segregated ballast water is kept in tanks that are separated from oily cargo. Non-segregated ballast water is considered a hazardous waste in California and cannot be discharged into the San Francisco Bay or coastal waters. Vessels may discharge properly managed, segregated ballast water from segregated ballast tanks into San Francisco Bay as they take on product from the Amorco Terminal. The discharged ballast water has the potential to contain a variety of harmful substances, most notably nonindigenous aquatic species.

As discussed in Section 2.0, vessels take on, discharge, and redistribute ballast water during cargo loading and unloading. Ships routinely take on ballast water after cargo is unloaded in one port, and later discharge the ballast water when cargo is loaded at another port. This exchange of ballast water from one port to another may result in the transport of numerous organisms from one region to another. The introduction of nonindigenous aquatic species via ballast water (and vessel biofouling, discussed in Impact WQ-5) has impacted the aquatic communities of the San Francisco Bay Estuary. The problems of nonindigenous aquatic species introductions are discussed in detail in Section 4.2, Biological Resources. Ballast water is a major ship-based introduction vector and is one of the primary vectors by which nonindigenous aquatic species enter the coastal waters of California (CSLC 2013e). Vessels that discharge ballast water to the marine environment are required to conform to ballast water management measures promulgated by State and federal regulations. Section 2.3.3 provides additional information regarding ballast water regulations. The U.S. Coast Guard (USCG), USEPA, and CSLC administer ballast water laws, regulations, and/or permits.

The USCG regulates ballast water through the National Invasive Species Act. In 2004, the USCG issued final mandatory ballast water management regulations that required any vessel with ballast water entering United States waters from outside the United States Exclusive Economic Zone to either conduct mid-ocean ballast water exchange, retain the vessel's ballast water onboard, or use an alternative control method approved by the USCG. 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. USCG also amended its regulations for engineering equipment by establishing an approval process for ballast water management systems.

Ballast water discharges from non-recreational vessels greater than 79 feet or equal in length are further regulated by the USEPA, through the NPDES Vessel General Permit (VGP), which is written to include existing USCG management and ballast water exchange requirements. Effective December 19, 2013, the VGP will contain new numeric limits for the concentration of living organisms in discharged for most vessels. As required by the VGP, all owner/operators of vessels equipped with ballast water tanks must maintain a ballast water management plan. The best management practices (BMP) for ballast water designated in the VGP include: Restricting discharges to only those essential to the operation of the vessel, removal of sediment from ballast tanks in mid-ocean or at dry-dock, avoiding ballast water uptake in areas of known pathogens, conducting mid-ocean ballast exchanges, and retaining all ballast water on board while in United States waters.

To inhibit the introduction and spread of nonindigenous aquatic species in California, the Coastal Ecosystems Protection Act of 2006 (Senate Bill [SB] 497; refer to Section 4.2, Biological Resources, for a description of this regulation) established performance standards for the discharge of ballast water, which are administered by the CSLC. Per regulations, vessels have four options to comply with California's performance standards, including: (1) retention of all ballast water on board, (2) use of an alternative ballast water management method, such as potable water, (3) discharge to an approved shore-based ballast water reception and treatment facility, and (4) treatment of all ballast prior to discharge by a shipboard ballast water treatment system. The performance standards regulations will be implemented gradually based on a vessel's ballast water capacity and year of construction. In a recent study, the CSLC determined that there are no the shipboard ballast water treatment systems currently available to meet all of California's performance standards for the discharge of ballast water (CSLC 2013e). Mid-ocean exchange of ballast water is considered an interim measure to reduce the introduction of nonindigenous aquatic species until effective treatment technologies are developed (Falkner 2003).

Although ballast water discharges are conducted in accordance with effective management practices and are administered by State and federal regulations, risk of nonindigenous aquatic species introduction to San Francisco Bay cannot be completely eliminated. The discharge of ballast water containing harmful organisms could impair the beneficial uses of the Project area and significantly degrade water quality.

Mitigation Measure:

MM WQ-3: Advise vessels of applicable standards and regulations (also see WQ-5). Tesoro shall advise both agents and representatives of shipping companies having control over vessels that have informed Tesoro of plans to call at the Amorco Terminal about the Coastal Ecosystems Protection Act of 2006 and associated implementing regulations.

Impact WQ-4: Degrade water quality as a result of discharge of cooling water, sanitary wastewater, bilge water, non-segregated ballast water, or other liquid wastes. (Less than significant.)

In addition to segregated ballast water, a vessel berthing at the Amorco Terminal may discharge cooling water from the ships' operating systems. Cooling water flows through the main engines and auxiliary equipment operating during the time the ships are berthed.

The SWRCB has adopted a Water Quality Control Plan for Control of Temperature in the Coastal and Interstate Waters and Enclosed Bays and Estuaries of California (Thermal Plan), which contains WQOs for coastal and interstate surface waters as well as enclosed bays and estuaries. The Thermal Plan specifies that no discharge to enclosed bays shall cause a surface-water temperature rise greater than 4°F above the natural temperature of the receiving waters at any time or place (SWRCB 1998). The volume of these cooling water flows is small compared to the tidal flow past the Amorco Terminal. Cooling water discharges on water quality would be less than significant, as the increase in water temperature would be quickly absorbed by the ambient temperature, and would not be expected to exceed the limitation in the Thermal Plan.

The California Clean Coast Act (SB 771) of 2005 prohibits the discharge of hazardous wastes, other wastes, or oily bilge water into California waters, and also prohibits the discharge of greywater and sewage from vessels with sufficient holding-tank capacity or from vessels capable of transferring wastewater to onshore facilities. The California Clean Coast Act requires that all vessels visiting California in 2006 submit a report describing their capability to store greywater and sewage, and providing information on their marine sanitation devices to the CSLC. Any discharges must also comply with the VGP and specific discharge limits for contaminants identified in the VGP. Non-segregated ballast water is considered a hazardous waste in California, and discharge is prohibited. Vessels are not allowed to offload trash, and additionally, no hull cleaning occurs at the Amorco Terminal.

The Amorco Terminal has the ability to receive oily ballast water or bilge water, which can be conveyed onshore via piping to tankage dedicated to the handling of ballast and residue liquids. The oily waste can be subsequently treated in the Refinery's Wastewater Treatment Plant (WWTP). Although this capability exists, ship operators and Tesoro typically cooperate to minimize the amount of oily ballast and/or bilge water sent to the WWTP, and the Amorco Terminal will typically receive such water only during emergency situations. Disposal of these wastes is the responsibility of the ship and is handled by a contract disposal service. Therefore, except for the unlikely case of a spill during transfer, none of these wastes would have any impact on water quality in the Project area.

Mitigation Measure: No mitigation required.

Impact WQ-5: Degrade water quality as a result of vessel biofouling. (Significant and unavoidable.)

Vessel biofouling occurs when organisms attach to the hull and other wetted surfaces of a vessel. When vessels move from port to port, biofouling communities are transported along with their "host" structure. Biofouling organisms can be introduced into these new areas when they reproduce, drop off, or are knocked off of the vessel.

Within California, up to 60 percent of the established nonindigenous aquatic species are considered to have been introduced through vessel biofouling (Ruiz et al. 2011). Even vessels that may be well maintained and that have little to no biofouling present on the hull can still represent a potential for nonindigenous aquatic species impact through biofouling of certain niches in the vessel. The effects of vessel biofouling are further discussed in Section 4.2, Biological Resources. As indicated in Section 4.2, Impact BIO-7, biofouling by commercial ships has been identified as one of the most important mechanisms for marine nonindigenous aquatic species introductions in North America .

According to Section 502 of the CWA, invasive species meet the definition of "pollutant" because they are "biological materials…discharged into water," and they impair or threaten to impair the full range of designated beneficial uses of waterbodies in the San Francisco Bay. The San Francisco Bay/Estuary is one of the most invaded estuaries in the world (Molnar et al. 2008). The San Francisco Bay has approximately 85 nonindigenous aquatic species currently in its waters, 66 percent of which are considered harmful (Molnar et. al. 2008). Both Suisun Bay and the Carquinez Strait are identified as impaired for invasive species.

The CSLC regulates vessel biofouling under the Marine Invasive Species Act of 2003 (MISA). In 2008, the CSLC initiated the requirement of annual submittal of the Hull Husbandry Reporting Form for vessels operating in State waters. In an effort to reduce introductions of nonindigenous aquatic species via vessel biofouling, data reported in the Husbandry Reporting Forms have been used in conjunction with CSLC-sponsored research to develop biofouling management requirements. The CSLC will propose new regulations to further vessel biofouling management standards, requiring vessels of 300 gross registered tons or greater to maintain a vessel-specific biofouling management plan, biofouling management logbook, and use anti-fouling systems to prevent or reduce organism attachment to vessel structures. Tesoro has no control over, ownership of, or authority to direct vessels that berth at the Amorco Terminal; therefore, details regarding how calling vessels manage biofouling cannot be provided as part of the Project (see Section 2.0, Project Description). The vessels would be governed by the applicable CSLC requirements for biofouling management, which would reduce the potential impact of aquatic species invasion from biofouling. Under MM WQ-5 (below) and MM BIO-7a, Tesoro would ensure that vessels seeking to call at the Amorco Terminal are advised of the MISA and are complying as required by the CSLC.

While regulations and provisions have been helpful in reducing the potential of new nonindigenous aquatic species introductions from hull fouling, existing standards and measures are not completely effective. The introduction of additional harmful organisms may impair several of the Project area's beneficial uses. Therefore, the introduction of new nonindigenous aquatic species via vessel biofouling as a result of continued Amorco Terminal operation could pose potential significant and unavoidable adverse impacts to water quality.

Mitigation Measure:

MM WQ-5: Ensure vessels regarding compliance with applicable regulations and standards (also see MM BIO-7a). Tesoro shall prepare, and maintain current, a fact sheet and provide it to all vessels calling at the Amorco Terminal to ensure that they are informed of applicable regulations and standards associated with the prevention of biofouling. Prior to allowing berthing at the Terminal, Tesoro will confirm with vessels that they are in compliance with the Marine Invasive

Species Act (MISA), including completion of MISA-required paperwork. Tesoro shall ensure that all vessels submit required reporting forms, as applicable for each vessel prior to the vessel's entry into San Francisco Bay or in the alternative, at least 24 hours prior to the vessel's arrival at the Amorco Terminal.

Impact WQ-6: Degrade water quality due to anti-fouling paints used on vessel hulls. (Significant and unavoidable.)

Marine anti-fouling paints or coatings are used to reduce nuisance algal and marine growth on ships. Biofouling can significantly affect the drag of the vessel through the water, reducing its fuel economy. (Refer to Impacts WQ-5 and CUM-BIO-4 for discussions on the environmental impacts associated with biofouling.) Anti-fouling coatings incorporate biocides such as copper, sodium chloride, and zinc as the active ingredients. The International Convention on the Control of Harmful Anti-fouling Systems on Ships went into force in January 2008. It prohibits and restricts application, re-application, installation, or use of harmful anti-fouling paints on ships, especially those containing harmful organotins, such as tributyltin (TBT). Ninety percent of biocide-based coatings on oil tankers entering California's waters are copper-based, and approximately 8 percent use biocide-free coatings (CSLC 2009). Biocide-free coatings generally contain silicon, which increases the slickness of the hull, so biofouling organisms fall off as the vessel travels at speed.

The VGP requires certain management practices, and places technology-based and water-quality based limits on hull leachates. No coatings may contain materials banned from use in the United States. When coatings are reapplied, biocides with the lowest release rate must be used, and the application of organotins is explicitly prohibited as discussed above. Vessels that are currently coated with TBT must have it removed or overcoated. Because of the restrictions on the use of biocides that leach into seawater, tankers arriving at the Amorco Terminal during the upcoming lease term would not represent a significant ongoing source for biocides in the Amorco Terminal's waters.

As a best management practice, Tesoro shall require representatives of vessels berthing at the Amorco Terminal to provide documentation certifying that their vessel is in compliance with the 2001 International Maritime Organization Convention on the Control of Harmful Anti-fouling Systems on Ships and other applicable regulations. Adherence to this resolution would help minimize local water quality impacts.

The concentration of copper and zinc in water and sediment in the vicinity of the Project are below the WQOs, ambient sediment concentrations, and the ER-L and ER-M (see Tables 4.3-2, 4.3-4, and 4.3-5). Suisun Bay and the Carquinez Strait are listed as impaired waterbodies on the CWA 303(d) list; however, copper and zinc are not among the identified contaminants of impairment. Although the continued vessel traffic in the Carquinez Strait and Suisun Bay is unlikely to cause a measurable increase in copper or zinc concentrations above WQOs or ambient levels, some leaching will always occur. Although the use of anti-fouling paint containing TBT was discontinued in 2008, there is still potential that vessels with old applications of TBT on their hulls could visit the Amorco Terminal. The use of these substances on vessels associated with the Amorco Terminal is considered to be a significant adverse impact to water quality that cannot be mitigated to less than significant.

Mitigation Measure:

MM WQ-6: Inform Vessels calling at the Amorco Terminal of the ban on Tributyl Tin (TBT). Tesoro shall prepare, and maintain current, a fact sheet and provide it to all vessels calling at the Amorco Terminal to ensure that they are informed of the requirements of the 2008 International Maritime Organization prohibition of TBT applications to vessel hulls. Prior to allowing berthing at the Terminal, Tesoro will confirm with vessels that they are in compliance with the Marine Invasive Species Act (MISA), including completion of MISA-required paperwork. Tesoro shall ensure that all vessels submit required reporting forms, as applicable for each vessel prior to the vessel's entry into San Francisco Bay or in the alternative, at least 24 hours prior to the vessel's arrival at the Amorco Terminal.

Impact WQ-7: Degrade water quality as a result of cathodic protection on vessels. (Less than significant.)

Tankers and barges calling at the Amorco Terminal are made of steel that requires cathodic protection. Many of these vessels have a coal tar-epoxy coating on their hull that insulates them from saltwater. Tankers often use an impressed current system for cathodic protection. Barges typically use sacrificial zinc anodes for cathodic protection. The slow leaching of zinc anodes may increase the concentration of zinc in the waters at the Amorco Terminal, but due to the slow rate of exchange of the anodes to seawater, it is considered to be negligible in comparison to ambient zinc in the marine environment. Water and sediment quality with regard to zinc is further discussed in Impact WQ-6. The impact of cathodic protection on water quality is considered less than significant.

Mitigation Measure: No mitigation required.

Impact WQ-8: Degrade water quality as a result of stormwater runoff from the wharf. (Potentially significant.)

Stormwater runoff from the Amorco Terminal may contribute pollutants to the San Francisco Bay. As described in Section 2.3.2, a drip pan or catch basin provides stormwater and surface liquid containment at the unloading manifold area of the Amorco Terminal. All transfer areas (e.g., work areas around risers, loading arms, hydraulic systems) are protected by berms. Stormwater and incidental spills are collected and drained to a recovery tank (also known as the slops tank) located under the transfer berth on the east end of the wharf. The tank is double-walled and has a 500-gallon capacity. The slops tank is equipped with a sump pump that is automatically activated as the level in the tank rises. There is an auxiliary pump in case the primary sump pump fails. The slops tank is protected from overflow by level-control instrumentation, including visual and audible high-level alarms. Testing of the slops tank overfill system is performed monthly and documented appropriately.

Collected runoff from the Amorco Terminal is combined with process waters and pumped to the Refinery WWTP for full treatment, and is ultimately discharged to Suisun Bay via permitted outfall E-001. Activities at the Amorco Terminal are subject to NPDES Permit CA0004961, Waste Discharge Requirements Order No. R2-2010-0084 issued by the SFBRWQCB. Pursuant to its NPDES permit, Tesoro has prepared a SWPPP, which includes the onshore operations at Amorco Terminal. The SWPPP does not specifically address the potential for pollutant input from the wharf (Tesoro 2011).

On non-bermed areas of the wharf, there is potential for contaminants to accumulate on surfaces from routine vehicle use, maintenance activities, and daily operations. Project activities require the transport and handling of hazardous materials such as fuels, oils, and waste products for operation and maintenance of facility equipment. Hazardous materials that accumulate on surfaces of the Amorco wharf would likely flow into the San Francisco Bay during storm events. However, the potential for adverse effects is less than significant with the combination of compliance to regulations regarding the management of hazardous materials and the existing secondary containment facilities in place at the Amorco Terminal.

Mitigation Measure:

MM WQ-8: Amend existing Stormwater Pollution Prevention Plan (SWPPP). Tesoro shall append the existing SWPPP to include specific Best Management Practices (BMPs) to protect stormwater runoff from the wharf area. BMPs shall be designed to reduce the input of contaminant to the San Francisco Bay and prevent leaks and spills during routine activities.

Impact WQ-9: Degrade water quality as a result of oil leaks and spills during unloading. (Significant and unavoidable.)

Accidental releases of petroleum products during loading and unloading operations at the Amorco Terminal could contaminate the surrounding surface water with floating product. Petroleum products present in Bay waters would likely exceed the Basin Plan water quality objective for oil and grease, which comprises any visible film or coating on the surface of the water or on objects in the water that cause nuisance or that otherwise adversely affect beneficial uses.

Accidental oil spills directly to the San Francisco Bay could occur during unloading operations. When introduced in the marine environment, the oil goes through a variety of transformations involving physical, chemical and biological processes. Physical and chemical processes, which begin soon after petroleum is spilled into surface waters, include evaporation, spreading, emulsification, dissolution, sea-air exchange, and sedimentation. Chemical oxidation of some of the components of petroleum is also induced in the presence of sunlight. The degraded products of these processes include floating tar lumps, dissolved and particulate hydrocarbon materials in the water column, and materials deposited into bottom sediments and the shoreline. Biological processes are generally slower than physical or chemical processes, and include degradation by microorganisms and uptake by large organisms and subsequent metabolism.

Release scenarios at the Amorco Terminal are presented in Impact OS-1 in Section 4.1, Operational Safety/Risk of Accidents. The consequences of a spill on water quality would depend on the size of the spill, the effectiveness of the response effort, and the biological, shoreline, water resources affected by the spill. A small spill of 1 gallon or less would result in an impact that can be mitigated, while a large spill of 1,000 barrels (42,000 gallons) most likely would result in a significant, adverse impact that would have residual effects after cleanup. The impacts of spills between 1 gallon and 1,000 barrels (42,000 gallons) depend on the effectiveness of response efforts and the resources impacted. As discussed in Section 4.1, Operational Safety/Risk of Accidents (refer to Impact OS-1), the probability of a release greater than 1,000 barrels at the Amorco Terminal is approximately 0.01, or one release approximately every 73 years, which is longer than the proposed lease extension of 30 years.

Oil spill trajectory modeling has been performed to evaluate the extent of impacts from a reasonable worst-case discharge of 22,178 barrels at the wharf. As indicated in Section 4.1, Operational Safety/Risk of Accidents, Impact OS-1, the maximum most probable discharge is 1,200 barrels. The figures in Appendix B show the worst-case spill modeled for both summer and winter conditions. The greatest shoreline impact occurs during the winter season, with impacts to the northern reaches of Honker, Suisun, and Grizzly Bays, and further propagation outside of the Carquinez Strait into San Pablo Bay.

Tesoro's Oil Spill Response Plan (OSRP) and Manual, last updated in November 2012, provides spill prevention measures and protocol in the event of an accidental release. All exposed piping, valves, and flanges are inspected during loading/unloading operations to check for leaks. Drip pans are placed beneath areas with high potential for leaks, such as hose and pipe connections. The drip pans discharge directly to the slops tank installed beneath the wharf. As described in Impact WQ-8, the 500-gallon slops tank is constructed of steel, double-walled and internally coated. An electronic gauging system is provided to determine the level in the tank, and a high alarm will sound if the tank is overfilled. The sump pump for the tank is activated automatically when the volume in the tank reaches a programed level. An auxiliary pump is installed in case the primary pump fails. Incidental spills collected in the slops tank are pumped onshore via the 20-inch diameter crude oil pipeline or 4-inch slops pipeline to the Refinery's WWTS.

As described in Section 2.6.4 and Section 4.1.1.4, the Amorco Terminal has oil spill-response equipment available in the event of a release into the San Francisco Bay. The Amorco wharf has two boom reels, one on the east and one on the west end of the wharf. Each reel contains 1,200 feet of 8-inch by 24-inch containment boom with universal connections. Tesoro has employed Bay Area Ship Services to ensure that a minimum of 600-foot boom can be deployed within approximately 30 minutes to contain a spill. Tesoro also contracts with Marine Spill Response Corporation to serve as the primary spill-response contactor. The containment and cleanup capability at the Amorco Terminal is further detailed in Section 4.1, Operational Safety/Risk of Accidents.

The Amorco Terminal is subject to regulations promulgated by the USEPA that require the preparation of a Spill Prevention Control and Countermeasure Plan (SPCCP) and regulations adopted by both the USEPA and the California Department of Fish and Wildlife's (CDFW) Office of Spill Prevention and Response (OSPR) covering the development and maintenance of oil spill response and contingency plans. Plans have been prepared in accordance with these regulatory requirements for the Amorco Terminal. In addition, Tesoro has a Wharf Operations Manual governing Amorco Terminal operations, including spill prevention. The OSPR also requires a Certificate of Financial Responsibility to demonstrate that it has adequate financial resources to pay cleanup and damage costs arising from an oil spill. Contingency planning and response measures for oil releases as discussed in Section 4.1, Operational Safety/Risk of Accidents, would be implemented, per regulations, to minimize this impact to the extent feasible and practicable.

Tesoro has contingency planning and response measures for oil releases in place, including a SPCCP (2012), Amorco Marine Oil Terminal OSRP (2012), and SWPPP (2011). Additionally, the CSLC has developed the Marine Oil Terminal Engineering and Maintenance Standards (MOTEMS), which apply to all existing and new marine oil terminals in California. MOTEMS includes criteria for inspection, structural analysis and design, mooring and berthing, geotechnical considerations, fire, piping, mechanical, and electrical systems. Refer to Section 4.1, Operational Safety/Risk of Accidents, for a more comprehensive discussion on MOTEMS and spill-prevention practices.

As discussed above, operational protocols proposed by Tesoro are designed to minimize the potential for accidental releases, and existing improvements include the use of secondary containment for all anticipated Amorco Terminal drips and small releases. However, even strict adherence to these protocols and spill response measures cannot guarantee that no contaminants would ever be released. The probability of a serious spill occurring would be minimized to the extent feasible with mitigation measures OS-1a, OS-1b, and OS-1c, but the risk cannot be eliminated. Consequences of a spill would depend on the spill conditions and could range from relatively small spills that can be contained during first-response efforts with rapid clean up and no significant impacts, to spills that are larger or difficult to clean up with significant residual impacts after mitigation. Even with the implementation of contingency planning and response measures for oil spills, a spill could spread over a large area and impact water quality to the San Francisco Bay. In such a case, impacts to water quality would be significant and unavoidable.

Mitigation Measure: No additional mitigation measures available.

Impact WQ-10: Degrade water quality due to oil releases from vessels in transit in the San Francisco Bay or along the outer coast. (Significant and unavoidable.)

The fate and water quality impacts of oil spills associated with vessel transit in the San Francisco Bay or along the outer coastline are similar to the effects described in Impact WQ-9. However, a larger oil spill is more likely from accidents associated with vessels in transit than from a spill during the controlled conditions of unloading at the Amorco Terminal. Most tanker spills/accidents that occur in transit are larger spills that cannot be quickly contained, and would result in significant and unavoidable impacts.

As presented in Impact OS-4 in Section 4.1, Operational Safety/Risk of Accidents, the probability of a release in the San Francisco Bay from a tank vessel transiting to the Amorco Terminal is equivalent to one spill ever 10,400 years. Modeling results presented in Impact OS-4 and in Appendix B, indicate that if a release occurs, probabilities of exceeding the level of concern (approximately 50 gallons present in 1 square nautical mile, as pre-defined in the modeling program) range from 75 to 100 percent along the shoreline east and west of the Carquinez Bridge in both summer and winter, with higher probabilities of exeedance extending into San Pablo Bay and Suisun Bay during winter months.

All tanker companies operating within California waters must demonstrate by signed contract to the USCG and CDFW that they have the necessary response assets to respond to a worst-case release as defined under federal and State regulations. While

Tesoro does not have legal responsibility for tankers it does not own, it does have responsibility to participate in improving general response capabilities.

Mitigation Measure: No additional mitigation measures available.

Alternative 1: No Project

Impact WQ-11: Degrade water quality during decommissioning of the Amorco Terminal. (Less than significant.)

This alternative would eliminate the water quality impacts associated with operations at Amorco Terminal. Under the No Project Alternative, the lease would not be renewed and the existing wharf would be decommissioned, with all of its components abandoned in place or removed. The effects on water quality during decommissioning, such as sediment disturbance or risk of leaks from construction equipment, would result in temporary, adverse, but less than significant impacts on water quality.

Mitigation Measure: No mitigation is required.

Impact WQ-12: Degrade water quality due to accidental spills from rail cars, trucks, and/or pipelines. (Significant and unavoidable.)

This alternative assumes that the Amoco lease would not be extended. Golden Eagle Refinery operations would be more dependent on crude oil receipts through various non-marine sources to meet regional refining demands. Land-based transportation options for crude transfer could include rail cars and trucks, and pipeline connections to other Bay Area marine terminals. An uncontained spill or substantial leak from land-based transport may result in a significant impact to water quality. A subsurface pipeline release of crude oil could also migrate upward through preferential soil pathways and appear at the surface, where it would pool and eventually flow downgradient in the direction of Suisun Bay and Carquinez Strait.

Tesoro would implement contingency planning and response measures for oil releases discussed in Impact WQ-8 and Section 4.1, Operational Safety/Risk of Accidents. These measures would provide protection against spills to the extent feasible. However, even with the implementation of contingency planning and response measures, an oil release during transfer, particularly from a pipeline, could spread over a large area and impact water quality. In such a case, impacts would be significant and unavoidable.

Should this alternative be selected, mitigation measures would be determined during a separate environmental review under the California Environmental Quality Act (CEQA).

Impact WQ-13: Degrade water quality due to stormwater runoff during construction. (Less than significant.)

Pipeline and rail delivery may require construction of new pipelines and/or new rail lines. During construction, lubricants, fuels, and other chemicals used for construction machinery could be spilled during normal usage or during refueling. Spilled material could run off into nearby watercourses or storm drains resulting in a significant, adverse impact. Project construction activities would involve trenching, grading, and excavation. Such soil-disturbing activities could cause erosion. If eroded soil were to come in contact with stormwater, runoff may have increased levels of turbidity, and subsequently, additional sedimentation could potentially occur in nearby waterbodies.

Runoff of sediment and contaminants during construction activities would be minimized through compliance with the State General Permit for Discharges of Stormwater Associated with Construction Activity (Water Quality Order 2009-0009-DWQ) and a project-specific SWPPP. Standard stormwater BMPs, such as erosion controls, soil barriers, sedimentation basins, site contouring, and others, would be used during construction activities to minimize runoff of soils and associated contaminants. As a result of BMP implementation, and stormwater management, construction would not be expected to notably degrade stormwater quality or receiving-water quality, and potential impacts would be less than significant.

Mitigation Measure: No mitigation required.

Alternative 2: Restricted Lease Taking Amorco Out of Service for Oil Transport

Impact WQ-14: Degrade water quality due to accidental spills from rail cars, trucks, and/or pipelines. (Significant and unavoidable.)

Refer to Impact WQ-12. Should this alternative be selected, mitigation measures would be determined during a separate environmental review under the California Environmental Quality Act (CEQA).

Impact WQ-15: Degrade water quality due to stormwater runoff during construction. (Less than significant.)

Refer to Impact WQ-13.

Mitigation Measure: No mitigation required.

Cumulative Impact Analysis

Impact CUM-WQ-1 Cause contaminant impacts on San Francisco Bay water quality. (Significant and unavoidable).

The water quality of the San Francisco Bay/Estuary has been degraded by inputs of pollutants from a variety of sources, including point sources such as municipal wastewater and industrial discharges and nonpoint sources such as urban and agricultural runoff, riverine inputs, dredging and dredge material disposal, marine vessel inputs, and inputs from air pollutants, spills, and accidents. In general, stormwater runoff is responsible for the greatest mass loadings of most contaminants (Davis et al*.* 2000).

The sources of contaminants to the San Francisco Bay and the levels of contamination are discussed in detail in Section 4.3.1. The identified stressors or pollutants in Suisun Bay and Carquinez Strait, according to the CWA 303(d) list include: Pesticides, dioxins/furans, mercury, nonindigenous aquatic species , nickel, PCBs, and selenium. Any contribution of these contaminants from Amorco Terminal operations could result in a significant, adverse cumulative impact.

Of this list, only nonindigenous aquatic species have been identified as potentially degrading water quality due to Amorco Terminal operations. As discussed above in Impacts WQ-3 and WQ-5, nonindigenous aquatic species can be introduced in ballast water and via vessel biofouling. Further, as discussed in MM WQ-3, Tesoro will not allow the discharge of non-segregated ballast water received at the Amorco Terminal to San Francisco Bay. Non-segregated ballast water is considered a hazardous waste California and cannot be discharged into the San Francisco Bay or coastal waters. In the event of an emergency, non-segregated ballast water can be pumped onshore to tankage for holding, treating, and isolation prior to treatment in the Refinery WWTP. Finally, as discussed in MM WQ-5 and MM BIO-7a, Tesoro would ensure that vessels calling at the Amorco Terminal are informed of applicable regulations and standards associated with the prevention of vessel biofouling, and prior to allowing berthing at the Amorco Terminal, Tesoro would confirm with vessels that they are in compliance with MISA. Although vessels that call at the Amorco Terminal are required to comply with federal and State regulations, compliance with the current standards is not enough to ensure full mitigation of this impact. Thus significant cumulative impacts would occur even with implementation of mitigation measures.

Though no contaminants associated with anti-fouling paints are on the 303(d) list for Suisun Bay or Carquinez Strait, anti-fouling paints are a significant concern for water quality in the San Francisco Bay. As discussed in Impact WQ-6, tankers visiting the Amorco Terminal may contribute to water contamination through use of anti-fouling paints, which contain copper, sodium chloride, and zinc, all of which are highly toxic to aquatic species. Although, TBT was phased out in 2008, vessels with old applications of

TBT on their hulls could still visit the Amorco Terminal. MM WQ-6 requires all vessels that visit the Amorco Terminal to comply with the 2001 International Maritime Organization Convention on the Control of Harmful Anti-fouling Systems on Ships and other applicable regulations. However, due to the high toxicity of these biocides, any contribution from the vessels calling at Amorco Terminal would be cumulatively significant.

Mitigation Measure: No additional mitigation measures available.

Impact CUM WQ-2: Cause re-suspension of sediment. (Less than significant.)

Dredging activities and propeller wash are likely to disturb seafloor sediments. However, increases in water-column turbidity would be temporary and localized, and unlikely to compound increases in turbidity that may arise from other projects in the region. If sediments are contaminated by legacy pollutants, their disturbance can lead to increases in contaminant concentrations within the water column. The effects of dredging and dredged material disposal on water quality are regulated and subject to acquisition of a dredging permit prior to dredging. Potential cumulative impacts to water quality from the disturbance of contaminated sediments can be fully eliminated by testing for and confirming the absence of elevated pollutant concentrations within sediments prior to conducting the work.

Mitigation Measure: No mitigation required.

Impact CUM-WQ-3 Degrade water quality due to releases from vessels in transit in the San Francisco Bay or along the outer coast. (Significant and unavoidable.)

As discussed in Impact WQ-10, a major oil spill from a vessel in transit in the san Francisco Bay or along the outer coast would have a significant, adverse impact on water quality. The incremental effects of such a vessel transiting to or from the Amorco Terminal would also be cumulatively significant. Section 4.1, Operational Safety/Risk of Accidents, Impact CUM-OS-1, presents a discussion of cumulative oil spill risk. Impacts would be minimized to the extent feasible with mitigation measures OS-4a and OS-4b (refer to Section 4.1, Operational Safety/Risk of Accidents), but the risk cannot be eliminated.

Mitigation Measure: No additional mitigation measures available.

4.3.4 SUMMARY OF FINDINGS

Table 4.3-6 includes a summary of anticipated impacts to water quality and associated mitigation measures.

Table 4.3-6: Summary of Water Quality Impacts and Mitigation Measures

Impact	Mitigation Measure(s)
Proposed Project	
WQ-1: Degrade water quality as a result of maintenance dredging	No mitigation required.
WQ-2: Degrade water quality as a result of sediment disturbance from vessel maneuvers	No mitigation required.
WQ-3: Degrade water quality by the discharge of ballast water	WQ-3: Advise vessels of applicable regulations and standards.
WQ-4: Degrade water quality as a result of discharge of cooling water, sanitary wastewater, bilge water, or other liquid wastes	No mitigation required.
WQ-5: Degrade water quality as a result of vessel biofouling	WQ-5: Advise vessels of applicable regulations and standards (also see Mitigation Measure BIO-7a).
WQ-6: Degrade water quality due to anti-fouling paints used on vessel hulls	WQ-6: Inform Vessels calling at the Amorco Terminal of the ban on TBT.
WQ-7: Degrade water quality as a result of cathodic protection on vessels	No mitigation required.
WQ-8: Degrade water quality as a result of stormwater runoff from the wharf	WQ-8: Amend existing SWPPP.
WQ-9: Degrade water quality as a result of oil leaks and spills during unloading	No additional mitigation measures available. (Refer to MMs OS-1a, OS-1b, and OS-1c.)
WQ-10: Degrade water quality due to releases from vessels in transit in the San Francisco Bay or along the outer coast	No additional mitigation measures available. (Refer to MMs OS-4a and OS-4b.)
Alternative 1: No Project	
WQ-11: Degrade water quality during decommissioning of the Amorco Terminal	No mitigation required.
WQ-12: Degrade water quality due to accidental spills from rail cars, trucks, and/or pipelines	Should this alternative be selected, mitigation measures would be determined during a separate environmental review under CEQA.
WQ-13: Degrade water quality due to stormwater runoff during construction	No mitigation required.

Impact	Mitigation Measure(s)
Alternative 2: Restricted Lease Taking Amorco Out of Service for Oil Transport	
WQ-14: Degrade water quality due to accidental spills from rail cars, trucks, and/or pipelines	Should this alternative be selected, mitigation measures would be determined during a separate environmental review under CEQA.
WQ-15: Degrade water quality due to stormwater runoff during construction	No mitigation required.
Cumulative Impacts	
CUM WQ-1: Cause contaminant impacts on San Francisco Bay water quality	No additional mitigation measures available. (refer to MMs WQ-3, WQ-5, and WQ-6.)
CUM WQ-2: Cause re-suspension of sediment	No mitigation required.
CUM WQ-3: Degrade water quality due to oil releases from vessels in transit in the San Francisco Bay or along the outer coast	No additional mitigation measures available. (Refer to MMs OS-4a and OS-4b.)

4.4 AIR QUALITY

Section 4.4 describes the existing air quality conditions and setting for the Amorco Marine Oil Terminal (Amorco Terminal) Lease Consideration Project (Project), including site-specific factors such as climatology and topography, which influence emissions dispersion. Additionally, the setting section identifies the locations of sensitive receptors that will be impacted by air pollution from the Project. The regulatory background section includes a discussion of the potential human health impacts and effects of pollutants on the surrounding community. Significance criteria are also discussed, and the baseline level of pollutants within the Project area are identified. The Impacts section includes anticipated Project air pollutant and greenhouse gas emissions, and their impacts, on the surrounding environment.

Unlike most projects that are still in the planning stage, the Amorco Terminal has been in operation since 1923. The Amorco Terminal's emissions are a part of the existing ambient air quality in the local and regional area, and have been included in the San Francisco Bay Area regional air emissions inventory and planning process. Therefore, this section includes both a discussion of the existing emissions and an analysis of the impacts associated with continued operations under the proposed 30-year lease period.

4.4.1 ENVIRONMENTAL SETTING

4.4.1.1 Local Climatology

The climate of the San Francisco Bay Area (Bay Area) is considered a Mediterranean-type, characterized by warm, dry summers and mild, wet winters. Extreme variations in ambient temperature are rare. The climate is strongly influenced by the proximity of the Pacific Ocean and irregularities in the inland topography.

During the summer months, the high-pressure system over the Pacific Ocean diverts precipitation and facilitates northwest wind flows over the Bay Area. These northwesterly flows, along with the natural current flowing southward from Alaska, promote the upwelling of cold water near the San Francisco coastline. Cool, moisture-laden air approaching the coast often results in condensation and the formation of fog and clouds in the region. In winter, the high-pressure system over the Pacific Ocean shifts southward, allowing weather systems to move inland across northern California. The formation of high-pressure systems over the mountainous regions of northern California cause winter winds in the Bay Area to come from the east and northeast.

A majority of the Bay Area's precipitation occurs from November to March. Average annual rainfall for the city of Martinez is 19.6 inches. Inversion conditions (characterized by cold air trapped at the surface by warm air), which are common in winter in many areas, are either nonexistent or very weak in the Bay Area. Stagnant conditions are unusual due to the replacement of air masses with each storm.

Weather patterns influence the dispersion of pollutants. Stagnant periods, which inhibit the dispersion of pollutants in the lower atmosphere, generally result from high temperatures and relatively stable environmental conditions. In the Bay Area, however, the land-sea temperature differential is frequently high on warm days, and turbulence results from the passage of westerly winds over the irregular topography, improving the dispersion of pollutants.

The air pollution potential is lowest for those regions closest to the bay, due largely to instability and strong atmospheric mixing characteristics created by onshore winds. During summer and fall, air emissions generated within the Bay Area, especially inland, can combine with sunshine under the restraining influences of topography to create conditions that are conducive to the buildup of photochemical pollutants, such as ozone, and secondary pollutants, such as sulfates and nitrates. Also, stable conditions characterized by low wind speeds contribute to increased concentrations of air pollutants due to accumulation in the air mass.

4.4.1.2 Atmospheric Air Pollutants

Criteria Air Pollutants

Criteria air pollutants are those pollutants for which the federal and state governments have established air quality standards for outdoor or ambient concentrations to protect public health. The national and state ambient air quality standards have been set at levels to protect human health with a determined margin of safety. For some pollutants, there are also secondary standards to protect the environment.

The U.S. Environmental Protection Agency (USEPA) has established ambient air quality standards for the following air pollutants:

- ozone (O_3)
- carbon monoxide (CO)
- nitrogen dioxide (NO_2)
- sulfur dioxide (SO_2)
- lead
- particulate matter (PM_{10} and $PM_{2.5}$)

The California Air Resources Board (CARB) has also established ambient air quality standards for the six pollutants regulated by the USEPA. Some of the California ambient air quality standards are more stringent than the national ambient air quality standards (NAAQS). In addition, California has established ambient air quality standards for the following pollutants or air quality conditions:

- hydrogen sulfide
- sulfates
- vinyl chloride
- particulates reducing visibility

The following paragraphs provide descriptions of the USEPA-established ambient air pollutants, including potential health effects of each.

Ozone. O_3 is one of a number of substances called photochemical oxidants that are formed when volatile organic compounds (VOCs) and NOx (a mixture of nitric oxide (NO) and NO_2) react in the presence of ultraviolet sunlight. The damaging effects of photochemical smog, which is a popular name for a number of oxidants in combination, are generally related to concentrations of O_3. Individuals exercising outdoors, children, and people with preexisting lung disease, such as asthma and chronic pulmonary lung disease, are considered to be the subgroups most susceptible to O_3 effects. Short-term exposures (lasting for a few hours) to O_3 at elevated levels can result in breathing pattern changes, reduction of breathing capacity, increased susceptibility to infections, inflammation of the lung tissue, and some immunological changes.

Carbon Monoxide. CO is a colorless, odorless gas formed by the incomplete combustion of fuels. Motor vehicles are the main source of this gas. CO competes with oxygen, often replacing it in the blood, thus reducing the blood's ability to transport oxygen to vital organs in the body. The ambient air quality standard for carbon monoxide is intended to protect persons whose medical condition already compromises their circulatory system's ability to deliver oxygen. These medical conditions include certain heart ailments, chronic lung diseases, and anemia. Persons with these conditions have reduced exercise capacity even when exposed to relatively low levels of CO. Smokers are also at risk from ambient CO levels because smoking increases the background level of CO in their blood.

Nitrogen Dioxide. NO_2 is a byproduct of fuel combustion. The principal form of nitrogen oxide produced by combustion is NO, but NO reacts quickly to form NO_2, creating the mixture of NO and NO_2 commonly referred to as NOx. NO_2 acts as an acute irritant and, in equal concentrations, is more injurious than NO. At atmospheric concentrations, however, NO_2 is only potentially irritating. There is some indication of a relationship between NO_2 and chronic pulmonary fibrosis. Some increase in bronchitis in young children has also been observed at concentrations below 0.3 parts per million. NO_2 absorbs blue light, which results in a brownish red cast to the atmosphere and reduced visibility. NOx emissions are also of concern because of their contribution to the formation of O_3 and particulate matter.

Sulfur Dioxide. SO_2 is a colorless, pungent gas formed primarily by the combustion of sulfur-containing fossil fuels. Health effects include acute respiratory symptoms and difficulty in breathing for children. Individuals with asthma may experience constriction of airways with exposure to SO_2. Though SO_2 concentrations have been reduced to levels well below State and federal standards, further reductions in SO_2 emissions are needed because SO_2 is a precursor to sulfate and PM_{10}.

Lead. Lead concentrations in air in California have historically exceeded the State and federal air quality standards by a wide margin, but have not exceeded State or federal standards at any Bay Area Air Quality Management District (BAAQMD) air quality monitoring station since 1982. Infants and children are more sensitive than others to the adverse effects of lead exposure. Exposure to low levels of lead can adversely affect the development and function of the central nervous system, leading to learning disorders, distractibility, inability to follow simple commands, and lower intelligence levels. In adults, increased lead levels are associated with increased blood pressure. Lead poisoning can cause anemia, lethargy, seizures, and death. Lead can be stored in the bone from early-age environmental exposure, and elevated blood lead levels can occur due to the breakdown of bone tissue during pregnancy, hyperthyroidism (increased secretion of hormones from the thyroid gland) and osteoporosis (breakdown of bony tissue).

Particulate Matter. Inhalable fine particulate matter (PM_{10}) consists of extremely small suspended particles or droplets 10 microns or smaller in diameter that can lodge in the lungs, contributing to respiratory problems. PM_{10} arises from such sources as re-entrained road dust, diesel soot, combustion products, tire and brake abrasion, construction operations, and fires. It is also formed in the atmosphere from NOx and SO_2 reactions with ammonia. PM_{10} scatters light and significantly reduces visibility. Inhalable particulates pose a serious health hazard, alone or in combination with other pollutants. More than half of the smallest particles inhaled will be deposited in the lungs and can cause permanent lung damage. Inhalable particulates can also have a damaging effect on health by interfering with the body's mechanism for clearing the respiratory tract or by acting as a carrier of an absorbed toxic substance. In 1997, the USEPA established a new particulate matter $PM_{2.5}$ standard, in addition to the PM_{10} standard. $PM_{2.5}$ is defined as particulate matter with a diameter less than 2.5 microns and is a subset of PM_{10}. $PM_{2.5}$ consists mostly of products from the reaction of NOx and SO_2 with ammonia, secondary organics, finer dust particles, and the combustion of fuels, including diesel soot. $PM_{2.5}$ is considered even more dangerous to human health than PM_{10} due to its ability to lodge more deeply into lung tissue.

Volatile Organic Compounds. VOCs are not true criteria pollutants in that there are no State or federal ambient air quality standards established. VOCs are regulated, however, because a reduction in VOC emissions reduces certain chemical reactions that contribute to the formation of ozone. VOCs are also transformed into organic aerosols in the atmosphere, contributing to higher PM_{10} and lower visibility levels. Although health-based standards have not been established for VOCs, health effects can occur from exposures to high concentrations of VOCs. Some hydrocarbon components classified as VOC emissions are hazardous air pollutants. Benzene, for example, is a hydrocarbon component of VOC emissions that is known to be a human carcinogen.

Toxic Air Contaminants

Toxic Air Contaminants (TACs), as classified by the State of California, are often referred to as "non-criteria" air contaminants because ambient air quality standards have not been established for these pollutants. There are hundreds of TACs, and exposure to these pollutants is associated with elevated risk of cancer and non-cancer health effects such as birth defects and genetic damage. The USEPA has a similar list of toxic substances referred to as Hazardous Air Pollutants (HAPs). Effects may be chronic (i.e., of long duration) or acute (i.e., of short duration) on human health. Acute health effects are attributable to short-term exposure to air toxics. These effects include nausea, skin irritation, respiratory illness, and, in extreme cases, death. Chronic health effects result from long-term exposure. The effect of major concern for this type of exposure is cancer, which may develop up to 30 years after exposure.

The USEPA regulates HAPs through technology-based requirements, which are implemented by State and local agencies. California regulates TACs through the Air Toxics Program (Health and Safety Code § 39660 et seq.) and the Air Toxics "Hot Spots" Information and Assessment Act (Health and Safety Code § 44300 et seq.). The CARB, working in conjunction with the Office of Environmental Health Hazard Assessment, identifies TACs. Air Toxic Control Measures (ATCMs) must then be adopted by CARB to implement controls to reduce TACs. Where there are federal HAP standards, the CARB must, at minimum, adopt the standards established by the USEPA. If there is a threshold below which there would be no significant adverse health impacts, the CARB must create an ATCM to reduce emissions so there are no adverse health effects. If there is not a threshold below which there would be no significant adverse health impacts, CARB must create an ATCM that reduces TAC emissions using the best available control technologies.

Diesel exhaust is the predominant contributor to human health risk from TACs statewide, and is estimated to represent approximately about 84 percent of the total risk (SCAQMD 2008). Diesel exhaust is a complex mixture of gases, vapors, and fine particles, and the evaluation of health effects of diesel exhaust is a complex scientific issue. Some of the chemicals in diesel exhaust, such as benzene and formaldehyde, have been previously identified as TACs by the CARB. California has adopted a comprehensive diesel risk-reduction program. The USEPA has adopted low-sulfur diesel fuel standards that will facilitate substantial reductions in diesel particulate matter through exhaust treatment. These low-sulfur standards went into effect in June 2006.

Global Warming and Ozone-depleting Gases

"Stratospheric ozone depletion" refers to the slow destruction of naturally occurring ozone, which lies in the upper atmosphere (called the stratosphere) and which protects the Earth from the damaging effects of solar ultraviolet radiation. Certain compounds, including chlorofluorocarbons (CFCs), halons, carbon tetrachloride, methyl chloroform, and other halogenated compounds, accumulate in the lower atmosphere and then gradually migrate into the stratosphere. In the stratosphere, these compounds participate in complex chemical reactions to destroy the upper ozone layer. Destruction of the ozone layer increases the penetration of ultraviolet radiation to the Earth's surface, a known risk factor that can increase the incidence of skin cancers and cataracts, contribute to crop and fish damage, and further degrade air quality.

Some gases in the atmosphere affect the Earth's heat balance by trapping infrared radiation. This layer of gases in the atmosphere functions much the same as glass in a greenhouse (i.e., both prevent the escape of heat). This is why global warming is also known as the "greenhouse effect." Gases responsible for global warming and their relative contribution to the overall warming effect are carbon dioxide (55 percent), CFCs (24 percent), methane (15 percent), and nitrous oxide (6 percent). It is widely accepted that continued increases in greenhouse gases will contribute to global warming, although there is uncertainty concerning the magnitude and timing of the warming trend. Global warming gases emitted as part of the Project include carbon dioxide and methane. Most carbon dioxide emissions are a result of fossil fuel combustion in stationary and mobile sources. They contribute to the greenhouse effect, but not to stratospheric ozone depletion. Methane is emitted from biogenic sources, incomplete combustion in forest fires, landfills, and leaks in natural gas pipelines. It is a greenhouse gas and traps heat 40 to 70 times more effectively than carbon dioxide. Methane emissions also come from petroleum sources, such as fugitive emissions from petroleum production, refining, and distribution.

4.4.1.3 Site Setting and Sensitive Receptors

The Project site is located on the Carquinez Strait, approximately 0.25 mile west of the Benicia-Martinez Bridge in an industrial area of the city of Martinez. The Carquinez Strait is the only sea-level gap between the San Francisco Bay and the Central Valley. Elevations in excess of 900 feet are reached in the surrounding hills of the Franklin Ridge, located west of Martinez. Topography to the north, across the Carquinez Strait, is also hilly. These topographical features create a high-pressure gradient causing high wind flows through the Carquinez Strait. Mount Diablo is also a major topographical feature with an elevation of over 3,800 feet, located approximately 15 miles to the southeast in Mount Diablo State Park.

For the purposes of air quality, sensitive receptors are generally defined as land uses with population concentrations that would be particularly susceptible to disturbance from dust or air pollution associated with the operation of the Amorco Terminal. These receptors generally include schools, day care centers, hospitals, residential care centers, parks, and churches. No sensitive land uses such as hospitals, schools, or convalescent homes are located near the Amorco Terminal. The nearest residential area is approximately 2,400 feet from the Amorco Tank Farm boundary and 4,900 feet from the berthing area.

4.4.1.4 Air Monitoring Data near the Amorco Terminal

The BAAQMD operates a regional air quality network for monitoring compliance ("attainment") with ambient air quality standards. The network consists of a series of monitoring stations used to measure ambient air concentrations of pollutants for which air quality standards have been established. Each station monitors a combination of gaseous and/or particulate pollutants. The data are used to describe the air quality within the surrounding community and to determine the attainment status of the air basin.

The air monitoring station closest to the site that monitors ozone, carbon monoxide, nitrogen dioxide, and $PM_{2.5}$ is located in Vallejo on Tuolumne Street in Solano County, approximately 8 miles northwest of the Amorco Terminal. The Crockett air monitoring station is located approximately 6 miles west of the Amorco Terminal, and presently only records sulfur dioxide concentrations. The Concord air monitoring station, located approximately 5.5 miles southeast of the Amorco Terminal, is the closest station that records PM_{10} data. A three-year summary of data collected at these stations is presented in Table 4.4-1.

As indicated in Table 4.4-1, monitoring stations in the vicinity of the Amorco Terminal did not record violations of carbon monoxide, nitrogen dioxide, or sulfur dioxide in the last three years. There were no recorded violations of the NAAQS for PM_{10} during the three-year period, but the State standard was exceeded once in 2011. The federal $PM_{2.5}$ standard was exceeded six times in 2011 and once in 2012. The State ozone standard was exceeded twice, and the federal ozone standard was exceeded once, in 2010.

Table 4.4-1: Summary of Air Quality Monitoring at the Vallejo, Concord, and Crockett Monitoring Stations

Pollutant/Standard	Number of Days Thresholds Were Exceeded, and Maximum Levels		
	2010	2011	2012
Ozone			
State 1 Hr > 0.09 ppm	0	0	0
State 8 Hr > 0.70 ppm	2	0	0
Federal 8 Hr > 0.075 ppm	1	0	0
Max 1 Hr Conc (ppm)	0.091	0.090	0.085
Max 8 Hr Conc (ppm)	0.080	0.069	0.062
Carbon Monoxide			
State 1 Hr > 20 ppm	0	0	0
Federal 1 Hr > 35 ppm	0	0	0
State 8 Hr > 9 ppm	0	0	0
Federal 8 Hr > 9 ppm	0	0	0
Max 1 Hr Conc (ppm)	2.9	3.0	2.8
Max 8 Hr Conc (ppm)	1.9	2.4	2.2
Nitrogen Dioxide			
State 1 Hr >0.18 ppm	0	0	0
Federal 1 Hr > 0.10 ppm	0	0	0
Federal Ann > 0.03 ppm	0	0	0
Max 1 Hr Conc (ppm)	0.056	0.047	0.052
Max Ann Conc (ppm)	0.009	0.010	0.009

Pollutant/Standard	Number of Days Thresholds Were Exceeded, and Maximum Levels		
	2010	2011	2012
Sulfur Dioxide			
State 1 Hr > 0.25 ppm	0	0	0
Federal 1 Hr >0.075 ppm	0	0	0
State 24 Hr > 0.04 ppm	0	0	0
Federal 24 Hr > 0.14 ppm	0	0	0
Federal Ann > 0.030 ppm	0	0	0
Max 1 Hr Conc (ppm)	0.011	0.007	0.014
Max 24 Hr Conc (ppm)	0.002	0.002	0.002
Max Ann Conc (ppm)	0.001	0.001	0.001
Particulate Matter ($PM_{2.5}$)			
Federal 24 Hr > 35 μ/m³	0	6	1
State Ann > 12 μ/m³	0	0	0
Federal Ann > 15 μ/m³	0	0	0
Max 24 Hr Conc (μ/m³)	29.5	54.2	36.8
Max Ann Hr Conc (μ/m³)	9	10	9
Particulate Matter (PM_{10})			
Federal 24 Hr > 150 μ/m³	0	0	0
State 24 Hr > 50 μ/m³	0	1	0
State Ann > 20 μ/m³	0	0	0
Max 24 Hr Conc (μ/m³)	41	59	35
Max Ann Hr Conc (μ/m³)	13.7	15.7	12.6

Source: BAAQMD 2013
Units/Acronyms: ppm – parts per million, μ/m³ - micrograms per cubic meter, Hr – hour, Ann – annual, Conc – concentration

4.4.2 REGULATORY SETTING

Federal and State laws that may be relevant to the Project are identified in Table 4-1. Regional and local laws, regulations, and policies are discussed below.

Bay Area Air Quality Management District

The BAAQMD implements federal and state air quality programs and regulations, and maintains a comprehensive program of planning, enforcement, technical innovation, and promotion of the understanding of air quality issues. The clean air strategy of the BAAQMD includes the preparation of plans for the attainment of ambient air quality standards, adoption and enforcement of rules and regulations concerning sources of air pollution, and issuance of permits for stationary sources of air pollution. .

In 2009, the BAAQMD released an update to its California Environmental Quality Act (CEQA) Guidelines. This is an advisory document that provides the lead agency, consultants, and project applicants with uniform procedures for addressing air quality in environmental documents. The handbook contains the following applicable components: criteria and thresholds for determining whether a project may have a significant adverse air quality impact; specific procedures and modeling protocols for quantifying and analyzing air quality impacts; methods available to mitigate air quality impacts; and information for use in air quality assessments and environmental documents that will be updated more frequently such as air quality data, regulatory setting, climate, and topography.

The BAAQMD has also established a climate protection program to reduce pollutants that contribute to global climate change and affect air quality. The climate protection program includes measures that promote energy efficiency, reduce vehicle miles traveled, and develop alternative sources of energy. In May 2012, the BAAQMD released updated CEQA Guidelines, requiring that the effects of climate change be addressed in CEQA documents. The CEQA Guidelines: (1) specify a threshold of significance for operations-related GHG emissions of 10,000 MT of CO_2e per year, (2) discuss how the BAAQMD established the thresholds of significance, (3) recommend that CEQA documents include a discussion of a project's GHG emissions from construction and operation, and (4) discuss GHG impact assessment and mitigation measures available. On March 5, 2012, the Alameda County Superior Court issued a judgment finding that the BAAQMD had failed to comply with CEQA when it adopted the new thresholds, and the BAAQMD appealed. On August 14, 2013, the court reinstated the guidelines; however, additional appeals may ensue.

Contra Costa County

The Contra Costa County General Plan includes goals to improve air quality, including meeting federal air quality standards, supporting efforts to reduce air pollution, restoring air quality to a more healthful level, and reducing the percentage of traffic trips at peak hours.

4.4.3 EMISSIONS INVENTORY

4.4.3.1 Baseline Condition Annual Emissions

Emissions Sources

The leased portion of the Amorco Terminal has the following emissions sources: (1) engines on ocean-going vessels (OGV); (2) displacement of VOCs during ballasting; (3) fugitive emissions from components such as pumps, valves, flanges, and pressure relief devices; and (4) diesel generators for fire pumps, when operational. The Amorco Terminal is an unloading-only facility; therefore it does not have a vapor control system, which would be required for the control of emissions from loading crude or other high-vapor-pressure products into OGV. The Amorco Terminal operates under a BAAQMD Title V Operating Permit, which includes the Golden Eagle Refinery (Refinery) (BAAQMD Facility #B2758) and the Amorco Terminal (BAAQMD Facility #B2759). Condition #22455, Part 11 of the Permit prohibits the shipment of crude oil from the Amorco Terminal.

Crude oil unloaded from OGV is piped into one of the five crude oil storage tanks at the Amorco Tank Farm. Each storage tank is designed with an external floating roof to minimize atmospheric emissions. The tanks are located onshore and are not part of the Project; therefore, such emissions are not considered in the baseline or life-of-lease assessments. Emissions from these tanks are primarily driven by atmospheric pressure conditions (weather) and are not expected to change over the life of the lease.

Because the facility is already operational, emissions such as worker commutes are already part of baseline/existing conditions, and, because these emissions are not expected to change, they were not considered in the baseline or life-of-lease analyses.

Vessels

OGV (Including tankers and barges) that call on the Amorco Terminal contribute indirectly to emissions associated with Amorco Terminal operations. These emissions are generated from the combustion of fuel oil by the vessel engines and generators as they travel, as well as emissions from auxiliary engines and boilers used to provide the necessary electrical and accessory power while the OGV are “hoteling” at the wharf.

Crude Oil Ballasting

Ballasting is the practice of loading one or more cargo tank compartments with seawater after the cargo has been offloaded. Ballast water intake allows an OGV to adjust the depth below surface of the ship hull, thus increasing stability and making the OGV less vulnerable to waves and winds. During a ballasting operation, VOCs are emitted into the atmosphere as the vapors from nonsegregated tanks are displaced with ballast water. BAAQMD Regulation 8 Rule 44, Marine Tank Vessel Operations, specifies the following requirements for ballasting operations:

- limit VOC emissions to less than 5.7 g/m^3 (2 pounds per 1,000 barrels) loaded;
- reduce VOC emissions by 95 percent by weight; and
- control ballasting emissions with segregated ballast tanks, dedicated clean ballast tanks, internal vapor balancing, and compression ballasting.

These requirements are specifically referenced in the Permit on Table VII–D.1, Applicable Limits and Compliance Monitoring Requirements.

Fugitives (Pumps, Valves, Flanges)

There are numerous pipelines associated with the Amorco Terminal that transport crude oil from the OGV to on-site storage tanks. The pumps, valves, flanges, and connectors along the pipelines are potential sources of fugitive emissions of VOC and methane. The leakage from these components is a function of the liquid being transported; condition of the components; and other variables such as pressure, vibration, heat, friction, and corrosion. Fugitive VOC emissions are estimated using the Correlation Equation Method from the *California Implementation Guidelines for Estimating Mass Emissions of Fugitive Hydrocarbon Leaks at Petroleum Facilities* issued by the California Air Pollution Control Officers Association and CARB. Fugitives are tracked in a Leak Detection and Repair (LDAR) database as part of the Amorco Terminal's compliance obligations under BAAQMD Regulation 8 Rule 18. The 2013 VOC emissions from fugitive components at the Amorco Terminal were 15.069 pounds per year.

4.4.3.2 Baseline Emissions

Maximum throughput for both the Refinery and Amorco Terminal are limited by the BAAQMD Title V Operating Permit. The Refinery is permitted for a maximum annual throughput of 63,875,000 barrels, and the Terminal is limited to 70,080,000 barrels on a rolling 12-month basis. The level of actual throughput received at the Amorco Terminal over the period from 2008 through 2012 has ranged between a low of 16,900,791 barrels and 53 vessel calls in 2010 to a high of 26,859,593 barrels and 85 vessel calls in 2008. The 2008 maximum of 85 annual vessel calls was assumed for the baseline of this assessment. This is well below the permitted throughput, which would correspond to approximately 194 vessels (with an individual cargo of 360,000 barrels each).

The 2008 vessel call quantity was conservatively chosen as a representative baseline because the intervening years may have been impacted by the decline in the overall economy and gasoline usage. As noted in Section 2.4.7, marine shipments of crude oil and demands for refinery products are expected to continue at a similar or slightly increased rate as seen in previous years, and the level of shipping activity to the Amorco Terminal is not expected to change substantially during the proposed 30-year lease agreement period, with an expected range of 60 to 90 vessels per year.

The Amorco Terminal emissions are regulated as part of the BAAQMD Title V Operating Permit for the Refinery. The Amorco Terminal emissions are included in the Refinery Emissions Clean Air Plan (CAP)~~, as specified in Permit Condition Number 8077~~. Pollutants regulated include carbon monoxide, nitrous oxides, hydrocarbons, sulfur dioxide, and particulate matter. The CAP is based on both annual and monthly maximum emissions from all Refinery operations. As long as Tesoro Refining and Marketing Company, LLC (Tesoro) complies with the CAP in total, even if emissions from the Amorco Terminal increase, the permit will not be considered to be violated.

In addition to regulating emissions, the Permit prescribes the calculation methodology to be used to quantify emissions from OGV. The methodology is contained in Condition 878 of the Permit as well as in Appendix B. The analysis presented herein conforms to the methods prescribed in the Permit. The calculation methodology in the Permit was reviewed as part of the recent renewal of the Permit and is current as of June 2011.

Table 4.4-2 presents the ship emissions for a single OGV call, based on the methodology prescribed in the Permit, for the 2008 baseline year.

Table 4.4-2: Emissions per OGV (pounds unless indicated)

Activity	VOC	SO_2	NOx	CO	PM_{10}	$PM_{2.5}$
Transit	157.87	1,012.22	1766.44	273.87	96.26	39.23
Maneuvering	105.25	674.81	1,177.63	182.58	64.18	26.16
Hoteling	90.47	1,324.51	977.51	149.99	98.28	20.54
Boiler	50.78	5,164.61	789.52	49.92	311.22	133.52
Tugs (2)	26.20	141.32	1,151.54	114.72	50.40	16.44
Total	**430.58**	**8,317.47**	**5,862.64**	**764.07**	**620.34**	**235.89**
Total (tons)	**0.22**	**4.16**	**2.93**	**0.38**	**0.31**	**0.12**

To conservatively estimate emissions, the following assumptions were used:

- large OGV (>180,000 deadweight tons) were assumed to call;
- a total travel distance of 31 miles, beginning 11 miles west of the Golden Gate Bridge, was assumed for the transit distance, and a total transit time of 3 hours was assumed for each direction;
- two hours of maneuvering time were included for incoming and outgoing OGV and added to the total transit time;

- each OGV was assumed to require two tugs for a total of 4 hours per tug for each direction; and
- each tanker was assumed to hotel at the Amorco Terminal for 20 hours.

4.4.3.3 Lease Period Emissions

Table 4.4-3 presents the emissions from the baseline year (85 OGV) as compared with the annual level expected during the 30-year lease agreement period (90 OGV, the maximum expected annually; refer to Section 2.4.7). The BAAQMD established significance thresholds for VOC, NOx, and PM_{10} in its 1999 Guidance Document for CEQA. The significance threshold for each of these criteria pollutants is an incremental increase of 15 tons/year and 88 pounds/day. As shown on Table 4.4-3, the annual significance thresholds are not expected to be exceeded.

Table 4.4-3: 2008 Baseline Year Compared with Anticipated Lease-Period Annual Emissions (tons)

Source	VOC		SO_2		NO_x		CO		PM_{10}		$PM_{2.5}$	
	2008	Lease Period	2008	Lease Period	2008	Lease Period	2008	Lease Period	2008	Lease Period	2008	Lease Period
OGV	18.30	19.38	353.49	374.29	249.16	263.82	32.47	34.38	26.36	27.92	10.03	10.61

Maximum daily emissions from the Amorco Terminal will not increase because the Amorco Terminal can only handle one OGV at a time, and typically, OGV are docked at the Amorco Terminal between 20 and 30 hours. On June 2, 2010, the BAAQMD adopted new thresholds of significance to assist in the review of projects under CEQA. On March 5, 2012 the Alameda County Superior Court issued a judgment finding that the BAAQMD had failed to comply with CEQA when it adopted the new thresholds, and the BAAAQMD appealed. Until the appeal is resolved, agencies will continue to rely upon the 1999 thresholds.

4.4.3.4 Baseline GHG Emissions

The baseline GHG impact of the Amorco Terminal was established, in part, in the 2010 BAAQMD GHG Emitting Facilities Report. The BAAQMD report contains all CO_2e emissions by facility within the BAAQMD's jurisdiction. This report identifies the GHG emissions from the Amorco Terminal separately from the Refinery. The Refinery GHG emissions were reported as 3,056,697 metric tons/year, and the Amorco Terminal is listed as 8 metric tons/year. The relatively low Amorco Terminal GHG emissions indicate that the indirect OGV emissions were not included in the calculation. The baseline emissions presented here will, therefore, comprise the sum of the non-OGV emissions presented in the 2010 BAAQMD GHG Report and OGV GHG emissions calculated herein, based upon baseline 2008 figures. (The difference in non-OGV emissions between the 2008 and 2010 throughput is assumed to be negligible.)

OGV operations at the Amorco Terminal would generate quantifiable emissions of carbon dioxide, methane, and nitrous oxides. Other recognized GHG emission sources, such as refrigerants, are not relevant to the Amorco Terminal. GHG emissions from OGV were calculated using the quantity of fuel specified in the BAAQMD Permit. CO_2e emissions were calculated using fuel usage data for engine types and emission factors for CH_4 and N_2O on a gram/kilowatt-hour basis as developed by the CARB and the Port of Long Beach. These were converted to CO_2e emissions per unit of fuel burned by applying the Global Warming Potentials factors of 21 for CH_4 and 310 for N_2O. The assumptions used for OGV calls regarding distances and time in each activity were the same as for the air pollutants presented above. Table 4.4-4 contains the estimated GHG emissions for the baseline and anticipated future OGV call cases.

Table 4.4-4: Inventory Summary of GHG Emissions

Source	CO_2e MT/Year[1]	
	Baseline (2008)	**Anticipated Future Annual**
Ballast emissions	0	0
Amorco Terminal operations other than OGV calls[2]	8.02	8.49
Vessel transit to Amorco Terminal vicinity	4,313.80	4,567.56
Maneuvering	2,965.23	3,139.65
Hoteling—main diesel engine	2,228.83	2,359.94
Hoteling—fuel oil	2,229.67	2,360.83
Boiler—unloading	14,638.29	15,499.37
Tug boats (2)	2,053.00	2,053.00
Total Emissions:	**28,428.82**	**30,101.10**

[1]CO_2-equivalent metric tons/year

[2]Other operations include fugitive emissions, tank emissions, fire pump testing. Emissions were scaled up by ratio of 90/85 vessel calls to account for potential increases in tank emissions based on throughput.

4.4.4 IMPACT ANALYSIS

4.4.4.1 Significance Criteria

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

- Conflict with or obstruct implementation of an applicable air quality plan, permit, or standard, or create an air quality violation
- Result in a considerable net increase of any criteria pollutant for which the Project region is non-attainment under an applicable federal or State ambient air quality standard, including releasing emissions that exceed quantitative thresholds for ozone precursors
- Expose sensitive receptors to substantial pollutant concentrations
- Create objectionable odors affecting a substantial number of people
- Generate GHG emissions, either directly or indirectly, that conflict with an applicable plan, policy, or regulation adopted for the purposes of GHG reduction

4.4.4.2 Assessment Methodology

Impacts of the proposed project on air quality and GHG emissions were assessed by comparing baseline conditions to anticipated changes from future Project operation during the proposed 30-year lease period. Impacts were quantified to the extent feasible, using the methods and data presented in Section 4.4.3.

4.4.4.3 Impacts Analysis and Mitigation Measures

The following subsections describe the Project's potential impacts on air quality and GHG emissions. Where impacts are determined to be significant, feasible mitigation measures are described that would reduce or avoid the impact.

Proposed Project

Impact Air Quality (AQ)-1: Conflict with or obstruct implementation of an applicable air quality plan, permit, or standard, or create an air quality violation. (Less than significant.)

Measured and calculated criteria pollutant emissions are limited by the CAP included in the BAAQMD-issued Title V Operating Permit encompassing the Refinery and the Amorco Terminal. By virtue of the Permit, continued operation of the Amorco Terminal up to the permitted throughput levels would not result in significant air quality emission impacts, because the limits set by the BAAQMD were determined to be sufficient to render these emissions less than significant. As discussed in Section 4.3.3, recent years indicate that the Amorco Terminal use is well below its BAAQMD-permitted limit, and is expected to be so over the proposed lease period.

Indirect contributions to Amorco Terminal emissions include OGV transit, hoteling, pumping, and tugboat operations that are not subject to explicit Permit conditions; however, they are calculated as prescribed by BAAQMD and are considered part of the overall emissions of the facility. As presented in Section 4.3.3, the BAAQMD significance thresholds established in its 1999 Guidance Document for CEQA for VOCs, NOx, and PM_{10} are not expected to be exceeded; thus, the impact of continued Amorco Terminal operations would be less than significant.

Mitigation Measure: No mitigation required.

Impact AQ-2: Result in a considerable net increase of any criteria pollutant for which the Project region is non-attainment under an applicable federal or State ambient air quality standard, including releasing emissions that exceed quantitative thresholds for ozone precursors. (Less than significant.)

As discussed in Section 4.4.1.4, the Project region is currently in non-attainment for ozone, PM_{10}, and $PM_{2.5}$. Table 4.4-3 shows the calculated anticipated annual increase in emissions for PM_{10} and VOCs (which are a precursor to ozone) under the proposed Project lease. The BAAQMD significance thresholds established in its 1999 Guidance Document for CEQA for VOCs and PM_{10} ($PM_{2.5}$ is not currently subject to a CEQA threshold) are not expected to be exceeded; thus, the net increase in emissions from these criteria pollutants is not considered to be significant.

Mitigation Measure: No mitigation required.

Impact AQ-3: Expose sensitive receptors to substantial pollutant concentrations. (Less than significant.)

The Amorco Terminal is located in an industrialized area. The nearest residence is located to the southwest of the Amorco Terminal and is greater than 4,000 feet from the wharf. Because the Amorco Terminal and its operations have been permitted through the BAAQMD, the requirements for potential exposure for sensitive receptors have already been satisfied; necessary hazardous and toxic air modeling to evaluate impacts to sensitive receptors, as well as necessary contingency measures, are part of the BAAQMD permitting process. The impact of ongoing Project operations is, therefore, less than significant.

Mitigation Measure: No mitigation required.

Impact AQ-4: Create objectionable odors affecting a substantial number of people. (Less than significant.)

The primary sources of odors at the Amorco Terminal would be fugitive VOC emissions from wharf components and from crude oil in aboveground storage tanks. As discussed in Section 4.3.3.1, the tanks are located onshore and are not part of the proposed lease extension Project, but in any case, emissions from these tanks are primarily driven by atmospheric pressure conditions (weather) and are not expected to change over the life of the lease. No sensitive receptors are located in the immediate area, and odors have not been historically reported. Therefore, the impact is less than significant.

Mitigation Measure: No mitigation required.

Impact GHG-1: Generate GHG emissions, either directly or indirectly, that conflict with an applicable plan, policy, or regulation adopted for the purposes of GHG reduction. (Less than significant.)

The inventory of annual GHG emissions, currently and under the proposed lease, is presented in Table 4.4-4. GHG emissions from the Amorco Terminal during the lease period will not increase by greater than 10,000 MT annually, as proposed in the updated 2012 BAAQMD CEQA guidelines; therefore, the impact is less than significant.

Mitigation Measure: No mitigation required.

Alternative 1: No Project

Impact AQ-5: Create air quality impacts during decommissioning of the Amorco Terminal or by the transfer of operations to other Bay Area terminals. (Less than significant.)

Under the No Project Alternative, the Amorco Terminal lease would not be renewed, and the existing Amorco Terminal would be subsequently decommissioned with its components abandoned in place, removed, or a combination thereof.

Decommissioning would likely be accomplished primarily via the water, with materials, other than those that can be used at the Refinery, taken away via barge. The activity would require heavy equipment to be used in the demolition of the wharf and related structures. Emissions from demolition activities would be less than significant provided all feasible dust implementation measures and emissions controls in regulations and guidance are followed.

After decommissioning, Amorco Terminal operations would cease and emission sources at the Project site would be eliminated. However, for the air basin as a whole, operations would be transferred to other Bay Area marine terminals. Increases to meet regional demand would be subject to review by the BAAQMD to determine whether the increase in operations would be in compliance with permitting.

Mitigation Measure: No mitigation required.

Impact AQ-6: Impact air quality during construction or operation of rail facilities or additional trucking. (Less than significant.)

Non-marine supplies of crude oil would likely come from re-purposing existing terminal operations in the Bay Area or by constructing additional facilities to handle crude oil by railcar or by truck. The Refinery has existing rail facilities that would need to be expanded to receive a large quantity of crude oil by rail. Expansion of the existing rail capability and a proposal to increase crude by rail deliveries would be subject to BAAQMD permitting and CEQA review. Deliveries would occur via unit trains of approximately 105 railcars capable of delivering approximately 73,500 barrels per unit train. It is anticipated that up to one unit train per day could be unloaded with an expanded railcar handling facility. This would equate to approximately 26.8 million barrels of crude per year, which is less than the amount of crude that would be received under the annual average case for the Amorco Terminal. Therefore, additional sources of crude oil would be required either from other Bay Area terminals or additional non-marine sources such as trucks.

Air quality emissions from delivery by railcar are lower than air quality emissions from OGV on a pounds/barrel crude delivered basis. However, railcar emissions are land-based, and locomotives may emit criteria and toxic pollutants, including diesel particulate emissions, in closer proximity to populations and sensitive receptors than do OGV. In addition, there may be other direct and indirect air quality impacts associated with increased railcar deliveries, such as energy generation to meet the power requirements to unload and transfer crude oil and additional vehicle-idling emissions from transportation delays caused by the frequent unit trains impacting rail crossings.

Receipt of crude oil via tanker truck would have the adverse air quality impact of emissions from the tanker trucks, each of which can only deliver approximately 200 barrels of crude oil. This would require placing 350 tanker trucks on the road for every unit train delivery of crude oil that is received at locations outside the Refinery. However, air quality emissions from delivery by tanker trucks would be lower than air quality emissions from OGV.

Construction of new pipelines to transfer crude oil to the Refinery from existing terminals would also be subject to CEQA review and BAAQMD permitting to ensure the terminals would be operating in accordance with existing BAAQMD permits and regulations. Any new pipeline construction would result in short-term air quality impacts associated with construction equipment.

Any beneficial impact from non-marine supplies of crude oil would primarily be associated with the OGV emissions and would not result in a significant local benefit beyond the vicinity of the wharf and along the OGV route to the Amorco Terminal. Localized benefits would be offset by potential increases in exposures to sensitive receptors along rail and truck routes and increased impacts at other Bay Area marine or rail terminals.

Mitigation Measure: No mitigation required.

Alternative 2: Restricted Lease Taking Amorco Out of Service for Oil Transport

Impact AQ-7: Create air quality impacts by the transfer of operations to other Bay Area terminals. (Less than significant.)

With a restricted lease, the operations associated with the Amorco Terminal would cease, resulting in elimination of all emission sources at the Project site. However, for the air basin as a whole, operations would be transferred to other Bay Area marine terminals. Increases to meet regional demand would be subject to review by the BAAQMD to determine whether the increase in operations would be in compliance with permitting.

Mitigation Measure: No mitigation required.

Impact AQ-8: Impact air quality during construction or operation of rail facilities or additional trucking. (Less than significant.)

See Impact AQ-6.

Mitigation Measure: No mitigation required.

Cumulative Impact Analysis

The 1999 BAAQMD CEQA Guidelines state that:

> *"Any proposed project that would individually have a significant air quality impact … would also be considered to have a significant cumulative air quality impact. For any project that does not individually have significant operational air quality impacts, the determination of significant cumulative impact should be based on an evaluation of the consistency of the project with the local general plan and of the general plan with the regional air quality plan.*
>
> *When a project is proposed in a city or county with a general plan that is consistent with the CAP and the project is consistent with that general plan (i.e., it does not require a general plan amendment), then the project will not have a significant cumulative impact (provided, of course, the project does not individually have any significant impacts). No further analysis regarding cumulative impacts is necessary."*

The proposed Project does not have an individually significant air quality impact. Section 21.51 of the City of Martinez General Plan adopted in 1973 states: "Expansion of the petroleum refining and related industries must proceed in an orderly fashion and be consistent with protection of the community's air, water, scenic and fiscal resources." The lease period does not involve the expansion of the existing Amorco Terminal and no construction is associated with the Project; therefore, the Project is consistent with the general plan and would not be considered to have a cumulative significant impact.

The city of Martinez is currently updating its general plan. The new general plan will cover the following elements (or topics): Land use, circulation, housing, conservation, open space, noise, and safety. In addition, the new general plan will be fully integrated and in conformance with the State's climate action planning requirements.

From the standpoint of GHG emissions, as discussed in Impact GHG-1, the incremental increase in emissions under the proposed lease falls below the BAAQMD's significant threshold. Therefore, although the Project contributes to overall GHG emissions in the environment, its cumulative effect is less than significant.

4.4.5 SUMMARY OF FINDINGS

Table 4.4-5 includes a summary of anticipated impacts to air quality and associated mitigation measures.

Table 4.4-5: Summary of Air Quality Impacts and Mitigation Measures

Impact	Mitigation Measure(s)
Proposed Project	
AQ-1: Conflict with or obstruct implementation of an applicable air quality plan, permit, or standard, or create an air quality violation.	No mitigation required.
AQ-2: Result in a considerable net increase of any criteria pollutant for which the Project region is non-attainment under an applicable federal or State ambient air quality standard, including releasing emissions that exceed quantitative thresholds for ozone precursors.	No mitigation required.
AQ-3: Expose sensitive receptors to substantial pollutant concentrations.	No mitigation required.
AQ-4: Create objectionable odors affecting a substantial number of people.	No mitigation required.
GHG-1: Generate GHG emissions, either directly or indirectly, that conflict with an applicable plan, policy, or regulation adopted for the purposes of GHG reduction.	No mitigation required.

Impact	Mitigation Measure(s)
Alternative 1: No Project	
AQ-5: Create air quality impacts during decommissioning of the Amorco Terminal or by the transfer of operations to other Bay Area terminals.	No mitigation required.
AQ-6: Impact air quality during construction or operation of rail facilities or additional trucking.	No mitigation required.
Alternative 2: Restricted Lease Taking Amorco Out of Service for Oil Transport	
AQ-7: Create air quality impacts by the transfer of operations to other Bay Area terminals.	No mitigation required.
AQ-8: Impact air quality during construction or operation of rail facilities or additional trucking.	No mitigation required.

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4.5 GEOLOGY, SEDIMENTS, AND SEISMICITY

Section 4.5 describes the environmental conditions and impacts analysis of geology, sediments, and seismicity issues associated with the granting of a new off-shore lease to the Amorco Marine Oil Terminal (Amorco Terminal) to continue to operate in the southeastern Carquinez Strait. The environmental setting provides information on the existing geologic and geotechnical conditions regionally, as well as in the immediate vicinity of the Amorco Terminal. Also included is a summary of laws and regulations that may affect geologic resources and seismicity analyses. This is followed by an analysis of the potential Project impacts. Geologic issues associated with renewing the Amorco Terminal lease primarily involve the effects of seismic events on Amorco Terminal structures and systems, including but not limited to pipelines, valves, supports, anchors, and electrical and mechanical equipment.

4.5.1 ENVIRONMENTAL SETTING

The Amorco Terminal is located in Martinez, Contra Costa County, along the southern edge of the Carquinez Strait approximately 0.5 mile southwest of the Benicia-Martinez Bridge, in the seismically active San Francisco Bay Area (Bay Area).

4.5.1.1 Regional Geology

California is located on the boundary between the Pacific and North American Tectonic Plates. The Pacific Plate comprises much of the Pacific Ocean and includes the western edge of the North American continent. The North American Plate includes the remainder of the North American continent and the western half of the Atlantic Ocean. The Pacific Plate is drifting northwesterly relative to the North American Plate, and the main line of contact between these two plates is the San Andreas Fault system.

The Bay Area lies within the geologically active part of the Coast Ranges geomorphic province of California, which is characterized by a series of nearly parallel mountain ranges (Goldman 1969) trending northwest-southeast. Figure 4.5-1 depicts the locations of the major faults that characterize the area. Active faults, including the Concord/Green Valley, West Napa, Calaveras, Hayward, San Gregorio, and San Andreas Faults, are roughly parallel to the western and eastern limits of the Bay Area. The San Francisco Bay itself began forming during the Pleistocene Epoch, approximately 2 million years ago, when the land masses now known as San Francisco and Marin began to tilt eastward along the Hayward Fault, forming a depression that filled with sediment and water.

The bedrock units underlying the area east of the Hayward Fault (which includes the Amorco Terminal; see Figure 4.5-1), and west of the Sierran basement rock boundary zone, range from Jurassic-Cretaceous to Quaternary-age (approximately 135 million years old to current). The oldest unit, the Franciscan Formation, is believed to have originated on the Pacific Ocean floor and was welded to the western margin of the American continent by plate movement. Subsequently, it was uplifted through the younger sedimentary rock to form the backbone of the Diablo Range, which is part of the Coast Ranges. The strata of this bedrock formation are highly distorted and partially metamorphosed through heat and compression. The Franciscan Formation primarily consists of interbedded sandstone and shale, limestone, radiolarian chert, and metavolcanic rocks (Goldman 1969).

The Great Valley Sequence, a thick sequence of Mesozoic sandstones and shales that overlies the Franciscan Formation, comprises sedimentary rock formed under ancient seas that once existed on the American continent. The youngest formations are the deposits of Quaternary-age marine sediments, known as “bay mud,” and Quaternary alluvium deposited by stream erosion. Figure 4.5-2 depicts the regional surface geology of the Suisun Bay and Carquinez Strait region near the Project site.

4.5.1.2 Site-specific Geology

The site-specific geologic characteristics described in this section are based on the regional studies of the Bay Area conducted by the California Geological Survey (CGS), formerly known as the California Division of Mines and Geology (Goldman 1969, Treaser 1963), and geotechnical investigations conducted by MACTEC Engineering and Consulting (MACTEC 2005) at the Amorco Terminal. Local surface conditions primarily comprise early Quaternary-age (Pleistocene) alluvium and late Quaternary-age (Holocene) bay mud. Goldman’s (1969) contour maps of the top of bedrock suggest that bedrock lies approximately 80 feet below mean lower low water (MLLW) near the Amorco Terminal shoreline to a depth of approximately 120 feet below MLLW along the Amorco wharf.

Three geotechnical investigations have been conducted to characterize the geology in the vicinity of the Amorco wharf (MACTEC 2005, Treadwell and Rollo 2008, Treadwell and Rollo 2010). Treadwell and Rollo (2010), in a geotechnical report that compiled geologic boring data from all previous investigations, concluded that approximately 15 to 20 feet of recently deposited soils, characterized as dredged spoils/bay sediments, exist in the area under the Amorco wharf. The report indicates that approximately 40 to 56 feet of compressible clay, characterized as bay mud, underlies the recent deposits. Stiff clays with occasional thin lenses of sand and gravel, described as older bay deposits, were encountered beneath the bay mud at thicknesses ranging from approximately 10 to 30 feet. Bedrock was encountered approximately 98 feet below the mudline, dipping from northeast to southwest. In general, the bedrock was found to consist of moderately to deeply weathered, weak to moderately strong claystone and siltstone, interbedded with layers of crushed to intensely fractured sandstone.

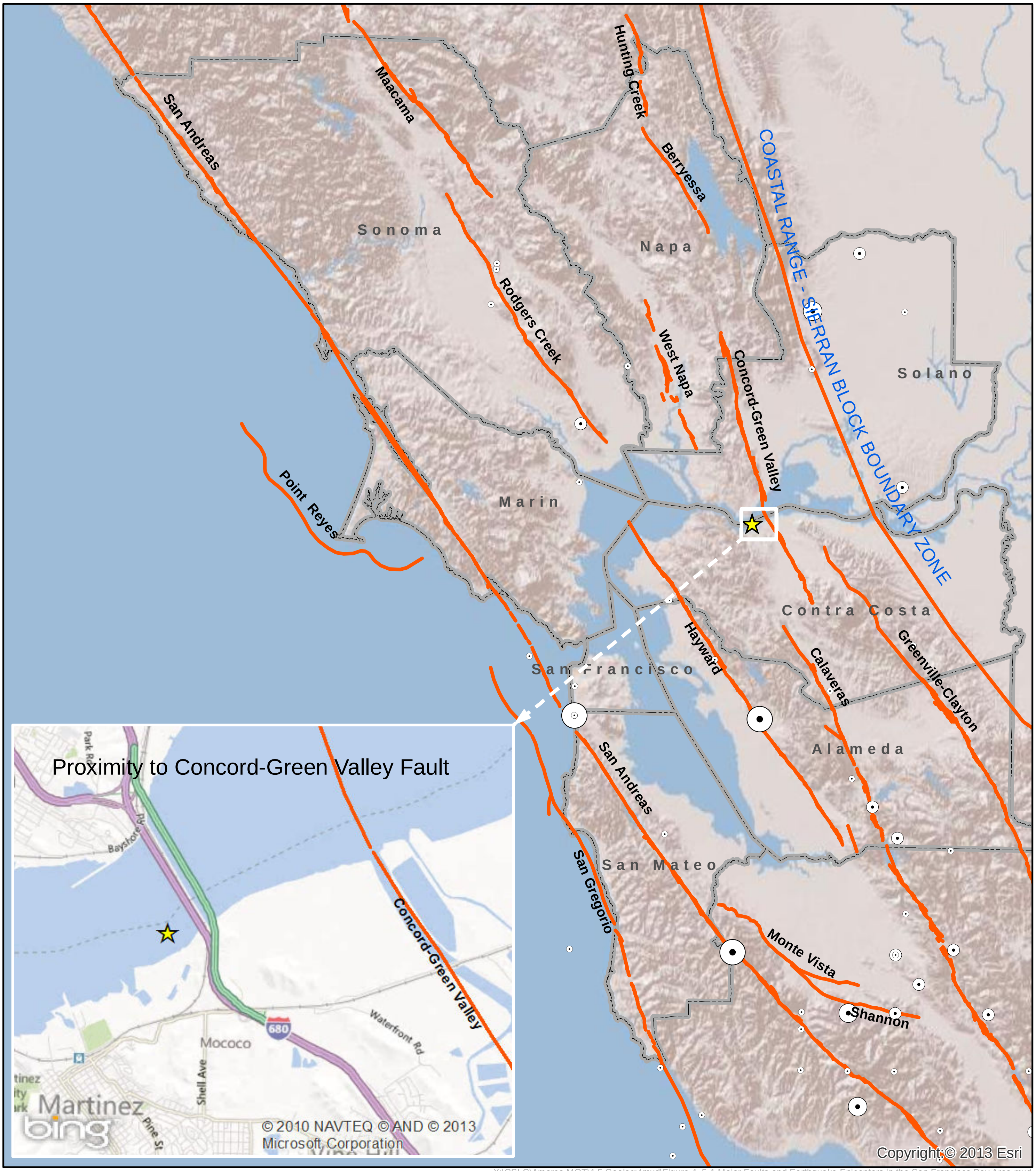

Figure 4.5-1 Major Faults and Earthquake Epicenters in the San Francisco Bay Area
California State Lands Commission
Amorco Marine Oil Terminal Lease

TRC

8/14/2013

Earthquake Epicenter
Magnitude
- 5.5 - 5.9
- 6.0 - 6.4
- 6.5 - 6.9
- 7.0 +

Fault Lines
Approximate Terminal Location

1:1,000,000

N

1 inch = 16 miles

0 5 10 mi

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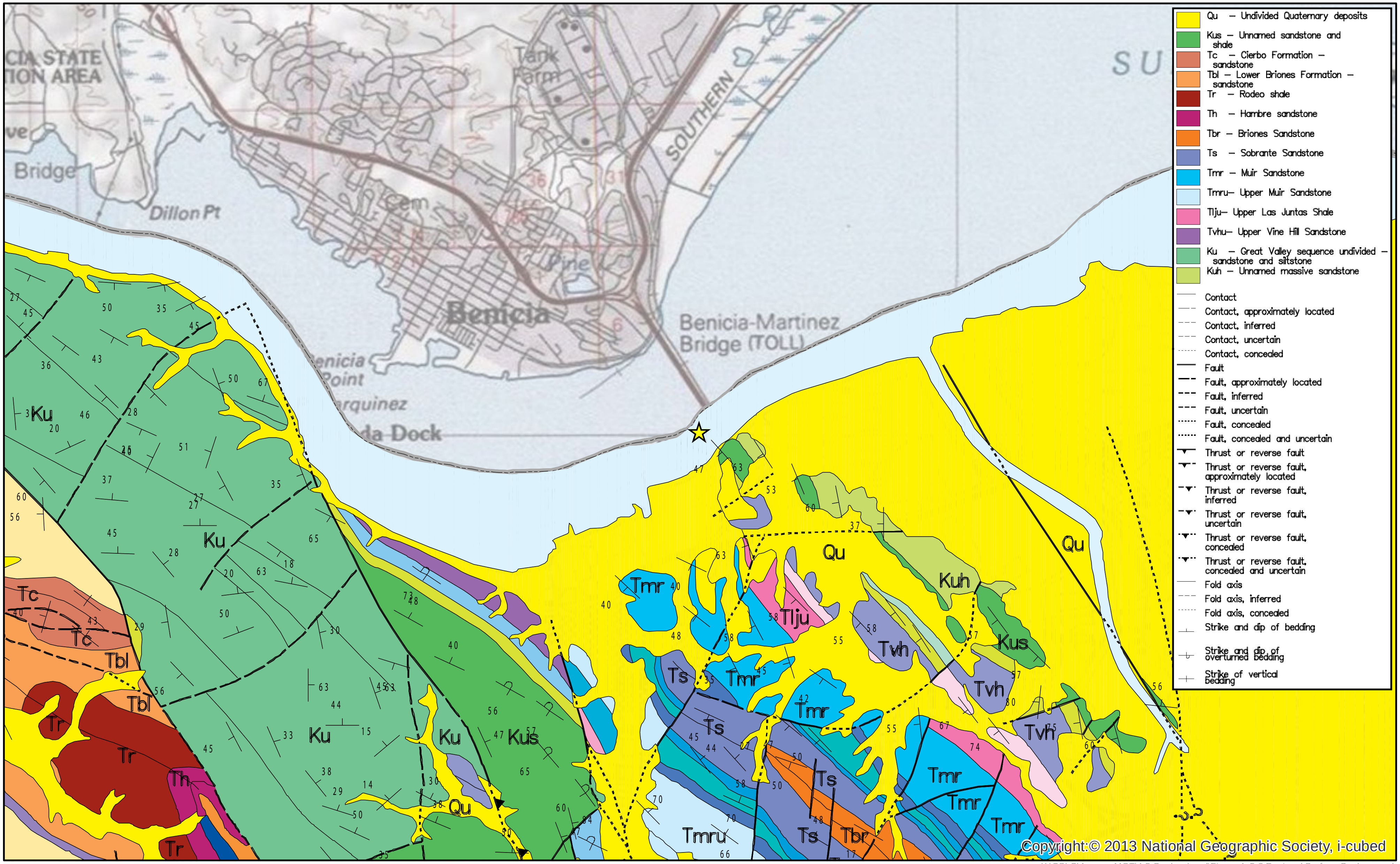

X:\CSLC\Amorco MOT\4.5 Geology\mxd\Figure 4_5-2 Regional Surface Geology.mxd

Figure 4.5-2
Regional Surface Geology
California State Lands Commission
Amorco Marine Oil Terminal Lease Consideration Project

TRC

8/14/2013

☆ Amorco Terminal Location

N

1:60,000

1 inch = 5,000 feet

0 0.5 1 mi

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4.5.1.3 Regional Seismicity

As discussed in Section 4.5.1.1, the San Francisco Bay Area lies along the San Andreas Fault, which forms the boundary between the Pacific and North American Tectonic Plates. Movement between the plates has created several other active faults parallel to the San Andreas, including the Hayward, Calaveras, Greenville, Concord/Green Valley, Rodgers Creek, and San Gregorio Faults. These faults create a zone approximately 50 miles wide through the greater San Francisco Bay Area. Table 4.5-1 shows data and locations for known active faults in the Amorco Terminal vicinity.

Table 4.5-1: Known Active Faults in the Amorco Terminal Vicinity

Fault	Approximate Distance from Site (miles)	Estimated Maximum Moment Magnitude (Mw)	Slip Rate (mm/year)[1]	Approximate Recurrence Interval (years)
Concord/Green Valley	1.75	6.9	6	200
West Napa	11.0	6.9	1	700
Hayward	11.6	7.1	9	160
Rogers Creek	11.6	7.0	9	200
Great Valley (segments 4 to 6)	15.1 to 18.7	6.5 to 6.7	1.5	475 to 625
Calaveras (north)	16.2	6.8	6	180
Greenville	19.1	6.9	2	620
Hunting Creek	29.3	7.1	6	200
San Andreas	29.6	7.9	24	220
San Gregorio	32.2	7.6	5	450
Point Reyes	37.6	7.0	0.3	3,500
Monte Vista	41.6	6.7	0.4	2,400
Calaveras (south)	44.2	6.2	15	35
Maacama (south)	48.4	6.9	9	220

Sources: Cao et al. 2003, WGCEP 2007
[1]mm/year = millimeters per year

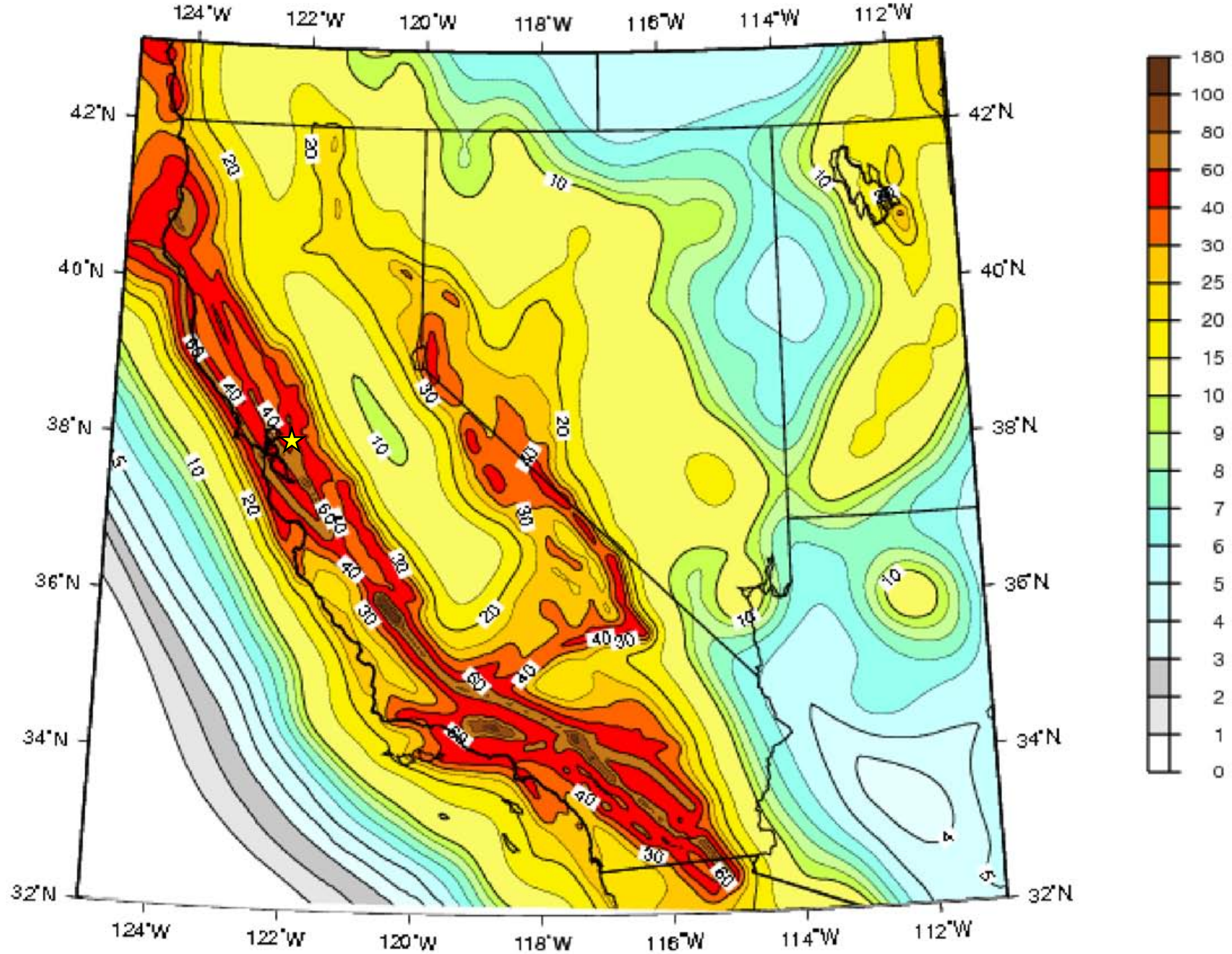
Several major earthquakes have occurred within the Bay Area on many of the major faults. Major earthquakes occurred in 1836 and 1868 along the Hayward Fault, which is located approximately 12 miles from the site. Both earthquakes had estimated moment magnitudes (Mw) of approximately 7. A major earthquake occurred in 1861 on the Calaveras Fault, which is located approximately 16 miles south of the site. This earthquake caused surface rupture for 8 miles through San Ramon Valley and caused severe damage within Contra Costa County. The “Mare Island” earthquake of 1898, along the southern end of the Rodgers Creek Fault, which is approximately 12 miles from the Amorco Terminal, is also of historic significance, with an estimated Mw of 6.2 (Toppozada et al. 1992). The 1838, 1906 (both with an estimated Mw of 7.9), and 1989 (“Loma Prieta”; Mw of 7.1) earthquake events comprise the most significant earthquakes that have occurred in the region within the past 200 years, and caused major damage to structures in the Bay Area. The Working Group on California Earthquake Probabilities (2007) estimates that (1) the Mw of future earthquakes for various faults within the San Andreas system varies from approximately 7.0 to 7.9 (2) there is a 62 percent chance that there will be a damaging earthquake (i.e., Mw of 6.7 or greater) in the San Francisco Bay Area within the next 30 years, and (3) there is a 27 percent chance that there will be a damaging earthquake on the Hayward/Rodgers Creek Fault zone within the next 30 years.

4.5.1.4 Site-specific Seismicity

Active faults, as defined by the CGS (Hart and Bryant 1997), do not transect the Amorco Terminal. An active fault, as defined in the Alquist-Priolo Earthquake Fault Zoning Act (see Section 4.5.2), is one that has experienced surface displacement within the Holocene period (within the last 11,000 years). The Amorco Terminal is surrounded by the Concord/Green Valley Fault to the east, the West Napa and Rodgers Creek Faults to the northwest, the Hayward Fault to the west, and the Calaveras Fault to the south, as shown on Figure 4.5-2. The Concord/Green Valley Fault is located less than 2 miles from the site and is estimated to be able to produce an Mw 6.9 earthquake approximately every 200 years. In the 150-year recorded history, no major earthquake has been recorded on this fault; however, the Working Group on California Earthquake Probabilities (2007) inferred that the entire Concord/Green Valley Fault Zone, which runs beneath Suisun Bay, could rupture in one major event. Several other faults are located between 10 and 20 miles from the Project site, and each of these is believed to be able to produce large earthquakes with a range of approximately Mw 6.5 to 7.0.

The U.S. Geological Survey ([USGS] 2002) developed Probabilistic Seismic Hazard Maps showing expected levels of ground shaking in the form of peak ground acceleration (PGA). The USGS Seismic Hazards Map (see Figure 4.5-3) shows, for California, the level of ground acceleration that has 1 chance in 475 of being exceeded each year, which is approximately equal to a 10 percent probability of being exceeded in 50 years. For the Amorco Terminal area, the expected PGA is approximately 46 percent of the Earth’s gravitational force (g), or 0.46 g.

Peak Acceleration (% gravitational-force) with 10% Probability of Exceedance in 50 Years
USGS 2002



X:\CSLC\Amorco MOT\4.5 Geology\mxd\Figure 4_5-3 Seismic Hazards Map, USGS 2002.mxd

Figure 4.5-3
Seismic Hazard Map, USGS 2002
California State Lands Commission
Amorco Marine Oil Terminal Lease Consideration Project

☆ Approximate Terminal Location

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The California Department of Transportation (1996) has also developed a Seismic Hazard Map for California showing contours of peak acceleration (see Figure 4.5-4). These contours reflect the effects of the Maximum Credible Events for the various contributing faults, and apply to ground motions for rock or stiff soil. As shown on Figure 4.5-4, a peak acceleration contour of 0.5 g is found in the Amorco Terminal vicinity. Both of these sources provide data that imply that strong ground shaking is likely should a major earthquake on a nearby active fault occur.

4.5.1.5 Tsunamis and Seiches

Tsunamis are sea waves typically created by undersea fault movement or coastal or subsea landslide. Tsunamis may be generated at great distance from shore (far field events) or nearby (near field events). Waves are formed as the displaced water moves to regain equilibrium, and radiates across the open ocean, similar to ripples from a rock being thrown into a pond. When the waveform reaches the coastline, it pushes upward from the ocean bottom to create a high swell of water that breaks and washes inland with velocities as high as 15 to 20 nautical miles per hour (knots). The water mass creates tremendous force and can impacts coastal structures.

A seiche is a long, rolling wave with periodic oscillation or “sloshing” of water in an enclosed basin and can be caused from strong winds. The period of oscillation can range from minutes to hours and have the potential to produce large changes in water levels.

Tsunamis and seiches are both rare. However, tsunamis have historically affected the Pacific coastline. The Fort Point tide gauge in San Francisco recorded approximately 21 tsunamis between 1854 and 1964. The 1964 Alaska earthquake generated a wave height of 7.4 feet near Crescent City, California, causing loss of human life. In March 2011, a 9.0 earthquake that occurred off Japan’s east coast produced a tsunami with waves that came ashore in northern and central California at heights between 4 feet and 8 feet, causing damage to docks and vessels.

A tsunami originating in the Pacific Ocean would lose much of its energy passing through San Francisco Bay. Ritter and Dupre (1972) estimated the run-up for the 100-year return period tsunami near the Golden Gate to be 10 feet. The available data indicate a systematic diminishment of the wave height from the Golden Gate to the head of the Carquinez Strait and on into Suisun Bay. The Marine Oil Terminal Engineering and Maintenance Standards (MOTEMS) (see Section 4.5.2) provides estimated tsunami run-up for areas of California. The maximum credible tsunami water levels and current speeds for the Martinez area are 2.3 feet and 1.3 feet per second, respectively, indicating a muted response to tsunamis than at the Golden Gate. MOTEMS requires that each marine oil terminal has a Tsunami Plan, detailing what actions will be taken to safeguard the facility, in the event of a tsunami threat.

4.5.1.6 Sea-Level Rise

Scientific research to date indicates that observed climate change around the globe will likely result in sea level rise. Sea levels in San Francisco Bay are measured at the San Francisco (Fort Point) tide station. The monthly mean sea levels during the period of 1906 to 2006 show an upward linear trend of approximately 2 millimeters per year (mm/yr). During this period, unusually high spikes are noted due to El Niño episodes. Based on the measured sea level rise of 2 mm/yr, the sea level rise at the Amorco Terminal over a 30-year period is estimated to be 0.2 foot. MOTEMS requires that all marine oil terminals consider, as part of design or upgrades, the predicted sea level rise over the remaining life of a terminal (see Section 4.5.2).

4.5.2 REGULATORY SETTING

Federal and State laws that may be relevant to the Project are identified in Table 4.0-1. Local laws, regulations, and policies are discussed below.

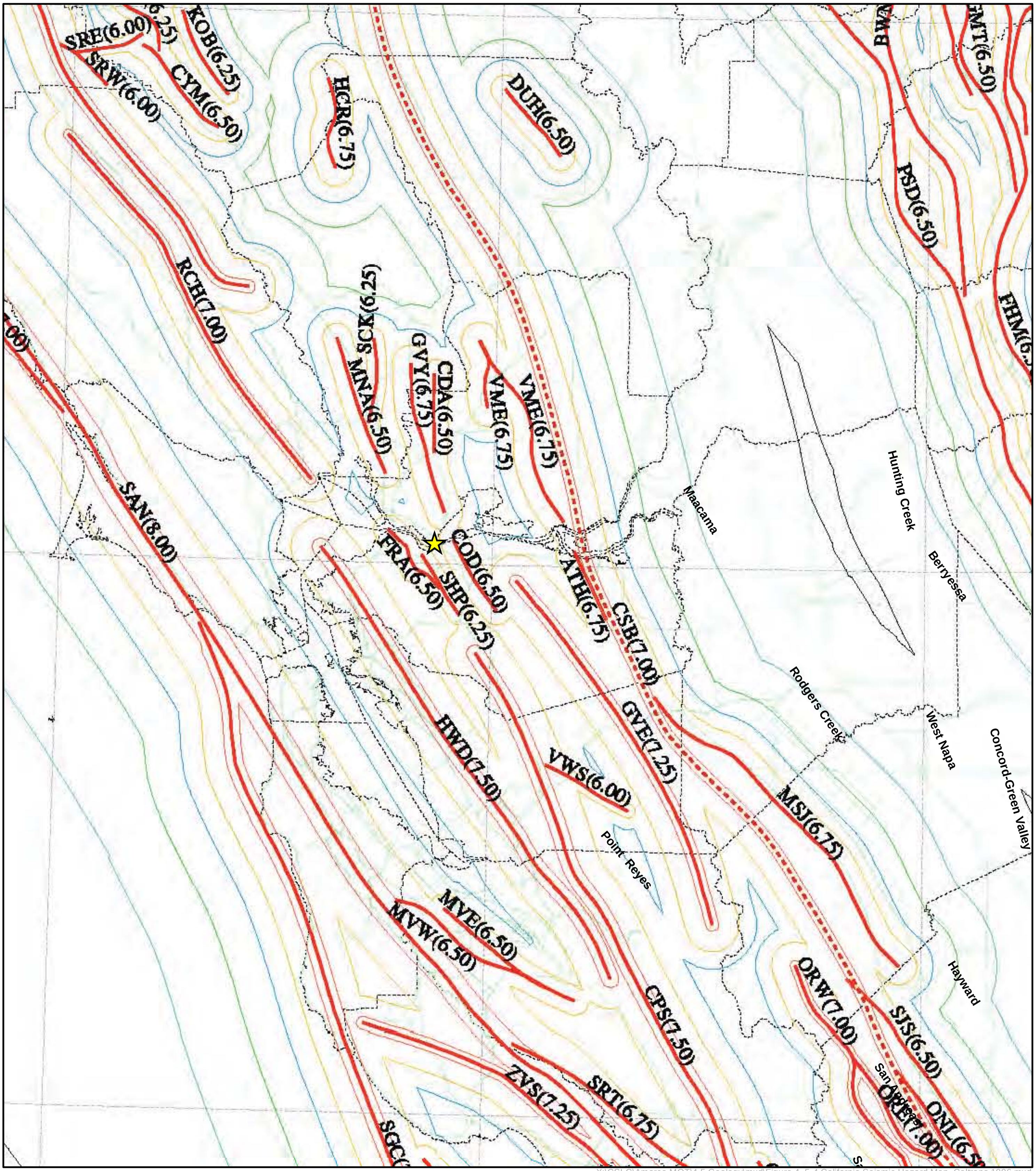
Contra Costa County

Contra Costa Health Services Hazardous Materials Programs administers the California Accidental Release Prevention (CalARP) Program (Cal. Code Regs., tit. 19, Div. 2, Ch. 4.5). Through CalARP, businesses that handle more than a threshold quantity of certain regulated substances must develop a Risk Management Plan (RMP). An RMP is a detailed engineering analysis of the potential accident factors (including seismic considerations) present at a business, and the mitigation measures that can be implemented to reduce this accident potential. Additionally, MOTEMS incorporates CalARP regulations regarding the seismic assessment of anchors and supports on pipelines and valves, and the seismic assessment of existing electrical and mechanical equipment.

City of Martinez

The Safety Element of the City of Martinez General Plan identifies geologic and seismic hazards in the city, provides restraints in the selection of land for development, and provides policies with regard to structural design. The Open Space Element identifies the City’s policies pertaining to natural resources, including soils and minerals.

Acceptable design criteria for static and dynamic loading conditions are specified by the International Building Code (IBC). The City has adopted the IBC per Section 15.04.010 of the Municipal Code.



X:\CSLC\Amorco MOT\4.5 Geology\mxd\Figure 4_5-4 California Seismic Hazard Map, Caltrans 1996.mxd

Figure 4.5-4
California Seismic Hazard Map, Caltrans 1996
California State Lands Commission
Amorco Marine Oil Terminal Lease Consideration Project

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0.7g Peak Acceleration Contour
0.6g Peak Acceleration Contour
0.5g Peak Acceleration Contour
0.4g Peak Acceleration Contour
0.3g Peak Acceleration Contour
0.2g Peak Acceleration Contour
0.1g Peak Acceleration Contour
Special Seismic Source (SSS)
Faults with Fault Codes (MCE)
State Highways
County Boundary
Latitude & Longitude
Approximate Terminal Location

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4.5.3 IMPACT ANALYSIS

4.5.3.1 Significance Criteria

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

- Surface faulting or ground rupture, as a result of a seismic event, that could substantially damage structures or create a risk of injury or loss of life;
- Ground motion due to a seismic event that could induce shaking, slope instability, liquefaction, settlement, or landslides which could substantially damage structures or create a risk of injury or loss of life;
- Tsunamis or seiches that would expose people or structures to the risk of loss, injury, or death;
- Reduction of the structural stability of the wharf due to an increase in loading conditions, vessel size, or number of vessels calling; or
- Construction or maintenance activities that could cause substantial soil erosion or impact to known mineral resources.

4.5.3.2 Assessment Methodology

Geologic impacts were evaluated in two ways: (1) impacts of geologic hazards on project components that may result in substantial damage to structures or infrastructure, or expose people to substantial risk of injury; and (2) the impact of the project on the local geologic environment.

4.5.3.3 Impacts Analysis and Mitigation Measures

Proposed Project

Impact Geology, Sediments, and Seismicity (GSS)-1: Expose people or structures to surface faulting and ground rupture, resulting in substantial structural damage and risk of injury or loss of life. (Less than significant.)

The Amorco Terminal lies outside of the Alquist-Priolo earthquake fault zone, so surface faulting and ground rupture from known active faults is not anticipated, and the impact is, therefore, less than significant. However, significant ground shaking could occur as a result of a major earthquake on a nearby fault; this impact is discussed as GSS-2, below. Accordingly, impacts from surface faulting or ground rupture would be less than significant.

Mitigation Measure: No mitigation required.

Impact GSS-2: Expose people or structures to strong ground shaking, slope instability, and/or seismically induced landslides causing substantial structural damage and risk of injury or loss of life. (Less than significant.)

The Amorco Terminal is subject to strong ground shaking as a result of a major earthquake on any of the nearby faults, described in Section 4.5.1.1. Prior to the recent Amorco wharf upgrades, which were completed in 2013, ground response analysis was performed to develop site-specific seismic design provisions in accordance with the California Building Code (Treadwell and Rollo 2008). These were incorporated into the MOTEMS upgrade design to minimize structural damage due to ground shaking.

Slope stability analysis was also performed for the wharf (Treadwell and Rollo 2008). The results of this study, which used an idealized subsurface profile and soil parameters from the investigation, indicated a relatively low "factor of safety," i.e., relatively low resistance to slope failure. However, the resulting anticipated ground displacements were small; even with a high level of shaking; the slope deformation was calculated as less than a 0.5 foot. In accordance with MOTEMS, under these conditions the effects of slope deformation can be neglected during structural evaluation of a wharf (Treadwell and Rollo 2008).

The potential for lateral spreading (downslope movement as a result of liquefaction of underlying soils) is considered low due to the low potential for liquefaction of the soils at the site (see Impact GSS-3, below).

Since 2007, Tesoro has been completing MOTEMS-required seismic upgrades at the Amorco wharf. These were completed in June 2013. Because potential seismic events have been considered within the upgrades design, potential adverse impacts are considered to be less than significant.

Mitigation Measure: No mitigation required.

Impact GSS-3: Expose people or structures to liquefaction and seismically induced settlement causing substantial structural damage and risk of injury or loss of life. (Less than significant.)

The results of sampling and laboratory testing and analyses of soils beneath the wharf indicate that the potential for liquefaction at the site is low (Treadwell and Rollo 2008). Therefore, this impact is less than significant.

Mitigation Measure: No mitigation required.

Impact GSS-4: Expose people or structures to the risk of loss, injury, or death as a result of tsunamis and/or seiches. (Less than significant.)

As discussed in Section 4.5.1.5, tsunamis and seiches are rare, and a tsunami originating in the Pacific Ocean would lose most of its energy as it passes through the San Francisco Bay and into the Carquinez Strait. Furthermore, MOTEMS requires marine oil terminals to have a Tsunami Plan to address far-field and near-field tsunami events, notifications and communications, tsunami warning system, tsunami response actions, tidal levels, currents and seiche conditions, loss of utilities, tsunami plan accessibility and training, and post-event inspection. Per MOTEMS, the Tsunami Plan must be revisited and revised, where necessary, at a minimum of every three years. Since minimal damage would be expected to occur to the Amorco wharf, and because Amorco is required to comply with the MOTEMS, impacts are less than significant.

Mitigation Measure: No mitigation required.

Impact GSS-5: Cause structural damage to the Amorco Terminal due to an increase in loading conditions, vessel size, or number of vessels calling. (Less than significant.)

MOTEMS requires mooring and berthing analyses to be performed, such that operational limits are established within the allowable capacities of the structure, fendering system, and mooring arrangements for the various sizes of vessels that are permitted to call at any given terminal. Changed loading conditions, vessel size, or number of vessels calling would not be permitted above the established operating limits, which are based in part on the design capabilities of the wharf structural components. Therefore, this impact is less than significant.

Mitigation Measure: No mitigation required.

Alternative 1: No Project

Impact GSS-6: Elimination of long-term potential for structural damage. (Beneficial.)

Under the No Project Alternative, the Amorco Terminal lease would not be renewed and the existing wharf would be subsequently decommissioned with its components abandoned in place, removed, or a combination thereof. Removal of the structures would not have geotechnical implications or result in geologic impacts. Following decommissioning of the wharf, any potential for structural damage will have been eliminated. The No Project Alternative would likely result in Amorco operations transferred to other Bay Area marine terminals. Those terminals could have the potential for geologic, sediment, and seismic impacts, depending on the specific condition or need for modifications or new construction associated with each terminal.

Mitigation Measure: No mitigation required.

Impact GSS-7: Potential to cause substantial soil erosion, or to impact a known mineral resource. (Less than significant.)

With the absence of the Amorco wharf, modification of existing and new overland pipelines, railways, and roadways would likely be required to deliver crude oil or other products to the Golden Eagle Refinery. Soil erosion or sedimentation during construction activities would be limited by the use of Best Management Practices per a Stormwater Pollution Prevention Plan, which is required by the Regional Water Quality Control Board for any project where one acre or more of land is disturbed. Temporary erosion-control measures would be implemented during the construction period to help maintain water quality, protect property, and prevent accelerated soil erosion. With regard to mineral resources, according to the State Mining and Geology Board Surface Mining and Reclamation Act Designation Report No. 7, the potential mineral deposits in Contra Costa County are located in the cities of Antioch and Byron. Therefore, the likelihood of significant mineral deposits being present along potential new pipelines to the Golden Eagle Refinery is small. For these reasons, impacts are anticipated to be less than significant.

Mitigation Measure: No mitigation required.

Impact GSS-8: Potential to cause damage and/or failure to pipelines as a result of a seismic event. (Less than significant.)

Modification of existing and new overland pipelines would likely be required to deliver crude oil or other products to the Golden Eagle Refinery. Integrity review of pipelines is required by the MOTEMS for pipelines at marine terminals to avoid failures due to seismic displacement, improper engineering design, corrosion, joint failure, and vandalism. Because of the MOTEMS seismic design and operational requirements, the chance of pipeline damage from a seismic event is less than significant. Discussion of the consequences of spills, including impacts to other resources, is presented in various subsections of Section 4.0, Environmental Impact Analysis.

For each pipeline system, pipeline operators are required to prepare and follow a manual of written procedures to ensure safety during pipeline maintenance and normal operations, abnormal operations, and emergencies (49 Code of Federal Regulations [CFR] Part 195.402). The maintenance and normal operations section of the manual must include current maps and records and procedures for operating, maintaining, repairing, starting up and shutting down the pipeline system; minimizing the potential for hazards;

and implementing applicable control room management procedures. The abnormal operations section addresses scenarios where the operating design limits have been exceeded and must include procedures for responding to, investigating and correcting the cause of abnormal operations. The emergencies section of the procedure manual must identify procedures for prompt and effective response, assessing the area impacted by the hazard, and minimizing public exposure to injury. Safety-related condition reports must also be included in the procedures manual and include instructions enabling personnel who perform operation and maintenance activities to recognize conditions that potentially may be safety-related conditions subject to the reporting requirements of 49 CFR 195.55.

Mitigation Measure: No mitigation required above MOTEMS-required engineering design, inspection, and maintenance.

Alternative 2: Restricted Lease Taking Amorco Out of Service for Oil Transport

Impact GSS-9: Potential to cause substantial soil erosion, or to impact a known mineral resource. (Less than significant.)

Refer to Impact GSS-7.

Mitigation Measure: No mitigation required.

Impact GSS-10: Potential to cause damage and/or failure to pipelines as a result of a seismic event. (Less than significant.)

Refer to Impact GSS-8.

Mitigation Measure: No mitigation required above MOTEMS-required engineering design, inspection, and maintenance.

Cumulative Impact Analysis

The shoreline of San Francisco Bay, Carquinez Strait, and Suisun Bay is home to many marine and industrial facilities that are susceptible to earthquake-related damage. The 1989 Loma Prieta earthquake caused extensive damage to various structures in the City of Oakland and its port facilities. Liquefaction and seismically induced settlement of loose and soft soils caused most of the damage, which included failure of bridge supports and damage to storage tanks. Most wharves, however, are constructed with redundancy, and experienced little or no damage during this earthquake. Marine oil terminals in California are designed to withstand large lateral forces and/or are required to upgrade to comply with MOTEMS, and thus are not expected to have significant damage from most earthquake events. Therefore, cumulative impacts, to which the Amorco contributes incrementally, are less than significant.

4.5.4 SUMMARY OF FINDINGS

Table 4.5-2 provides a summary of anticipated impacts and associated mitigation measures.

Table 4.5-2: Summary of Geology, Sediments, and Seismicity Impacts and Mitigation Measures

Impact	Mitigation Measure(s)
Proposed Project	
GSS-1: Expose people or structures to surface faulting and ground rupture, resulting in substantial structural damage and risk of injury or loss of life.	No mitigation required.
GSS-2: Expose people or structures to strong ground shaking, slope instability, and/or seismically induced landslides causing substantial structural damage and risk of injury or loss of life.	No mitigation required.
GSS-3: Expose people or structures to liquefaction and seismically induced settlement causing substantial structural damage and risk of injury or loss of life.	No mitigation required.
GSS-4: Expose people or structures to the risk of loss, injury, or death as a result of tsunamis and/or seiches.	No mitigation required.
GSS-5: Cause structural damage to the Amorco Terminal due to an increase in loading conditions, vessel size, or number of vessels calling.	No mitigation required.
Alternative 1: No Project	
GSS-6: Elimination of long-term potential for structural damage.	No mitigation required.
GSS-7: Potential to cause substantial soil erosion, or to impact a known mineral resource.	No mitigation required.
GSS-8: Potential to cause damage and/or failure to pipelines as a result of a seismic event.	No mitigation required above MOTEMS-required engineering design, inspection, and maintenance.
Alternative 2: Restricted Lease Taking Amorco Out of Service for Oil Transport	
GSS-9: Potential to cause substantial soil erosion, or to impact a known mineral resource.	No mitigation required.
GSS-10: Potential to cause damage and/or failure to pipelines as a result of a seismic event.	No mitigation required above MOTEMS-required engineering design, inspection, and maintenance.

4.6 CULTURAL RESOURCES

Section 4.6 provides a detailed description of existing cultural resources in the vicinity of the Amorco Marine Oil Terminal (Amorco Terminal) Lease Consideration Project (Project), and addresses the potential cultural resources impacts that could result from the granting of a new lease for Amorco Terminal operations, as well as for Project alternatives.

4.6.1 CONCEPTS AND TERMINOLOGY

The following definitions are common terms used to discuss the regulatory requirements and treatment of cultural resources:

- **Cultural resource:** A term used to describe several different types of resources, including prehistoric and historic-period archaeological resources; historic-period architectural structures such as buildings, bridges, and infrastructure; and resources of importance to Native Americans.
- **Historic properties:** A term defined by the National Historic Preservation Act (NHPA) as any prehistoric or historic district, site, building, structure, or object included, or eligible for inclusion, in the National Register of Historic Places (National Register), including artifacts, records, and material remains related to such a property.
- **Historical resource:** A term defined under the California Environmental Quality Act (CEQA) (Pub. Resources Code, § 21084.1 and State CEQA Guidelines § 15064.5, subds. (a) and (b)), as any resource (including buildings, sites, structures, objects, records, manuscripts, etc.) listed, or determined eligible for listing, in the California Register of Historic Resources (California Register). The California Register includes resources listed, or formally determined eligible for listing, in the National Register, as well as some California State Landmarks and Points of Historical Interest.
- **Unique archaeological resource:** A CEQA term defined under Public Resources Code section 21083.2, subdivision (g) as an archaeological artifact, object, or site about which it can be clearly demonstrated that there is a high probability that it meets any of the following criteria: (1) contains information needed to answer important scientific research questions and there is a demonstrable public interest in that information, (2) has a particular quality such as being the oldest of its type or the best available example, or (3) is directly associated with a scientifically recognized important prehistoric or historic event or person.

4.6.2 ENVIRONMENTAL SETTING

4.6.2.1 Prehistoric, Ethnographic, and Historic Background

Natural Conditions

The Project area is in the southeastern Carquinez Strait near the southern border of the Suisan Bay/Sacramento River Delta in Contra Costa County, California, within the larger San Francisco Bay Area. The region in which the Project is located has a Mediterranean climate and supports a variety of wetland communities and grasslands.

Prehistoric Setting

This section describes the cultural changes in the San Francisco Bay Area. No discussion of the Clovis time (11500 to 8000 calibrated Before Present [cal. B.P.]) is provided, as there has been no evidence related to this time found in the area, presumably because it has been submerged or buried (Milliken et al. 2007). The sequence used here is very broad and includes the Lower, Middle, and Late Archaic periods, and the Emergent Occupation.

Lower Archaic (8000 to 3500 cal. B.P.) A generalized mobile forager pattern among prehistoric groups is characterized by portable milling stones, millingslabs (metates), and handstones (manos), as well as wide-stemmed projectile points. Archaeobotanical remains suggest an economy focused on acorns.

Middle Archaic (3500 to 500 cal. B.P.) During the Middle Archaic there appears to be an increase in regional trade and possibly signs of sedentism. The first cut shell beads appear in mortuaries. Mortars and pestles are documented shortly after 4000 cal. B.P. Net sinkers are a typical marker for this time. The burial complexes with ornamental grave associations seem to represent a movement from forager to semi-sedentary land use (Milliken et al. 2007).

Upper Archaic (500 cal. B.P. to cal. Anno Domini [A.D.] 1050) The Upper Archaic period shows continued specialization and an increase in the complexity of technology. Acorns and fish are the predominant food sources. New bone tools and ornaments appear, including whistles and barbless fish spears. Beads become prominent, with several types. Mortars and pestles continue to be the sole grinding tools. Net sinkers disappear at most sites. Mortuary practices change from a flexed position to an extended position.

Emergent (cal. A.D. 1050 to Historic) Many archaeologists believe that craft specialization, political complexity, and social ranking were highly developed. New bead types and multi-perforated and bar-scored ornaments appear. The bow and arrow replace the dart and atlatl as the favored hunting tools (Moratto 1984). Cultural traditions seem to be very similar to those witnessed at the time of European contact.

Ethnographic Setting

The Project lies within the territory occupied by the Native American group known to the Spanish as the Costanoan (Levy 1978). The contemporary descendants of this group are members of the Ohlone Indian Tribe. The Costanoan group occupied the coast of California from San Francisco to Monterey and inland to include the mountains from the southern side of the Carquinez Strait to the eastern side of the Salinas River south of the Chalone Creek.

Costanoan is a linguistic term for a family of eight related languages. Each language was spoken by a distinct group of people within a recognized geographic area. In the Martinez area the spoken language was Karkin. This language was spoken only in a very small area and probably all the speakers were related. Political units within each ethnic group were called tribelets and each tribelet contained between 50 and 500 people. Each tribelet had one or more permanent villages and probably several temporary camps within its territory.

The Costanoans were hunter gatherers, with acorns being the most important plant food. Various roots, nuts, berries, and seeds were important. The Costanoan group's practices included managed burning of chaparral to encourage sprouting of seed plants and improve browsing for deer and elk. The favored animals for hunting were deer and rabbit. Whales and sea lions were eaten when found stranded on the beach. Waterfowl were captured in nets using decoys. Important fish were steelhead, salmon, and sturgeon, and mussels and abalone were the preferred shellfish.

Dome thatched houses with rectangular doorways and a central hearth were the standard dwellings. Technology included tule balsa canoes, bows and arrows, and baskets.

Historic Overview

A number of Spanish expeditions passed through the area between 1769 and 1776, including those led by Portola, Fages, Anza, and Rivera. Although the exact routes of the early explorers cannot be determined, none is thought to have traveled near the Project area (Milliken 1995, Beck and Haase 1974).

The Spanish government founded missions and secular towns with the land itself being held by the government. The Mexican government closed the missions in the early 1830s and former mission lands were given to individuals as land grants.

The Martinez area was originally part of two Mexican land grants. The Rancho El Pinole was granted to Ygnacio Martinez in 1824 and Rancho La Juntas was granted to William Welch in 1844. The town of Martinez can be traced to the 1847 establishment of a ferry service that crossed the Carquinez Strait. The ferry was part of the main route from San Francisco to the gold mining areas in the Sierras. The town grew rapidly by providing supplies and other services to the miners using the ferry route (City of Martinez 2013). Martinez was designated as the county seat for Contra Costa County in 1851. After the gold rush, the area continued to flourish due to agriculture, predominantly wheat and fruit. John Muir lived in Martinez from 1890 to 1914, and his home is preserved as the John Muir National Historic Site. Commercial salmon fishing began in the 1870s and soon two fish canneries opened in Martinez.

Martinez became an industrial center in the early 20th century when chemical and petroleum facilities were built. The Mountain Copper smelter was built at Bull's Head Point, and several refineries were opened in 1915. The Martinez location provided a deep-water harbor and rail connections for these industrial facilities.

Refer to Section 1.0, Introduction for a discussion of the history of the existing facility.

4.6.2.2 Cultural Resources in the Vicinity of the Amorco Terminal

Summary of Known Cultural Resources and Significance Findings

Archaeological Record Search

The California Historic Resources Information System maintains regional offices that manage site records for known cultural resource locations and related technical studies. The regional office for Contra Costa County is the Northwest Information Center at Sonoma State University in Rohnert Park, California. Information regarding cultural resource studies and archaeological sites was compiled using a 1-mile radius around the Project area. Sources reviewed include all known and recorded archaeological and historic sites and cultural resource reports. Additional resources that were consulted for relevant information included the National Register, California Register, California Inventory of Historic Resources, California Points of Historical Interest, California Historical Landmarks, and historic maps.

The archaeological record search for the project was requested on May 23, 2013, and was conducted on June 20, 2013. The record search identified no cultural resources within the footprint of the Project area, but one resource was identified within the tank farm portion of the Amorco Terminal (07-000132). There are a total of 12 previously recorded cultural resources within a 1-mile radius (see Table 4.6-1).

There are no sites currently listed on the National Register, California Register, Contra Costa County Historic Resources Inventory, or the list of California Historical Landmarks within 1 mile of the Project area.

The record search indicated that a total of 40 cultural resource studies have been completed within a 1-mile radius of the Project area; of these, two include portions of the Project area.

Table 4.6-1: Cultural Resources Previously Recorded within 1 Mile of the Project Site

Primary Number*	Brief Description	Recorder and Date
07-000132	Shell mound	Pilling 1910
07-000499	Southern Pacific Railroad Line	Unknown 1994
07-000521	Martinez Railroad Station	Hill 1995
07-000522	Concrete warehouse	Hill 1995
07-000523	Large industrial building	Hill 1995
07-000859 (same as 48-000445)	Southern Pacific Martinez-Benicia Bridge	Unknown 1989
07-002543	Mountain Copper Company Wharf	Hill 1995
07-002545	Mountain Copper Company West Pier	William Self & Associates 2000
07-002685	Peyton Marsh Drainage System	JRP Historical Consulting 1997
07-002750	Sharkey Building	Henderson 2006
07-002759	1927 L-shaped school building	Grover 2007
07-003083	Multi-level government building	Weatherford 2011
48-000445 (same as 07-000859)	Southern Pacific Martinez-Benicia Bridge	Unknown 1989

Source: Northwest Information Center 2013

The California State Lands Commission (CSLC) online database for shipwrecks (CSLC 2013c) was checked on June 17, 2013. The database lists shipwrecks by county and is based primarily on historical accounts of these incidents. This database search is by latitude and longitude. No known shipwrecks appeared within the Project footprint. One shipwreck does appear on the U.S. Geological Survey (USGS) topographic map over 1 mile to the south of the Project area. The cultural resource studies that include portions of the Project area were marine archaeological studies, and were both negative for shipwrecks in the vicinity of the Project.

<u>Native American Heritage Commission</u>

TRC Solutions, Inc. (TRC) contacted the Native American Heritage Commission (NAHC) on May 23, 2013 regarding the potential presence of burials and sacred lands in the Project area and vicinity (see Appendix F for the NAHC correspondence). In its June 11, 2013 response, the NAHC stated that the sacred lands file records search did not indicate the presence of any known Native American cultural resources within the immediate

Project area. The NAHC enclosed a list of Native American individuals and/or organizations that might have knowledge of cultural resources in or near the Project area.

On June 14, 2013, TRC sent letters with a Project location map to all individuals/groups on the list requesting information and comments. There have been no responses at the time of this writing.

Paleontological Record Search

On June 18, 2013, a locality record search was conducted on the University of California, Museum of Paleontology website (University of California 2013). No localities were found within the Project area for invertebrates, microfossils, or vertebrates. An online search was done at the USGS (USGS 2013b) for the geologic rock units for the Project area. The maps show that the Project area is predominantly Alluvium dating from the Holocene and a few portions are from the Pleistocene, with some pockets of mud deposits from the late Holocene. There is minimal potential for fossils, due to previous dredging and because the depositional environment for fossil preservation is low.

4.6.3 REGULATORY SETTING

Federal and State laws that may be relevant to the Project are identified in Table 4-1. Local laws, regulations, and policies are discussed below.

Contra Costa County

The following goal and policy from the Open Space Element of the *Contra Costa County General Plan* (2005) may be applicable to the Project.

- Goal 9-31: To identify and preserve important archaeological and historic resources within the County.
- Policy 9-32: Areas which have identifiable and important archaeological or historic significance shall be preserved for such uses, preferably in public ownership.

4.6.4 IMPACT ANALYSIS

4.6.4.1 Significance Criteria

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

- Cause a substantial adverse change in the significance of a historical or archaeological resource as defined in State CEQA Guidelines section 15064.5.

4.6.4.2 Assessment Methodology

For the purposes of this Environmental Impact Report, potential impacts to cultural resources were evaluated based on a review of all known and recorded archaeological and historic sites within 1 mile of the Project area. Additional resources that were consulted include cultural resource reports, the California Register, National Register, California Inventory of Historic Resources, California Historical Landmarks, historic maps, and the CSLC online database for shipwrecks.

A paleontological record search was conducted online through the University of California, Museum of Paleontology website.

4.6.4.3 Impacts Analysis and Mitigation Measures

The following subsections describe the Project's potential impacts on cultural resources. Where impacts are determined to be significant, feasible mitigation measures are described that would reduce or avoid the impact.

Proposed Project

Impact Cultural Resources (CR)-1: Have the potential to disturb previously unrecorded historical, archaeological, or paleontological resources, and human remains. (No impact.)

No construction activities would occur as part of the lease renewal; therefore, there would be no disturbance to previously unrecorded or recorded historical, archaeological, or paleontological resources, or human remains. Because there are no shipwrecks in the immediate area of the Amorco Terminal, maintenance dredging would also have no impact on cultural resources.

Mitigation Measure: No mitigation required.

Alternative 1: No Project

Impact CR-2: Have the potential to disturb previously unrecorded historical, archaeological, or paleontological resources, and human remains. (Potentially significant.)

Under the No Project Alternative, Tesoro's lease would not be renewed and the existing Amorco Terminal would be subsequently decommissioned with its components abandoned in place, removed, or a combination thereof. The decommissioning of the Amorco Terminal would follow an Abandonment and Restoration Plan.

After decommissioning, the No Project Alternative assumes that incoming tankers would instead go to the Avon Terminal, located approximately 2.5 miles east of the Amorco Terminal. Because the Avon Terminal is currently in operation, no impacts to cultural resources would occur at the Avon Terminal.

The Amorco Terminal may eventually be converted to another use, which would require a separate CEQA environmental review. Because no shipwrecks have been found in the project vicinity and maintenance dredging has taken place as recently as 2005, no impacts to cultural resources would be anticipated during the decommissioning and dismantling process.

This alternative assumes that there would be no Amorco Terminal to receive crude or transport product and, therefore, refinery operations would be dependent on crude oil receipts through non-marine sources in order to meet regional refining demands. Sources may include land-based transportation such as rail cars and trucks, and/or pipeline connections to other San Francisco Bay Area marine oil terminals, or a combination thereof. Crude oil transportation by rail car would involve constructing additional rail lines and associated handling facilities. Pipeline delivery would require construction of new pipelines and/or the purchase of existing pipeline capacity from other local petroleum refinery competitors.

Construction of railroads and/or pipelines, including, but not limited to, clearing of vegetation, grading, and excavation, could result in significant impacts to historical, archaeological, and/or paleontological resources, and/or human remains if these resources cannot be avoided. Should this alternative be selected, it would be subject to substantial CEQA environmental review and permitting by local and State agencies.

Alternative 2: Restricted Lease Taking Amorco Out of Service for Oil Transport

Impact CR-3: Have the potential to disturb previously unrecorded historical, archaeological, or paleontological resources, and human remains. (No impact.)

The Amorco Terminal may eventually be converted to another use, which would require a separate CEQA environmental review. Because no shipwrecks have been found in the project vicinity and maintenance dredging has taken place as recently as 2005, no impacts to cultural resources would be anticipated. Refer to Impact CR-3 for land-based impacts.

Mitigation Measure: No mitigation required.

Cumulative Impact Analysis

Because no construction would occur as part of the proposed Project, there would be no disturbance to previously unrecorded or recorded historical, archaeological, or paleontological resources, or human remains. Therefore, routine operations at the Amorco Terminal would not contribute to cumulative cultural resource impacts.

4.6.5 SUMMARY OF FINDINGS

Table 4.6-2 includes a summary of anticipated impacts to cultural resources and associated mitigation measures.

Table 4.6-2: Summary of Cultural Resources Impacts and Mitigation Measures

Impact	Mitigation Measure(s)
Proposed Project	
CR-1: Have the potential to disturb previously unrecorded historical, archaeological, or paleontological resources, and human remains.	No mitigation required.
Alternative 1: No Project	
CR-2: Have the potential to disturb previously unrecorded historical, archaeological, or paleontological resources, and human remains.	Should this alternative be selected, mitigation measures would be determined during a separate environmental review under CEQA.
Alternative 2: Restricted Lease Taking Amorco Out of Service for Oil Transport	
CR-3: Have the potential to disturb previously unrecorded historical, archaeological, or paleontological resources, and human remains.	No mitigation required.

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4.7 LAND-BASED TRANSPORTATION

Section 4.7 provides a detailed description of the existing land transportation system in the vicinity of the Amorco Marine Oil Terminal (Amorco Terminal) and the potential effects on land transportation and traffic that may occur with the implementation of the Amorco Marine Oil Terminal Lease Consideration Project (Project). Assessment of vessel traffic is addressed as part of Section 4.1, Operational Safety/Risk of Accidents.

4.7.1 CONCEPTS AND TERMINOLOGY

Traffic is typically measured and averaged over a 24-hour period. This average daily traffic (ADT) is often based on an actual 24-hour traffic count taken during mid-week. In some cases, traffic is measured at various times during the day and extrapolated to the ADT. Seasonal variations may also be taken into account by collecting data during different months of the year.

The capacity of a roadway segment or intersection is the maximum rate of vehicular traffic flow under prevailing traffic, design, and operational conditions. Factors affecting capacity include: traffic controls, lane widths, grades, the amount of truck and bus traffic, the availability of on-street parking, parking turnover, and turn movements. Capacity is commonly defined for hourly periods of time. However, for generalized planning purposes, it is useful to define capacity as the maximum volume of traffic that a roadway may be expected to carry during a 24-hour period to maintain a level of service (LOS). Daily capacities, as defined by the Transportation Research Board in the *Highway Capacity Manual*, (2000) for various facilities under ideal conditions are listed in Table 4.7-1.

The LOS of a roadway segment or intersection is a qualitatively defined measure of prevailing traffic, design, and operational conditions. The LOS, denoted alphabetically from A to F (best to worst), is a summary evaluation of the degree of congestion, roadway design constraints, delay, accident potential, and driver discomfort experienced during a given period of time (peak hour for intersections and 24 hours for roadway segments). While LOS A is the most desirable operational condition for a roadway or intersection, LOS C is considered a benchmark for planning purposes. In heavily urbanized areas, LOS D is an accepted, though undesirable, condition for peak hour travel, particularly on freeways. The LOS may be quantitatively calculated by a number of methods that generally compare vehicle counts with the physical and operational capacity of the roadway under study. For roadway segments and controlled intersections, the volume/capacity (V/C) ratio is indicative of the LOS. Traffic LOS definitions are explained in Table 4.7-2.

1 **Table 4.7-1: Daily Capacities for Major and Minor Arterials**

Facility Geometrics	Capacity in Vehicles Per Day (LOS E)[1]
8-lane Divided Regional Arterial	80,000
8-lane Divided Major Arterial	72,000
6-lane Divided Major Arterial	54,000
4-lane Divided Major Arterial	36,000
4-lane Undivided Major Arterial	30,000
2-lane Undivided Major Arterial	15,000
4-lane Minor Arterial	24,000
2-lane Minor Arterial	12,000

Source: Transportation Research Board 2000
[1]LOS = Level of Service

2 **Table 4.7-2: Summary of Levels of Service (LOS) for Intersections**

LOS	Flow Type	Delay	Maneuverability	V/C[1] Ratio
A	Stable flow	Very slight or no delay. If signalized, conditions are such that no approach phase is fully utilized by traffic and no vehicle waits longer than one red indication.	Turning movements are easily made, and nearly all drivers find freedom of operation.	0.00 – 0.60
B	Stable flow	Slight delay. If signalized, an occasional approach phase is fully utilized.	Vehicle platoons are formed. Many drivers begin to feel somewhat restricted within groups of vehicles.	0.61 - 0.70
C	Stable flow	Acceptable delay. If signalized, a few drivers arriving at the end of a queue may occasionally have to wait through one signal cycle.	Backups may develop behind turning vehicles. Most drivers feel somewhat restricted.	0.71 - 0.80
D	Approaching unstable flow	Tolerable delay. Delays may be substantial during short periods, but excessive backups do not occur.	Maneuverability is severely limited during short periods due to temporary backups.	0.81 - 0.90
E	Unstable flow	Intolerable delay. Delay may be considerable (up to several signal cycles).	There are typically long queues of vehicles waiting upstream of the intersection.	0.91 - 1.00
F	Forced	Excessive delay.	Jammed conditions. Backups from other locations restrict or prevent movement. Volumes may vary widely, depending on the downstream backup conditions.	Varies

Source: Transportation Research Board 2000
[1]V/C = volume/capacity ratio

4.7.2 ENVIRONMENTAL SETTING

4.7.2.1 Roadway Transportation System

The Amorco Terminal is located off of Interstate 680 (I-680) near the Marina Vista Road exit. The entrance to the Amorco Terminal, Amorco Road, connects to Marina Vista Road, approximately 0.5 mile west of I-680. At Amorco Road, Marina Vista Road is a narrow, two-lane paved roadway with dirt shoulders. Various locations along Marina Vista Road have a physical divider separating westbound and eastbound lanes. Approximately 0.5 mile west of the Amorco Road/Marina Vista Road intersection, Marina Vista Road becomes a one-way road westbound as it approaches downtown, and Escobar Street parallels Marina Vista Road eastbound. While Marina Vista Road is lightly traveled in the vicinity of Amorco Road, trucks make up a large portion of the traffic volume, reflecting the industrial nature of the land use in the area.

The city of Martinez has jurisdiction of Marina Vista Road. The posted speed limit on the stretch of Marina Vista Road near Amorco Road varies from 25 to 35 miles per hour. Table 4.7-3 depicts 24-hour vehicle counts to the west and east of I-680, respectively. Marina Vista Road becomes Waterfront Road approximately 0.5 mile east of I-680.

Table 4.7-3: 24-Hour Vehicle Counts on Marina Vista Road West of Interstate 680 and Waterfront Road East of Interstate 680 (2002)

Roadway	Eastbound Traffic Total	Eastbound Peak Hour	Westbound Traffic Total	Westbound Peak Hour	Total Both Directions
Marina Vista Road	4,337	(AM) 295	5,594	(AM) 641	9,931
		(PM) 644		(PM) 303	
Waterfront Road	2,184	(AM) 311	2,185	(AM) 179	4,369
		(PM) 163		(PM) 258	

Source: CSLC 2011a

There are no truck trips attributable to Amorco's Terminal operations. All Amorco Terminal employee and associated delivery vehicles enter through the Amorco Terminal entrance (Amorco Road) off Marina Vista Road and park inside the facility. Amorco Terminal receives crude oil over the wharf and transfers it by pipeline to storage tanks closer the Golden Eagle Refinery (Refinery). Since tanker truck loading or offloading is not used, there is no truck traffic associated with the Amorco Terminal.

4.7.2.2 Railroad System

No rail or rail spur is associated with the Amorco Terminal. However, railroad tracks run parallel to Marina Vista Road and must be crossed to enter Amorco Terminal. These tracks carry freight and Amtrak San Joaquin (service from San Francisco to Bakersfield, 10 trains per day) and follow the southern shore of the Carquinez Strait. Railroad traffic can temporarily block access to Amorco Terminal. Another set of tracks, which cross the Carquinez Strait between the east and west spans of the Benicia Bridge, are elevated and have no impact on access to Amorco Terminal. These tracks carry freight and Amtrak Capitol Corridor (service from San Jose to Sacramento, 24 trains per day), California Zephyr (service from Chicago to Emeryville, two trains per day), and Coast Starlight (service from Seattle and Washington, 2 trains per day).

4.7.3 REGULATORY SETTING

Federal and State laws that may be relevant to the Project are identified in Table 4-1. Local laws, regulations, and policies are discussed below.

Interstate highways, state routes, and bridges are governed by the Federal Highway Administration and California Department of Transportation; county roads are governed by Contra Costa County; and other local streets and highways are governed by local cities. In all cases, specific standards apply with respect to the planning, design, and operation of roadways and intersections. Not all governing agencies impose the same criteria (e.g., cross sections and rights-of-way for the same street may differ from jurisdiction to jurisdiction). Rail facilities are regulated in the State by the California Public Utilities Commission (CPUC). Train operations are also subject to CPUC guidelines. The design and operation of railroad grade crossings are subject to Federal Railroad Administration guidelines. Numerous other federal agencies also have regulatory authority over rail transportation.

TRANSPAC, Central County Action Plan for Routes of Regional Significance

Regional Transportation Planning Committees work cooperatively to establish overall goals, set performance measures (i.e., Multi-modal Transportation Service Objectives) for designated Routes of Regional Significance, and outline a set of projects, programs, measures, and actions that will support achievement of the objectives. Interstate 680 is a route of regional significance through Contra Costa County.

City of Martinez

The city of Martinez Downtown Specific Plan (2006) Circulation (Section 13) identifies the Marina Vista/Escobar route as one of the three principal through streets, due largely to the fact that that these are the only routes to and from downtown with straightforward connections to the regional highway system. The other principal through streets are Alhambra/Berrellesa and Court/Pine/Pacheco. These three Gateway Corridors are designated as arterials in the city of Martinez General Plan Transportation Element.

4.7.4 IMPACT ANALYSIS

4.7.4.1 Significance Criteria

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

- Generate project-related traffic that would cause LOS to drop below standards established by the local jurisdictions, if project-generated traffic cannot be minimized at these critical locations through development and implementation of a traffic control plan and/or appropriate improvements to accommodate facility operations
- Design elements of the project, or project construction, would result in conditions increasing the risk of accidents for vehicular or non-distance, sharp curves, or large speed differentials between construction-related and general-purpose traffic
- Generate parking demand that exceeds parking supply
- Conflict with adopted policies, plans, or programs regarding public transit, bicycle, or pedestrian facilities, or otherwise decrease the performance of safety of such facilities
- Substantially affect emergency response capabilities to effectively mitigate spills and other accident conditions

4.7.4.2 Assessment Methodology

Environmental impacts are discussed in this section relative to the roadways in the vicinity of the Project. Because there would be no construction associated with continued operation of the Amorco Terminal, there would be no changes to the existing conditions as a result of lease renewal.

4.7.4.3 Impacts Analysis and Mitigation Measures

The following subsections describe the Project's potential impacts on land-based transportation. Where impacts are determined to be significant, feasible mitigation measures are described that would reduce or avoid the impact.

Proposed Project

Impact Land Transportation (LT)-1: Generate project-related traffic that would cause LOS to drop below standards established by local jurisdictions; increase risk of accidents due to design elements of the project; generate significant parking demand; conflict with adopted policies, plans, or programs regarding land-based transportation; or substantially affect emergency response capabilities. (No impact.)

Under the new lease, Amorco Terminal operations would continue as at present. No vehicular activity is associated with the existing Amorco Terminal operations beyond employees and associated delivery vehicles; hence, no impacts would result from continued operations. Over the 30-year life of the lease, no modifications to the Amorco Terminal are proposed. Amorco Terminal operations would not conflict with any adopted transportation plans, policies, and programs or affect emergency response capabilities. All parking would remain on-site.

Mitigation Measure: No mitigation required.

Alternative 1: No Project

Impact LT-2: Generate project-related vehicular traffic resulting from the dismantling of existing structures. (Less than significant.)

Under the No Project Alternative, the Amorco lease would not be renewed and the existing Amorco Terminal would be decommissioned with its components abandoned in place, removed, or a combination thereof. Decommissioning would likely be accomplished primarily via the water, with materials, other than those that can be used at the Refinery, taken away via barge. If any materials were relocated by land, they would likely be relocated via heavy truck to the Golden Eagle Refinery. Based on prior experience, a construction crew of 25 workers would be anticipated. During decommissioning and removal, estimated to last 90 days, five trucks are assumed on a daily basis and when two-way trips and passenger-car equivalents are calculated, Amorco Terminal demolition could add as many as 70 ADT. Impacts resulting from increased traffic due to Project decommissioning would be less than significant because removal would be short-term, and truck trips would be scheduled to avoid peak traffic hours. Therefore, decommissioning and removal activities would result in a negligible increase in vehicular traffic. Because the Amorco Terminal would no longer be operational, daily vehicular supply trips and employee trips associated with the Terminal would cease. There would be little to no differential on surface street traffic with elimination of the Amorco Terminal.

Mitigation Measure: No mitigation required.

Impact LT-3: Generate project-related traffic that would cause LOS to drop below standards established by local jurisdictions; increase risk of accidents due to design elements of the project; generate significant parking demand; conflict with adopted policies, plans, or programs regarding land-based transportation; or substantially affect emergency response capabilities. (Potentially significant.)

To operate at its current capacity without the Amorco Terminal, Tesoro Refining and Marketing Company, LLC may need to arrange for crude/product delivery by truck, pipeline, and/or rail transfers from other marine oil terminals in the San Francisco Bay

Area to the Golden Eagle Refinery. If the Refinery were to receive truck shipments, it would likely be short-term, as receipt of crude oil via tanker truck would require placing 350 tanker trucks on the road for every unit train delivery of crude oil that is received at locations outside the Refinery. Crude oil transportation by rail car would involve constructing additional rail lines and associated handling facilities. Pipeline delivery would require construction of new pipelines and/or the purchase of existing pipeline capacity from other local petroleum refinery competitors. Short-term traffic impacts would result from the modifications at other Bay Area marine oil terminals; however, such modifications would require a separate environmental review under the California Environmental Quality Act (CEQA). Short-term and long-term impacts associated with pipeline and/or railroad construction and operation are addressed below.

Short-term Impacts

Pipeline and/or rail construction would require both materials deliveries and construction workers, thereby creating a small increase in localized traffic. Based on prior experience, it is estimated that construction may require 25 workers daily, and up to 10 trucks to bring construction supplies and remove any cut material and debris, as necessary. Assuming that each haul truck is equivalent to two passenger cars and that each vehicle makes two trips (coming and going), the construction ADT volume would be 90. Depending on the chosen route and the LOS on access roads, this temporary additional volume could result in significant impacts if these vehicles are forced onto roads operating at unacceptable levels (i.e., LOS E or F).

A second potential area of temporary, potentially significant impacts is where pipelines or rail lines come into proximity with roads. Installation of pipeline and/or rail crossings may necessitate the closure of half or all road lanes during construction. Similarly, if the line parallels or is constructed within the confines of any roads, one or more lanes may be closed. A lane closure can have a significant impact if it causes congestion that extends back to the previous intersection and reduces the traffic-carrying capacity of that intersection. Closing one lane of a two-lane road causes a reduction of more than 50 percent because not only the number of lanes is reduced by half, but the speed in the vicinity of the closure may be reduced due to traffic-control mechanisms (cones, flagmen, etc.) and the “rubbernecking” phenomenon (the tendency of motorists to want to see what is causing an impairment). Alternative routing of traffic during construction along a roadway segment may mitigate congestion. However, the increase in traffic on nearby adjacent roads typically causes traffic slowing and backups on those roads and would only slightly mitigate the problems associated with roadway construction.

Long-term Impacts

Traffic along Marina Vista Road and the roads in the vicinity of the new pipeline and/or railroad alignments would be the same as baseline conditions in the long term. The occasional trips associated with inspection and maintenance would be negligible.

Therefore, there would be no long-term impacts to land-based transportation under this alternative.

Alternative 2: Restricted Lease Taking Amorco Out of Service for Oil Transport

Impact LT-4: Generate project-related traffic that would cause LOS to drop below standards established by local jurisdictions; increase risk of accidents due to design elements of the project; generate significant parking demand; conflict with adopted policies, plans, or programs regarding land-based transportation; or substantially affect emergency response capabilities. (Potentially significant.)

Refer to Impact LT-3.

4.7.5 SUMMARY OF FINDINGS

Table 4.7-4 includes a summary of anticipated impacts to land-based transportation and associated mitigation measures.

Table 4.7-4: Summary of Land-based Transportation Impacts and Mitigation Measures

Impact	Mitigation Measure(s)
Proposed Project	
LT-1: Generate project-related traffic that would cause LOS to drop below standards established by local jurisdictions; increase risk of accidents due to design elements of the project; generate significant parking demand; conflict with adopted policies, plans, or programs regarding land-based transportation; or substantially affect emergency response capabilities.	No mitigation required.
Alternative 1: No Project	
LT-2: Generate vehicular traffic resulting from the dismantling of existing structures.	No mitigation required.
LT-3: Construction of pipeline or rail improvements could potentially increase traffic substantially in relation to existing traffic load and capacity of the street system.	Should this alternative be selected, mitigation measures would be determined during a separate environmental review under CEQA.
Alternative 2: Restricted Lease Taking Amorco Out of Service for Oil Transport	
LT-4: Construction of pipeline or rail improvements could potentially increase traffic substantially in relation to existing traffic load and capacity of the street system.	Should this alternative be selected, mitigation measures would be determined during a separate environmental review under CEQA.

4.8 LAND USE AND RECREATION

Section 4.8 provides a detailed description of the existing land use and recreation conditions around the Amorco Marine Oil Terminal (Amorco Terminal) Lease Consideration Project (Project) study area, outlines applicable land use plans and policies, and summarizes potential land use and recreation-related impacts and mitigation measures associated with the proposed lease renewal.

4.8.1 ENVIRONMENTAL SETTING

4.8.1.1 Land Uses near the Amorco Terminal

The Amorco Terminal is located in the city of Martinez (city), Contra Costa County, California, on the south shore of the Carquinez Strait, west of the Benicia-Martinez Bridge (Interstate 680 [I-680]). The Carquinez Strait is a narrow channel; it is approximately 1 mile wide at the Amorco Terminal.

The Amorco Terminal is located on public land leased from the California State Lands Commission (CSLC) in a historically industrial section of the city. The Amorco Terminal is a heavy industrial facility located in an area characterized by wildlife preserves, the Carquinez Strait shoreline, and several heavy industrial facilities. There are no sensitive land uses such as hospitals, retirement communities, or schools located adjacent to or near the Amorco Terminal. The nearest residential area is approximately 1 mile to the southwest of the Amorco Terminal, and is adjacent to heavy industrial uses on land zoned as Industrial (see Figure 4.8-1). The following summarizes land uses that surround the Project site:

- North of the Amorco Terminal are the Carquinez Strait and Suisun Bay, which provide industrial transport access, commercial and recreational water uses, and wildlife habitat. The Carquinez Strait provides transport access for cargo vessels, and supports sport fishing, commercial fishing, shellfish harvesting, recreational boating and kayaking, shoreline hiking, and other water-related recreational activities.
- South and west of the Amorco Terminal are the shoreline of the Carquinez Strait and open space marshlands owned by the State. Further south is the Amorco Tank Farm and appurtenant structures, and further west is the Shell Martinez Marine Terminal.
- East of the Amorco Terminal are I-680 and the Benicia-Martinez Bridge. Land further east is occupied by heavy industrial development and open space.

The Amorco Terminal operates on approximately 16.6 acres of sovereign land under the jurisdiction of the CSLC as a barge and tanker transfer facility for crude oil and petroleum products. Additionally, pursuant to the McAteer-Petris Act of 1965, the Bay Conservation and Development Commission (BCDC) has regulatory jurisdiction over land use activities within the first 100 feet from the shore of San Francisco Bay, which gives the BCDC jurisdiction over the Amorco Terminal. According to the *San Francisco Bay Plan* (amended 2006), which is produced by the BCDC to guide jurisdictional development activities, the Amorco Terminal site is designated for Water-Related Industry. The Amorco Terminal is consistent with this use designation.

Although the city of Martinez does not have jurisdiction over the Amorco Terminal, the city does have jurisdiction over the land occupied by the associated onshore Amorco Tank Farm. The city's General Plan (GP) designates the Amorco Tank Farm site as Industrial ("I"). In addition, the Tank Farm site has a zoning designation of Heavy Industrial ("H-I") with an overlay Environmental Conservation District ("ECD"). The GP land use and zoning designations are consistent with existing and surrounding uses.

4.8.1.2 Recreational Uses on Carquinez Strait and Suisun Bay

As a heavy industrial use, no recreational facilities or activities are directly associated with the Amorco Terminal. However, there are a number of recreational facilities (designated parks, wildlife preserves, open space, etc.) and recreational uses (nature viewing, hiking, boating, fishing, surfing, etc.) in the Project vicinity, including:

- hiking, bird watching, or nature viewing in open space preserves near the site;
- water uses on the Carquinez Strait and Suisun Bay by recreational boat users and sport fishermen, including recreational marinas such as the Martinez Marina, Benicia Marina and Yacht Club, and Glen Cove Marina; and
- near-shoreline picnicking and park activities associated with the East Bay Regional Park District and city facilities.

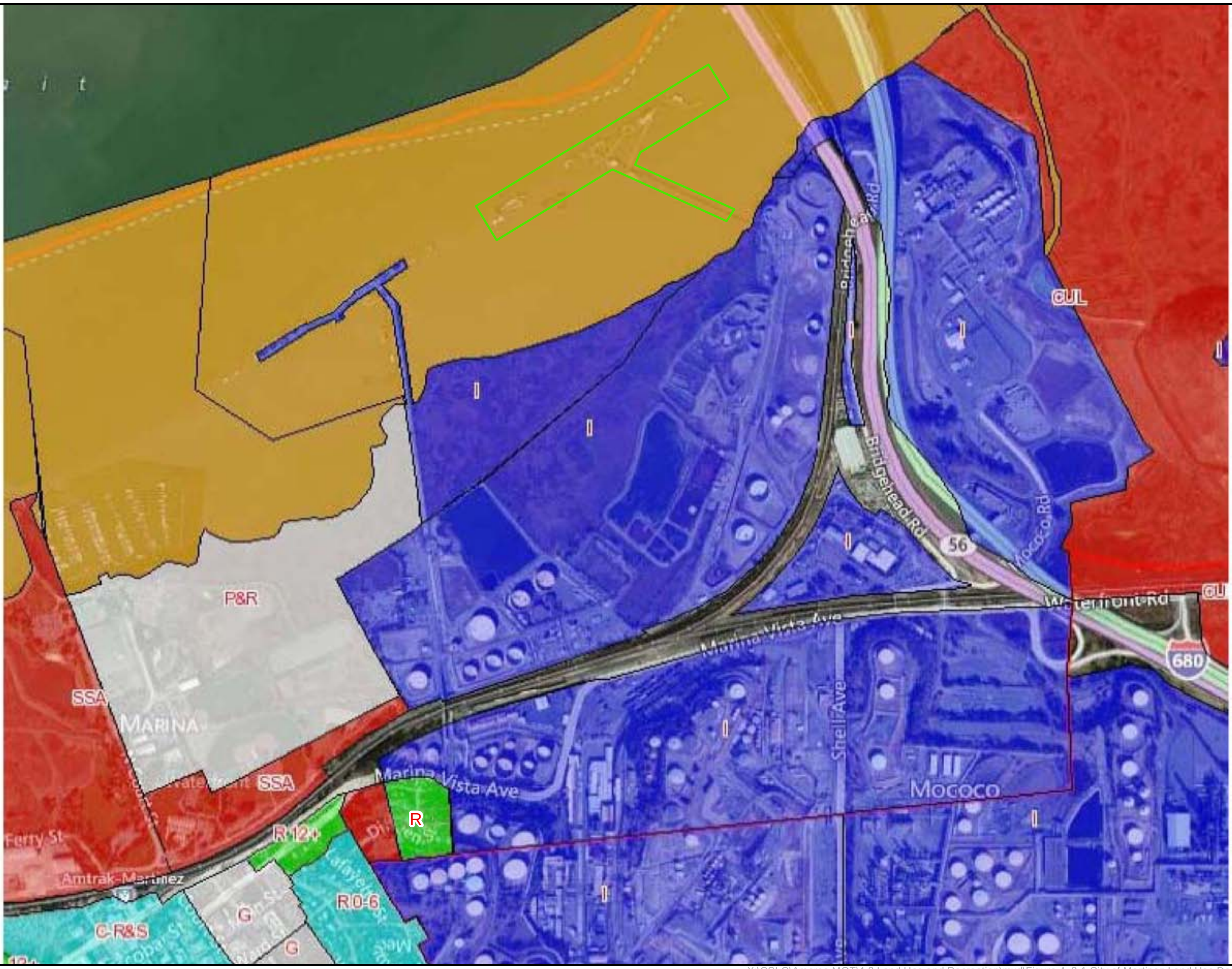
These facilities are described by jurisdiction below and shown on Figure 4.8-2.

Bay Conservation and Development Commission

The BCDC controls a trail easement to the southwest of the Amorco Terminal, which provides access to the onshore open space area to the west of the associated Amorco Tank Farm.

California Department of Fish and Wildlife

The California Department of Fish and Wildlife (CDFW) maintains the 760-acre Point Edith Wildlife Area located east of I-680 and across the Pacheco Flood Control channel. The CDFW also manages shoreline marshlands onshore near the Amorco Terminal.



X:\CSLC\Amorco MOT\4.8 Land Use and Recreation\mxd\Figure 4_8-1 City of Martinez Land Use Designations in the Project Vicinity.mxd

Figure 4.8-1
City of Martinez Land Use Designations in the Project Vicinity
California State Lands Commission
Amorco Marine Oil Terminal Lease Consideration Project

TRC

8/22/2013

R: Residential
C - R&S: Commercial, Retail and Services
I: Industrial
G: Government
CUL: Open Space/Conservation Use Land
P&R: Parks and Recreation
SSA: Special Study Area

CSLC Lease Boundary

N

1:14,000

1 in = 1,167 ft

0 0.1 0.2 mi

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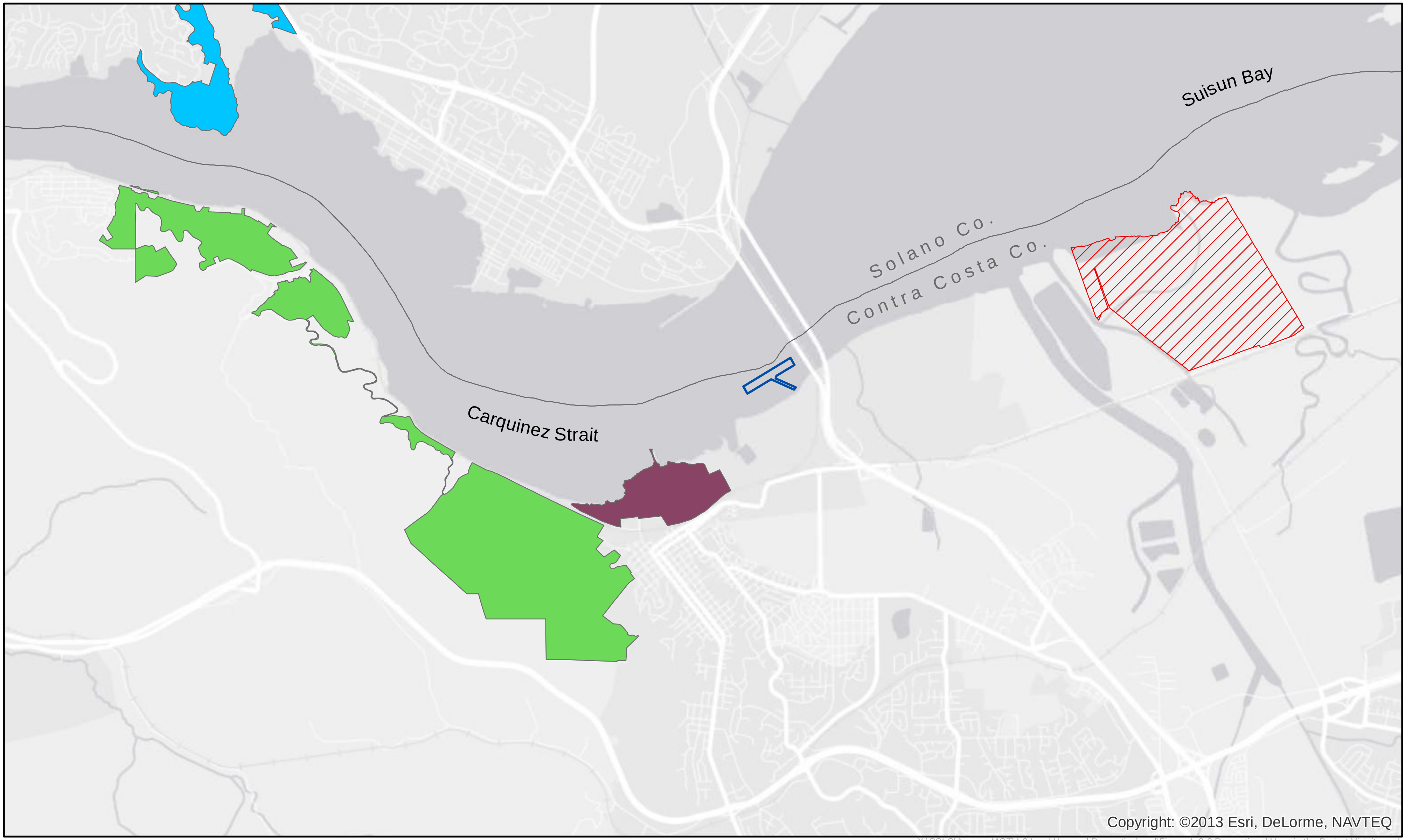

X:\CSLC\Amorco MOT\4.8 Land Use and Recreation\mxd\Figure 4_8-2 Recreational Uses in the Project Vicinity.mxd

Figure 4.8-2
Recreational Uses in the Project Vicinity
California State Lands Commission
Amorco Marine Oil Terminal Lease Consideration Project

TRC

10/7/2013

CSLC Lease Boundary
Benicia State Park Recreation Area
Point Edith Wildlife Area
Martinez Regional Shoreline/ Martinez Waterfront Park
Carquinez Strait Regional Shoreline

source: San Francisco Bay Conservation and Development Commission

N

1:60,000

1 in = 5,000 ft

0 0.5 1 mi

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East Bay Regional Park District

The East Bay Regional Park District manages several open space recreational parks near the Project site and on the shoreline of the Carquinez Strait. Table 4.8-1 provides a brief summary of these facilities and their locations relative to the Amorco Terminal.

Table 4.8-1: East Bay Regional Park District Parks near the Project Site

Regional Park	Description	Location	Approximate Distance from Amorco Terminal	Acreage
Martinez Regional Shoreline	Marshland, hiking and horse trails, boating, multi-use field facilities	City of Martinez shoreline	1.5 miles to the west	N/A
Carquinez Strait Regional Shoreline	Marshland, hiking and horse trails	Along Carquinez Scenic Drive between Crockett and Martinez	3 miles to the west	1,415
Waterbird Regional Preserve	Wetland; associated uplands with hiking trails	East of Interstate 680	1 mile to the southeast	198
Point Pinole Regional Shoreline	Hiking and horse trails, fishing, camping	Giant Highway, Richmond	14 miles to the west	2,315
Browns Island	No facilities	Island north of Pittsburg	14 miles to the east	595

Source: East Bay Regional Park District 2012

City of Martinez

The city maintains 13 parks ranging in size from 1 to 150 acres, although none is located immediately adjacent to the Project site. Waterfront Park, which is located at North Court Street via Ferry Street Four, is approximately 0.08 mile from the Amorco Terminal; this 150-acre park is comprised of multiple playing fields and picnic areas. The city also operates the Martinez Marina in the Martinez Regional Shoreline Preserve. The marina is just north of Waterfront Park. The marina is the launching area for many of the recreational boats and sport fishermen that recreate near the Amorco Terminal. The marina also offers a fishing pier and a multi-use field complex.

4.8.1.3 Recreational Uses on San Francisco Bay and San Pablo Bay

This section describes the land use and recreation setting within San Francisco Bay and San Pablo Bay for the evaluation of the risks associated with oil spills from vessels that service the Amorco Terminal. San Francisco and San Pablo Bays contain a variety of shoreline-related recreational opportunities. Major recreational park areas and sensitive land uses (including wildlife reserves/refuges) are listed in Table 4.8-2.

Table 4.8-2: Major Shoreline Recreational Areas, San Francisco and San Pablo Bays

Bay/Shoreline Parks	
Angel Island State Park	Bay View Park
Bayside Park	Benicia State Recreation Area
Berkeley Waterfront – Cesar Chavez Park	Candlestick Point State Recreation Area*
Carquinez Strait Regional Shoreline	Carquinez Strait – Vallejo Shoreline
China Camp State Park	Coyote Hills Regional Park
Coyote Point County Park	Eastshore State Park*
Gateway Shoreline Park*	Golden Gate National Recreation Area
Hayward Regional Shoreline	Keil Cove-Bluff Point Park*
Martin Luther King, Jr. Regional Shoreline Park	Martinez Regional Shoreline and Martinez Waterfront Park
McInnis County Park	Middle Harbor Shoreline Park
Miller/Knox Regional Shoreline	Mountain View Shoreline Park
Oyster Bay Regional Shoreline*	Oyster Point Marina Park
Point Isabel Regional Shoreline	Point Molate
Point Pinole Regional Shoreline	Point San Pablo Peninsula*
Robert W. Crown Memorial State Beach and Elsie Roemer Bird Sanctuary	San Francisco Bay Area Water Trail*
San Leandro Shoreline Park System	San Pablo Bay Regional Shoreline Park
West Contra Costa Sanitary Landfill*	Wilson Point Beach and Park
Refuges/Preserves/Wildlife Areas	
Alameda National Wildlife Refuge*	Bair Island Ecological Reserve
Brooks Island Regional Preserve	Browns Island Regional Shoreline
Castro Rocks	Don Edwards San Francisco Bay National Wildlife Refuge
Eden Landing Ecological Preserve	Greco Island
Hamilton Field*	Marin Baylands National Wildlife Refuge*
Marin Islands National Wildlife Refuge and State Ecological Reserve	Mount Tamalpais Waterfowl Refuge
Napa-Sonoma Marshes Wildlife Area*	Palo Alto Baylands Nature Reserve
Petaluma Marsh	Point Edith Wildlife Area
Rat Rock	Ravenswood Open Space Preserve
Red Rock	Redwood Shores Ecological Reserve
San Francisco Bay National Estuarine Research Reserve (China Camp State Park)	San Pablo Bay National Wildlife Refuge
Skaggs Island Naval Reservation*	The Brothers
The Sisters	

Source: BCDC 2006
*Proposed facility

Developed parks, and recreational and sightseeing areas that provide access to the shoreline are found along the urbanized sections of San Francisco Bay, particularly along the waterfront areas of the San Francisco Peninsula. In addition, there are approximately 140 boat-launching ramps/marinas and associated facilities (including fishing piers) throughout San Francisco Bay. Extensive private boating (both sail and power) occurs throughout San Francisco Bay. Undeveloped marsh areas are located to the south. The San Francisco Bay National Wildlife Refuge and Coyote Hills Regional Park at the southern end of San Francisco Bay provide opportunities for hiking and biking in selected areas and near the shore.

The northern end of San Pablo Bay is not as urbanized as the southern portions of San Pablo Bay. Most of the shoreline along north San Pablo Bay and across the bay from the Project area consists of the San Pablo National Wildlife Refuge, where hiking and hunting activities are allowed. Only a few boat ramps and fishing piers are in this area.

4.8.1.4 Recreational Uses on the Outer Coast

This section describes the land use and recreation setting along the Pacific outer coast for the evaluation of the risks associated with oil spills from vessels that service the Amorco Terminal. The outer coast consists of a broad mix of land uses, including undeveloped open coastal areas, wetlands, unique shoreline and coastal resource areas, and areas of concentrated development and urban uses. The conditions of the various uses range from relatively undisturbed land areas to degraded coastal zones affected by urban development and industrial pollution. Opportunities for recreation vary along California's shoreline. The coast contains a variety of features ranging from coastal bluffs and beaches to nearby mountains and forests offering a diversity of recreational opportunities. The more urbanized areas tend to have more "developed" recreational opportunities such as trails with manicured vegetation, while the less urbanized areas and those in remote locations tend to have more natural settings with "undeveloped" recreational uses. Some of the less developed areas are designated as preserves or wilderness. Recreational activities include nature viewing, hiking, biking, and equestrian trails, with beaches providing a range of uses such as picnicking, shore fishing, volleyball, windsurfing/sailing, and surfing. All along the outer coast are fishing piers and berthing and launching facilities for recreational boats; however, the greatest concentrations of these facilities are found in the urbanized areas.

4.8.2 REGULATORY SETTING

Federal and State laws that may be relevant to the Project are identified in Table 4-1. Local laws, regulations, and policies are discussed below.

City of Martinez

The city's GP is a comprehensive, long-range planning document stating the city's development goals and policies. It is used to define land use restrictions, which are implemented through the city's Zoning Ordinance. Policy 21.51 of the GP states "Expansion of the petroleum refining and related industries must proceed in an orderly fashion and be consistent with protection of the community's air, water, scenic and fiscal resources. The GP land use designation for the Amorco Tank Farm is Industrial.

The city's Zoning Ordinance implements the GP policies. The onshore Amorco Tank Farm has a zoning designation of Heavy Industrial ("H-I"), and the Amorco Terminal also has an overlay Environmental Conservation District ("ECD-H-I").

4.8.3 IMPACT ANALYSIS

4.8.3.1 Significance Criteria

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

- Conflict with any applicable land use plan, policy, or regulation of an agency with jurisdiction over the Project adopted for the purpose of avoiding or mitigating an environmental effect
- Cause residual impacts on sensitive shoreline lands and/or water and non-water recreation due to an accidental release of oil
- Conflict with established or proposed land uses, including potentially sensitive land uses

4.8.3.2 Assessment Methodology

Environmental impacts are discussed in this section relative to the areas adjacent to the Project. Potential land use and recreational impacts relate to continued operation of the offshore portion of the Amorco Terminal. Potential long-term land and recreational use impacts relate to such issues as compatibility of the facilities with existing and proposed land uses in the surrounding area (e.g., changes in land use, land use conflicts, and effects on potentially sensitive land uses) and conformity with governmental land use and recreation plans, policies, and regulations.

4.8.3.3 Impacts Analysis and Mitigation Measures

The following subsections describe the Project's potential impacts on land use and recreation; where impacts are determined to be significant, feasible mitigation measures (MM) are described that would reduce or avoid the impact.

Proposed Project

Impact Land Use and Recreation (LUR)-1: Conflict with any applicable land use plan, policy, or regulation of an agency with jurisdiction over the Project adopted for the purpose of avoiding or mitigating an environmental effect. (Less than significant.)

Because the Amorco Terminal is located on sovereign lands under the jurisdiction of the CSLC in a historically industrial section of the city, the BCDC is the only other agency with land use jurisdiction over the site. The BCDC's *San Francisco Bay Plan* (amended 2006) is the most comprehensive planning document for water-related development around San Francisco Bay. According to the *San Francisco Bay Plan*, the Amorco Terminal site is designated for Water-Related Industry. Use of the Amorco Terminal is consistent with this use designation.

Although the city does not have jurisdiction over the Amorco Terminal, the city's GP designates the Amorco Tank Farm site as Industrial, and the zoning designation is Heavy Industrial. These land use and zoning designations are consistent with existing and surrounding uses.

The use of the Amorco Terminal as an industrial facility in an area planned and zoned for industrial uses is consistent with all applicable local and regional land use plans and policies. Because applicable planning documents designate the Amorco Terminal and surrounding areas for industrial uses, which currently exist and are compatible, future planning policies and plans over the proposed 30-year lease term would likely continue to designate the area in a similar manner. Impacts would be less than significant.

Mitigation Measure: No mitigation required.

Impact LUR-2: Cause residual impacts on sensitive shoreline lands and/or water and non-water recreation due to an accidental release of oil at or near the Amorco Terminal. (Significant and unavoidable.)

An accidental spill of oil at or near the Amorco Terminal could cause residual impacts on sensitive shoreline lands and recreation near the water and the shoreline, including Martinez Regional Shoreline, Martinez Waterfront Park, and Carquinez Strait Regional Shoreline, and to recreational boats (refer to Section 4.8.1.2). The greatest risk of a spill is from small accidents at the Amorco Terminal during normal operations. While there is less risk of spill during tankering, the size of a spill that could result would be much greater and more severe. The degree of impact is influenced by factors such as location, spill size, type of material spilled, prevailing wind and current conditions, the vulnerability and sensitivity of the shoreline, and effectiveness of early containment and cleanup efforts.

Crude oil feedstocks are shipped to and from the Amorco Terminal. Light product spills generally volatize relatively rapidly, and little remains within 24 to 48 hours after a spill. Heavy crude oil may disappear over a period of several days, with remaining heavy fractions lasting from several weeks to several months floating at or near the surface in the form of mousse, tar balls, or mats.

If a spill were to occur at the Amorco Terminal, transfer operations would be suspended. The capability to immediately respond and deploy appropriate containment booming would influence the extent of affected shoreline. Tesoro Refining and Marketing Company, LLC (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 to serve as the primary Oil Spill Response Organization contractor in its Oil Spill Response Plan for offshore, onshore, and shallow-water response services. Refer to Section 2.6.4 for a more detailed description of the Amorco Terminal oil spill response capabilities and equipment.

Because it is impossible to predict with any certainty the potential consequences of a spill, impacts from spills are considered to be significant and unavoidable if first-response efforts would not contain or clean up the spill, resulting in residual impacts that would affect the general public's use of shoreline or water areas. If a spill occurs that would be contained and cleaned up during the first response, that spill would be considered a less than significant with mitigation impact to land use and recreation.

Mitigation Measures OS-1a, OS-1b, OS-1c, OS-4a, and OS-4b, presented in Section 4.1, Operational Safety/Risk of Accidents of this Environmental Impact Report (EIR), provide improved oil spill containment measures. With implementation of these measures, the risk to shoreline and recreational resources can be reduced to less than significant for small spills; however, impacts would remain significant for large spills.

Mitigation Measure: No additional mitigation measures available.

Impact LUR-3: Cause residual impacts on sensitive shoreline lands and/or water and non-water recreation due to an accidental release of oil from vessels in transit. (Significant and unavoidable.)

Depending on spill size and location, a spill within San Francisco Bay or Carquinez Strait could affect recreational boating in the vicinity of the spill and its area of spread. Depending on wind and current condition and the size of the spill, the shoreline and land- and water-recreation uses could also be affected. Oil spill modeling for the vicinity of the Amorco Terminal (see Appendix C) shows the potential extent of oil spread based on various scenarios of spill size, wind, tide, and current conditions. Modeling results indicate that probabilities of exceeding the levels of concern range from 75 to 100 percent along the shoreline east and west of the Carquinez Bridge in both summer and winter, with higher probabilities of exceedance extending into San Pablo Bay and Suisun Bay for the winter scenario. Refer to Section 4.1, Operational Safety/Risk of Accidents for a more in-depth discussion of oil spill modeling in the Project vicinity.

Shoreline uses that could be affected by a spill include marinas, parks, and other recreational uses, as well as other marine terminals and port and harbor operations. Passenger and cargo vessels, commercial fishing vessels, recreational boaters, and others may have to slow, reroute, or halt operations during cleanup and containment.

Compared to the San Francisco Bay, existing land uses and recreational areas along the outer coast are more diverse, ranging from heavily used areas to areas that are undeveloped and fairly inaccessible, especially along the northern coast. Spills that beach along heavily used areas and recreational points would limit or preclude such uses and result in significant, adverse impacts, depending on the characteristics of a spill and its residual effects. Oil that spreads to beaches, sand dunes, tide pools, shoreline reserves, harbors, marinas, and other recreational boating and fishing facilities would limit access to these areas due to containment equipment and cleanup activities. Spills that reach the more remote portions of the shoreline may not necessarily decrease the availability of recreational uses because use may be minimal, but would result in impacts to biological resources and water quality (refer to Sections 4.2 and 4.3 for details). Portions of the coastline would also be visually affected by spills, as discussed in Section 4.10, Visual Resources, Light, and Glare.

Over the life of the proposed new lease, as more areas of the coastline are developed or made accessible to the public, the likelihood that an established land use or recreational amenity may be affected by a spill would also increase.

Because it is impossible to predict with any certainty the potential consequences of a spill, impacts from spills are considered to be significant and unavoidable if first-response efforts would not contain or clean up the spill, resulting in residual impacts that would affect the general public's use of shoreline or water areas. If a spill occurs that would be contained and cleaned up during the first response, that spill would be considered a less than significant with mitigation impact to land use and recreation.

Mitigation measures OS-1a, OS-1b, OS-1c, OS-4a, and OS-4b, presented in Section 4.1, Operational Safety/Risk of Accidents, provide improved oil spill containment measures. With implementation of these measures, the risk to shoreline and recreational resources can be reduced to less than significant for small spills; however, impacts would remain significant for large spills.

Mitigation Measure: No additional mitigation measures available.

Impact LUR-4: Conflict with established or proposed land uses, including potentially sensitive land uses. (Less than significant.)

The existing Amorco Terminal is compatible with all adjacent and proximate land uses. The Amorco Terminal is not immediately surrounded by any other facilities, with the exception of the Shell Martinez Marine Terminal to the west. Both facilities are industrial and are allowed land uses within the planning jurisdiction of the city of Martinez. There are no sensitive or incompatible land uses (such as hospitals, retirement communities, or schools) located near the Amorco Terminal. The nearest residential area is approximately 1 mile to the southwest of the Amorco Terminal, and is adjacent to heavy industrial uses on land zoned as Industrial.

A new 30-year lease would not create any physical land use incompatibilities, mainly because current activities would continue in the same manner. The Amorco Terminal would continue to be compatible with all existing surrounding industrial land uses. Because the area is built out and zoned Industrial, it is highly unlikely that any sensitive, incompatible land uses would be developed near the Amorco Terminal during the 30-year lease period.

In 2006, Senate Bill 1556 mandated that the Delta Protection Commission adopt a plan and implementation program for a continuous recreational corridor trail network through the five Delta counties, linking the San Francisco Bay Trail system to the planned Sacramento River trails in Yolo and Sacramento counties. The Great California Delta Trail (Delta Trail) is to include routes for bicycling and hiking, with interconnections to other trails, park and recreational facilities, and public transportation. Operation of the Amorco Tank Farm prohibits public access to the shoreline, so constructing the Delta Trail through the facility is not feasible. However, the upland portion of the Amorco Terminal is not under the jurisdiction of the CSLC, and is not part of the proposed lease. Therefore, issues related to land use associated with the planned trail segments are not applicable to this EIR.

Mitigation Measure: No mitigation required.

Alternative 1: No Project

Impact LUR-5: Cause residual impacts on sensitive shoreline lands and/or water recreation due to an accidental release of oil from marine-based sources; or conflict with established or proposed land uses, including potentially sensitive land uses. (Beneficial.)

Under the No Project Alternative, Tesoro's lease would not be renewed and the existing Amorco Terminal would be subsequently decommissioned with its components abandoned in place, removed, or a combination thereof. The decommissioning of the Amorco Terminal would be governed by an Abandonment and Restoration Plan.

The localized risk of a spill (i.e., risks associated with the specific location and access route to the Amorco Terminal) impacting shoreline land uses and precluding recreational uses in the vicinity of the Amorco Terminal would not occur, as the Amorco Terminal would not be in use. With no potential for spills in the immediate area, a beneficial impact would occur near the Amorco Terminal.

After decommissioning, the No Project Alternative assumes the number of tankers servicing the area would remain essentially the same due to regional demands, and assumes that without the Amorco Terminal, incoming tankers would instead go to the Avon Terminal. Therefore, the risks associated with the transport of oil would not be removed from the region, but simply shifted to a nearby facility, approximately 2.5 miles away. An incremental increase in risk associated with increases in vessel activity at the Avon Terminal would result. At the Avon facility, there would be the potential for oil spill impacts similar to the proposed Project.

The Amorco Terminal would eventually be decommissioned and abandoned or converted to another use, which would require a separate California Environmental Quality Act environmental review. No significant adverse land use or recreation impacts would be anticipated for the decommissioning process.

Mitigation Measure: No mitigation required.

Impact LUR-6: Cause residual impacts on sensitive lands and/or recreation due to an accidental release of oil imported from non-marine sources; or conflict with established or proposed land uses, including potentially sensitive land uses. (Significant and unavoidable.)

This alternative assumes that there would be no Amorco Terminal to receive crude or transport product and, therefore, Refinery operations would be dependent on crude oil receipts through non-marine sources in order to meet regional refining demands. Sources may include land-based transportation such as rail cars and trucks, and/or pipeline connections to other Bay Area marine oil terminals, or a combination thereof.

Crude oil transportation by rail car would involve constructing additional rail lines and associated handling facilities. Pipeline delivery would require construction of new pipelines and/or the purchase of existing pipeline capacity from other local petroleum refinery competitors. Permit modification might be required for any increased use of the existing pipeline to the Plains All America Martinez Terminal, or the Kinder Morgan Pipeline.

If pipeline and/or rail construction were needed, alignments would need to be identified and easements obtained. Conversion of some lands in highly developed urban areas could either directly or indirectly affect land use, including recreational use. This could result in significant impacts. In areas where property could be taken to construct pipeline and/or railway alignments, impacts could be wholly or partially mitigated by monetary means or land trades. However, impacts would remain significant in the event that land is deeded to an easement and taken out of public use such as a public park, if that loss contributes to a decrease in park space with no means for replacement. Incompatible land uses with adjacent property could also result in significant impacts. During operation of the pipeline and or rail cars, accidental oil spills could result in significant impacts.

Alternative 2: Restricted Lease Taking Amorco Out of Service for Oil Transport

Impact LUR-7: Cause residual impacts on sensitive shoreline lands and/or water recreation due to an accidental release of oil from marine based sources; or conflict with established or proposed land uses, including potentially sensitive land uses. (Beneficial.)

Refer to Impact LUR-5.

Mitigation Measure: No mitigation required.

Impact LUR-8: Cause residual impacts on sensitive lands and/or recreation due to an accidental release of oil imported from non-marine sources; or conflict with established or proposed land uses, including potentially sensitive land uses. (Significant and unavoidable.)

Refer to Impact LUR-6.

Cumulative Impact Analysis

Routine operations at the Amorco Terminal would not contribute to cumulative land use or recreation impacts. However, there is a risk of a potentially significant oil spill from the proposed Project and other marine oil terminal projects in the region. Over the proposed 30-year lease period, increased throughput would occur through an increase in the number of vessels handled at the Amorco Terminal. An incremental increase in spill risk that would impact land use and recreation would be associated with that increase. When the cumulative environment is considered, the contribution from the proposed Project is small. Even so, impacts to sensitive shoreline lands and/or water and non-water recreation due to an accidental release of oil would remain potentially significant. Tesoro would be responsible for spills at or near the Amorco Terminal, but not for vessels transiting San Francisco Bay or the outer coast.

4.8.4 SUMMARY OF FINDINGS

Table 4.8-3 includes a summary of anticipated impacts to land use and recreation and associated mitigation measures.

Table 4.8-3: Summary of Land Use and Recreation Impacts and Mitigation Measures

Impact	Mitigation Measure(s)
Proposed Project	
LUR-1: Conflict with any applicable land use plan, policy, or regulation of an agency with jurisdiction over the Project adopted for the purpose of avoiding or mitigating an environmental effect	No mitigation required.
LUR-2: Cause residual impacts on sensitive shoreline lands and/or water and non-water recreation due to an accidental release of oil at or near the Amorco Terminal	No additional mitigation measures available. (refer to MMs OS-1a, OS-1b, OS-1c, OS-4a, and OS-4b.)
LUR-3: Cause residual impacts on sensitive shoreline lands and/or water and non-water recreation due to an accidental release of oil from vessels in transit	No additional mitigation measures available. (refer to MMs OS-1a, OS-1b, OS-1c, OS-4a, and OS-4b.)
LUR-4: Conflict with established or proposed land uses, including potentially sensitive land uses	No mitigation required.
Alternative 1: No Project	
LUR-5: Cause residual impacts on sensitive shoreline lands and/or water and non-water recreation due to an accidental release of oil; or conflict with established or proposed land uses, including potentially sensitive land uses	No mitigation required.
LUR-6: Cause residual impacts on sensitive lands and/or water and non-water recreation due to an accidental release of oil; or conflict with established or proposed land uses, including potentially sensitive land uses	Should this alternative be selected, mitigation measures would be determined during a separate environmental review under CEQA.
Alternative 2: Restricted Lease Taking Amorco Out of Service for Oil Transport	
LUR-5: Cause residual impacts on sensitive shoreline lands and/or water and non-water recreation due to an accidental release of oil; or conflict with established or proposed land uses, including potentially sensitive land uses	No mitigation required.
LUR-6: Cause residual impacts on sensitive lands and/or water and non-water recreation due to an accidental release of oil; or conflict with established or proposed land uses, including potentially sensitive land uses	Should this alternative be selected, mitigation measures would be determined during a separate environmental review under CEQA.

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4.9 NOISE

Section 4.9 provides a detailed description of existing noise environment at the Amorco Marine Oil Terminal (Amorco Terminal) Lease Consideration Project (Project) study area, and identification of sensitive receptors. Applicable regulations of the local community are also discussed. For purposes of discussion, a brief description of the generation and characteristics of sound and how sound is measured is also provided.

4.9.1 CONCEPTS AND TERMINOLOGY

4.9.1.1 Terminology

This noise analysis relies on the following standard noise-related terms and principles.

- **Environmental noise:** Environmental noise is defined as unwanted sound resulting from vibrations in the air. Excessive noise can cause annoyance and adverse health effects. Annoyance can include sleep disturbance and speech interference. It can also distract attention and make activities more difficult to perform (U.S. Environmental Protection Agency [USEPA], 1978).
- The range of pressures that create noise is broad. Noise is, therefore, measured on a logarithmic scale, expressed in **decibels (dB)**. Noise is typically measured on the **A-weighted scale (dBA)**, which has been shown to provide a good correlation with human response to sound and is the most widely used descriptor for community noise assessments (Harris 1998).
- To describe the time-varying character of environmental noise, various statistical noise descriptors are typically used.
  - **Lmax**: Lmax is the maximum noise level generated by a source at a specified distance.
  - **Leq**: Leq is the equivalent noise level over a specified period of time (i.e., one hour). It is a single value of sound that includes all of the varying sound energy in a given duration.
  - **L90, L50, and L10**: These are the A-weighted sound levels that are exceeded at the specified percentage of time. For example, L90 is the sound level exceeded 90 percent of the time and is often considered the background, or residual, noise level. Similarly, L10 is the sound level exceeded 10 percent of the time and is commonly used as a measurement of intrusive sounds such as aircraft overflight.
  - **L_{dn}:** L_{dn}, or day-night noise level, is the A-weighted sound level over a 24-hour period with an additional 10 dB penalty imposed on sounds that occur at night between 10 p.m. and 7 a.m.

- **CNEL:** CNEL, or Community Noise Equivalent Level, is similar to L_{dn} and is the A-weighted sound level over a 24-hour period with an additional 10 dB penalty imposed on sounds that occur between 10 p.m. and 7 a.m., and 5 dB penalty imposed on sounds that occur in the evening between 7 p.m. and 10 p.m. CNEL was developed in California for evaluating noise levels in residential communities. CNEL will always be higher than L_{dn} for the same location; therefore, it is appropriate and conservative to use CNEL when L_{dn} is not available or when comparing calculated noise to an L_{dn} threshold.

4.9.1.2 General Noise Concepts

Sound travels through the air as pressure waves caused by some type of vibration. In general, sound waves travel away from a noise source at ground level in a hemispherical pattern. The energy contained in a sound wave is spread over an increasing area as it travels away from the noise source. Typical A-weighted noise levels for various sound sources are summarized in Table 4.9-1.

The nature of dB scales is such that individual dB ratings for different noise sources cannot be added directly to give the sound level for the combined noise from all sources. Instead the combined noise level produced by multiple noise sources is calculated using logarithmic summation. For example, if one source produces a noise level of 80 dBA, then two of the identical sources side by side would generate a combined noise level of 83 dBA, or an increase of only 3 dBA.

People generally perceive a 10 dBA increase in a noise source as a doubling of loudness. Also, most people cannot detect differences of less than 2 dBA between noise levels of a similar nature, while most could probably perceive a change of approximately 5 dBA. When a new intruding sound is of a different nature than the background sound, such as a horn sounding in heavy vehicle traffic, most people can detect changes as low as 1 dBA. When distance is the only factor considered, sound levels from isolated point sources of noise are reduced by approximately 6 dBA for every doubling of distance. The following formula can also be used to determine noise reduction at any distance from an isolated point source:

$$L_2 = L_1 – (20 \times \log_{10}(r_2/r_1)$$

Where: L_1 is the noise level at reference distance (r_1)

L_2 is the noise level at receptor distance (r_2)

When the noise source is on a continuous line, such as vehicle traffic on a highway, sound levels decrease by approximately 3 dBA for every doubling of distance.

Noise levels can also be affected by several factors other than distance. Topographic features and structural barriers absorb, reflect, and scatter sound waves and affect the reduction of noise levels. Atmospheric conditions (wind speed and direction, humidity, and temperature) and the presence of dense vegetation can also affect the degree to which sound waves are attenuated over distance.

Table 4.9-1: Typical A-weighted Sound Levels

Sound Source	Sound Level (dBA)	Typical Human Response
Carrier deck jet operation	140	Painfully loud
Limit of amplified speech	130	
Jet takeoff (200 feet) Auto horn (3 feet)	120	Threshold of feeling and pain
Jet takeoff (2,000 feet) Riveting machine	110	Very annoying
Shout (0.5 feet) New York subway station	100	
Heavy truck (50 feet) Pneumatic drill (50 feet)	90	Hearing damage (8-hour exposure)
Passenger train (100 feet) Helicopter (in flight, 500 feet) Freight train (50 feet)	80	Annoying
Freeway traffic (50 feet)	70	Intrusive
Air conditioning unit (20 feet) Light auto traffic (50 feet)	60	
Normal speech (15 feet)	50	Quiet
Living room Bedroom Library	40	
Soft whisper	30	Very quiet
Broadcasting studio	20	
	10	Just audible
	0	Threshold of hearing

Source: Compiled by TRC

4.9.2 ENVIRONMENTAL SETTING

4.9.2.1 Noise Characteristics of the Project Area

The Amorco Terminal is located on the Carquinez Strait adjacent to the Benicia-Martinez Bridge to the east and the Shell Martinez Marine Terminal (Shell Terminal) to the west. Noise in the Project area is derived primarily from the mobile sources associated with the bridge (road traffic, railroad) and strait (vessel traffic). Secondary noise sources include industrial activities at the adjacent Shell Terminal and the nearby Shell refinery to the east.

To determine the existing noise level at the Project site during typical operation activities, field monitoring was conducted. Noise measurements were taken between 5:30 p.m. and 7 p.m. on Thursday, August 1, 2013, associated with the docking and unloading of the ship NISSOS KYTHNOS. The noise measurement period included inactivity prior to ship arrival, approach and docking of the ship, and the crude oil offloading process.

The noise monitor was set up on the berth approximately at the midpoint of the berth as shown on Figure 4.9-1. A RION NA-27 integrating sound level meter with an integral data logger, meeting the IEC651:1979/IEC804:1985 requirements for precision Type 1 sound level meters, was used. The meter was calibrated at the beginning and at the end of each measurement with a Bruel & Kjaer Model 4231 sound level calibrator.

The L_{eq} varied from 54.4 dBA to 61.8 dBA over the monitoring period. L_{max} levels were recorded as high as 78.7 dBA, but these were observed to be attributable to sources outside the Project area, such as airplanes, and trains and vehicles on bridge. Based on the noise measurement data collected and observations of monitoring personnel, noise in the Project area did not vary substantially before, during, or after the docking and unloading process, and no individual sources of increased noise attributable to the Amorco Terminal activities were discernible (TRC 2013).

It is important to note that the Amorco Terminal is currently in operation and is already considered a partial contributor to the ambient noise environment at the receptor locations, which would remain unchanged by the Project.

4.9.2.2 Sensitive Receptors

There are no sensitive receptors or sensitive land uses (i.e., hospitals, schools, nursing homes) located near the Amorco Terminal. The nearest residences are located along Miller Avenue and Dineen Street, approximately 1 mile south of the Amorco Terminal. There is also potential for “live-aboard” residences on boats docked at the Martinez Marina, as near as approximately 0.66 mile southwest of the Amorco Terminal.

X:\CSLC\Amorco MOT\4.9 Noise\mxd\Figure 4_9-1 Noise Monitoring and Receptor Locations.mxd

Figure 4.9-1
Noise Monitoring and Receptor Locations
California State Lands Commission
Amorco Marine Oil Terminal Lease Consideration Project

Noise Receptor (R)
Noise Monitor (NM)
CSLC Lease Boundary

N
1:10,000
1 inch = 833 feet
0 325 650 ft

TRC

10/8/2013

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The residential receptor locations, and their proximity to the Amorco Terminal, are shown on Figure 4.9-1. As seen on Figure 4.9-1, industrial (including the Shell Terminal) and railroad facilities existing between the Amorco Terminal and the residential (R-1) and marina (R-2) receptors would generally contribute more noise at these receptor locations than the Amorco Terminal.

4.9.3 REGULATORY SETTING

Federal and State laws that may be relevant to the Project are identified in Table 4-1. Local laws, regulations, and policies are discussed below.

Contra Costa County

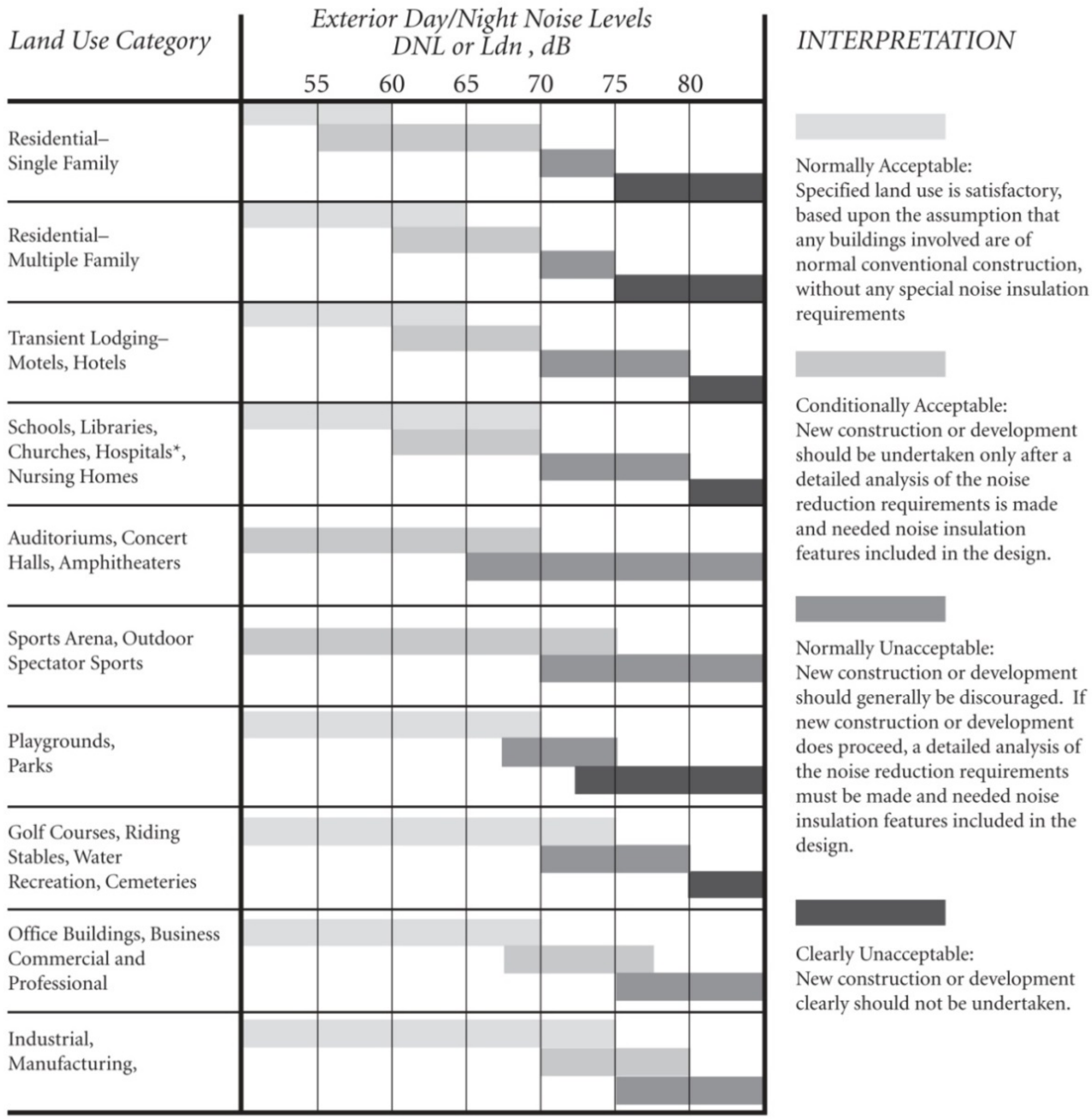
Section 11 (Noise Element) of the *Contra Costa County General Plan* establishes the acceptability of proposed new land uses within existing noise-impacted areas in accordance with the State of California General Plan Guidelines, as shown in Table 4.9-2. This table can also be used to determine if receptors within a current land use area will be significantly impacted by a proposed new land use in the vicinity. The maximum exterior noise level considered to be “normally acceptable” for single-family residential uses is 60 dBA L_{dn}; and noise levels of up to 70 dBA L_{dn} are considered to be “conditionally acceptable.” The maximum exterior noise level considered to be “normally acceptable” without condition for industrial uses is 70 dBA L_{dn}. This policy does not apply to temporary noise levels, such as from construction.

City of Martinez

The Noise Element of the *City of Martinez General Plan* (1985) is implemented under City Ordinance Chapter 8.34 (Noise Control) as follows:

- Section 8.34.020 (Noise Standards) establishes a standard of 60 dBA L_{dn} for exterior noise.
- Section 8.34.030 (Noise Regulations) prohibits construction activity before 7 a.m. and after 7 p.m. daily, and before 9 a.m. and after 5 p.m. on weekends and holidays.
- Section 8.34.060 (Noise Standards for New Construction) requires all new commercial or industrial development to be located within 500 feet of any residential development to be designed and operated within the acceptable standards for noise.

1 **Table 4.9-2: Noise Level/Land Use Compatibility**



Source: Office of Planning and Research, State of California General Plan Guidelines, Appendix A: Guidelines for the Preparation and Content of the Noise Element of the General Plan, 1998.

*Because hospitals are often designed and constructed with high noise insulation properties, it is possible for them to be satisfactorily located in noisier areas.

4.9.4 IMPACT ANALYSIS

4.9.4.1 Significance Criteria

For the purposes of this analysis, an impact was considered to be significant and require mitigation if, as a result of the Project, it was determined that the following would occur:

- A violation of local noise ordinances or any other exceedance of applicable noise standards in regulations promulgated at the county, State, or federal level. The lowest applicable noise level criteria is as follows:
  - The *Contra Costa County General Plan Noise Element* states that the maximum day-night level (L_{dn}) for an industrial land use is 70 dBA (A-weighted sound level)

4.9.4.2 Assessment Methodology

Environmental impacts are discussed in this section relative to sensitive receptors in the vicinity of the Project. Potential noise impacts relate to continued operation of the offshore portion of the Amorco Terminal, which is already considered a partial contributor to the ambient noise environment at the receptor locations.

4.9.4.3 Impacts Analysis and Mitigation Measures

The following subsections describe the Project's potential impacts on noise levels at residential receptor locations in the vicinity. Where impacts are determined to be significant, feasible mitigation measures are described that would reduce or avoid the impact.

Proposed Project

Impact Noise (NO)-1: Cause a violation of local noise ordinances or any other exceedance of applicable noise standards in regulations promulgated at the county, State, or federal level. (Less than significant.)

Based on the noise measurement data collected and observations of monitoring personnel (TRC 2013), Project operations (i.e., ship docking and unloading process) do not result in a measurable increase in ambient noise at the Project site or in the vicinity, and do not create discernible individual sources of increased noise that would allow the Project to approach the significance threshold of 70 dBA L_{dn}. The existing Project operation noise is considered a partial contributor to the ambient noise environment at the receptor locations, which would remain unchanged by the Project.

Mitigation Measure: No mitigation required.

Alternative 1: No Project

Impact NO-2: Effects on noise with no new Amorco Terminal lease. (Less than significant.)

Under the No Project Alternative, the Tesoro Refining and Marketing Company, LLC lease would not be renewed and the existing Amorco Terminal would be subsequently decommissioned with its components abandoned in place, removed, or a combination thereof. The decommissioning of the Amorco Terminal would be governed by an Abandonment and Restoration Plan, and noise generated by demolition and removal would be considered construction noise in conformance with the local ordinance.

After decommissioning, the No Project Alternative assumes the number of tankers servicing the area would remain essentially the same due to regional demands, and assumes that without the Amorco Terminal, incoming tankers would instead go to the Avon Terminal. Since the contribution of the Project to ambient noise conditions at residential receptors was determined to be negligible, decommissioning the facility and shifting tanker traffic to another local facility would not result in a significant increase or decrease in noise in the vicinity of the Project.

Mitigation Measure: No mitigation required.

Impact NO-3: Effects on noise by importing crude supplies from non-marine sources. (Potentially significant.)

This alternative assumes that there would be no Amorco Terminal to receive crude or transport product and, therefore, Golden Eagle Refinery operations would be dependent on crude oil receipts through non-marine sources to meet regional refining demands. Sources may include land-based transportation such as rail cars and trucks, and/or pipeline connections to other San Francisco Bay Area marine oil terminals, or a combination thereof.

Crude oil transportation by rail car would involve constructing additional rail lines and associated handling facilities. Pipeline delivery would require construction of new pipelines and/or the purchase of existing pipeline capacity from other local petroleum refinery competitors. Construction noise would be in conformance with the local ordinance.

If an increase in rail transportation volume was selected as an alternative means of crude oil transport to the Golden Eagle Refinery, there is potential for a significant increase in noise in the vicinity since rail activity is already a major source of noise in the vicinity and the railroad is located closer to the residential receptor locations.

Alternative 2: Restricted Lease Taking Amorco Out of Service for Oil Transport

Impact NO-4: Effects on noise by taking Amorco Terminal out of service for oil transport. (Beneficial.)

The Amorco Terminal is an existing facility on land zoned Heavy Industrial. A reduction in noise levels to the Project area are anticipated as a result of a restricted lease.

Mitigation Measure: No mitigation required.

Cumulative Impact Analysis

Routine operations at the Amorco Terminal would not contribute to cumulative noise impacts. Based on the noise measurement data collected and observations of monitoring personnel (TRC 2013), Project operations (i.e., ship docking and unloading process) do not result in a measurable increase in ambient noise at the Project site or in the vicinity, and do not create discernible individual sources of increased noise that would allow the Project to approach the significance threshold of 70 dBA L_{dn}. The existing Project operation noise is considered a partial contributor to the ambient noise environment at the receptor locations, which would remain unchanged by the Project.

4.9.5 SUMMARY OF FINDINGS

Table 4.9-3 includes a summary of anticipated impacts to existing ambient sound levels.

Table 4.9-3: Summary of Noise Impacts and Mitigation Measures

Impact	Mitigation Measure(s)
Proposed Project	
NO-1: Cause a violation of local noise ordinances or any other exceedance of applicable noise standards in regulations promulgated at the county, State, or federal level	No mitigation required.
Alternative 1: No Project	
NO-2: Effects on noise with no new Amorco Terminal lease	No mitigation required.
NO-3: Effects on noise by taking Amorco Out of Service for oil transport	Should this alternative be selected, mitigation measures would be determined during a separate environmental review under CEQA.
Alternative 2: Restricted Lease Taking Amorco Out of Service for Oil Transport	
NO-4: Effects on noise by taking Amorco Terminal out of service for oil transport	No mitigation required.

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4.10 VISUAL RESOURCES, LIGHT AND GLARE

Section 4.10 provides a detailed description of the existing visual resources of the Amorco Marine Oil Terminal (Amorco Terminal) Lease Consideration Project (Project) study area, regional visual character, views of the Project area from important vantage points, and the changes of these views that would occur with the continued use of the Amorco Terminal for an additional 30-year period. It also discusses impacts on visual resources from continued use of the Amorco Terminal, accidental spill releases, and identifies mitigation measures to reduce impacts to less-than-significant levels.

4.10.1 ENVIRONMENTAL SETTING

4.10.1.1 Regional Character of Carquinez Strait and Suisun Bay

Carquinez Strait forms a visually distinct, yet relatively narrow channel that connects San Pablo Bay to Suisun Bay. The approximately 6-mile strait lies between two major bridges: the Carquinez Bridge, from Crockett to Vallejo; and the Benicia-Martinez Bridge, from Benicia to Martinez. Both bridges are visually distinct features in a landscape characterized by gently rolling terrain. To the east, Suisun Bay widens until it reaches the city of Pittsburg, where the shoreline narrows again before the waters enter from both the Sacramento and San Joaquin Rivers. The landscape in the area is a combination of gently rolling hills and flat expanses of land. The Carquinez Strait and Suisun Bay are characterized by a visual mix of industrial uses, small towns, and open areas of undeveloped land.

The 1,294-acre Carquinez Strait Regional Shoreline includes several parcels of land along the southern shoreline of the Strait. The area is characterized by coastal scrub and grasslands, bay laurels, and oak woodlands. The shoreline's bluffs rise approximately 750 feet to summits and ridges of the rolling terrain.

Characteristic views of the Strait and Suisun Bay show tugboats pushing barges, directing ships, or moving from job to job in the area. Oil tankers are a common site in the area, with four active terminals located between Crockett and Avon.

Regional, county, and city policies address aesthetic issues in the area. These policies include the general plans (GPs) of both Contra Costa and Solano counties, and of the cities of Martinez and Benicia. While there are no designated State Scenic Highways in the Project vicinity, the city of Benicia has identified Interstate 680 (I-680) north of the bridge as a scenic route.

The Bay Conservation and Development Commission (BCDC) *San Francisco Bay Plan* (amended 2006) contains policies on visual quality and visual access to the waterfront. The BCDC also provides design review of new projects that may affect the appearance of the San Francisco Bay.

4.10.1.2 Visual Character of the Amorco Terminal and Adjacent Area

The Amorco Terminal is located on the Carquinez Strait, approximately 0.25 mile west of the Benicia-Martinez Bridge. I-680 is east and northeast of the Project site. The area is characterized primarily by industry, as well as open space and marshland. Heading south on I-680, the Amorco Terminal is clearly visible from portions of the bridge; however, the adjacent Shell Refinery and marine terminal are also clearly visible. The Amorco Terminal, Tank Farm, and marshland are in motorists' foreground views while exiting the bridge in Martinez. Middleground views consist primarily of industrial uses, and gently rolling hills are in the background.

From the Amorco Terminal to either side between I-680 to the east and the Shell Martinez Marine Terminal to the west, the visual setting is characterized by views of the marsh and shoreline. The marshland includes wetland grasses and low-level shrubs, providing a visual "softscape." Focal points that can be defined as the predominant "hardscape" landscape features along the shoreline include the Benicia-Martinez Bridge, the Amorco Terminal, and the Shell Martinez Marine Terminal.

The Amorco Terminal is approximately 0.85 mile from Marina Vista Road, and is separated from the road by the associated Amorco Tank Farm and by railroad tracks adjacent to Marina Vista Road. A berm between the railroad tracks and the Amorco Terminal blocks views of the facility from Marina Vista Road in both directions. No residential receptors are located in the area within views of the Amorco Terminal. Only water users and travelers across the Benicia-Martinez Bridge have views of the Amorco Terminal.

The northern shore of the Carquinez Strait consists primarily of industrial uses, including the Valero Benicia Refinery; thus, public views from the north of the Amorco Terminal are also limited.

Other environmentally sensitive areas in the vicinity of the Amorco Terminal are identified in Section 4.2, Biological Resources, and Section 4.8, Land Use and Recreation.

Exterior lighting is provided along the approach trestle and at the wharf to allow for night operations and provide safety for employees.

4.10.1.3 Visual Character of the San Francisco Bay Area

The San Francisco and San Pablo Bays' shoreline contains a range of visual stimulation consisting mainly of urbanized and industrial areas, with occasional rural and open space areas, coastal wetlands, and salt evaporation ponds. The landform throughout most of the area is hilly terrain. Where there is no development, the open area is generally covered with low vegetation.

The greatest area of urbanization is within the central and south-central portions of San Francisco Bay. From San Francisco south to Palo Alto, urban development is prevalent on the western shoreline. On the eastern shoreline, urban development is continuous from San Leandro to Pinole Point, but from there eastward is fairly undeveloped.

San Francisco and San Pablo Bays contain about 90 percent of California's remaining coastal wetlands. Major preserves and shoreline parks include Suisun Bay Marsh, with numerous duck hunting preserves; San Pablo Bay National Wildlife Refuge off of Tubbs Island, which is accessible by boat; and Point Pinole Regional Shoreline. China Camp State Park, along the southwest shore of San Pablo Bay, preserves a historic Chinese shrimp fishing village. Coyote Hills Regional Park and San Francisco Bay National Wildlife Refuge protect important wetland acreage in the South Bay for wintering waterfowl. Many other small parks, piers, and recreational marinas also provide access to the shoreline.

The southern portion of the San Francisco Bay Area (Bay Area) contains several large areas of salt evaporation ponds. One is located north of the San Francisco Bay National Wildlife Refuge on the eastern shoreline, and another across the San Francisco Bay on the western shoreline. Several others are also along the far southern end.

Within the Bay Area, there are numerous ports, harbors, marine terminals, and naval terminals. A description of these facilities is presented in Section 2.0, Project Description. Marine vessel traffic is a common sight throughout the Bay Area.

4.10.1.4 Outer Coast

Outside of the Golden Gate, one of the more pristine areas is the Farallon Islands, located 27 nautical miles west of Point Bonita in Marin County. The islands rise from the edge of the continental shelf forming jagged, rocky outcroppings, and remain the most important seabird nesting site on the coast. The Gulf of Farallones and Monterey Bay are marine sanctuaries located off the coast and contain protected resources.

A large portion of the northern California coast remains representative of the shoreline of years past. Little development has occurred and areas along the northern California coast remain unspoiled. From the Golden Gate north, the shoreline consists of dramatic coastline features, including rolling hilly coastal landforms dropping to sandy beaches; jagged rock outcroppings forming hazards to marine vessels in the nearshore; cliffs that drop to the sea; and large, flat beach areas with dunes. Small shoreline communities and picturesque harbor areas also dot the shoreline in some areas. A large number of rivers and creeks cut the coastline, adding visual interest. Established preserve areas are also along the coastline. Vegetation is diverse, ranging from salt marsh vegetation to Douglas fir and redwood forests.

The southern California coastline from Santa Barbara south ranges from undeveloped stretches (southern Orange County/northern San Diego County) to intense development

(San Diego, Orange, and Los Angeles counties), to less intense development, but still much urbanization, toward Santa Barbara.

4.10.2 REGULATORY SETTING

Federal and State laws that may be relevant to the Project are identified in Table 4-1. Local laws, regulations, and policies are discussed below.

4.10.2.1 Regional Regulations

The following San Francisco Bay Plan (amended 2006) Appearance, Design, and Scenic Views policy may be applicable to the Project.

Policy 4: Structures and facilities that do not take advantage-of or visually complement the Bay should be located and designed so as not to impact visually on the Bay and shoreline. In particular, parking areas should be located away from the shoreline. However, some small parking areas for fishing access and Bay viewing may be allowed in exposed locations.

4.10.2.2 Local Regulations

Contra Costa County

The County of Contra Costa GP is a comprehensive, long-range planning document stating the County's development and preservation goals and policies. Based on consultation with the County, the Contra Costa County GP would not be applicable to the Proposed Project (extension of the existing lease agreement) because it is in an incorporated area of the city of Martinez and the County does not have policies or regulations directly applicable to marine terminals or oil spills (Contra Costa County 2002).

City of Martinez

The following city of Martinez GP (1973) policies may be applicable to the Project.

<u>Land Use Element</u>

Policy 21.51: Expansion of the petroleum refining and related industries must proceed in an orderly fashion and be consistent with protection of the community's air, water, scenic and fiscal resources.

Open Space Element

Policy 22.50: All other waterways and their banks should be protected from encroachment and degradation and restored or enhanced visually through appropriate landscaping where deemed necessary. Integration of these into park or trail systems and other common open spaces should be required as a condition for development of adjoining lands.

Central Martinez Specific Area Plan

Policy 30.722: The highest priority should be assigned to conservation, park and recreational uses at the waterfront. Contemplated uses should include: an expanded and improved boat marina, fishing pier(s), water-oriented commercial/recreational establishments, scenic routes, hiking and bicycling pathways, and areas for both active and passive recreational pursuits.

Policy 30.724: Existing industrial and non-water-related commercial activities should be concentrated, attractively maintained and screened from view. Ultimately, incompatible waterfront uses should be relocated to other suitable locations.

4.10.3 IMPACT ANALYSIS

4.10.3.1 Significance Criteria

Visual impacts are considered adverse and significant if one or a combination of the following apply:

- Cause adverse impacts on a scenic vista or scenic highway
- Create a new source of substantial light or glare, which would adversely affect day or nighttime views in the area (including views from land and water)
- Routine operations and maintenance visually contrast with or degrade the character of the viewshed (from adjacent roadways, waterways, or other public or private spaces), or otherwise change the expectations of viewers, resulting in a negative impression of the viewshed

4.10.3.2 Assessment Methodology

Because of the time factor involved in oil dispersion, visual impacts from spills are considered to be significant and unavoidable impacts if first-response efforts would not contain or cleanup the spill, resulting in residual impacts that would be visible to the general public on shoreline or water areas. If a spill occurs that would be contained and cleaned up during the first response, that impact to visual resources would be considered less than significant with mitigation.

4.10.3.3 Impacts Analysis and Mitigation Measures

The following subsections describe the Project's potential impacts on aesthetic and visual resources; where impacts are determined to be significant, feasible mitigation measures (MMs) are described that would reduce or avoid the impact.

Proposed Project

Impact Visual Resources (VR)-1: Cause adverse impacts on a scenic vista or scenic highway. (Less than significant.)

A scenic vista is generally considered a view of an area that has remarkable scenery or a resource that is indigenous to the area. A scenic resource may also represent a landmark or area that has been noted for its outstanding scenic qualities and is thereby protected by State or local plans because of those qualities. As described in Section 3.1.3.1, the Project area is urban in nature and lacks any outstanding scenic qualities.

While there are no designated State Scenic Highways in the Project vicinity, the City of Benicia has identified I-680 north of the Benicia-Martinez Bridge as a scenic route, and the BCDC *San Francisco Bay Plan* (amended 2006) designates the bridge itself as a scenic drive. The Amorco Terminal can be seen clearly from the bridge, particularly when driving southbound and approaching the southern end of the bridge. However, the Amorco Terminal is an existing facility on land zoned Heavy Industrial, and no visual changes to the Project area are planned as a result of the new 30-year lease. Therefore, the proposed Project would not result in significant adverse impacts on a scenic vista or scenic highway.

Mitigation Measure: No mitigation required.

Impact VR-2: Create a new source of substantial light or glare, which would adversely affect day or nighttime views in the area (including views from land or water). (Less than significant.)

Exterior lighting is provided along the approach trestle and at the wharf to allow for night operations and provide safety for employees. These lights point toward the loading/unloading activity. During operation of the Amorco Terminal, existing lighting would continue to be used at existing locations and levels, and no new lighting would be installed. As there are no sensitive receptors in the area, there would be no impacts caused by lighting or glare from the Terminal.

Tanker movements throughout the Carquinez Strait are part of an established pattern of activity in the area. These vessel movements are an acceptable visual action. The docked ships would generate light while at the dock from unloading operations, which would be at any time of day or night. The low-level lighting from ships is typically distant from receptors and does not result in light and glare impacts to nearby land uses; therefore, light and glare impacts from ships would be less than significant.

Mitigation Measure: No mitigation required.

Impact VR-3: Create visual effects from routine operations over the 30-year lease period. (Less than significant.)

Project operations involve tanker activity at the existing Amorco Terminal and vessel transit through established shipping lanes in Carquinez Strait, and San Pablo and San Francisco Bays. The Amorco Terminal has been in place since 1923, and the Project site is industrial in character. No visual changes from existing operations would occur over the lease period. The berthing of ships at the wharf can be seen from I-680, consistent with existing conditions; however, ship berthing cannot be seen from Marina Vista Road, as views are obstructed by the railroad berm and Tank Farm, and the wharf is distant. Viewers from boats have more direct views of the vessels. The level of shipment activity and throughput is not expected to change substantially during the proposed 30-year lease agreement period. The annual ship and barge traffic is approximately 60 to 90 vessels (anticipated maximum). Due to the Amorco Terminal capacity, only one vessel at a time would continue to be berthed at the wharf. From the water, ships berthed at the Amorco Terminal would appear as a use consistent with the existing operations. Therefore, Project operations would not significantly change the visual character of the area, and impacts are considered adverse, but less than significant.

Vessels currently transit near the Amorco Terminal in the shipping lane. Therefore, continued transit operations would result in adverse, but less-than-significant impacts to the visual environment.

Vessels transiting to the Amorco Terminal in the San Francisco Bay transit lanes and along the outer coast would continue to blend in with other accepted tankering operations. No new visual elements would be added and public sensitivity toward views would not change. Impacts are adverse, but less than significant.

Mitigation Measure: No mitigation required.

Impact VR-4: Create visual effects from accidental releases of oil at or near the Amorco Terminal. (Significant and unavoidable.)

This analysis considers the occurrence of accidental spills separate from routine operations. In general, the potential impacts resulting from such an occurrence would tend to degrade the visual quality of the water and shoreline. The degree of impact is influenced by factors not limited to location, spill size, type of material spilled, prevailing wind and current conditions, the vulnerability and sensitivity of the shoreline, and effectiveness of early containment and cleanup efforts.

The greatest risk of a spill is from small accidents at the Amorco Terminal during normal operations. While there is less risk of spill during tankering, the size of a spill that could result is much greater, as discussed in Section 4.1, Operational Safety/Risk of Accidents. The following discusses the visual impacts expected to occur in the event of a spill.

Generally, small leaks and spills (50 to 100 barrels) would be easily contained with contingency measures employed at the Amorco Terminal. However, the Amorco Terminal is located in an area of rapidly moving current. Thus, if a spill is not detected immediately, or if a moderate- or large-sized spill at or near the Amorco Terminal occurred at a rate unable to be quickly contained due to the rapid current, then the spill could spread over a large area. Oil spill modeling results indicate that probabilities of exceeding the levels of concern range from 75 to 100 percent along the shoreline east and west of the Carquinez Bridge in both summer and winter, with higher probabilities of exceedance extending into San Pablo Bay and Suisun Bay for the winter scenario. See Appendix C for the oil spill modeling results and Section 4.1, Operational Safety/Risk of Accidents, for a detailed discussion of the results.

Visually, oiling conditions could range from light oiling, which appears as a surface sheen, to heavy oiling, including floating lumps of tar. Light product spills generally volatilize relatively rapidly, and little remains within 24 to 48 hours after a spill. Heavy crude oil may disappear over a period of several days, with remaining heavy fractions lasting from several weeks to several months floating at or near the surface in the form of mousse, tarballs, or mats. Therefore, the presence of oil on the water would change the color and, in heavier oiling, textural appearance of the water surface. Oil on shoreline surfaces or nearshore marsh areas would cover these surfaces with a brownish-blackish, gooey substance.

Such oiling would result in a negative impression of the viewshed. The public, becoming aware of a spill, may react negatively to its visual effects. Sensitivity heightens and awareness of the negative change in the environment increases. Without rapid containment by immediate booming and cleanup, the visual effects of even a small spill of 50 barrels can leave residual impacts, and they can be significant.

Tesoro Refining and Marketing Company, LLC (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 to serve as the primary Oil Spill Response Organization contractor in its Oil Spill Response Plan for offshore, onshore, and shallow-water response services. Refer to Section 2.6.4 for a more detailed description of the Amorco Terminal oil spill response capabilities and equipment.

The impact of a spill on a sensitive area could last for a long period of time, depending on the level of physical impact and cleanup ability. In events where light oiling would disperse rapidly, significant adverse impacts are expected. In events where medium to heavy oiling occurs over a widespread area, and where first-response containment and cleanup efforts are not effective, leaving residual effects of oiling, significant adverse impacts would be expected. The physical effort involved in cleanup itself, including the equipment used, would contribute to a negative impression of the environment and the visual impact. It is impossible to predict with any certainty the potential consequences of spills; therefore, visual impacts can be considered to be adverse and significant, depending on the effectiveness of first-response containment and cleanup.

Mitigation measures OS-1a, OS-1b, OS-1c, OS-4a, and OS-4b, presented in Section 4.1, Operational Safety/Risk of Accidents, provide improved oil spill containment measures. With implementation of these measures, the risk to shoreline and recreational resources can be reduced to less than significant for small spills; however, impacts would remain significant for large spills.

Mitigation Measure: No additional mitigation measures available.

Impact VR-5: Create visual effects from oil spills from vessels in transit. (Significant and unavoidable.)

Vessels transiting the shipping lanes also pose a risk of spills from accidents. A moderate to large spill has the potential to spread within a large area, with floating oil and oil contacting sensitive shoreline resources given the right wind and current conditions, and the size and origin of the spill. While spills would be significant, spills from vessels enroute to the Amorco Terminal would be the responsibility of the ship's operators/owners and not Tesoro, as Tesoro does not own any vessels. Response capability is analyzed in Section 4.1, Operational Safety/Risk of Accidents.

Spills along the outer coast could result in significant adverse impacts, where spills would be visible in the nearshore zone or at the shoreline. Spills would change the color and texture of water and shoreline conditions. The level of public sensitivity and expectations of views along the outer coast are more varied than within San Francisco Bay. Along many portions of the outer coast, public usage is low. In such areas, the public perception and expectations of viewers would not change as much as in areas the public frequents. In high-use areas such as coastal park and beach areas, ecological preserve areas, communities and harbors, and other areas where a higher number of viewers would be present, visual sensitivity would be high where cleanup efforts and residual effects were occurring.

It is impossible to predict with any certainty the potential consequences of spills; therefore, visual impacts can be considered to be adverse and significant, depending on the effectiveness of first-response containment and cleanup. Response capability for spills from any ships in transit would defer to the Marine Spill Response Corporation, as described in Sections 2.0, Project Description, and 4.1, Operational Safety/Risk of Accidents.

Mitigation measures OS-1a, OS-1b, OS-1c, OS-4a, and OS-4b, presented in Section 4.1, Operational Safety/Risk of Accidents, provide improved oil spill containment measures. With implementation of these measures, the risk to shoreline and recreational resources can be reduced to less than significant for small spills; however, impacts would remain significant for large spills.

Mitigation Measure: No additional mitigation measures available.

Alternative 1: No Project

Impact VR-6: Effects on visual resources with no new Amorco Terminal lease. (Beneficial.)

The No Project Alternative involves lease denial and cessation of Amorco Terminal operations. The Amorco Terminal would eventually be decommissioned or converted to another use, which would be subject to separate California Environmental Quality Act (CEQA) review. If the Project were to be dismantled, it is likely that heavy equipment, including a barge or crane, would be used temporarily. While the removal effort would cause adverse effects due to the heavy equipment, impacts would be short-term and less than significant. With the removal of the Amorco Terminal from the shoreline, a slight long-term beneficial change in visual conditions in the immediate area may occur.

After decommissioning, the No Project Alternative assumes the number of tankers servicing the area would remain essentially the same due to regional demands, and that without the Amorco Terminal, incoming tankers would instead go to the Avon Terminal. Therefore, the risks associated with the transport of oil would not be removed from the region, but simply shifted to a nearby facility, approximately 2.5 miles away. The localized risk of a spill (i.e., risks associated with the specific location and access route to the Amorco Terminal) impacting visual resources would shift. Impacts at the Amorco Terminal would not occur, as the Amorco Terminal would not be in use. With no potential for spills in the immediate area, a slight beneficial impact may occur. However, an incremental increase in risk associated with increases in vessel activity at the Avon Terminal would result. At the Avon facility, there would be the potential for oil spill impacts similar to the proposed Project.

The No Project Alternative assumes that other facilities in the area, such as the Avon Terminal, would have the capability to make up for the loss of the Amorco Terminal. However, if other facilities do not have this capability, they may be required to expand. While this document does not examine the potential impacts of a facility expansion because the possibility of such an action is too speculative at this time, expansion of existing facilities would not likely result in significant adverse visual impacts. Any such expansion activities likely would trigger environmental review at the time of a proposal to expand any of the facilities in the area.

Mitigation Measure: No mitigation required.

Alternative 2: Restricted Lease Taking Amorco Out of Service for Oil Transport

Impact VR-7: Effects on visual resources by taking Amorco Terminal out of service for oil transport. (Less than significant.)

The Amorco Terminal is an existing facility on land zoned Heavy Industrial, and no visual changes to the Project area are anticipated as a result of a restricted lease. Should this alternative be selected, mitigation measures would be determined during a separate environmental review under CEQA.

Mitigation Measure: No mitigation required.

Cumulative Impact Analysis

Oil spills from multiple sources that would overlap in time (either the spill occurrence or the cleanup operation) are unlikely; however, such incidents would result in significant, adverse visual impacts. A spill can begin as a localized incident, but can have the potential to spread over a very large area. If more than one spill were to occur within a short timeframe within the Carquinez Strait, Suisun Bay, San Pablo Bay, or along the outer coast and first-response cleanup efforts were unsuccessful, impacts to visual resources would be significant and unavoidable.

4.10.4 SUMMARY OF FINDINGS

Table 4.10-1 includes a summary of anticipated impacts to visual resources and associated mitigation measures.

Table 4.10-1: Summary of Visual Resources Impacts and Mitigation Measures

Impact	Mitigation Measure(s)
Proposed Project	
VR-1: Cause adverse impacts on a scenic vista or scenic highway	No mitigation required.
VR-2: Create a new source of substantial light or glare, which would adversely affect day or nighttime views in the area (including views from land or water)	No mitigation required.
VR-3: Create visual effects from routine operations over the 30-year lease period	No mitigation required.
VR-4: Create visual effects from accidental releases of oil at or near the Amorco Terminal	No additional mitigation measures available. (Refer to MMs OS-1a, OS-1b, OS-1c, OS-4a, and OS-4b.)
VR-5: Create visual effects from oil spills from vessels in transit	No additional mitigation measures available. (Refer to MMs OS-1a, OS-1b, OS-1c, OS-4a, and OS-4b.)
Alternative 1: No Project	
VR-6: Effects on visual resources with no new Amorco Terminal lease	No mitigation required.
Alternative 2: Restricted Lease Taking Amorco Out of Service for Oil Transport	
VR-7: Effects on visual resources by taking Amorco Terminal out of service for oil transport	No mitigation required.

5.0 OTHER REQUIRED CEQA SECTIONS

The potential significant environmental effects associated with the proposed Amorco Marine Oil Terminal (Amorco Terminal) Lease Consideration Project (Project) have been addressed in Sections 4.0 through 4.12 of this Environmental Impact Report (EIR). The Guidelines for the California Environmental Quality Act (State CEQA Guidelines) state in part that an EIR shall also:

- identify and focus on the significant environmental effects of a proposed project (Guidelines § 15126.2, subd. (a));
- describe any significant impacts, including those that can be mitigated but not reduced to a level of insignificance (Guidelines § 15126.2, subd. (b));
- identify significant irreversible environmental changes that would be caused by a proposed project should it be implemented (Guidelines § 15126.2, subd. (c));
- identify any growth-inducing impacts of a proposed project such as the ways in which the proposed project could foster economic or population growth, or the construction of additional housing, either directly or indirectly, in the surrounding environment (Guidelines § 15126.2, subd. (d)); and
- identify the environmentally superior alternative (Guidelines § 15126.2, subd. (e)(2)).

These elements are discussed in Sections 5.1 through 5.4, below.

5.1 SIGNIFICANT ENVIRONMENTAL EFFECTS THAT CANNOT BE AVOIDED IF THE PROJECT IS IMPLEMENTED

Pursuant to the State CEQA Guidelines section 15126.2, subdivision (b), this Section presents those significant environmental impacts that cannot be avoided should the California State Lands Commission (CSLC) grant a new 30-year lease for the Amorco Terminal. These impacts would remain significant and unavoidable, even after incorporation of available and feasible mitigation measures.

- **Large spills at the Amorco Terminal during transfer operations.** Although the chance of an oil spill is low, if an accidental spill occurs, unavoidable significant impacts can result. A spill larger than 1 gallon would be expected approximately every 7.9 years. The probability of a spill larger than 1,000 gallons from the Amorco Terminal is 0.01, or one spill every 73 years. Tesoro Refining and Marketing Company, LLC (Tesoro) is compliant with U.S. Coast Guard regulations for spill response for responding to a small (50 barrels) spill, and impacts are less than significant. The consequences of a spill would depend on the size of the spill; the effectiveness of the response effort; and the biological, commercial fishery, shoreline, and other resources affected by the spill. A spill of 1 gallon or less would result in an adverse impact that can be mitigated, while a large spill of 1,000 barrels (42,000 gallons) most likely would result in significant, adverse impacts that would have residual effects after mitigation. The impacts of spills between 1 gallon and 1,000 barrels (42,000 gallons) depend on the effectiveness of response efforts and the resources impacted.

- **Spills from pipelines during non-transfer periods.** The Marine Oil Terminal Engineering and Maintenance Standards (MOTEMS) have set requirements for preventative maintenance that include periodic inspection of all terminal components. Tesoro has an extensive pipeline inspection and maintenance program in place, and fully complies with MOTEMS requirements. Nevertheless, leaks or spills are possible and considering the Amorco Terminal pipeline volume of 757 barrels, a substantial spill is possible. Even with response measures in place, depending on the size of the spill and the environmental resources affected, impacts of a spill could be significant.
- **Large spills from vessels in transit.** The potential for a spill from the Amorco Terminal, including the tank vessel while it is at the Amorco Terminal, was found to be much greater than the potential of a spill from a tank vessel transiting within the San Francisco Bay. However, while the probability of a large spill from vessels in transit is small, the consequences of such a spill would be a significant, adverse impact.
- **Potential for fires and explosions:** The closest populated public areas are residential areas, parks, and marinas that are all located too far away to be impacted by heat from a potential fire or flying debris from a potential explosion at the Amorco Terminal. Therefore, the risk to the public from such an event at the Amorco Terminal is less than significant. If an oil spill were to occur from the Amorco Terminal and become ignited it could drift toward residential, park, or marina areas and present a hazard to the public or property. The intervening distance would provide time to respond and evacuate public areas if needed for safety so the risk to persons from a potential ignited oil spill is low. However, a major fire at the Amorco Terminal could result in an oil spill with significant impacts.
- **Introduce invasive nonindigenous species to the San Francisco Bay Estuary.** Introduction of invasive organisms in segregated ballast water released in San Francisco Bay could have significant impacts to plankton, benthos, fishes, and birds. The discharge of segregated ballast water that contains harmful microorganisms could impair several of the Project area’s beneficial uses, including commercial and sport fishing, estuarine, habitat, fish migration, preservation of rare and endangered species, water contact recreation, non-contact water recreation, fish spawning, and wildlife habitat. Tesoro would ensure that vessels seeking to call at the Amorco Terminal are advised of California’s Marine Invasive Species Act and are submitting forms as required by the CSLC.

- **Introduce invasive nonindigenous species from biofouling.** The risk of species introductions from biofouling by commercial ships has not been quantified, but is assumed to be high, and is one of the primary routes through which nonindigenous aquatic species are introduced to the estuary. Tesoro has no control over, ownership of, or authority to direct vessels that would dock at its Amorco Terminal. The vessels would be governed by the applicable CSLC standards for biofouling management, which would reduce the potential impact of aquatic species invasion from biofouling. However, the impact of introducing new non-native and invasive species via ballast water and biofouling in the San Francisco Bay and Sacramento-San Joaquin River Delta could potentially be so devastating that even a reduced risk has the potential to cause a significant and unavoidable adverse impact to special-status species and habitats.
- **Spill effects on biological resources.** Impacts from spills would depend on the material and quantity spilled. An oil spill of 1,000 barrels or greater has the potential to have significant, adverse impacts on biological resources. A spill between 50 and 1,000 barrels would also probably have significant biological impacts that might not be avoidable. Short-term, direct impacts to marine biota from an accidental oil spill include physical oiling, which may cause injury or death; toxic exposure to volatile gas; disturbance from clean-up activities; and loss of habitat. Indirect impacts include disruption of predator-prey relationships; introduced toxins in the food web, which may cause low-level health impacts to prey species that bioaccumulate in predator species; possible toxic effects on embryos; and interruption or degradation of reproduction potential.
- **Spill effects on water quality.** The severity of impact from larger leaks or spills at the Amorco Terminal or from vessels in transit that cannot be easily contained would depend on spill size, oil composition, spill characteristics (instantaneous vs. prolonged discharge), effect of environmental conditions on spill properties due to weathering, and the effectiveness of clean-up operations. In the event of an oil spill, the initial impacts would be to the quality of surface waters and the water column, followed by potential impacts to sedimentary and shoreline environments. Following a spill, hydrocarbon fractions would be partitioned into different regimes and each fraction would have a potential to affect water quality. Large spills at the Amorco Terminal have the potential to result in significant, adverse impacts on water quality. Also, most tanker spills/accidents and larger spills that cannot be quickly contained either in San Francisco Bay or along the outer coast would result in significant, adverse impacts.

- **Spill effects on shoreline and recreation amenities.** An accidental spill of oil at or near the Amorco Terminal could cause residual impacts on sensitive shoreline lands and recreation, including Martinez Regional Shoreline, Martinez Waterfront Park, and Carquinez Strait Regional Shoreline, and to recreational boats. The degree of impact is influenced by factors such as location, spill size, type of material spilled, prevailing wind and current conditions, the vulnerability and sensitivity of the shoreline, and effectiveness of early containment and cleanup efforts. Impacts from spills are considered to be significant and unavoidable if first-response efforts would not contain or clean up the spill, resulting in residual impacts that would affect the general public's use of shoreline or water areas.
- **Spill Effects on Visual Environment.** The Amorco Terminal is in an area of rapidly moving current. If a spill is not detected immediately, the spread of a larger spill over a large portion of the Carquinez Strait (Strait) could occur, and potentially impact shoreline areas on both sides of the Strait. The presence of oil on the water would change the color and, in heavier oiling, textural appearance of the water surface. Oil on shoreline surfaces or nearshore marsh areas would cover these surfaces with a brownish-blackish, gooey substance. Such oiling would result in a negative impression of the viewshed. The public, becoming aware of a spill, may react negatively to its visual effects. Without rapid containment by immediate booming and cleanup, the visual effects of even a small spill of 50 barrels can leave residual impacts, and they can be significant.
- **Spill effects on commercial fisheries.** Shrimp, herring, and sport fisheries in the Central Bay, North Bay, San Pablo Bay, Carquinez Strait, Napa River, and Honker Bay are at highest risk of spill contamination. The Strait and Suisun Bay is a migratory corridor and feeding/rearing area for many sport fish species, including striped bass, sturgeon, and salmon. Fishing activities would be further impacted by closures of piers for recreational fishing and marinas for both commercial and recreational fishing. In addition, loss or damage to fisheries and fishing gear would increase the impacts on commercial fishing operations and angling activities. Significant, adverse impacts to commercial and sports fisheries would result from oil spill accidents originating at the Amorco Terminal or from transiting tankers going to the Amorco Terminal.

5.2 SIGNIFICANT IRREVERSIBLE CHANGES THAT WOULD BE CAUSED BY THE PROJECT SHOULD IT BE IMPLEMENTED

Per State CEQA Guidelines section 15126.2, subdivision (c), this Section presents the irreversible changes related to the use of, or long-term commitment of, nonrenewable resources. Irreversible changes represent long-term environmental damages that could result from the Project.

- Of the impacts presented in Section 5.1, even the impacts of oil spills over a long period of time are reversible. However, if a large spill were to cause enough damage to water quality or biological resources so as to result in the elimination of a species, an irreversible impact would result.
- Operation of the Amorco Terminal indirectly acts as a stimulus for the extraction of oil reserves, adding to the eventual depletion of a non-renewable resource.

5.3 GROWTH-INDUCING IMPACT OF THE PROPOSED PROJECT

The Project involves a new lease for operation of the Amorco Terminal. If granted, the new lease would allow Tesoro to continue to operate the Amorco Terminal, which has operated at its current location, facilitating the transfer of crude oil feedstocks from tanker vessels to Tesoro's Amorco Tank Farm immediately upland, which are later transferred via pipelines from the Tank Farm to the Golden Eagle Refinery (Refinery), since 1923. The Amorco Terminal operates on an approximately 14.9-acre section of sovereign public land on the Carquinez Strait leased from the CSLC. The Amorco Terminal is capable of operating 365 days per year, 24 hours per day, although actual operation depends on shipping demands. Over the last 5 years, annual vessel calls at the Amorco Terminal have ranged from 53 to 85, averaging 69 calls per year (between 2008 and 2012). The level of shipment activity and throughput is not expected to change substantially during the proposed 30-year lease agreement period. No changes to the Amorco Terminal wharf are proposed. The Amorco Terminal is currently existing and operating, and any increase in operations would be market driven to keep up with the demands within the region. These demands are considered growth accommodating and not growth inducing, and would not directly or indirectly foster economic growth, population growth, or the need for housing.

5.4 ENVIRONMENTALLY SUPERIOR ALTERNATIVE

The State CEQA Guidelines section 15126.6, subdivision (e)(2) states:

> *The "no project" analysis shall discuss the existing conditions at the time the notice of preparation is published, or if no notice of preparation is published, at the time environmental analysis is commenced, as well as what would be reasonably expected to occur in the foreseeable future if the project were not approved, based on current plans and consistent with available infrastructure and community services. If the environmentally superior alternative is the "no project" alternative, the EIR shall also identify an environmentally superior alternative among the other alternatives*."

The determination of an environmentally superior alternative is difficult because of the many factors that must be balanced. The No Project Alternative eliminates operational impacts associated with the Amorco Terminal and thus appears to be environmentally superior; however, implementation of this alternative, at least for the short term, does not meet the Project objective of supplying the crude oil required to maintain Refinery operational viability. In the long term, it would potentially shift similar levels of impact to other San Francisco Bay Area (Bay Area) marine oil terminals in order to make up the differential for crude oil and product transport throughout San Francisco Bay. The capacity of other Bay Area terminals may be taxed, potentially increasing vessel congestion, collisions, and costs while vessels wait to berth and offload/load.

This alternative could also shift Tesoro's sources for crude oil to land-based means of traditional crude oil transportation such as a pipeline and/or rail to absorb import operations from the Amorco Terminal, resulting in potentially significant land-based impacts to operational safety/risk of accidents, water quality, land use/recreation, and visual resources due to the risk of spills, fire, or explosion. In addition, construction of pipelines and/or rail lines would potentially impact biological resources, cultural resources, land-based transportation, and noise.

The Restricted Lease Taking Amorco Out of Service for Oil Transport Alternative would also potentially shift similar levels of impact to other Bay Area marine oil terminals, and/or to land-based means of traditional crude oil transportation such as a pipeline and/or rail in order to make up the differential for crude oil and product transport throughout San Francisco Bay. All potential impacts remain the same as for the No Project Alternative.

For the reasons mentioned above, both the No Project Alternative and the Restricted Lease Taking Amorco Out of Service for Oil Transport Alternative are considered to represent a greater potential adverse environmental impact than the proposed Project. Therefore, the proposed Project is selected as the environmentally superior alternative.

6.0 COMMERCIAL AND SPORT FISHERIES

Section 6.0 provides a detailed description of existing commercial and sport fisheries around the Amorco Marine Oil Terminal (Amorco Terminal) Lease Consideration Project (Project) study area, including environmental and regulatory settings, and examines the potential for impacts to these resources from continued operation of the Amorco Terminal. The major issues focus on: (1) the effects of continued Project operations, including the associated vessel traffic, on commercial, sport, and subsidence fishery resources and activities; (2) the effects of potential oil spills on fishery resources and activities; and (3) the effects of continued operations and potential oil spills on subsidence fisheries.

6.1 ENVIRONMENTAL SETTING

6.1.1 Methodology and Data Collection

As discussed in Section 1.0, Introduction, information from relevant documents, including the Shell Martinez Marine Terminal Lease Consideration Environmental Impact Report (EIR) (CSLC 2011, State Clearinghouse [SCH] No. 2004072114) and the Shore (now Plains) Terminals LLC Martinez Marine Terminal Lease Consideration EIR (CSLC 2012, SCH No. 2001042022), have been referenced and included, as appropriate for the preparation of this EIR.

The detailed geographic focus of this EIR is from the Carquinez Bridge, encompassing Carquinez Strait (Strait) and Suisun Bay, to the western edge of the legally defined Delta, just west of Pittsburg (approximately 64 square miles). This area encompasses the Amorco Terminal and the areas to the east and west that are most susceptible to oil spills. Vessels using the Amorco Terminal transit through San Francisco Bay, so the area from the Golden Gate to the entrance of Carquinez Strait is the secondary area of study and will be generally described using existing data. Finally, potential for impacts from vessels transiting the outer California coast will be briefly presented by incorporating information from other documents by reference.

To characterize the existing environment in the San Francisco Bay estuary, which extends from the mouth of Coyote Creek near the city of San Jose in the south to Chipps Island at the eastern end of Suisun Bay, California Department of Fish and Wildlife (CDFW; formerly California Department of Fish and Game) catch and landing statistics and other published materials were used to describe commercial and recreational fisheries. A short description of the CDFW fisheries databases is provided to explain their uses and limitations.

To standardize fish landing reporting, the CDFW divides coastal and bay waters into reporting blocks. The CDFW provides both commercial and charter boat fish landings by fishing area or block (where fish are caught) and by port or region (where the fish are landed). Fish dealers, processors, or charter boat operators record landings data. For commercial fisheries, data concerning species, weight, catch block, mode (gear type), and price paid to fishing operators are provided to the CDFW. Charter boat operators report to the CDFW the number of fish caught on their boats. (CSLC 2011a).

The collected fish landings data have their limitations. For commercial fisheries, the data may not be entirely accurate or complete as fishing operators may report catches in blocks other than where the fish were actually caught. Catches often occur in more than one block, but may be reported for only one block. Because of these limitations, the CDFW data are supplemented by other information to better describe the fisheries.

For recreational data, the charter boat landings provide the only consistent database that records angler catches, despite the fact that catches from recreational private boats, shore/beaches, and piers make up about 86 percent of total recreational catches (CSLC 2011a). Information from seafood-consumption studies is used to further describe the fisheries, but these data are based on short-term sampling studies that describe a snapshot in time, rather than a long-term history of fishing activity. These databases were used despite these limitations; qualitative updates are provided from other sources, as needed. (CSLC 2011a).

6.1.2 Carquinez Strait/Suisun Bay Fisheries, West of the Legally Defined Delta

Fisheries Overview

San Francisco Bay is divided into three connecting bays: San Francisco Bay proper, San Pablo Bay, and Suisun Bay. The Carquinez Strait links the Sacramento/San Joaquin Delta and Suisun Bay with the San Pablo and San Francisco Bays. This system of bays is influenced by the ocean and its tides, and by large volumes of freshwater runoff from the Sacramento and San Joaquin River watershed; the Strait is where the fresh water and salt water meet. The watersheds begin in the Sierra Nevada and drain California's Central Valley (CSLC 2011a).

One of the environmental influences on the estuary and its fish is movement of the null zone, which marks the upstream edge of seawater influence and the upstream limit of what is known as the entrapment zone. The location of this zone moves upstream and downstream several miles daily, depending on changes in freshwater flows from the rivers and streams. The entrapment zone is an area where suspended materials concentrate as a result of mixing by the outgoing freshwater flow from the Delta above the heavier saltwater flow from San Francisco Bay. The entrapment zone contains concentrations of suspended materials such as nutrients, plankton, and fine sediments that are often many times higher than in areas upstream or downstream of the entrapment zone (Levine-Fricke 2004). This trophically rich habitat is thought to be important for the rearing of many fish species. Its precise location between the lower Delta and Suisun Bay varies according to the strength and phase of the tides, and the level of freshwater inflow from the Sacramento and San Joaquin Rivers. High freshwater flows from the Delta push the entrapment zone west toward Carquinez Strait; low flows put it closer to the mouth of the Delta.

Historical Summary and Trends

Historically, major native fisheries in the area included shrimp, sturgeon, and Chinook salmon, among others. Striped bass, an introduced species, is also very popular among anglers in the estuary.

The estuary's fisheries have always been important to humans, as evidenced by the tens of thousands of people who lived along its shores before Europeans arrived. By the 1800s, fish were a major resource for settlers, with the primary species being Chinook salmon, sturgeon, striped bass, and Pacific herring. The Bay-Delta region was the largest fishing center on the west coast. However, human use of the Sacramento River system and San Francisco Bay took a heavy toll. Adverse impacts on San Francisco Bay and fisheries began with siltation caused by hydraulic mining in the mid-1800s. As California's population grew, extensive land reclamation, dredging and filling, urban development, water pollution, dams, upstream water diversions, and other water developments altered the estuary to such an extent that San Francisco Bay fisheries declined significantly. Historically, overfishing also took a toll on fisheries. However, in recent years, other activities have caused major declines. (CSLC 2011a).

Another factor that drastically changed San Francisco Bay's trophic structure was the introduction of non-native plant and animal species, beginning in the 19th century. Non-native species have been introduced to San Francisco Bay via a number of vectors, including the deliberate introduction of species for recreational or commercial purposes. America shad, striped bass, carp, and catfish were deliberately introduced. Transoceanic vessel traffic has been identified as one of the major vectors of non-native species, and hull fouling and ballast water are the single largest contributor of non-native species to San Francisco Bay. The most important invasive species in the project vicinity is the overbite clam, *Corbula amurensis*. Thought to have been introduced in San Francisco Bay by ballast water exchange from a cargo ship, this phytoplankton eater species is now so abundant that the current population is capable of filtering the estuary's water column several times a day and has caused a crash in the abundance of phytoplankton in San Francisco Bay (SFEP 2004).

Shrimp

The shrimp fishery began in the early 1860s; by 1871, Chinese immigrants fished using stationary shrimp nets and were exporting large quantities of dried shrimp meal to China. Annual landings peaked in 1890 to over 5 million pounds. By 1915, shrimp were fished by beam trawl and in 1935 landings totaled 3.4 million pounds. Landings steadily declined due to reduced demand for fresh and dried shrimp for food. By the early 1960s, average annual landings declined to 1,500 pounds. In 1965, this fishery rebounded as a viable source of bait for sturgeon and striped bass sport fishing (CDFG 2001).

Shrimp populations appear to vary widely from year to year. Studies show that abundance of bay shrimp increases with increased river inflow to the estuary, probably because juvenile shrimp favor low-salinity habitat. Harvest management is limited to compiling logbook data and monitoring species composition in bay shrimp landings. Catch limits, closed seasons, or restricting harvest in areas are not considered necessary by fisheries regulators because the limited demand maintains fishing effort at levels that would not threaten long-term sustainability of the species. If freshwater inflows increase due to upstream fishery restoration efforts, there may be a beneficial effect on the shrimp fishery (CDFG 2001).

Sturgeon

Sturgeon remains have been found in Native American middens in the Bay-Delta region. White sturgeon has dominated the fishery, although there have been small catches of green sturgeon. The commercial fishery lasted from the early 1860s to 1901 and concentrated in San Francisco Bay and the Delta. Fishing gear included gillnets, longlines, and multiple unbaited hooks. Landings peaked at 1.65 million pounds in 1887, declined to 0.3 million pounds in 1895 and to 0.2 million pounds in 1901, when the fishery was closed. Sport fishing for sturgeon was later legalized in 1954. In 1964, the small catch increased significantly when the minimum size limit decreased from 50 inches to 40 inches and it was discovered that bay shrimp were effective bait. By the 1980s, the harvest rate was 40 percent greater than the rate during the two earlier decades. In 1992, a minimum size limit of 46 inches and a maximum 72-inch size limit were established to protect the species from over harvest (CDFG 2010). Effective in 2013, white sturgeon must measure between 40 inches and 60 inches (CDFW 2013a). Permitted fishing gear is limited to barbless hook and line.

Sturgeon annual harvest estimates show that angling regulation changes begun in 1990 are reducing harvest rates by about 50 percent of the levels seen in the 1980s (CSLC 2011a). Despite the decreased fishing effort, sturgeon populations vary greatly over the years. Angler catch and mark-recapture study information suggests that strong year classes since 1980 have occurred only during 5 of the 10 years when the Sacramento Valley Water Year Index was rated “wet”. An abundance estimate of 142,000 adult fish was reported in 1997 (CDFG 2010). Annual fish populations vary due to changes in high spring freshwater outflows from the Delta, and scientists attribute the high population levels to the very wet 1982-1983 period. Conversely, experts note the severe 1987-1992 drought adversely affected reproductive success and caused a substantial decline in the adult sturgeon population, as recruitment nearly ceased and reduced growth rates and mortality limited the abundance of fish in the harvestable population (CSLC 2011a). Charter boat catch statistics for block 308 mimic these trends. From 1998 to 2000, only 85 sturgeon were caught, compared to 561 caught from 2002 to 2004. On average, 208 sturgeon per year were reported caught from 2005 to 2012. Of these, approximately 50 per year were kept (see Appendix F).

Pacific Salmon

Of the five species of Pacific salmon found on the Pacific coast, Chinook, *Oncorhynchus tshawytscha*, and coho, *O. kisutch*, are the species most frequently encountered in California fisheries. As with sturgeon, salmon fisheries existed long before European settlers arrived in the 1700s. Harvests of Sacramento/San Joaquin watershed salmon by American Indians may have exceeded 8.5 million pounds annually. Traditional fishing methods included use of gill and dip nets, fishing spears, and communal fish dams. The commercial fishery began with the advent of the gold rush. By 1860 the gillnet fishery was well established in Suisun Bay, San Pablo Bay, and the lower reaches of the two rivers. The canning industry stimulated the growth of the fishery, with canneries operating throughout the river system. In 1882 the fishery reached its peak when 12 million pounds were landed. Shortly thereafter, the fishery collapsed due primarily to pollution and degradation of rivers by mining, agriculture, and timber operations, combined with increased landings. By 1919 the last cannery closed, and in 1957 the last inland commercial fishing area open to the general public was permanently closed (CDFW 2013b).

The ocean troll fishery continued and today’s trollers use fishing techniques developed during the 1940s. In addition, electronic equipment has significantly increased the efficiency of the modern troller. Prior to 1990, the fishing industry enjoyed relatively high and consistent harvests, averaging about 7 million pounds annually of salmon. Later commercial harvests have been much more erratic, with the largest catch being 14.4 million pounds in 1988 but generally substantially lower since. In 1993 the retention of coho salmon was prohibited in all California commercial fisheries to protect stocks. A sudden collapse of Sacramento River Chinook salmon in 2007 led to a complete closure of the fishery in 2008 and 2009, and while open in 2010 and 2011 it remained considerably constrained (CDFW 2013b).

The ocean sport fishery became popular with the development of the commercial passenger fishing vessel after World War II. The highest sport landings occurred in 1995 when anglers landed a record 397,200 Chinook. Prior to the 2008 and 2009 closure, lower recreational landings were typically associated with strong El Nino events. After the 2007 collapse, the lowest harvest on record was in 2010 when only 14,800 Chinook salmon were caught statewide (CDFW 2013b). Oceanic and in-river conditions play major roles in salmon catches; however, the variability can also be attributed to changes in fishery regulations. Since 1988, progressively more restrictive regulations have been imposed on the commercial fishery to protect stocks of special concern, including those that are federal and State endangered or threatened species. As an example, the sport fishery is the only allowable salmon fishery in the estuary. (CSLC 2011a).

Striped bass

A major sport fishery has evolved around the striped bass, with an estimated annual value exceeding 47 million dollars in 1985 (CDFG 2001). Striped bass were introduced in 1879 by railcar from the east coast; 132 were unloaded in Martinez and released in the Carquinez Strait. Three years later, 300 more bass were shipped in and released; the entire west coast striped bass fishery evolved from these introductions (CDFG 2001). In the 1970s legal-sized bass (over 18 inches) numbered around 2 million. By 1995, because of pollution and freshwater diversions, the population of legal bass hovered around 800,000 (California State Coastal Conservancy 1995). The primary California population of striped bass is found in the San Francisco Bay estuary, although there have also been introductions in various reservoirs and the ocean in southern California (CDFG 2001). As with salmon, the future of the striped bass fishery is uncertain. The fishery's future depends on present efforts to successfully screen water diversions, to succeed at hatchery programs, and to address population declines that may be caused by invasive species, pollutants, and Bay-Delta water exports (CSLC 2011a).

Fisheries near the Amorco Terminal

The Amorco Terminal is located in CDFW fish block 308. This block encompasses the Carquinez Strait and the western extent of Suisun Bay; block 302 includes the remainder of Suisun Bay. Landings for block 308 are reported below and in Appendix F. For all CDFW blocks, catch block data appear to be sporadic from year to year due to inaccuracies in the reporting of landing locations. The data are supplemented by information from other sources (CSLC 2011a).

Commercial Fisheries

The prominent commercial fishery in the vicinity of the Amorco Terminal is the shrimp trawl fishery. The modern fishery, which began in 1965, has been harvested entirely by beam trawl. Most shrimp are harvested for bait; a small percentage of catch is still reserved for human consumption. Live tanks are used on all vessels and shrimp are transported to local bait shops by truck in either the tanks or iced-down wooden trays.

From 1991 to 2004, recorded landings in block 308 totaled over 21,000 pounds (65 percent of the total catch in the block). These landings compare with over 19.4 million pounds for the entire estuary; by far, most shrimp were caught in South San Francisco Bay. Along with shrimp, trawlers also harvest staghorn sculpin, yellowfin goby, and Chinook salmon, for example totaling 2,558, 2,269, and 3,399 pounds, respectively, (25.5 percent of the catch) over the same time period in block 308 (CSLC 2011a). Between 2005 and 2012, shrimp were harvested from Block 308 only in 2007 (325 pounds) and 2012 (3,391 pounds). Approximately 615 pounds of shrimp have been harvested in 2013 through July (see Appendix F).

Current information indicates that shrimp trawling occurs in San Pablo Bay and Suisun Bay, including waters near the Amorco Terminal (see Figure 6-1). Fishing also occurs in waters less than 20 feet deep in the channels of the estuary's shallow reaches. Fishing occurs year round, but landings usually peak during the months of June through November. Monthly variations in landings may have as much to do with changes in salinity in the water as with fluctuations in demand by sport anglers (CDFG 2001).

Expectations for the shrimp fishery remain as they are now; most of the product is used for angler bait, and little is reserved for human consumption. The market is not expected to change much over the next 20 years.

Charter/Private Boat Sport Fisheries

Marinas near the Amorco Terminal include Martinez, Crockett, Benicia, Glen Cove, and Vallejo. In Suisun Bay, Port Suisun, Suisun Marina, Pierce Harbor, Solano Yacht Club, Harris Yacht Harbor, and McAvoy Yacht Harbor service sport boats. In all, 11 facilities provide launches and berths for charter and private boats.

Martinez Marina and Yacht Club are approximately 1 mile to the west of the Amorco Terminal. The marina is open year round and has approximately 250 slips. It is primarily a fishing marina. The marina harbors about 3 charter fishing boats and 10 oil spill response vessels (CSLC 2011a).

The city of Martinez adopted a Marina Master Plan in 1993 to upgrade and replace the marina. To date they have removed the old ferry pier, constructed a plaza and new boat launch, and performed dredging at the entrance. Additional dredging, breakwater repair, and entrance reconfiguration are planned over the next several years, contingent on funding (City of Martinez 2013).

Figure 6-2 shows the Strait and Suisun Bay provide habitat for and support numerous fisheries, including American shad, Chinook salmon fry, and shallow-water fish.

Compared to the rest of San Francisco Bay, charter boat activity is relatively light, with sturgeon and striped bass the main fisheries of interest. Recorded charter-boat data for CDFW block 308 show that striped bass and sturgeon are the most popular species caught in the area, with occasional landings of halibut, flounder, and leopard shark (see Appendix F). Charter boats are most active out of Martinez Marina during sturgeon season, roughly October to April; private boat anglers are expected to follow similar fishing patterns (CSLC 2011a).

Demand for recreational fishing, in general, may increase as the San Francisco Bay Area (Bay Area) population increases. However, recreational fisheries are on a general decline. As with commercial fisheries, recreational fishing growth is limited more by the supply of healthy fish than by demand. Therefore, if San Francisco Bay's condition significantly improves, recreational fishing will likely grow. The reverse situation is also possible.

Pier and Shore Fishing

Public piers, shoreline, and beach areas that provide access for fishing are located throughout the Bay Area; however, access to the open water in the immediate area of the Amorco Terminal is limited. Most shoreline access is provided in or near marinas and on or near several piers. Piers and public shoreline areas near the Amorco Terminal include Martinez Marina, Martinez park and public pier, 9th Street Park and pier in Benicia, Benicia Marina and pier, Benicia State Recreation Area, Crockett Marina and Dowrelio Pier, and Vallejo fishing pier and shoreline parks. Anglers have been known to catch flounder, sturgeon, shad, salmon, steelhead, and striped bass from these areas. The Martinez public pier is popular with shoreside anglers going after sturgeon and striped bass (CSLC 2011a).

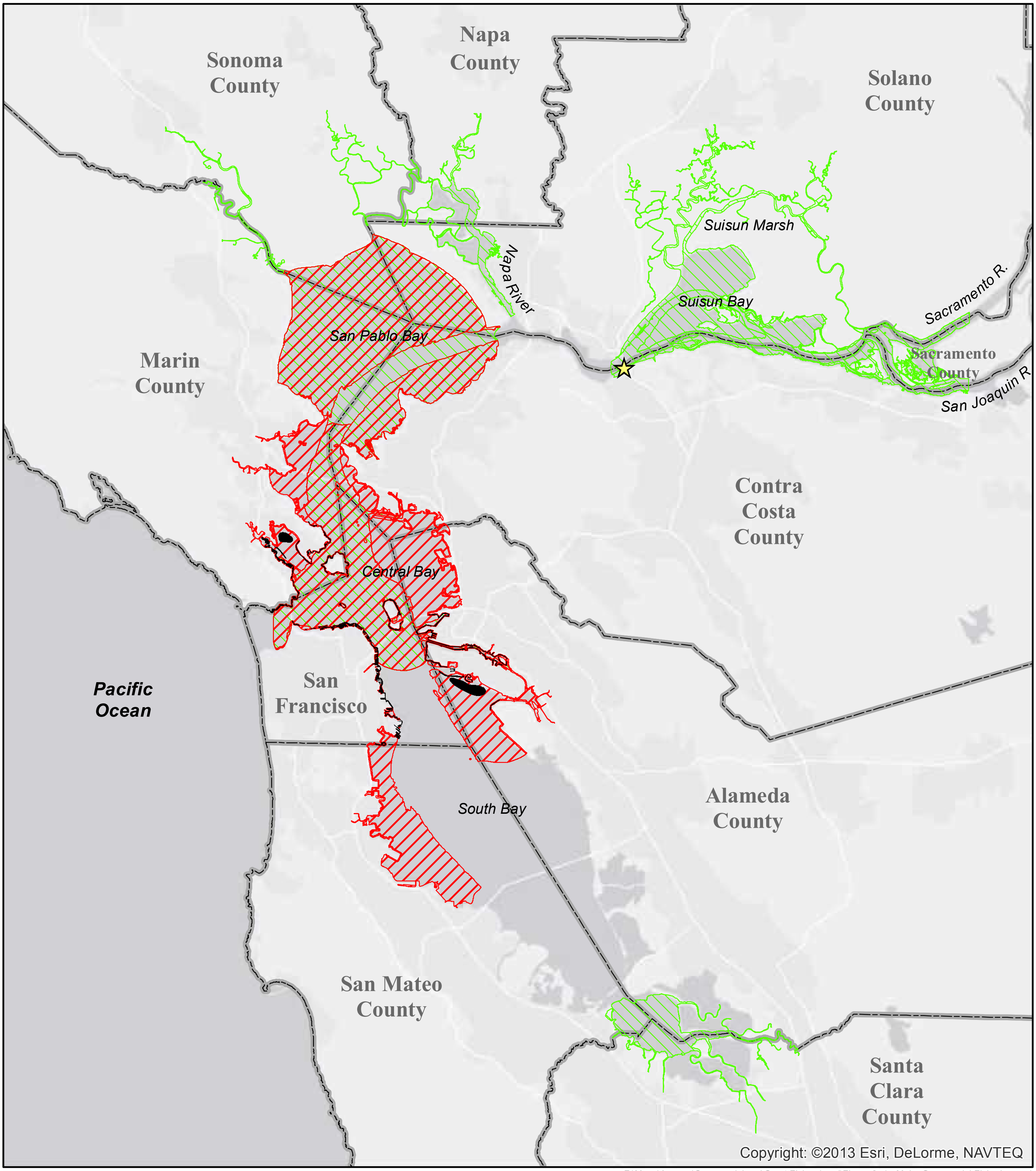
6.1.3 San Francisco and San Pablo Bay Fisheries

Commercial Fisheries

<u>Shrimp</u>

Bay and brine shrimp fishing occurs year round. In 1965, this fishery was developed to supply bay shrimp as live bait for sturgeon and striped bass sport fishing. A small percentage of catch is still consumed fresh. The commercial harvest has been entirely by beam trawl; live tanks are used on all vessels and shrimp are transported to local bait shops by truck in either the tanks or iced-down wooden trays. Staghorn sculpin, yellowfin goby, and long jaw mudsucker are also caught and sold by shrimpers (CSLC 2011a).

Key fishing locations include the South Bay, San Pablo Bay, and Suisun Bay (see Figure 6-1). Fishing also occurs in waters less than 20 feet deep in the channels of the estuary's shallow reaches. Currently, the number of vessels harvesting shrimp ranges from to 8 to 10. Three trawlers fish in the South Bay, six in the North and San Pablo Bays, and one roams throughout the estuary (CSLC 2011a). From 1991 to 2003, recorded landings for San Francisco Bay Area ports totaled 14.9 million pounds and averaged 1.1 million pounds per year. From 2000 to 2003, landings were less than the longer-term average and ranged from more than 972 thousand pounds to more than 607 thousand pounds. (CSLC 2011a). Shrimp landings in 2010 and 2011 were approximately 56 thousand pounds and 38 thousand pounds, respectively, with no reporting of brine shrimp (CDFG 2011a and 2012a).



F:\Maps\Amorco\Commercial and Sport Fishery\mxd\Figure 6 -1 - Major Commercial Fisheries.mxd

Figure 6-1 Major Commercial Fisheries
California State Lands Commission
Amorco Marine Oil Terminal
Lease Consideration Project

TRC

10/8/2013

Legend

- Amorco Terminal Location
- Pacific Herring Spawning Areas
- Blacktail Bay Shrimp
- California Bay Shrimp

DATA: 1998 NOAA Environmental Sensitivity Indexes

N

1:500,000

1 inch = 8 miles

ft
0 18,750 37,500

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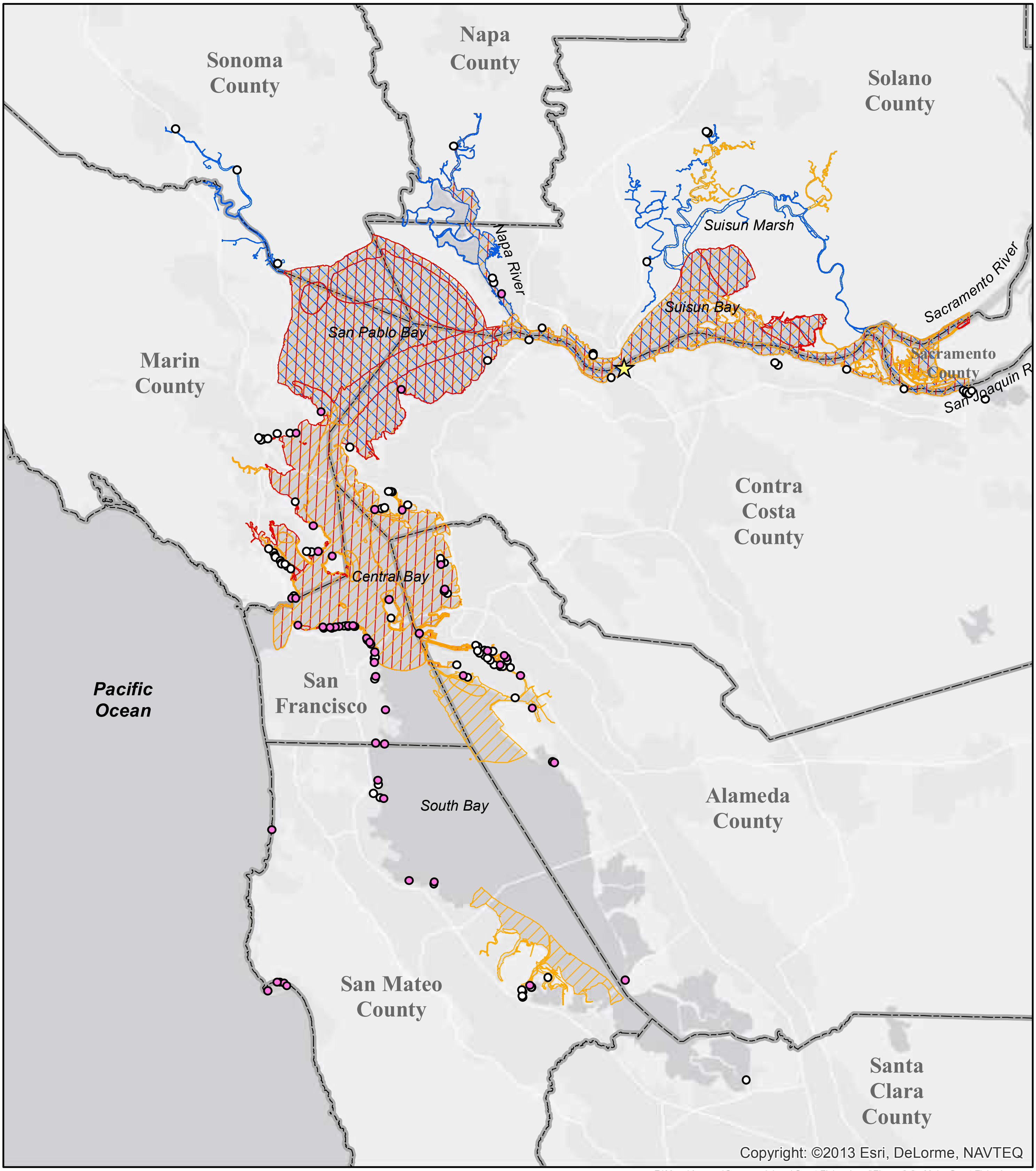

F:\Maps\Amorco\Commercial and Sport Fishery\mxd\Figure 6-2 - Major Sport Fisheries.mxd

Figure 6-2 Major Sport Fisheries

California State Lands Commission

Amorco Marine Oil Terminal Lease Consideration Project

TRC

10/8/2013

Legend

- Amorco Terminal Location
- Fishing Pier
- Marinas
- American Shad
- Striped Bass
- White Sturgeon

Fishing areas are found throughout the Bay.

DATA: 1998 NOAA Environmental Sensitivity Indexes

N

1:500,000

1 inch = 8 miles

0 18,750 37,500 ft

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Pacific Herring

Pacific herring is the last remaining commercial fishery within San Francisco Bay (Saving the Bay 2013). The San Francisco Bay Pacific herring harvest occurs during spawning season, generally from December through March, until quotas are filled. The focus of the herring harvest is the roe, which is exported to Japan. Fishing is conducted mainly with gillnets (CDFW regulations phased out use of round haul nets); and a few fishing interests use the roe-on-kelp method. Kelp is harvested from Monterey Bay and southern California and is hung from floating rafts or beneath piers in San Francisco Bay. Herring spawn on the kelp, which is then landed and processed (CDFG 2008).

San Francisco Bay produces from 90 to nearly 100 percent of the State's herring catch (CDFG 2008). Over the last 10+ years, most herring fishing has occurred in CDFW block 488 (Central Bay), according to the CDFW. However, herring spawn, and a portion of the fishery occurs, in the South Bay, especially during years with higher-than-normal rainfall (CSLC 2011a).

Herring fisheries are highly managed by the CDFW through the use of area closures, timing and gear restrictions, and quotas. Regulations change annually based on the previous year's estimates of spawning biomass. Currently, the CDFW allows harvest of about 10 to 15 percent of the herring that are expected to return to spawn (CDFG 2008). The San Francisco Bay Pacific sac-roe herring fishery experiences annual ups and downs (exceeding 20 million pounds landed in 1982, 1989, and 1997 but declining to just 362 thousand pounds in the 2004-2005 season), and was closed in the 2009 season (Saving the Bay 2013). The value of the sac-roe herring fishery peaked during the 1995-1996 season at 19.5 million dollars and has been steadily declining since. The fishing revenue from the 2006 harvest was just 426 thousand dollars (CDFG 2008). Lower harvests have typically occurred during or after El Niño events.

Other Fisheries

Small commercial fisheries also exist for finfish and shellfish, including white croaker, halibut, rockfish, salmon, shark, and Dungeness crab. San Francisco Bay is also a nursery area for Dungeness crab, an important ocean commercial and sport fishery north and south of San Francisco Bay. The Bay Institute reports that the number of young Dungeness crabs in the estuary is on the rise. The recent increase in abundance may be related to improved ocean conditions, as well as efforts to reduce pollution and restore tidal marsh habitat in San Francisco Bay (CSLC 2011a).

Sport Fisheries

San Francisco Bay supports a wide variety of fishes for sport fishing opportunities, including charter fishing, private boat fishing, pier fishing, and beach/shore fishing. The most popular game fishes caught in San Francisco Bay are striped bass and sturgeon. While most salmon fishing occurs in the ocean outside the Golden Gate, striped bass is caught throughout the estuary, and sturgeon fishing concentrates in San Pablo Bay, portions of the South Bay, and points east. American shad, surfperch, halibut, smelt, rockfishes, sharks, rays, clams, and others also offer fishing opportunities to Bay Area anglers (CSLC 2011a).

Between 1989 and 2003, the number of charter boats operating out of San Francisco Bay ranged from a high of 93 to a low of 44, averaging 59 over the 15 years. In 2003, 44 charter boats operated in San Francisco Bay and the Delta, the total number of anglers was 52,747, and a total of 150,031 fish were caught (CSLC 2011a).

In 2001 the California Department of Health Services and San Francisco Estuary Institute conducted a seafood-consumption study and surveyed anglers throughout the San Francisco Bay estuary. The results of the survey indicate that striped bass, halibut, and sturgeon are the most commonly consumed species of party and private boat anglers (SFEI 2001). Pier and shoreside anglers surveyed by the seafood-consumption study consumed a high percentage of striped bass similar to boating anglers, but ate higher percentages of white croaker and jacksmelt (SFEI 2001).

6.1.4 Outer Coast: Oregon Border to Mexico

Commercial and Sport Fisheries

Commercial fisheries are generally described using port landings for all ports in California, including those in Eureka, San Francisco, Monterey, Santa Barbara, Los Angeles, and San Diego. Collectively, these ports reported a total of 4.9 billion pounds of fish taken from 1989 through 2000 (CSLC 2011a). Based on the annual average, a similar amount (407 million pounds) was taken in 2011. Of this, approximately 65 percent was market squid (CDFG 2012a). For sport fisheries, in northern California a total of 72.9 million finfish were reported taken by surveyed anglers from shore, party boats, and private boats from 1989 to 2001 (CSLC 2011a), averaging approximately 6 million per year. For the same years in southern California, 163.7 million finfish were reported caught by surveyed anglers (CSLC 2011a), averaging approximately 13.6 million per year. In 2010, reported landings in northern and southern California were 484 thousand and 1.35 million, respectively (CDFG 2011b). In 2011, reported landings in northern and southern California were 666 thousand and 1.85 million, respectively (CDFG 2012b).

Marine Aquaculture and Kelp Harvesting

There are 41 registered marine aquaculture facilities along the California coast and marine aquaculture leases totaled 11 in 1998. As of 2001, seven kelp bed lessees leased 24 kelp beds totaling 32.56 square miles from Año Nuevo (San Mateo County) to San Diego (CSLC 2011a).

6.2 REGULATORY SETTING

This section describes the two general types of regulatory tools used to help ensure responsible human activities: Controls on human development and resource harvesting management.

The California State Lands Commission (CSLC) manages and protects important natural resources and uses on public lands, including tidelands. Commercial and recreational fishing, kelp harvesting, and aquaculture are all considered important uses by the CSLC. Permits are issued for development on tidelands, and mitigation is often required to help protect natural resources and access to those resources.

Coastal zone development is regulated by the San Francisco Bay Conservation and Development Commission (BCDC) and the California Coastal Commission (CCC), depending on the location. The BCDC develops and implements plans for the conservation and development of San Francisco Bay waters and regulates shoreline development, including commercial and recreational fishing facilities. The CCC, which has authority along the coast (excluding San Francisco Bay), helps ensure that the biological productivity of coastal resources is maintained, enhanced, and restored for commercial, recreational, scientific, and educational purposes. It ensures that onshore commercial and recreational fishing facilities are protected and, where feasible, upgraded.

National Oceanic and Atmospheric Administration (NOAA) Fisheries is responsible for protecting special-status species under the Endangered Species Act. Additionally, the CDFW, U.S. Fish and Wildlife Service, and U.S. Army Corps of Engineers have regulatory authority to manage development and ensure the protection of aquatic resources. The CDFW is responsible for enforcement of the State endangered species regulations and the protection and management of all State biological resources. The CDFW's Office of Spill Prevention and Response (OSPR) is also responsible for the State's spill response capability. The OSPR contracts oil spill response organizations to ensure available resources in accordance with the San Francisco Oil Spill Contingency Plan, and monitors these organizations' response capabilities through unannounced drills and other methods. Water quality management and the permitting of discharges into State waters are administered by the California Regional Water Quality Control Board (RWQCB) under the Porter-Cologne Act and the federal Clean Water Act.

Fisheries, aquaculture, and kelp harvesting are overseen by several State and federal agencies, including the CDFW, U.S. Department of Commerce, Pacific Fisheries Management Council (PFMC), and NOAA Fisheries. Fisheries are defined, by broad definition of the Federal Fishery Conservation and Management Act (FCMA), as fish, their habitat, and fishing activities. Salmon, groundfish, and pelagic fish species are managed under individual fisheries management plans authorized under the FCMA, the

Sustainable Fisheries Act, and the American Fisheries Act. Within California, most of the legislative authority over fisheries management is enacted within the Marine Life Management Act. This law directs the CDFW and the Fish and Game Commission to issue sport and commercial harvesting licenses, as well as licenses for aquaculture operations. The PFMC, a regional entity with representatives from the fishing industry, the public, and State and federal biological resource management agencies, imposes seasonal, geographic, and gear limitations to maintain healthy fisheries populations and prevent overfishing. If resources are adversely affected to the extent that productive habitat or populations are reduced, harvesting managers will likely respond by limiting harvests.

6.3 IMPACT ANALYSIS

6.3.1 Significance Criteria

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

- Reduce any fishery in San Francisco Bay, the Strait, or along the outer coast by 10 percent or more during a season, or reduce any fishery by 5 percent or more for more than one season
- Affect kelp and aquaculture harvest areas by 5 percent or more
- Cause lost harvesting opportunities due to harbor closures; impacts on living marine resources and habitat; and equipment or vessel loss, damage, or subsequent replacement
- Cause substantial or sustained impact to spawning habitat of commercially important species

6.3.2 Assessment Methodology

To determine the impacts associated with routine operations over the life of the CSLC lease, the following facts and assumptions were used.

- Over the last 5 years, tankers made, on average, 69 vessel calls per year, with a low of 53 in 2010 and a high of 85 in 2012. The anticipated level of shipment activity is not expected to change substantially over the 30-year life of the CSLC lease. The anticipated maximum of annual ship and barge traffic can be expected to range from approximately 60 to 90 vessels.
- Vessels will comply with the voluntary agreement made with the CDFW to maintain a minimum distance of 50 nautical miles offshore from the mainland for loaded crude oil tankers transiting between Alaska and California. Vessels will travel within established 1-mile-wide traffic lanes to San Francisco from the north, south, and west until entering the Precautionary Area where eastbound and westbound traffic

is merged west of the Golden Gate. Once inside the Precautionary Area, vessels will traverse through Regulated Navigational Areas (RNAs), the Carquinez Strait, and Bulls Head Channel on their way to and from the Amorco Terminal, as described in Section 2.0, Project Description and shown on Figure 2-5.

- A space-use conflict would arise when the space available to conduct an activity is limited and competing demands are made for the available space.
- The Amorco Terminal can accommodate vessels no longer than 941 feet.
- Fishing operators normally navigate a safe distance from an obstacle to avoid collision and entanglements.
- To maintain the required depth below mean lower low water, the shipping berth area would be periodically dredged over the 30-year life of the lease. The last dredging operation occurred in 2005 and removed approximately 500 yards of material.

6.3.3 Impacts Analysis and Mitigation Measures

The following subsections describe the Project's potential impacts on commercial and sport fisheries. Where impacts are determined to be significant, feasible mitigation measures (MMs) are described that would reduce or avoid the impact.

Proposed Project

Impact Commercial and Sport Fisheries (CS)-1: Cause space-use conflicts with commercial or recreational sport fisheries as a result of routine Amorco Terminal operations. (Less than significant.)

Amorco Terminal operations occur in CDFW block 308, and the prominent commercial fishery is the shrimp trawl fishery. The Carquinez Strait trawl grounds hug the south shore of the Carquinez Strait and their eastern terminus is the Benicia Bridge. Recreational sport fishing can occur at any location within the Bay-Delta. Boat and shoreside anglers target striped bass, leopard shark, sturgeon, flounder, and halibut. Routine Project operations are considered part of baseline conditions, are not expected to expand, and would not be expected to result in any temporary reduction of commercial or recreational sport fishing, result in lost harvesting time because of harbor closures, damage equipment or vessels, or cause impacts on living marine resources or habitat that would have a significant effect on either commercial or recreational sport fishing. At present, no kelp harvesting or aquaculture is conducted within the Bay-Delta, nor is any projected to occur in the foreseeable future. There would, therefore, be no impact to kelp harvesting or aquaculture.

Mitigation Measure: No mitigation required.

Impact CS-2: Cause space-use and navigation conflicts with commercial fisherman as a result of tanker and barge traffic to and from the Amorco Terminal. (Less than significant.)

Vessels in transit between the Amorco Terminal and the Pacific Ocean pass through active Pacific herring and bay shrimp fishing areas. All tankers and barges are restricted to existing navigation channels through San Francisco Bay and are required to cooperate with the U.S. Coast Guard (USCG) Vessel Traffic Service and pass through RNAs to reduce vessel congestion. They are restricted to the RNAs and established navigation channels while transiting San Francisco Bay. Commercial herring fishing occurs primarily in the South Bay and Central Bay. In the Central Bay, shipping corridors used by vessels calling at the Amorco Terminal pass through herring fishing areas around Angel Island, off Alcatraz, and along portions of the Tiburon shore. Over the past approximately 6 years, Tesoro Refining and Marketing Company, LLC (Tesoro) has had approximately six vessels lighter at Anchorage 9. In the South Bay, lightering operations at Anchorage 9 could continue to interfere with herring fishing operations. In the Central Bay and San Pablo Bay, vessels transiting to and from the Amorco Terminal would continue to pass through shrimp trawl grounds. Commercial fishing boats, primarily trawlers, are able to avoid any large vessels located within the shipping channel. The proposed Project would not result in any increases in vessel trips to and from the Amorco Terminal, so no additional navigational conflicts are anticipated over those that may have occurred in past years and are part of baseline conditions. Therefore, this impact would be less than significant.

Mitigation Measure: No mitigation required.

Impact CS-3: Cause space-use and navigational conflicts with recreational and sport fishing activities as a result of tanker and barge traffic to and from the Amorco Terminal. (Less than significant.)

Sport fishing navigational or space-use conflicts between recreational anglers (operating from either commercial party boats or private vessels) and the tankers and barges transiting between the Amorco Terminal and Pacific Ocean are expected to be minimal. Recreational fishing for starry flounder, shark, rockfish, sturgeon, halibut, striped bass, and American shad occurs from shore and both anchored and drifting boats, depending on the targeted fish species. Since no additional vessel trips are proposed by the Project, no additional conflicts with recreational fishermen are expected over what may have occurred in the past and are part of baseline conditions. Therefore, this impact would be less than significant.

Mitigation Measure: No mitigation required.

Impact CS-4: Cause substantial direct and/or indirect impacts on aquatic biota through the changing of physical and chemical environmental factors as a result of maintenance dredging. (Less than significant.)

Turbidity and suspended-sediment concentration (SSC) can be much greater than ambient conditions in the immediate vicinity of dredging activities. Increased turbidity increases light attenuation, which can reduce phytoplankton productivity, reduce the feeding of some fish species, and change feeding and migration patterns, while increased SSCs can bury the benthic community, reduce the water-filtration rates of filter feeders adjacent to the dredge area, or increase fish gill injury (NMFS 2004). Estimates of the amount of material that is resuspended during dredging range from 0 to 5 percent (Suedel et al*.* 2008). Dredging at the Amorco Terminal would potentially resuspend 25 cubic yards of sediment over the course of dredging activity. The majority of sediment resuspended during dredging activities resettles within 50 meters of the dredge site within 1 hour (Anchor Environmental 2003), though plume effects can be observed as far downstream as 400 meters (Clarke et al*.* 2007). Densities of suspended sediment over ambient levels decrease with distance from the dredge site and are more pronounced at the bottom of the water column than near the surface (Clarke et al*.* 2007). However, sediment plumes are unlikely to have lasting effects given the high background turbidity; in one study in San Pablo Bay, dredging plumes were found to have only a localized effect (Schoellhamer 2002). Resuspended sediments near the surface of the water column are expected to dissipate downstream, where they would not increase sediment significantly above ambient levels. Therefore, impacts from increased turbidity and increased SSC concentrations on pelagic species would be less than significant.

Dredging would remove the existing infauna community and alter the substrate composition and topography at the Amorco Terminal. Following the completion of dredging, the benthic community is expected to undergo typical ecological succession patterns. As previously described, the benthic community at any estuarine location is dependent on salinity levels. Following salinity-change events, it takes several months for the initial group of benthic organisms to settle and grow. Because freshwater flows into San Francisco Bay may change over the course of dredging, it is likely that the benthic community that forms in the dredged area would be composed of species with a different salinity affinity than those that were removed. However, a change in community composition would occur naturally in the absence of the dredging project due to the seasonal variation in salinity levels at the site. Therefore, this impact would be less than significant.

Indirect effects that are anticipated by dredging are the potential spread of nonindigenous species as a result of disturbing the benthic habitat. Dredging would create newly disturbed benthic habitat, making it attractive for settlement by opportunistic nonindigenous species. However, the benthic community at locations near the Amorco Terminal is composed of a mix of introduced and native species, and it is likely that the benthic community at the marine terminal is similarly composed. As early settlers on the site are recruited from the water column, it is likely that the benthic community that reforms would also be a mixture of native and introduced species. The benthic community that forms at the Amorco Terminal site is unlikely to differ substantially from the community that is present. Therefore, indirect impacts from dredging are expected to be less than significant.

Scheduled maintenance dredging is known sufficiently in advance and Tesoro continues to comply with applicable permits to ensure appropriate assessments are conducted prior to conducting maintenance-related dredging. Dredged spoils are tested and managed according to permits issued by jurisdictional agencies, including the CSLC, U.S. Army Corps of Engineers, BCDC, and San Francisco Bay RWQCB. Because disturbance from dredging operations is intermittent and impacts are temporary, impacts from routine maintenance dredging are anticipated to be less than significant.

Mitigation Measure: No mitigation required.

Impact CS-5: Cause impacts to commercial and recreational sport fisheries as a result of minor fuel, lubricant, and/or boat-related spills. (Less than significant.)

With continuing operation, the Amorco Terminal would remain a potential point location for minor fuel, lubricant, and other boat-related spills. Any uncaptured material would be dispersed into the waters around the Amorco Terminal, degrading the quality of the water column and benthic habitat in the vicinity of the Amorco Terminal. Though minor spills are not an occurrence of normal Project operations, they are reasonably foreseeable as a result of the Project.

Examples of past minor spills from the Amorco Terminal include the release of small amounts of diesel fuel from pipelines or transfer lines into the Strait, discharge of lubricating oil from docking vessels into the Strait, and the accidental release of hydraulic fluid from a boom during an oil spill drill (USCG 2013). In the State of California, any release or threatened release of a hazardous material must be reported to the local emergency response agency and to the California Emergency Management Agency. There is no minimum reporting quantity. All reported releases from the Amorco Terminal were minor, ranging from 7 drops of hydraulic fluid to 1 gallon of diesel. Minor spills are quickly cleaned up using vacuum trucks and absorbent pads to recover the material.

No significant adverse impacts are expected to fisheries from minor spills associated with the ongoing operation of the Amorco Terminal. Tesoro operators have a demonstrated history of quick containment response and reporting for small spills. Any minor amounts of contaminants that are released into the water would be quickly dispersed by the swift currents in the Strait such that concentrations of pollutants would not achieve the levels at which harm to aquatic species is observed.

Tesoro's operators use Consequences of Deviation Tables to monitor, compensate, and correct for operating parameters that deviate due to equipment failure, routine maintenance, feed variations, and other factors. The tables detail mechanical set-point criteria, consequences of deviation from the set point, and the operator response for instrument Critical Operating Limits (COL) and Process Operating Limits (POL). A COL/POL database for current unit operating limits is maintained on the Golden Eagle Intranet. Adherence to these operating ranges and consequences of deviation reduces the potential for minor spills from transfer of crude oil. Although impacts from minor spills are adverse, they are not expected to have a significant effect on fisheries near the Amorco Terminal.

Mitigation Measure: No mitigation required.

Impact CS-6: Cause impacts to commercial and recreational sport fisheries as a result of major fuel, lubricant, and/or boat-related spills. (Significant and unavoidable.)

Shrimp, herring, and sport fisheries in the Central Bay, North Bay, San Pablo Bay, Carquinez Strait, Napa River, and Honker Bay are at highest risk of spill contamination. The Carquinez Strait and Suisun Bay is a migratory corridor and feeding/rearing area for many different sport fish species, including striped bass, sturgeon, and salmon. In addition, San Francisco Bay marinas, launch ramps, and fishing access points may be threatened, contaminated, or closed. Impacts from spills would depend on the quantity spilled. Whereas light oils such as fuel oil are acutely toxic and cause the greatest impacts to species that live in the upper water column, most crude oils that would be delivered to the Amorco Terminal do not mix well with water and can cause severe, long-term contamination to intertidal areas and cause oiling of fishery infrastructures. Heavy oils such as heavy crude weather slowly and may cause severe long-term contamination of intertidal areas and sediments. Depending on the weight of the oil, spills may harden and wash up along the shoreline.

Crude oils contain a large proportion of highly persistent tar-like compounds. Volatile components of crude oil stock disappear over a few days, but the heavier fractions form an emulsion with sea water (called "mousse"), which allows greater dispersal of oil. Some fraction of crude oil will aggregate into tarballs or mats. The more exposed to the elements oil is, the more rapidly it weathers. The heaviest oils may sink in the water, contaminating the water column and being forced by tidal waves into the substrate. Buried oils are not weathered.

Fish can be killed or injured from contact with oil spills. The susceptibility of fish to a spill depends on its growth stage, feeding behavior, and the type of oil. Juvenile fish and bay shrimp that use shallow or near-surface waters are susceptible to acute toxicity from lighter oils, while fish that swim lower in the water column, such as salmon and sturgeon, are less likely to come in direct contact with oil. Fish may come into direct contact with oil, thus contaminating their gills; they may absorb toxic components of oil through their skin; and they may suffer adverse effects from eating contaminated food. Substrate that herring use for spawning could become oiled by a large spill. Oil from the Cosco Busan container ship spill in 2007 was listed as one of several factors that may have contributed to the steep decline in herring that led to the closure of the fishery in 2009 (Saving the Bay 2013).

Oil Spill Modeling

As presented in Section 4.1, Operational Safety/Risk of Accidents, the average most probable and maximum most probable spills for crude oil shipped through the Amorco Terminal were modeled.

Results of these models indicate that while spills at or near the Amorco Terminal have the potential to travel through Carquinez Strait into San Pablo Bay and into Suisun Bay and its associated marshes, the highest probability of contact with oil occurs within the direct vicinity of the Amorco Terminal. The trajectory of the spill and the extent of its distribution vary seasonally. A spill in winter during the flooding season would be carried by heavy Delta outflows into San Pablo Bay, oiling shorelines and facilities along the Carquinez Strait. During the dry summer months, spills are carried upstream along tidal currents and dispersed by wind into Suisun Bay.

Table 4.2-10 in Section 4.2, Biological Resources shows the biomass of fish and invertebrates that would be impacted from a modeled spill at a Martinez wharf (ASA 2009).

Significant adverse impacts to commercial and sports fisheries would result from oil spill accidents originating at the Amorco Terminal or from transiting tankers going to the Amorco Terminal. The number and type of species impacted by an oil spill depends on the season in which the spill occurs. Table 4.2-11 in Section 4.2, Biological Resources shows fish species that are more than 50 percent likely to be impacted by an oil spill during summer and winter scenarios. As seen in the table, most recreational sport fishes, as well as commercial bay shrimp, would be susceptible to impact from a spill throughout the year.

In addition to the mitigation measures presented below, implementation of MMs OS-1a, OS-1b, OS1-c, OS-4a, and OS-4b (refer to Section 4.1, Operational Safety/Risk of Accidents) and MMs BIO-6a through BIO-6c (refer to Section 4.2, Biological Resources) would reduce impacts to commercial and sport fisheries resources.

Mitigation Measures:

MM CS-6a: Tesoro shall post notices to warn fishing interests of a spill. In the event of an Amorco Terminal or associated vessel spill, Tesoro shall post notices at spill sites, marinas, launch ramps, and fishing access points to warn fishing interests of locations of contaminated sites. Notices shall be written in English and Spanish, and be posted in areas most likely to be seen by fishing interests.

MM CS-6b: Tesoro shall provide compensation for damages from a spill. If damages to fishing operations or related businesses are determined by State, federal, or local authorities to be caused by Tesoro, financial compensation shall be provided by Tesoro as determined by the authorities. Any losses shall be documented as soon as possible after a spill, using methods for determining damages established beforehand. Response for damage losses should include provisions for compensating operators and businesses as soon as possible.

Impact CS-7: Cause impacts to commercial and sport fisheries as a result of the introduction of additional invasive non-native species from international vessels visiting the Amorco Terminal. (Significant and unavoidable.)

The San Francisco Bay and Delta region is among the most invaded aquatic ecosystems in North America. Since 1970, the rate of invasion has been one new species every 24 weeks (Cohen and Carlton 1995). In some parts of the estuary, including Suisun Bay, introduced species account for the majority of species diversity. Introduced species have the potential to dominate the estuary’s food webs and may result in profound structural changes to habitat. The results from introductions of species into new habitats are highly unpredictable, and can range from being presumed beneficial to being highly damaging. The striped bass is itself an introduced species, and it continues as an important recreational species. One of the most destructive invasive species is the overbite clam, *Corbula amurensis*. Thought to have been introduced in San Francisco Bay by ballast water exchange from a cargo ship, this phytoplankton-consuming species is now so abundant that the current population is capable of filtering the estuary’s water column several times a day and has caused a crash in the abundance of phytoplankton in San Francisco Bay (SFEP 2004). *Corbula* has overgrazed San Francisco Bay’s phytoplankton, which young fish rely on for food, and caused a cascade of ecosystem events that has contributed to the decline of all fish species in San Francisco Bay.

The California Aquatic Invasive Species Management Plan identifies commercial shipping as the most important vector for the introduction of aquatic invasive species (OSPR 2008). Commercial ships introduce aquatic invasive species through ballast water exchange or vessel biofouling. These vector routes are addressed in Section 4.2, Biological Resources, and summarized below.

Ballast Water Exchange

In commercial ships, ballast water is taken on in large enough quantities that it is able to support a host of marine species, from plankton to fish, during their relatively long transit times in ballast. Ballast water is, therefore, capable of transporting live aquatic species halfway around the world.

Under the National Invasive Species Act of 1996, the USCG established regulations and guidelines to prevent the introduction of aquatic invasive species from ballast water discharge. At the State level, the CSLC is the lead implementing agency for the State's ballast water management program. As directed by the Marine Invasive Species Act of 2003, the CSLC formulated recommendations to regulate ballast water discharge for vessels operating in State waters. All vessels coming into California from outside the exclusive economic zone are required to submit ballast-water reports to the CSLC that include information about port of origin, how the ballast water was managed, and how much ballast water was discharged.

Compliance with ballast water management requirements in California is extremely high. Between July 2010 and June 2012, 97 percent of forms were submitted as required. The primary vessel-reported practice for ballast water management is retention on board, which is considered the most protective management strategy (CSLC 2013e). Vessels moored at the Amorco Terminal discharge treated ballast water to San Francisco Bay under the terms of the Vessel General Permit and USCG regulatory guidelines, as well as State performance standards for discharge. Many of the vessels visiting the Amorco Terminal receive exemptions from USCG ballast-water treatment standards; however, the Vessel General Permit and State programs do not exempt these vessels from performance standards.

Vessel Biofouling

Many marine organisms that have a sessile life stage in which they are attached to hard substrata can readily colonize ships' hulls or niche areas. The most common fouling organisms are barnacles, but mussels, seaweed, anemones, and sea squirts can also attach themselves to ships' hulls (OSPR 2008). Shrimps, worms, and sea snails can hide in the crevices created by colonies of barnacles and mussels. Fouling organisms are then transported into new environments where they may be transferred from the ship into the new environment by spawning, detachment, or mechanical removal.

Fouling by commercial ships is one of the primary routes through which nonindigenous aquatic species are introduced to the estuary. The CSLC states that all vessels pose some level of risk from biofouling (CSLC 2013e). Beginning in 2008, the CSLC required vessels operating in State waters to submit an annual Hull Husbandry Reporting Form.

Tesoro has no control over, ownership of, or authority to direct vessels that would dock at its marine terminal; therefore, specific details of how vessels manage biofouling cannot be provided as part of the Project (refer to Section 2.0, Project Description). The vessels would be governed by the applicable CSLC standards for biofouling management, which would reduce the potential impact of aquatic species invasion from biofouling.

Under MMs BIO-7a and BIO-7b, Tesoro will ensure that vessels seeking to call at the marine terminal are advised of California's Marine Invasive Species Act and are submitting forms as required by the CSLC, and will be required to provide a share of the funding for actions related to non-indigenous aquatic species. However, the impact of introducing new non-native and invasive species via ballast water and hull fouling in the San Francisco Bay and Delta could potentially be so devastating that even a reduced risk has the potential to cause a significant and unavoidable adverse impacts to commercial and recreational sport fisheries.

Mitigation Measures: No additional mitigation measures available.

Impact CS-8: Cause degradation of Bay-Delta waters from vessel hull antifouling paint. (Less than significant.)

Antifouling paint from tankers and barges using the Amorco Terminal may contribute to the contaminant loading of Bay-Delta waters and sediments. The amount of contaminant material originating from vessels using the Amorco Terminal is assumed to be relatively small and lower than other known sources of similar contaminants to San Francisco Bay, such as the ports of Oakland and San Francisco and the nearby mothballed merchant marine fleet. As a result, any contaminants that might originate from the continued use of the Amorco Terminal are not expected to affect fish species targeted by commercial or recreational fishermen. Therefore, this impact would be less than significant.

Mitigation Measure: No mitigation required.

Alternative 1: No Project

Impact CS-9: Cause impacts to the San Francisco Bay estuary and associated biota resulting from the decommissioning and abandoning in place of existing structures. (Significant and unavoidable.)

As described in Section 3.3, the Amorco Terminal lease would not be renewed, and the Amorco Terminal would be decommissioned and either abandoned in place or partially or completely removed. Decommissioning and/or deconstruction of the Amorco Terminal would cause temporary disturbance to fisheries habitat and nearby sport fishing resulting in short-term adverse, but less than significant impacts. In the long term, fisheries habitat would likely be reclaimed and more area would likely open up for sport fishing, resulting in a beneficial impact.

Crude oil vessel traffic would most likely be transitioned to the nearby Avon Terminal, so there would be little reduction in crude oil tanker traffic transiting the estuary. Thus, there would be no overall reduction in shipping noise, and the risk of hazards from an oil spill and from the introduction of nonindigenous aquatic species introduced via ballast water and hull fouling would be shifted upstream rather than reduced, and the potential impact to the San Francisco Bay estuary and associated biota would be continue to be significant and unavoidable.

Mitigation Measure: No mitigation measures available.

Impact CS-10: Cause impacts to the San Francisco Bay estuary and associated biota resulting from the partial or complete removal of Amorco Terminal structures. (Potentially significant.)

Construction activities associated with partial or complete removal of the Amorco Terminal would cause temporary disturbances to habitat and wildlife that inhabit the Carquinez Strait. Removal of Amorco Terminal structures would result in physical harm or injury to individuals and increased levels of noise that could cause harm to fish and wildlife. Depending on construction timing, noise levels could also impede fish migration. Work that disturbs the channel bottom could release contaminated sediments from the channel floor with potential adverse effects to wildlife. Beneficially, removal of the Amorco Terminal structures would result in a small but probably insignificant lessening of night lights along the Carquinez Strait. Mitigation would be required to ensure that removal of the Amorco Terminal structures was conducted to reduce adverse impacts to habitat and species. Any Amorco Terminal-removal projects would be subject to regulation under existing State and federal regulations, at which point environmental review would be conducted and mitigation measures developed to ensure that the project was in compliance with relevant regulations.

Alternative 2: Imported Crude Supplies from Non-marine Sources

Impact CS-11: Cause impacts to the San Francisco Bay Region and associated biota by decommissioning and removing the Amorco Terminal and shifting crude oil imports to overland transport. (Less than significant.)

Under this alternative, the Amorco Terminal would not be in use, and crude oil would be transported overland through a combination of rail, tanker, and pipelines to the Golden Eagle Refinery. Decommissioning and removing the Amorco Terminal would result in the same level of impacts as the No Project Alternative. However, the overall number of vessels transiting the estuary would be reduced, with a reduction of shipping and the potential for major oil spill or introduction of nonindigenous aquatic species via ballast water or hull fouling, resulting in a beneficial impact to commercial and sport fishing.

Cumulative Impact Analysis

The geographic context for analysis of cumulative impacts to commercial and sport fishery resources includes the San Francisco-San Pablo Bay region, Carquinez Strait, and the outer coast of California. Impacts to commercial and sport fishery resources from the Project that are less than significant may become significant when combined with impacts from related projects in the region. This analysis identifies cumulative impacts and evaluates whether the incremental contribution of the Project to a cumulative impact would be considerable.

Impact CUM-CS-1: Cause cumulative adverse impacts to commercial and sport fishery resources through space-use conflicts as result of routine Amorco Terminal operations. (Less than significant.)

Operations at the Amorco Terminal would continue in conjunction with those of nearby marine oil terminals and marinas. Marine vessels transiting through the Carquinez Strait would continue to use established shipping channels. Terminal uses and the use of shipping channels precludes access to fishing areas, but also concentrates land uses and vessel traffic so other areas are available for fishing. The Project contributes to the cumulative impact caused by space-use conflicts. The number of vessels visiting the Amorco Terminal is less than 1 percent of vessel traffic in the San Francisco region and the Amorco Terminal is located within an industrial zone; therefore, the incremental contribution of the Project is not cumulatively considerable.

Mitigation Measure: No mitigation required.

Impact CUM-CS-2: Cause cumulative impacts to San Francisco Bay estuary and associated biota from oil spills from all marine oil terminals combined, or from all tankering combined. (Significant and unavoidable.)

A major oil spill at the Amorco Terminal or from vessels visiting the Amorco Terminal would potentially affect a wide range of marine and terrestrial biological resources. As discussed in Section 4.1, Operation Safety/Risk of Accidents, operations associated with the Amorco Terminal contribute incrementally to the cumulative risk of an oil spill. Vessel traffic associated with the Amorco Terminal is approximately 4.7 percent of the total probability of a spill from tanker and tank barge traffic in San Francisco Bay. Among the facilities with potential to contribute to the accidental release of petroleum products are the Chevron Richmond Refinery Long Wharf Terminal, Tesoro Avon Marine Terminal, and the Plains All American Martinez Marine Terminal. As discussed in Impact CS-6, major spills of fuel, crude oil, or other materials can be expected to have serious adverse effects on commercial and recreational fishing interests. Fish species could be directly impacted and fisheries infrastructures would be threatened by a major spill. Two major spills into the San Francisco Bay from different sources within the same season would cause even greater adverse impacts to the fisheries and habitats. MMs BIO-6a through BIO-6c collectively aid in the prevention and cleanup of accidental releases of oil spills. Mitigation Measures CS-6a and CS-6b provide for notification to fishing interest and compensation for damage from a spill; however, a major spill could have a residual impact following spill response and cleanup. Therefore, the impact would be cumulatively considerable and significant cumulative impacts would occur from implementation of the Project.

Mitigation Measure: No additional mitigation measures available.

Impact CUM-CS-3: Cause cumulative impacts by increasing the risk of introduction of nonindigenous aquatic species from vessel traffic to San Francisco Bay. (Significant and unavoidable).

The California Ballast Water Management for Control of Nonindigenous Species Act of 1999, as revised and reauthorized by the Marine Invasive Species Act of 2003, and California Public Resources Code sections 71200 to 712717 specify required ballast water and vessel biofouling management practices. These laws and associated regulations were developed to prevent future introduction of nonindigenous species to San Francisco Bay-Delta waters. Prior to the introduction of these management practices, however, a considerable number of nonindigenous species were introduced into the San Francisco Bay-Delta, resulting in a realignment of the biotic communities in San Francisco Bay. All commercial vessel traffic to San Francisco Bay has the potential to introduce nonindigenous aquatic species. Although vessels that call at the Amorco Terminal are required to comply with federal and State provisions, compliance with the current regulations is not enough to ensure full mitigation of this impact. Thus, significant cumulative impacts would occur.

Mitigation Measures: No mitigation measures available.

6.4 SUMMARY OF FINDINGS

Table 6-1 includes a summary of anticipated impacts to commercial and sport fisheries and associated mitigation measures.

Table 6-1: Summary of Commercial and Sport Fisheries Impacts and Mitigation Measures

Impact	Mitigation Measure(s)
Proposed Project	
CS-1: Cause space-use conflicts with commercial or recreational sport fisheries as a result of routine Amorco Terminal operations	No mitigation required.
CS-2: Cause space-use and navigation conflicts with commercial fisherman as a result of tanker and barge traffic to and from the Amorco Terminal	No mitigation required.
CS-3: Cause space-use and navigational conflicts with recreational and sport fishing activities as a result of tanker and barge traffic to and from the Amorco Terminal	No mitigation required.
CS-4: Cause substantial direct and/or indirect impacts on aquatic biota through the changing of physical and chemical environmental factors as a result of maintenance dredging	No mitigation required.
CS-5: Cause impacts to commercial and recreational sport fisheries as a result of minor fuel, lubricant, and/or boat-related spills	No mitigation required.
CS-6: Cause impacts to commercial and recreational sport fisheries as a result of major fuel, lubricant, and/or boat-related spills	MM CS-6a: Tesoro shall post notices to warn fishing interests of a spill. MM CS-6b: Tesoro shall provide compensation for damages from a spill.

Impact	Mitigation Measure(s)
Proposed Project	
CS-7: Cause impacts to commercial and sport fisheries as a result of the introduction of additional invasive non-native species from international vessels visiting the Amorco Terminal	No additional mitigation measures available. (Refer to MMs BIO-7a and BIO-7b.)
CS-8: Cause degradation of Bay-Delta waters from vessel hull antifouling paint	No mitigation required.
Alternative 1: No Project	
CS-9: Cause impacts to the San Francisco Bay estuary and associated biota resulting from the decommissioning and abandoning in place of existing structures	No mitigation measures available.
CS-10: Cause impacts to the San Francisco Bay estuary and associated biota resulting from the partial or complete removal of Amorco Terminal structures	Should this alternative be selected, mitigation measures would be determined during a separate environmental review under CEQA.
Alternative 2: Imported Crude Supplies from Non-marine Sources	
CS-11: Cause impacts to the San Francisco Bay Region and associated biota by decommissioning and removing the Amorco Terminal and shifting crude oil imports to overland transport	Should this alternative be selected, mitigation measures would be determined during a separate environmental review under CEQA.
Cumulative Impacts	
CUM-CS-1: Cause cumulative adverse impacts to commercial and sport fishery resources through space-use conflicts as result of routine Amorco Terminal operations	No mitigation required.
CUM-CS-2: Cause cumulative impacts to San Francisco Bay estuary and associated biota from oil spills from all marine oil terminals combined, or from all tankering combined	No additional mitigation measures available. (Refer to MMs BIO-6a through BIO-6c, CS-6a, and CS-6b.)
CUM-CS-3: Cause cumulative impacts by increasing the risk of introduction of nonindigenous aquatic species from vessel traffic to San Francisco Bay	No mitigation measures available.

7.0 SOCIOECONOMICS AND ENVIRONMENTAL JUSTICE

Section 7.0 addresses socioeconomic and environmental justice issues associated with the proposed Amorco Marine Oil Terminal (Amorco Terminal) Lease Consideration Project (Project), which would involve granting a new 30-year lease for Amorco Terminal operations.

7.1 SOCIOECONOMIC EFFECTS

This section presents the socioeconomic analysis for the proposed Project. The regional and local population and existing economic conditions are presented, followed by a discussion of the contribution that the Amorco Terminal makes to the regional and local economies. Impacts on socioeconomics from the proposed Project and alternatives are then presented. The level of impact of Amorco Terminal operations to the local and regional economy is also assessed.

7.1.1 Analysis and Conditions

Population

Table 7-1 summarizes Contra Costa County demographics from the 2000 and 2010 census. It also shows the demographics for the Project area, which is located in the City of Martinez. The county's population growth rate from 2000 through 2010 was 11 percent. During the same time period, housing increased by 44,338 units or 13 percent. Employment increased by 21 percent from 2000 through 2010.

Table 7-1: Demographic Characteristics for Contra Costa County and the City of Martinez

Characteristic	2000	2010	2000 to 2010	
			Change	Percent
Total Population				
Martinez	35,866	35,824	-42	-0.1
Contra Costa County	948,816	1,049,025	100,209	11
Housing Units				
Martinez	14,597	14,976	379	3
Contra Costa County	354,577	398,915	44,338	13
Employed				
Martinez	19,950	20,196	246	1
Contra Costa County	451,357	546,316	94,959	21

Source: U.S. Census 2000 and 2010

Employment

As shown in Table 7-2, between 2000 and 2010, employment in Contra Costa County grew by 21 percent. Table 7-2 shows employment in Contra Costa County by major industry. The construction sector experienced the most job growth, with a 4 percent increase in employment between 2000 and 2010. The categories of manufacturing, transportation (including communications and utilities), and wholesale and retail trade industries decreased in the number of jobs. The decreases ranged from 0.3 to 4.4 percent.

Table 7-2: Contra Costa County Employment by Industrial Sector

Industry Sector	2000	2010	2000 to 2010	
			Change	Percent
Agriculture, Forestry, Fisheries, and Mining	2,311	2,699	388	1.7
Construction	34,403	35,919	1,516	4
Manufacturing	38,281	34,917	-3,364	-0.9
Transportation, Communications, and Utilities	45,283	25,187	-20,096	-4.4
Wholesale and Retail Trade	69,052	67,102	-1,950	-0.3
Finance, Insurance, and Real Estate	47,361	48,139	778	0.2
Services (professional, educational, management)	195,863	197,180	1,317	0.07
Public Administration	18,803	20,910	2,107	1.1
Total	451,357	432,053	-19,304	-0.4

Source: U.S. Census 2000 and 2010

Amorco Marine Oil Terminal Contribution to the Economy

The Amorco Terminal is located on the Carquinez Strait, approximately 0.25 mile west of the Benicia-Martinez Bridge, in the city of Martinez, Contra Costa County (see Figure 2-1 in Section 2.0, Project Description). The Amorco Terminal operates on 14.9 acres of public land leased from CSLC. Tesoro's associated Amorco Tank Farm, located approximately 0.3 mile south of the Amorco Terminal on 35.7 acres of Tesoro-owned property, is used to store product. The Amorco Terminal operates as an import-only facility for crude oil, although it has the capability to export crude oil or other heavy petroleum products (and in the past has been used in this capacity). The facility allows waterborne vessels to berth and moor, and supports the required equipment to transfer product, namely crude oil, between vessels and onshore storage tanks, otherwise known as unloading.

Present operations at the Amorco Terminal involve the transfer of crude oil from tanker vessels to Tesoro's Amorco Tank Farm, from which the oil is eventually piped to Tesoro's

Golden Eagle Refinery (Refinery). Equipment throughout the facility is controlled by both manual operators and automatic control systems. Marine 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 Amorco Terminal is capable of operating 365 days per year, 24 hours per day.

A minimum of two personnel are required to be on duty during marine transfer operations, the Amorco Terminal Person-in-Charge 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 Refinery typically receives approximately 150,000 barrels per day of crude oil import from waterborne and land-based sources. As presented over the last 5 years in Table 2-2 (see Section 2.0, Project Description), Amorco facilities have handled approximately 30 to 50 percent of the petroleum products received at the Refinery. Anticipated use of the Amorco Terminal for operations in the immediate future ranges from approximately 37 to 55 percent of the petroleum products received at the Refinery. As such, the Amorco Terminal provides a key amenity for the Refinery's future operation.

7.1.2 Regulatory Setting

There are no regulatory requirements that apply to socioeconomics.

7.1.3 Impact Significance Criteria

Impacts were considered to be significant if the proposed Project or any alternatives would:

- result in a substantial decrease in the employment and economic base of the City of Martinez, Contra Costa County, or Amorco Terminal;
- induce substantial growth or concentration of population, or displace a large number of people; or
- have a potential to impact the local or regional economy due to spills of petroleum products.

7.1.4 Impact Analysis and Mitigation

Proposed Project

The Project would enable continued operation of the facility at its existing service level and, therefore, would result in no changes in the employment or economic activity level. Consequently, the Project would have no impact to either the local or countywide economy.

Given the Project's absence of a job increase or new development that displaces any local residents, the Project would have no growth effects to the local or Contra Costa County economy. The only potentially significant economic effects that might be associated with the Project would be potential indirect adverse economic effects that might result from petroleum product spill effects to local physical resources. The indirect economic effects are analyzed below.

Effects of Future Petroleum Product Spills

Extensive analysis and discussion of the potential resource impacts from the effect of an accidental release of petroleum products at or near the Amorco Terminal are presented elsewhere in this Environmental Impact Report (EIR). The Project's spill risk is analyzed in Section 4.1, Operational Safety/Risk of Accidents. The location and severity of any such accidental spill would determine the nature, location, and severity of any related environmental effects, and the analysis has accordingly modeled a variety of future spill scenarios. The resource-specific potential impacts are discussed in detail under their appropriate resource sections.

While there is no guarantee against accidental upset conditions, appropriate preventative measures combined with the faculty to provide swift responses in the event of a release can minimize the potential impacts, depending on the size of the spill. Operational safety measures are also discussed in Section 4.1, Operational Safety/Risk of Accidents, of this document. Adherence to the requirements of the Oil Spill Response Plan and other operational safety measures as required by local, State, and federal regulations would reduce the potential impact to the greatest extent practical. However, there remains a significant and unavoidable adverse environmental impact associated with the possibility of a large spill (i.e., more than 50 barrels of petroleum product) somewhere within the San Francisco Bay. Given the unknown specifics of any such accident, the nature and location of any such event's physical impacts are indeterminate. However, in any case, the duration of almost any major accident is nonetheless relatively short term.

The economic activity for the local and regional economy associated with any of the resource areas that might be potentially affected depends on the size of the spill. Future spill impacts would be temporary. For example, the recreation and commercial fishing activity within the Amorco Terminal vicinity or greater region that would be potentially impacted by a Project-related spill event would be relatively limited. Furthermore, the recreation and commercial fishing activity could relocate to other recreational or fishery locations for the relatively short duration of the spill event. As discussed in more detail in Section 4.8, Land Use and Recreation, local recreation is minimal and hence generates negligible revenues and employment for the local or County economy. Similarly, Section 6.0, Commercial and Sport Fisheries, also details the extent of commercial and sport fishing activity in the Amorco Terminal vicinity. While these activities generate greater employment and revenues, their magnitude is very small, especially compared to the employment and revenues of the other industry sectors (such as Services, Manufacturing, and Trade) which play a far greater economic role in the local and Contra Costa County economy.

As a result, given the relatively minor role of the indirect economic effects associated with any of the potentially affected resource areas, and that most of the Project-related effects are projected to be less than significant, the resulting overall socioeconomic impact is projected to be less than significant.

No Project Alternative

Under the No Project Alternative, Tesoro's Amorco Terminal lease would not be renewed and the existing Amorco Terminal would be subsequently decommissioned with its components abandoned in place, removed, or a combination thereof. Under the No Project Alternative, crude oil would continue to be imported and exported through Tesoro's Avon Marine Oil Terminal; however, the daily throughput capacity for the Refinery would be reduced, at least temporarily, as a result of shutting down the Amorco Terminal import operations.

It is likely that under the No Project Alternative, Tesoro would pursue transitioning the Avon Marine Oil Terminal to absorb import operations from the Amorco Terminal, thereby increasing the throughput at the Avon Marine Oil Terminal to the Refinery to meet regional refining demands. Tesoro's Avon Marine Oil Terminal is capable of operating as both an import and export facility, and similar to the proposed Project, is currently subject to CEQA evaluation for a new 30-year lease of sovereign land to continue its operations. In addition, Tesoro may consider alternative means of traditional crude oil transportation such as a pipeline and/or rail transportation. Pipeline delivery may require construction of new pipelines and/or the purchase of existing pipeline capacity from other local petroleum refinery competitors.

The cessation of operations at the existing Amorco Terminal site would reduce the potential for accidental spills and upset conditions to occur at the Project site. However, with increased operations at other terminals, the potential impacts would likely remain relatively similar to those of existing conditions. Other terminals have similar regulatory compliance requirements as the proposed Project, which would maintain potential impacts to less-than-significant levels.

While closure of the Amorco Terminal might have the beneficial effect of reducing the risks of accidental spill impacts occurring locally, closure of the Amorco Terminal operations would eliminate the employment and revenue benefits that it generates for the local economy. However, the analysis presumes that most of any "displaced" petroleum product transfers would be relocated to another marine terminal in the region. Consequently, the identified risk reduction benefits are expected to be minimal, and the Amorco Terminal's lost employment and revenues benefits would be similarly transferred to another marine terminal facility. In any case, the resulting socioeconomic impact is projected to be less than significant.

Restricted Lease Taking Amorco Out of Service for Oil Transport Alternative

Under this alternative, Tesoro's Amorco Terminal lease would be renewed with modification to restrict its allowed use such that the existing Terminal would be left in place, taken out of service and placed into caretaker status for any petroleum product transfer, and not decommissioned or demolished. No environmental impacts would be associated with these activities. Because the structure of the Amorco Terminal would remain in place, Tesoro would retain the option to apply to bring it back into service for oil transport at some time in the future, should the need arise. Any future change in use of the Amorco Terminal would require a lease action and potential separate CEQA review by the CSLC.

This alternative would have the same type of socioeconomic effects as those identified for the proposed Project, although the magnitude of the effects would be correspondingly diminished. While the lesser risk of accidental spill impacts would be beneficial, limits on future Amorco Terminal operations would reduce employment and revenue benefits that the Amorco Terminal generates for the local economy. However, the analysis presumes that most of any "displaced" product transfers would be relocated to a nearby alternative facility. In any case, the resulting socioeconomic impact is projected to be less than significant.

7.1.5 Cumulative Projects Analysis

As discussed above, the only socioeconomic impacts associated with the Project are the indirect effects associated with the potential petroleum product spill impacts to local physical resources. Consequently, only the related cumulative impacts associated with potential spills would have the potential to result in cumulative socioeconomic impacts. The past, current, and foreseeable projects are identified in Section 3.0, Alternatives and Cumulative Projects.

According to Section 4.1, Operational Safety/Risk of Accidents, the cumulative impact of these other projects in conjunction with the Project would represent a significant and unavoidable adverse effect of the Project.

However, the adverse impact is an unavoidable aspect of the Amorco Terminal and Onshore Oil Terminal facilities' function by which it generates its positive direct economic impacts (i.e., generating the Amorco Terminal revenues and employment) as well as the indirect benefits of helping to meet the regional fuel and energy demand. Furthermore, demand for the oil product is independent of the Project and is expected to remain irrespective of whether the Project is approved. If the Project is not approved, the Amorco Terminal transfer activities would likely be relocated elsewhere in the region and would entail a comparable degree of major spill risk. As a result, approval or closure of the Amorco Terminal would not be expected to appreciably change the overall total likelihood or magnitude of any major spill and any resulting economic impacts. Consequently, the Project would have a less-than-significant cumulative contribution to any potential adverse socioeconomic cumulative impacts that might be associated with Amorco Terminal operations.

7.2 ENVIRONMENTAL JUSTICE

This section discusses the distributional patterns of high-minority and low-income populations on a regional basis and characterizes the distribution of such populations adjacent to the Project. This discussion focuses on whether the Project has the potential to affect area(s) of high-minority population(s) and low-income communities, thus creating an inconsistency with the intent of the California State Lands Commission (CSLC) Environmental Justice policy. An inconsistency with the CSLC Environmental Justice policy would occur if the Project would:

- Have a potential to disproportionately impact minority and/or low-income populations at levels exceeding the corresponding medians for Contra Costa County, where the Project is located; and/or
- Result in a substantial disproportionate decrease in the employment and economic base of minority and/or low-income populations residing in Contra Costa County and/or immediately surrounding cities.

7.2.1 Background

Federal

On February 11, 1994, President Clinton issued an “Executive Order on Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations” designed to focus attention on environmental and human health conditions in areas of high minority populations and low-income communities, and promote non-discrimination in programs and projects substantially affecting human health and the environment. The order requires the U.S. Environmental Protection Agency (USEPA) and all other federal agencies (and state agencies receiving federal funds) to develop strategies to address this issue. The agencies are required to identify and address any disproportionately high and adverse human health or environmental effects of their programs, policies, and activities on minority and/or low-income populations.

In 1997, the USEPA’s Office of Environmental Justice released the *Environmental Justice Implementation Plan*, supplementing the USEPA environmental justice strategy and providing a framework for developing specific plans and guidance for implementing Executive Order 12898. Federal agencies received a framework for the assessment of environmental justice in the USEPA’s *Guidance for Incorporating Environmental Justice*

Concerns in EPA's NEPA Compliance Analysis in 1998. This approach emphasizes the importance of selecting an analytical process appropriate to the unique circumstances of the potentially affected community.

State

While many state agencies have used the USEPA's Environmental Justice Implementation Plan as a basis for the development of their own environmental justice strategies and policies, the majority of California State agencies do not have guidance for incorporation of the environmental justice impact assessment into California Environmental Quality Act (CEQA) analysis. The California Air Resources Board (CARB) has, for example, examined this issue and has received advice from legal counsel, by a memorandum entitled "CEQA and Environmental Justice," which states, in part, "For the reasons set forth below, we will conclude that CEQA can readily be adapted to the task of analyzing cumulative impacts/environmental justice whenever a public agency (including CARB, the air pollution control districts, and general purpose land use agencies) undertakes or permits a project or activity that may have a significant adverse impact on the physical environment. All public agencies in California are currently obliged to comply with CEQA, and no further legislation would be needed to include an environmental justice analysis in the CEQA documents prepared for the discretionary actions public agencies undertake."

Under Assembly Bill (AB) 1553, signed into law in October 2001, the State Governor's Office of Planning and Research (OPR) is required to adopt guidelines for addressing environmental justice issues in local agencies' general plans. Currently, the OPR is in the process of updating the General Plan Guidelines to incorporate the requirements of AB 1553.

The CSLC developed and adopted an Environmental Justice policy to ensure equity and fairness in its own processes and procedures. CSLC adopted an amended Environmental Justice policy on October 1, 2002, to ensure that, "Environmental Justice is an essential consideration in the Commission's processes, decisions and programs and that all people who live in California have a meaningful way to participate in these activities." The policy stresses equitable treatment of all members of the public and commits to consider environmental justice in its processes, decision-making, and regulatory affairs. The policy is implemented, in part, through identification of, and communication with, relevant populations that could be adversely and disproportionately affected by CSLC projects or programs, and by ensuring that a range of reasonable alternatives is identified that would minimize or eliminate environmental issues affecting such populations. This discussion is provided in this document consistent with and in furtherance of CSLC's Environmental Justice policy.

Local

Regional and local environmental justice assessments have been performed by agencies within the study area, such as the Bay Area Metropolitan Transportation Commission's (MTC) *2001 Regional Transportation Plan Equity Analysis and Environmental Justice Report.* Methods applied in this EIR analysis are consistent with those used in the MTC report.

7.2.2 Setting

This section analyzes the distributional patterns of high-minority and low-income populations within the Project's affected region and characterizes the distribution of such populations within the census block areas adjacent to the Project site.

Project Study Area

The Project study area used for the environmental justice analysis includes a 1-mile radius from the Amorco Terminal. This is considered a conservative boundary for the environmental justice analysis and any potential significant impacts of air quality, noise, or hazardous materials to local residents from Project activities. Although the Amorco Terminal is located on State tidelands under the jurisdiction of the California State Lands Commission, the hazard footprint extends within the area of influence of the city of Martinez and within land under the jurisdiction of Contra Costa County, which were defined as the Communities of Comparison for this analysis.

Racial and income data were collected for all census blocks that were found to intersect with the potential impact radius for the shoreside location of the Amorco Terminal and the onshore Amorco Tank Farm. According to the USEPA's "Final Guidance for Incorporation of Environmental Justice Concerns in USEPA's National Environmental Policy Act (NEPA) Compliance Analyses" (April 1998), a minority or low-income community is disproportionately affected when the community would bear an uneven level of health and environmental effects compared to the general population. Further, the State CEQA Guidelines recommend that the "community of comparison" selected should be the smallest governmental unit that encompasses the impact footprint for each resource. Therefore, the "community of comparison" for the Project site was determined as the city within whose jurisdiction each site was located. Racial and income demographic information was also obtained for all of the "communities of comparison" identified for the Project.

Study Area Demographics

Portions of two census-block groups were determined to be within the previously defined 1-mile radius of the Amorco Terminal, and demographic data from the two block groups were used as the study area for this analysis. The area of effect from potential hazards occurring at the Amorco Terminal is located in two census tracts: 3160 and 3200.01.

Minority Populations

The U.S. Department of Commerce, Census Bureau (Census Bureau) census year 2010 study area population was 3,091, 36.4 percent of which is considered to be of a minority race (see Table 7-3). The largest percentage minority group within the study area was the "some other race alone" category, which included 391 persons or approximately 12.6 percent of the total study area population. The "some other race" category includes all other census responses not included in the "White," "Black or African American," "American Indian and Alaska Native," "Asian," and "Native Hawaiian and Other Pacific Islander" race categories (Census Bureau 2003). To ensure that study area minority populations are adequately and fully identified, census data were gathered for Hispanic origin. Hispanic is considered an origin, not a race, by the Census Bureau. An origin can be viewed as the heritage, nationality group, lineage, or country of birth of the person or the person's parents or ancestors before their arrival in the United States (Census Bureau 2003). People who identify their origin as Spanish, Hispanic, or Latino may be of any race. Therefore, those who are counted as Hispanic are also counted under one or more race categories.

Census respondent write-in entries, such as Hispanic/Latino are believed to constitute the majority of the "some other race" category within the Project study area (see Table 7-4). In comparison, the city of Martinez and Contra Costa County had total minority group population ratios of 22.9 and 41.4 percent, respectively.

Table 7-3: 2010 Race Characteristics

Race	Project Study Area	City of Martinez	Contra Costa County
White	1,965	27,603	614,512
Black or African American	344	1,303	97,161
American Indian and Alaska Native	34	255	6,122
Asian	118	2,876	151,469
Native Hawaiian and Other Pacific Islander	20	121	4,845
Some other race alone	391	1,425	112,691
Two or more races	219	2,241	62,225
Minority Subtotal (percent of total)	1,126 (36.4%)	8,221 (22.9%)	434,513 (41.4%)
Total	3,091	35,824	1,049,025

Source: Census Bureau 2010

Table 7-4: Hispanic Origin 2010

	Hispanic in Origin	Total Population	Percent Hispanic
Project Study Area	876	3,091	28.3
City of Martinez	5,258	35,824	14.7
Contra Costa County	255,560	1,049,025	24.4

Source: Census Bureau 2010

Low-Income Populations

The Council on Environmental Quality's (CEQ) environmental justice guidance does not clearly set the demarcations at the census poverty thresholds, but states that, "Low-income populations in an affected area should be identified with the annual statistical poverty thresholds from the Bureau of the Census' Current Population Reports, Series P-60 on Income and Poverty."

Poverty level thresholds vary according to a household's size and composition. The most current poverty thresholds (2002) are $18,849 for a two-parent household with two children. The poverty thresholds provide one national measurement of income that is not adjusted for regional costs of living. The Census Bureau's poverty statistical data also report population data income ratios from 50 percent to 200 percent of the poverty threshold (Census Bureau 2000d). For many federal and State programs serving low-income households, eligibility levels are significantly higher than the poverty level.

As shown in Table 7-5, 746 persons within the study area were determined in 2011 to be below the poverty level (Census Bureau 2011). This represents approximately 18.4 percent of the population within the study area. The city of Martinez and Contra Costa County had percentages of 9.9 percent and 7.5 percent, respectively, of their population determined to be below the poverty level.

Table 7-5: Study Area Population Poverty Status in 2011

	Population Estimated Below Poverty Level in 2011	Total Population in 2011	Estimated Percent of Population Below Poverty Level in 2007-2011
Project Study Area	746	4,051	18.4
City of Martinez	2,687	35,824	7.5 (+/-1.9)
Contra Costa County	103,853	1,049,025	9.9 (+/-0.4)

Source: Census Bureau 2011

7.2.3 Policy Analysis and Conditions

Methodology

As identified in other sections of this EIR, the Project has the potential to result in significant adverse physical effects on the environment. These effects would represent conflicts with the CSLC Environmental Justice policy if they disproportionately affect minority or low-income populations or decrease these communities' employment and/or economic base.

A two-step process has been conducted to assess the Project's consistency with the CSLC Environmental Justice policy. First, areas within the study area containing minority or low-income populations that may be disproportionately affected ("community of concern") were identified using MTC and CEQ guidance. The second step of the process evaluated the Project's significant, unmitigated adverse resource effects to determine whether these effects would have a disproportionate environmental impact on any of the identified minority and/or low-income population. Impacts for each resource are generally discussed in this analysis, and specific information on impacts should be drawn from the appropriate EIR section. The analysis also evaluates whether the Project would have any impacts on local employment or the communities' local economies.

For any identified significant unmitigated adverse effect, more detailed and site-specific review of the residential population within the "communities of concern" will be performed. Census block areas typically may encompass relatively large residential areas that may extend beyond the area where the resource impacts might be located; additional site-specific demographic review may be required to identify and evaluate the actual population located within the "potential impact radius" that would be affected. The site-specific analysis would also potentially be used to evaluate the nature and severity of the specific resource impacts and determine (if possible) appropriate mitigation measures.

"Communities of Concern" Definitions

<u>Minority Populations</u>

According to the CEQ guidelines for environmental justice analysis:

> *Minority populations should be identified where either (a) the minority population of the affected area exceeds 50 percent or (b) the minority population percentage of the affected area is meaningfully greater than the majority population percentage in the general population or other appropriate unit of geographic analysis. A minority population also exists if there is more than one minority group present and the minority percentage, as calculated by aggregating all minority persons, meets one of the above-stated thresholds (CEQ 1997).*

MTC's *2001 Regional Transportation Plan Equity Analysis and Environmental Justice Report* identified areas within the MTC planning area that had high proportions of minority and low-income populations. According to MTC criteria, areas with high percentages of minority populations (Minority Zones) were those having minority populations of 70 percent or more.

As a conservative assumption, the environmental justice analysis uses the CEQ minority population definition to identify "communities of concern" within the Project study area.

Low-income Populations

The CEQ's environmental justice guidance does not clearly set the demarcations at the census poverty thresholds, but states that, "Low-income populations in an affected area should be identified with the annual statistical poverty thresholds from the Bureau of the Census' Current Population Reports, Series P-60 on Income and Poverty."

The MTC *2001 Regional Transportation Plan Equity Analysis and Environmental Justice Report* provides one of the most substantial recent environmental justice analyses and is used by several other Bay Area agencies as a model. In its definition of low-income communities, the report states (MTC 2001):

> *Low-income is defined as the household income that is at or below the United States Department of Health and Human Services Poverty Guidelines. For the purposes of this exercise [i.e., 2001 Regional Transportation Plan Equity Analysis] the definition of low-income to households was established as households at or below 200 percent of poverty. This level was used to reflect the relatively high cost of living in the Bay Area. Zones, where the low-income population was 30 percent of the total population or greater, were included in the Equity Analysis.*

As a conservative assumption, the environmental justice analysis uses the MTC low-income population definition to identify "communities of concern" within the Project study area.

Areas with Meaningfully Greater Minority or Low-Income Populations

For those communities that do not meet either of above "community of concern" definitions, their minority and low-income percentages were compared to those of the communities of comparison to determine whether the remaining study area census block groups have meaningfully greater minority or low-income populations. A census track's minority or low-income population differences were considered "meaningfully greater" if its population of low-income or minority residents sufficiently altered the character of the community to enable it to be clearly distinguished from that of its community of comparison.

7.2.4 Relationship to Alternatives

Communities of Concern Identified Within the Project Study Area

The above identified "communities of concern" criteria were applied to the census block groups identified within the study area. In addition, the census block groups were compared to demographic data for the community of comparison to determine whether that specific block groups had a "meaningfully greater" percentage of minority or low-income population.

Under the State CEQA Guidelines for minority populations, Census Tracts 3160 and 3200.0 (with 41 percent minorities) do not qualify as "communities of concern." Based on the MTC low-income definitions, Census Tracts 3160 and 3200.01 (with 18.4 percent of the population below the poverty level) do not qualify as a "community of concern."

Environmental Justice Impacts to a Surrounding Community of Concern

<u>Proposed Project</u>

Census Tracts 3160 and 3200.01, which encompass the Project site, do not qualify as communities of concern and therefore an environmental justice analysis is not warranted to determine if the Project would disproportionately affect this local residential population.

Another important factor relevant to environmental justice is that the proposed future Project operations would be unchanged from its current activities and land uses at the site and the surrounding vicinity. Consequently, since no changes in the Project's current air quality, noise, or recreation effects are expected to occur, the proposed new lease would therefore have no impact on these resources. As a result, no inconsistency with the CSLC Environmental Justice policy would be expected to result from the effects of Project-related activities to the area's air quality or noise conditions.

Based on the environmental analysis conducted for this EIR, several potential significant impacts were identified within the other resource areas that require mitigation to ensure that their effects would be less than significant. The principal potential environmental impacts to the local residential populations in the Project vicinity consist of hazardous material or waste releases (discussed in Section 4.3, Water Quality), or the various resource impacts that could be associated with an accidental release of petroleum product at or near the Amorco Terminal (see Section 4.1, Operational Safety/Risk of Accidents).

Water quality and waste handling regulations, as well as the Amorco Terminal's stormwater pollution prevention plan, would ensure that the potential impacts from any hazardous materials or waste within the study area through improper handling or storage, accidental upset conditions, or stormwater runoff would be reduced to a less-than-significant level. Consequently, there would be no inconsistency with the CSLC

Environmental Justice policy that would result from the effects of Project-related operations to water quality.

Extensive analysis and discussion of the potential temporary resource impacts from the unlikely effect of an accidental release of petroleum product at or near the Amorco Terminal are discussed elsewhere in this EIR. The Project's spill risk is analyzed in Section 4.1, Operational Safety/Risk of Accidents. The location and severity of any such accidental spill would determine the nature, location, and severity of any related environmental effects; the analysis has accordingly modeled a wide variety of future spill scenarios. The resource-specific potential impacts are discussed in detail under their appropriate resource sections.

While there is no guarantee against accidental upset conditions, appropriate preventative measures combined with the faculty to provide swift responses in the event of a release can minimize the potential impacts. Operational safety mitigation measures are also discussed separately in Section 4.1, Operational Safety/Risk of Accidents. Adherence to the requirements of the Oil Spill Response Plan along with other operational safety measures as required by local, State, and federal regulations would reduce the potential impact to the greatest extent practicable.

However, there would remain a significant and unavoidable adverse environmental impact associated with the possibility of a large spill (i.e., more than 50 barrels of petroleum product) somewhere within San Francisco Bay. Given the unknown specifics of any such accident, the nature and location of any such event's physical impacts are unknown. However, the duration of most accidents would be relatively short term. The economic activity for the local and regional economy associated with any of the resource areas that might be potentially affected depends on the size of the spill. Future spill impacts would be temporary. Furthermore, the geographical area that would be affected by any future spill would vary considerably given the nature, location, and timing of the spill. Therefore, resulting impacts, although largely limited to coastal areas, would not disproportionately affect low-income or minority communities. Consequently, there is no inconsistency with the CSLC Environmental Justice policy resulting from the effects of Project-related operations.

The Amorco Terminal has been operational since 1923. As a result, the continued operation of the facility would ensure the Project's current employment and local economic activity levels are maintained. The facilities' current operations have a positive economic impact to the surrounding local communities, due to the Project's employment and revenue benefits to the local economy. Consequently, given the absence of any local employment or economic activity decreases, no inconsistency with the CSLC Environmental Justice policy would be expected to result from the Project's economic effects.

No Project Alternative

Under the No Project Alternative, a new lease for the Amorco Terminal would not be granted and the existing wharf would be either decommissioned, abandoned, removed, or a combination thereof. In addition, the upland tank farm would continue to operate but product would no longer be delivered or shipped by marine vessel. Because it can be expected that demand for the products currently handled at the Amorco facility would continue with or without the proposed Project, the No Project Alternative may therefore result in an increase of truck and/or rail transport to the Refinery. The limited truck and rail capacity at the Refinery could not accommodate the entire displaced product and would likely lead to diversion of some product shipments to other marine oil terminals, including Tesoro's Avon Marine Oil Terminal and/or more distant from the final destination.

The cessation of operations at the existing Amorco Terminal would reduce the potential for accidental spills and upset conditions to occur at the Project site. However, with increased operations at other terminals, the potential impacts would likely remain relatively similar to those of existing conditions. Other terminals have similar regulatory compliance requirements as the proposed Project, which would reduce potential impacts to less-than-significant levels.

While closure of the Amorco Terminal might have the beneficial effect of reducing the risks of accidental spill impacts occurring locally, closure of the Amorco Terminal would eliminate the employment and revenue benefits that the Amorco Terminal generates for the local economy. However, the analysis presumes that most of any "displaced" product transfers would be relocated to a nearby alternative facility. Consequently, the identified risk reduction benefits are expected to be minimal, and the Amorco Terminal's lost employment and revenue benefits would be similarly transferred to the other facility. In any case, no inconsistency with the CSLC Environmental Justice policy would be expected to result under the No Project Alternative.

Restricted Lease Taking Amorco Out of Service for Oil Transport Alternative

This alternative would have the same type of environmental justice effects as those identified for the proposed Project, although the magnitude of the effects would be correspondingly diminished. While the lesser risk of accidental spill impacts would be beneficial, limits on future Amorco Terminal operations would reduce employment and revenues benefits the Amorco Terminal generates for the local economy. However, the analysis presumes that most of any "displaced" product transfers would be relocated to a nearby alternative facility. Consequently, the identified risk reduction benefits are expected to be minimal and the Amorco Terminal's lost employment and revenues benefits would be similarly transferred to the other facility. In any case, no inconsistency with the CSLC Environmental Justice policy would be expected to result under the Restricted Lease Taking Amorco Out of Service for Oil Transport Alternative.

7.2.5 Cumulative Projects Policy Analysis

As discussed above, the only environmental justice impacts associated with the Project are the indirect effects associated with the potential petroleum product spill impacts to local physical resources. Consequently, only the cumulative impacts associated with potential spills would have the potential to result in cumulative environmental justice impacts. The past, current, and foreseeable projects are identified in Section 3.0, Alternatives and Cumulative Projects.

According to Section 4.1, Operational Safety/Risk of Accidents, the cumulative impact of other projects in conjunction with the Project would represent a significant and unavoidable adverse environmental impact associated with the possibility of a large spill (i.e., more than 50 barrels of petroleum product) somewhere within San Francisco Bay from the Project and the other reasonably foreseeable future projects. Given the unknown specifics of any such accident, the nature and location of any such event's physical impacts are unknown. However, in any case, the duration of most major accidents is nonetheless expected to be relatively short term. The economic activity for the local and regional economy associated with any of the resource areas that might be potentially affected is relatively minor, and any future spill impacts would be temporary. Furthermore, the geographical area that would be affected by any future spill would vary considerably given the nature, location, and timing of the spill. Therefore, resulting impacts, although largely limited to coastal areas, would not disproportionately affect low-income or minority communities but could affect a wide variety of coastal communities within the region. Consequently, there is no inconsistency with the CSLC Environmental Justice policy resulting from the cumulative effects of the Project's future operations.

This adverse impact is an unavoidable aspect of the Amorco Terminal's function by which it generates its positive direct economic impacts (i.e., generating the Amorco Terminal revenues and employment) and the indirect benefits of helping to meet the regional fuel and energy demand. Furthermore, demand for oil products is independent of the Project and is expected to remain irrespective of whether the Project is approved. If the Project is not approved, the Amorco Terminal transfer activities would likely be relocated elsewhere in the region and would entail a comparable degree of major spill risk. As a result, approval or closure of the Amorco Terminal would not appreciably change the overall total likelihood or magnitude of any major spill and any resulting adverse impacts. Consequently, the Project would have a less-than-significant cumulative contribution to any potential adverse economic cumulative impacts that might be associated with a major spill occurrence. As a result, approval of the Project would be consistent with the CSLC Environmental Justice policy since no disproportionate employment or economic impacts to communities of concern would be expected from the project's less-than-significant cumulative impacts.

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8.0 MITIGATION MONITORING PROGRAM

As the Lead Agency under the California Environmental Quality Act (CEQA), the California State Lands Commission (CSLC) is required to adopt a program for reporting or monitoring regarding the implementation of mitigation measures for the Amorco Marine Oil Terminal Lease Consideration Project, if it is approved, to ensure that the adopted mitigation measures are implemented as defined in this Environmental Impact Report (EIR). This Lead Agency responsibility originates in Public Resources Code section 21081.6, subdivision (a) (Findings), and the State Guidelines for Implementing CEQA sections 15091, subdivision (d) (Findings) and 15097 (Mitigation Monitoring or Reporting).

8.1 MONITORING AUTHORITY

The purpose of a Mitigation Monitoring Program (MMP) is to ensure that measures adopted to mitigate or avoid significant impacts are implemented. A MMP can be a working guide to facilitate not only the implementation of mitigation measures by the Project proponent, but also the monitoring, compliance and reporting activities of the CSLC and any monitors it may designate.

The CSLC may delegate duties and responsibilities for monitoring to other environmental monitors or consultants as deemed necessary, and some monitoring responsibilities may be assumed by responsible agencies, such as affected jurisdictions and cities, and the California Department of Fish and Wildlife (CDFW). The number of construction monitors assigned to the project will depend on the number of concurrent construction activities and their locations. The CSLC or its designee(s), however, will ensure that each person delegated any duties or responsibilities is qualified to monitor compliance.

Any mitigation measure study or plan that requires the approval of the CSLC must allow at least 60 days for adequate review time. When a mitigation measure requires that a mitigation program be developed during the design phase of the project, the Applicant must submit the final program to the CSLC for review and approval at least 60 days before construction begins. Other agencies and jurisdictions may require additional review time. It is the responsibility of the environmental monitor assigned to the installation or implementation of the project or a project component (e.g., a pipeline “spread” [the equipment and crew needed to build a section of pipeline]) to ensure that appropriate agency reviews and approvals are obtained.

The CSLC or its designee will also ensure that any deviation from the procedures identified under the monitoring program is approved by the CSLC. Any deviation and its correction shall be reported immediately to the CSLC or its designee by the environmental monitor.

8.2 ENFORCEMENT RESPONSIBILITY

The CSLC, as the lead agency, is responsible for enforcing the procedures adopted for monitoring through the environmental monitor. Any assigned environmental monitor shall note problems with monitoring, notify appropriate agencies or individuals about any problems, and report the problems to the CSLC or its designee.

8.3 MITIGATION COMPLIANCE RESPONSIBILITY

Tesoro is responsible for successfully implementing all the mitigation measures in the MMP, and shall ensure that these requirements are met by all of its construction contractors and field personnel. Standards for successful mitigation also are implicit in many mitigation measures that include such requirements as obtaining permits or avoiding a specific impact entirely. Other mitigation measures include detailed success criteria. Additional mitigation success thresholds may be established by applicable agencies with jurisdiction through the permit process and through the review and approval of specific plans for the implementation of mitigation measures.

8.4 GENERAL MONITORING PROCEDURES

Environmental Monitors. Many of the monitoring procedures will be conducted during the construction phase of the project, if there is a construction phase. The CSLC and the environmental monitor(s) are responsible for integrating the mitigation monitoring procedures into the construction process in coordination with the Applicant. To oversee the monitoring procedures and to ensure success, the environmental monitor must be on site during that portion of construction that has the potential to create a significant environmental impact or other impact for which mitigation is required. The environmental monitor is responsible for ensuring that all procedures specified in the monitoring program are followed.

General Reporting Procedures. Site visits and specified monitoring procedures performed by other individuals will be reported to the environmental monitor. A monitoring record form will be submitted to the environmental monitor by the individual conducting the visit or procedure so that details of the visit can be recorded and progress tracked by the environmental monitor. A checklist will be developed and maintained by the environmental monitor to track all procedures required for each mitigation measure and to ensure that the timing specified for the procedures is adhered to. The environmental monitor will note any problems that may occur and take appropriate action to rectify the problems.

Public Access to Records. The public is allowed access to records and reports used to track the monitoring program. Monitoring records and reports will be made available for public inspection by the CSLC or its designee on request.

8.5 MITIGATION MONITORING TABLES

This section presents mitigation monitoring tables (Tables 8-1 through 8-5) for the following environmental disciplines: Operational Safety/Risk of Accidents; Biological Resources; Water Quality; Land Use and Recreation; and Visual Resources, Light and Glare. All other environmental disciplines were found to have less than significant or no impacts and are therefore not included below. Each table lists the following information, by column:

- Impact (impact number, title, and impact class);
- Mitigation Measure (full text of the measure);
- Location (where the impact occurs and the mitigation measure should be applied);
- Monitoring/reporting action (the action to be taken by the monitor or Lead Agency);
- Effectiveness criteria (how the agency can know if the measure is effective);
- Responsible agency; and
- Timing (before, during, or after construction; during operation, etc.).

Table 8-1: Mitigation Monitoring – Operational Safety/Risk of Accidents

Impact (Class)	Mitigation Measure(s) (MMs)	Monitoring/ Reporting Action	Effectiveness Criteria	Responsible Agency	Timing
OS-1: Potential for spills and response capability for containment of oil spills from the Amorco Terminal during transfer operations. (Significant and unavoidable.)	MM OS-1a: **Provide and maintain mooring line quick release devices** that shall be able to be activated within 60 seconds. • These devices shall be capable of being engaged by electric/push button release mechanism and by integrated remotely-operated release system. • Tesoro shall document procedures and training for systems use and communications between Amorco Terminal and vessel operator(s). • Routine inspection, testing and maintenance of all equipment and systems in accordance with manufacturers' recommendations and necessity are required to ensure safety and reliability, to the satisfaction of CSLC staff. • Tesoro may install alternate technology that provides an equivalent level of protection, as reviewed by CSLC staff and approved by the Commission at a publicly noticed meeting.	CSLC monitor to observe properly provided and maintained devices and periodically monitor procedures and training for systems use.	This measure would allow a vessel to leave the Amorco Terminal as quickly as possible in the event of an emergency (fire, explosion, accident, or tsunami that could lead to a spill) that could impact the Amorco Terminal or the vessel.	CSLC	Within 24 months of lease implementation
	MM OS-1b: **Tension Monitoring Systems.** Provide and maintain TMSs to effectively monitor all mooring line and environmental loads, and avoid excessive tension or slack line conditions that could result in damage to the terminal structure and/or equipment and/or vessel mooring line failures that could result in spills. • Line tensions and environmental data shall be integrated into systems that record and relay all critical data in real time to the control room, terminal operator(s) and vessel operator(s).	CSLC monitor to observe properly provided and maintained devices and periodically monitor procedures and training for systems use.	Reduces potential for damages and spills.	CSLC	Within 24 months of lease implementation

Impact (Class)	Mitigation Measure(s) (MMs)	Monitoring/ Reporting Action	Effectiveness Criteria	Responsible Agency	Timing
	• This system shall include, but not be limited to, quick release hooks only (with load cells), site-specific current meter(s), site-specific anemometer(s), and visual and audible alarms that can support effective preset limits and shall be able to record and store monitoring data. • Tesoro shall document procedures and training for systems use and communications between Amorco Terminal and vessel operator(s) • Routine inspection, testing and maintenance of all equipment and systems in accordance with manufacturers' recommendations and necessity are required to ensure safety and reliability, to the satisfaction of CSLC staff. • Tesoro may install alternate technology that provides an equivalent level of protection, as reviewed by CSLC staff and approved by the Commission at a publicly noticed meeting.				
	MM OS-1c: **Allision Avoidance Systems.** Provide and maintain AASs at the Amorco MOT to prevent damage to the pier/wharf and/or vessel during docking and berthing operations. • The AASs shall be used and alarmed to monitor vessel drift (both surge and sway) during all mooring operations, and shall be equipped with an AIS receiver to capture passing vessel parameters. • This shall be integrated with the TMSs such that all data collected are available in the Control Room and to Amorco Terminal operator(s) at all times and vessel operator(s) during berthing operations. The AASs shall	CSLC monitor to observe properly, provided, and maintained devices and periodically monitor procedures and training for systems use.	Reduces potential for damages and spills.	CSLC	Within 24 months of lease implementation

Impact (Class)	Mitigation Measure(s) (MMs)	Monitoring/ Reporting Action	Effectiveness Criteria	Responsible Agency	Timing
	also be able to record and store monitoring data. • Tesoro shall document procedures and training for systems use and communications between Amorco Terminal and vessel operator(s). • Routine inspection, testing and maintenance of all equipment and systems in accordance with manufacturers' recommendations and necessity are required to ensure safety and reliability, to the satisfaction of CSLC staff.				
OS-2: Amorco Terminal spills from pipelines during non-transfer periods. (Significant and unavoidable.)	No additional mitigation measures available. (See MM OS-1a, OS-1b, OS1c, OS4a, and OS-4b.)	See MM OS-1a, OS-1b, OS1c, OS4a, and OS-4b.	See MM OS-1a, OS-1b, OS1c, OS4a, and OS-4b.	See MM OS-1a, OS-1b, OS1c, OS4a, and OS-4b.	See MM OS-1a, OS-1b, OS1c, OS4a, and OS-4b.
OS-3: Potential for fires and explosions and response capability. (Significant and unavoidable.)	MM OS-3b: Fire Protection Assessment. Tesoro shall develop a Fire Protection Assessment, including a set of procedures, training and drills consistent with Marine Oil Terminal Engineering and Maintenance Standards (Cal. Code Regs., tit. 24, §3108F2.2). Tesoro shall also develop a set of procedures and conduct training and drills for dealing with tank vessel fires and explosions for tank vessels berthed at the terminal. The procedures shall include the steps to follow in the event of a tank vessel fire and describe how Tesoro and the vessel will coordinate activities. The procedures shall also identify other capabilities that can be procured if necessary in the event of a major incident. The Fire Plan and procedures shall be submitted to the California State Lands Commission (CSLC) staff within 90 days of lease renewal. The CSLC staff shall have final approval of the plan.	Tesoro shall prepare and submit Fire Protection Assessment to CSLC for review and approval.	Provides planning and procedures for emergency response.	CSLC	Submit to CSLC within 90 days of signing the lease agreement.

Impact (Class)	Mitigation Measure(s) (MMs)	Monitoring/ Reporting Action	Effectiveness Criteria	Responsible Agency	Timing
OS-4: Response capability for accidents in the Bay and outer coast.	MM OS-4a: U.S. Coast Guard (USCG) Ports and Waterways Safety Assessment workshops. Tesoro shall participate in USCG PAWSA workshops for the San Francisco Bay Area to support overall safety improvements to the existing Vessel Traffic Service in the Bay Area or approaches to the Bay, if such workshops are conducted by the USCG during the life of the lease.	Tesoro shall demonstrate to CSLC their participation in USCG PAWSA workshops to support overall safety in the Bay and to protect sensitive resources.	Reduces potential damage to resources.	CSLC	Life of lease.
	MM OS-4b: Spill response to vessel spills. Tesoro shall respond to any spill from a vessel traveling in the San Francisco Bay to or from the Amorco Terminal or moored at the Amorco Terminal , as if it were its own, without assuming liability, until such time as the vessel's response organization can take over management of the response actions in a coordinated manner.	CSLC monitor to observe emergency actions.	Reduces potential damage to resources.	CSLC	Life of lease.

Table 8-2: Mitigation Monitoring – Biological Resources

Impact (Class)	Mitigation Measure(s) (MMs)	Monitoring/Reporting Action	Effectiveness Criteria	Responsible Agency	Timing
BIO-6: Cause impacts to the San Francisco Bay Estuary and associated aquatic biota as a result of major fuel, lubricant, and/or boat-related spills. (Significant and unavoidable.)	MM BIO-6a: Bird rescue personnel and rehabilitators. Tesoro shall ensure that procedures are in place to bring bird rescue personnel and rehabilitators to the site following a spill event that is not immediately contained at the Amorco Terminal. This requires having contractual arrangements in place as part of the Golden Eagle Refinery Oil Spill Contingency Plan so that bird rescue personnel and equipment can be on-site within hours of the onset of an accidental release.	Verify contractual arrangements in place and contact info on site	Minimize marine bird mortality in the event of a spill.	CSLC	Within 60 days of project approval and EIR certification and for life of lease.

Impact (Class)	Mitigation Measure(s) (MMs)	Monitoring/Reporting Action	Effectiveness Criteria	Responsible Agency	Timing
	MM BIO-6b: **Cleanup of oil from biological area.** When a spill occurs, Tesoro shall develop procedures for cleanup of any sensitive biological areas contacted by oil in consultation with biologists from the CDFW, National Marine Fisheries Service (NMFS), and U.S. Fish and Wildlife Service (USFWS).	Verify that cleanup procedures have been developed.	Minimize impacts to sensitive biological areas in the event of a spill.	CSLC, with CDFW, U.S. USFWS, and NMFS	Within 60 days of project approval and EIR certification and for life of lease.
	MM BIO-6c: Natural Resource Damage Assessment (NRDA) Team. Tesoro shall coordinate to the maximum extent feasible with the NRDA Team to determine the extent of damage and loss of resources, cleanup, restoration, and compensation. Tesoro shall keep the CSLC staff informed of its participation in such efforts by providing copies of memos, meeting agendas, emails, or other appropriate documentation. Tesoro shall be responsible for cleanup, restoration, and compensation of damages to resources if Tesoro is determined to be the responsible party for a spill.	Tesoro shall provide documentation of participation to CSLC staff.	Reduces potential damage and loss of resources from oil spill.	CSLC, NRDA trustee agencies (typically USFWS, NMFS, CSLC, CDFW)	In conjunction with NRDA, for life of lease.
BIO-7: Introduce invasive nonindigenous species to the San Francisco Bay Estuary. (Significant and unavoidable.)	MM BIO-7a: Marine Invasive Species Act (MISA) Reporting Forms. Tesoro shall advise both agents and representatives of shipping companies having control over vessels that have informed Tesoro of plans to call at the Amorco Terminal about the California Marine Invasive Species Act and associated implementing regulations. Tesoro shall satisfy itself that all vessels submit required reporting forms, as applicable for each vessel, to the CSLC Marine Facilities Division, including, but not limited to, the Ballast Water Reporting Form, Hull Husbandry Reporting Form, Ballast Water Treatment Technology Reporting Form, and/or Ballast Water Treatment Supplemental Reporting Form.	Verify documentation of vessel compliance with reporting requirements and associated regulation.	Compliance with MISA to reduce the introduction of nonindigenous aquatic species from ballast water and hull fouling.	CSLC	Life of lease.
	MM BIO-7b: Invasive species action funding. Tesoro shall participate and assist in funding ongoing and future actions related to nonindigenous aquatic species	The level of funding shall be determined by the CSLC, DWR,	Contributions will go towards effort in finding a solution to	CSLC, DWR, CDFW	Life of lease.

Impact (Class)	Mitigation Measure(s) (MMs)	Monitoring/Reporting Action	Effectiveness Criteria	Responsible Agency	Timing
	as identified in the October 2005 Delta Smelt Action Plan (State of California 2005). The funding support shall be provided to the Pelagic Organism Decline Account or other account identified by the California Department of Water Resources (DWR) and CDFW, the lead Action Plan agencies. The level of funding shall be determined through a cooperative effort between the CSLC, DWR, CDFW, and Tesoro, and shall be based on criteria that establish Tesoro's commensurate share of the plan's nonindigenous aquatic species actions costs.	CDFW, and Tesoro as part of the agencies' responsibilities under the Delta Smelt Action Plan and CSLC's administration of MISA.	pelagic species decline.		
CUM-BIO-2: Cause cumulative impacts to San Francisco Bay Estuary and associated biota from oil spills from all marine oil terminals combined, or from all tankering combined. (Significant and unavoidable.)	MM CUM-BIO-2a: Tesoro shall implement MM BIO-6a through BIO-6c.	See MM BIO-6a through BIO-6c.	See MM BIO-6a through BIO-6c.	See MM BIO-6a through BIO-6c.	See MM BIO-6a through BIO-6c.
CUM-BIO-3: Cause cumulative impacts by increasing the risk of introduction of nonindigenous aquatic species from vessel traffic to San Francisco Bay. (Significant and unavoidable.)	MM CUM-BIO-3a: Tesoro shall implement MM BIO-7a and BIO-7b.	See MM BIO-7a and BIO-7b.	See MM BIO-7a and BIO-7b.	See MM BIO-7a and BIO-7b.	See MM BIO-7a and BIO-7b.

Table 8-3: Mitigation Monitoring – Water Quality

Impact (Class)	Mitigation Measure(s) (MMs)	Monitoring/Reporting Action	Effectiveness Criteria	Responsible Agency	Timing
WQ-3: Degrade water quality by the discharge of ballast water. (Significant and unavoidable.)	MM WQ-3: Advise vessels of applicable regulations and standards. Tesoro shall advise both agents and representatives of shipping companies having control over vessels that have informed Tesoro of plans to call at the Amorco Terminal about the Coastal Ecosystems	Tesoro will advise both agents and representatives of shipping companies having control over	Informing vessel operators of regulations and standards will help reduce the potential	CSLC, U.S. Gulf Coast, U.S. Environmental	Prior to the vessel's entry into San Francisco

Impact (Class)	Mitigation Measure(s) (MMs)	Monitoring/Reporting Action	Effectiveness Criteria	Responsible Agency	Timing
	Protection Act of 2006 and associated implementing regulations.	vessels that have informed Tesoro of plans to call at the Amorco Terminal about the Coastal Ecosystems Protection Act of 2006 and associated implementing regulations.	of nonindigenous aquatic species introduction via ballast water.	Protection Agency	Bay or in the alternative, at least 24 hours prior to the vessel's arrival at the Amorco Terminal.
WQ-5: Degrade water quality as a result of vessel biofouling. (Significant and unavoidable.)	MM WQ-5: **Advise vessels of applicable regulations and standards.** Tesoro shall prepare, and maintain current, a fact sheet and provide it to all vessels calling at the Amorco Terminal to ensure that they are informed of applicable regulations and standards associated with the prevention of biofouling. Prior to allowing berthing at the Terminal, Tesoro will confirm with vessels that they are in compliance with the Marine Invasive Species Act (MISA), including completion of MISA-required paperwork. Tesoro shall ensure that all vessels submit required reporting forms, as applicable for each vessel prior to the vessel's entry into San Francisco Bay or in the alternative, at least 24 hours prior to the vessel's arrival at the Amorco Terminal.	Tesoro shall prepare, and maintain current, a fact sheet and provide it to all vessels calling at the Amorco Terminal to ensure that they are informed of applicable regulations and standards associated with the prevention of biofouling. Tesoro would confirm with vessels that they are in compliance with MISA, including completion of MISA-required paperwork.	Informing vessel operators of regulations and standards will help reduce the risk of the risk of nonindigenous aquatic species introductions through vessel biofouling. Data collected from the MISA reporting forms will aid research in preventing biofouling.	CSLC	Prior to the vessel's entry into San Francisco Bay or in the alternative, at least 24 hours prior to the vessel's arrival at the Amorco Terminal.
WQ-6: Degrade water quality due to anti-fouling paints used on vessel hulls. (Significant and unavoidable.)	WQ-6 **Inform Vessels calling at the Amorco Terminal of the ban on tributyltin (TBT).** Tesoro shall prepare, and maintain current, a fact sheet and provide it to all vessels calling at the Amorco Terminal to ensure that they are informed of the requirements of the 2008 International Maritime Organization prohibition of TBT applications to vessel hulls. Prior to allowing berthing at the Terminal, Tesoro will confirm with vessels that they	Tesoro shall Inform vessels calling at the Amorco Terminal of the ban on TBT. Tesoro will advise both agents and representatives of shipping companies	Informing vessel operators of the ban on TBT will help reduce the impact to water quality from highly harmful antifouling.	CSLC	Prior to the vessel's entry into San Francisco Bay or in the alternative, at least 24

Impact (Class)	Mitigation Measure(s) (MMs)	Monitoring/Reporting Action	Effectiveness Criteria	Responsible Agency	Timing
	are in compliance with the Marine Invasive Species Act (MISA), including completion of MISA-required paperwork. Tesoro shall ensure that all vessels submit required reporting forms, as applicable for each vessel prior to the vessel's entry into San Francisco Bay or in the alternative, at least 24 hours prior to the vessel's arrival at the Amorco Terminal.	about the requirements of the 2008 International Maritime Organization prohibition of TBT applications to vessel hulls.			hours prior to the vessel's arrival at the Amorco Terminal.
WQ-8: Degrade water quality as a result of stormwater runoff from the wharf. (Potentially significant.)	WQ-8: Amend existing Storm Water Pollution Prevention Plan (SWPPP). Tesoro shall append the existing SWPPP to include specific Best Management Practices (BMPs) to protect stormwater runoff from the wharf area. BMPs shall be designed to reduce the input of contaminant to the San Francisco Bay and prevent leaks and spills during routine activities.	Tesoro shall append the existing SWPPP to include specific Best Management Practices (BMPs) to protect stormwater runoff from the wharf area.	Amended Plan will prevent releases of contaminants from the wharf to nearby waterways.	CSLC	Prior to implementation of Project activities.
WQ-9: Degrade water quality as a result of oil leaks and spills during unloading. (Significant and unavoidable.)	No additional mitigation measures available. (See MMs OS-1a, 1b, and 1c.)	See MMs OS-1a, 1b, and 1c.	See MMs OS-1a, 1b, and 1c.	See MMs OS-1a, 1b, and 1c.	See MMs OS-1a, 1b, and 1c.
WQ-10: Degrade water quality due to releases from vessels in transit in the San Francisco Bay or along the outer coast. (Significant and unavoidable.)	No additional mitigation measures available. (See MMs OS-4a and OS-4b.)	See MMs OS-1a, 1b, and 1c.	See MMs OS-1a, 1b, and 1c.	See MMs OS-1a, 1b, and 1c.	See MMs OS-1a, 1b, and 1c.
CUM WQ-1: Cause contaminant impacts on San Francisco Bay water quality. (Significant and unavoidable.)	No additional mitigation measures available. (See MMs WQ-3, WQ-5 and WQ-6.)	See MMs WQ-3, WQ-5 and WQ-6.	See MMs WQ-3, WQ-5 and WQ-6.	See MMs WQ-3, WQ-5 and WQ-6.	See MMs WQ-3, WQ-5 and WQ-6.
CUM WQ-3: Degrade water quality due to oil releases from vessels in transit in the San Francisco Bay or along the outer coast. (Significant and unavoidable.)	No additional mitigation measures available. (See MMs OS-1a, 1b, and 1c.)	See MMs OS-1a, 1b, and 1c.	See MMs OS-1a, 1b, and 1c.	See MMs OS-1a, 1b, and 1c.	See MMs OS-1a, 1b, and 1c.

Table 8-4: Mitigation Monitoring – Land Use and Recreation

Impact (Class)	Mitigation Measure(s) (MMs)	Monitoring/Reporting Action	Effectiveness Criteria	Responsible Agency	Timing
LUR-2: Cause residual impacts on sensitive shoreline lands and/or water and non-water recreation due to an accidental release of oil at or near the Amorco Terminal. (Significant and unavoidable.)	No additional mitigation measures available. (See MMs OS-1a, OS-1b, OS-1c, OS-4a, and OS-4b.)	See MMs OS-1a, OS-1b, OS-1c, OS-4a, and OS-4b.	See MMs OS-1a, OS-1b, OS-1c, OS-4a, and OS-4b.	See MMs OS-1a, OS-1b, OS-1c, OS-4a, and OS-4b.	See MMs OS-1a, OS-1b, OS-1c, OS-4a, and OS-4b.
LUR-3: Cause residual impacts on sensitive shoreline lands and/or water and non-water recreation due to an accidental release of oil from vessels in transit. (Significant and unavoidable.)	No additional mitigation measures available. (See MMs OS-1a, OS-1b, OS-1c, OS-4a, and OS-4b.)	See MMs OS-1a, OS-1b, OS-1c, OS-4a, and OS-4b.	See MMs OS-1a, OS-1b, OS-1c, OS-4a, and OS-4b.	See MMs OS-1a, OS-1b, OS-1c, OS-4a, and OS-4b.	See MMs OS-1a, OS-1b, OS-1c, OS-4a, and OS-4b.

Table 8-5: Mitigation Monitoring – Visual Resources, Light and Glare

Impact (Class)	Mitigation Measure(s) (MMs)	Monitoring/Reporting Action	Effectiveness Criteria	Responsible Agency	Timing
VR-4: Create visual effects from accidental releases of oil at or near the Amorco Terminal. (Significant and unavoidable.)	No additional mitigation measures available. (See MMs OS-1a, OS-1b, OS-1c, OS-4a, and OS-4b.)	See MMs OS-1a, OS-1b, OS-1c, OS-4a, and OS-4b.	See MMs OS-1a, OS-1b, OS-1c, OS-4a, and OS-4b.	See MMs OS-1a, OS-1b, OS-1c, OS-4a, and OS-4b.	See MMs OS-1a, OS-1b, OS-1c, OS-4a, and OS-4b.
VR-5: Create visual effects from oil spills from vessels in transit. (Significant and unavoidable.)	No additional mitigation measures available. (See MMs OS-1a, OS-1b, OS-1c, OS-4a, and OS-4b.)	See MMs OS-1a, OS-1b, OS-1c, OS-4a, and OS-4b.	See MMs OS-1a, OS-1b, OS-1c, OS-4a, and OS-4b.	See MMs OS-1a, OS-1b, OS-1c, OS-4a, and OS-4b.	See MMs OS-1a, OS-1b, OS-1c, OS-4a, and OS-4b.

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